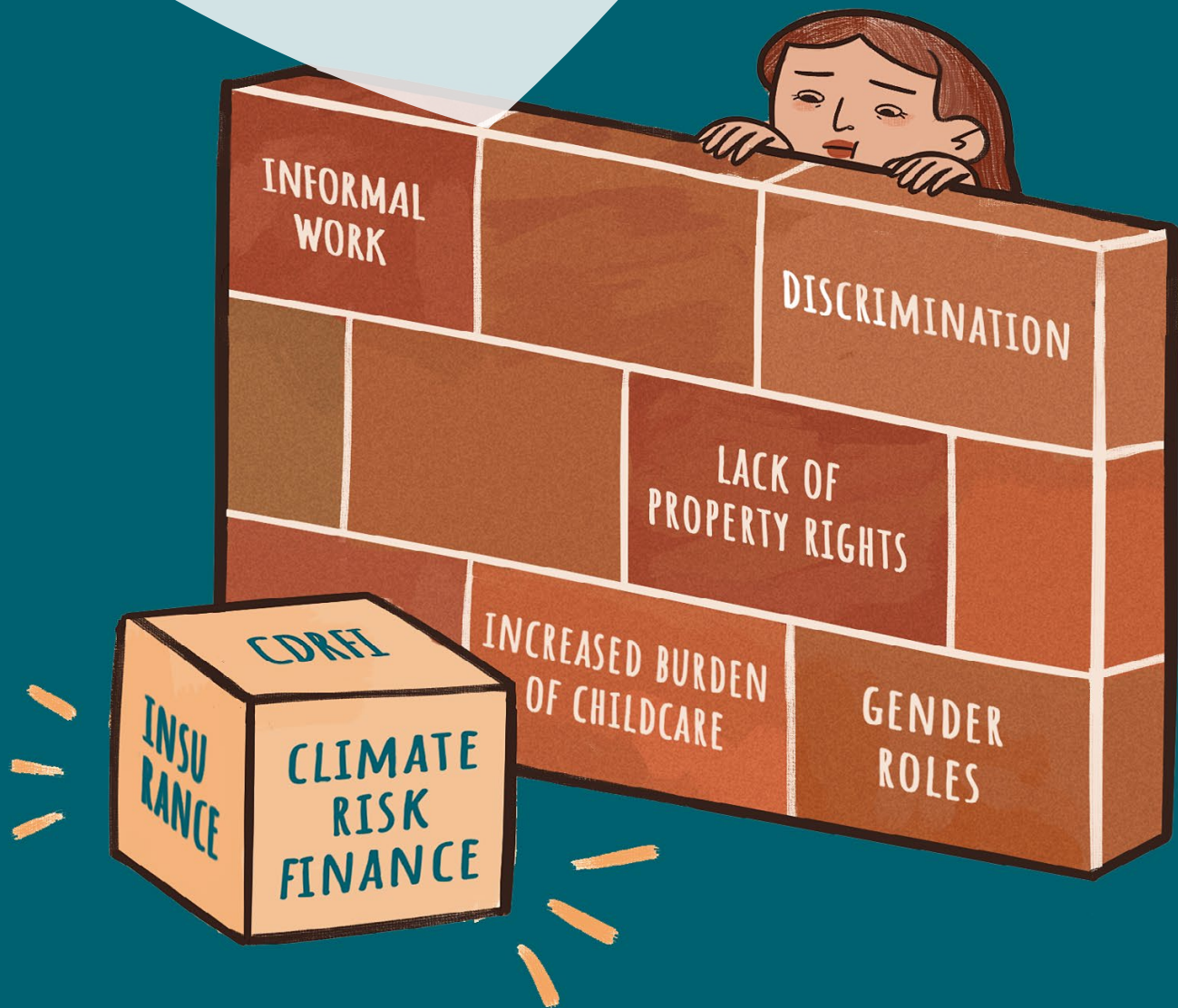




InsuResilience
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**Gender and Poverty-related Barriers
of the Urban Poor to access
Climate and Disaster Risk Finance
and Insurance:**

Evidence from the
Mahila Housing Trust in India



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Gender and Poverty-related Barriers of the Urban Poor to access Climate and Disaster Risk Finance and Insurance:

Evidence from the Mahila Housing Trust in India

Author

Vartika Shukla

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Abbreviations

ABPMJAY	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana
AIDIS	All-India Debt and Investment Survey
AIDMI	All-India Disaster Mitigation Institute
BMZ	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung
BPL	Below Poverty Line
CDKN	Climate and Development Knowledge Network
CDRFI	Climate and Disaster Risk Finance and Insurance
CoE	InsuResilience Centre of Excellence on Gender-smart Solutions
GAC	Global Affairs Canada
GDP	Gross Domestic Product
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
HDPE	High-density polyethylene
IGP	InsuResilience Global Partnership
IMD	Indian Meteorological Department
INR	Indian Rupee
IRDAI	Insurance and Regulatory Development Authority of India
LAC	Latin American and the Caribbean
MFI	Microfinance Institution
MHT	Mahila Housing SEWA Trust
MiCRO	Microinsurance Catastrophe Risk Organization
NFHS	National Family Health Survey
NGO	non-governmental organization
OECD	Organisation for Economic Co-operation and Development
OOPe	Out-of-pocket expense
OPD	Out Patient Department
PMFBY	Pradhan Mantri Fasal Bima Yojana
PM-JAY	Pradhan Mantri Jan Arogya Yojana
PMJBY	Pradhan Mantri Jeevan Jyoti Beema Yojana
PMJDY	Pradhan Mantri Jan Dhan Yojana
PMSBY	Pradhan Mantri Suraksha Beema Yojana
SAR	South Asian Region
SHG	Self-Help Group
UCCN	Urban Climate Change Research Network
UNDP	United Nations Development Programme
UNICEF	United Nations International Children's Emergency
UNISDR	United Nations Office for Disaster Risk Reduction
USD	United States Dollar
WASH	Water, Sanitation and Hygiene

Table of Contents

1	Introduction	5
2	Methodology	7
3	Context	8
4	Adverse Socio-economic Preconditions related to Climate and Disaster Risk	10
	4.1 Risk and risk perception of heat-related stresses.	10
	4.2 Risk and risk perception of flooding-related climate stresses	12
	4.3 Gender-related barriers to accessing CDRFI in other global contexts	14
5	Adaptation Measures and Coping Strategies of the Urban Poor to inform CDRFI Solutions	16
	5.1 Adaptation measures for heat-related stresses	16
	5.2 Adaptation measures for flood-related stresses	18
6	Approaches for financial protection	19
	6.1 Savings	19
	6.2 Credit	20
	6.3 Insurance	21
7	Conclusion & Recommendations	24
	Recommendations	25
8	Annex	29
	I. Guiding questions on perceptions of climate-related hazards, their impact, and actions to reduce them.....	29
	II. Traditional methods used by the community (based on interviews with women in the low-income segment)	30
	Against heat	30
	Against Flooding	31

1 Introduction

At a time when the impacts of climate change are predicted to push as many as 132 million additional people into extreme poverty by 2030¹ there is an increasing requirement for strengthened adaptation and resilience-building mechanisms. This is particularly the case for those populations that are most vulnerable to climate shocks and stresses. Between 2010 and 2020, climate-related events triggered 83% of all disasters resulting from natural hazards, which have caused more than 410,000 deaths and affected 1.7 billion people.² In 2020 alone, 14,301 people were killed, 97.1 million people were affected and USD 171.3 billion in economic losses were caused by climate-related disasters.³

The different characteristics and living conditions of an individual or community can influence their vulnerability to climate shocks and stresses. In a global study, Crate & Nuttall⁴ demonstrate that women are three to four times more vulnerable to climate-related disasters than men, with the prevailing evidence indicating that gender differentiation is based on historical and existing inequalities and discriminatory norms rather than biological sex. They conclude that the disparities in impacts (differentiated by gender) are due to a lack of opportunities for women to access education and information. For example, cultural exclusion of women from activities like hiking, climbing trees and swimming means that women gain fewer skills to react to sudden hazards such as floods

and flash floods. At the same time, women often “bear the burden of the house” and are expected to fulfil the “role of family earners and caregivers”. In India along with many other countries, “the cumulative effect of unpaid caretaking roles, part-time employment, and debarment from relief benefits all enhance the problems of middle-aged or young women” (Madhuri, 2016). Since socio-cultural gender roles like these can potentially increase vulnerability to climate-related risk, it is important to understand gender-differentiated impacts and find suitable solutions to support the communities most vulnerable to climate-related disasters.

Climate and Disaster Risk Finance and Insurance (CDRFI) solutions can play an essential role in coping with and adapting to climate change, enabling governments, businesses, and individuals to protect their financial security in the event of shocks, and to provide information and incentives for improved risk management⁵. CDRFI “refers to prearranged financial arrangements and instruments aimed at strengthening financial resilience or providing financial protection for climate and disaster risks. The central goal of CDRFI is to assist more rapidly and reliably those in need when a disaster strikes by using an array of quickly disbursing financial instruments.”⁶

1 Jafino, B. Walsh, J. Rozenberg and Hallegatte, S. (2020). Revised estimates of the impact of climate change on extreme poverty by 2030. Policy Research Working Paper, World Bank, Bank, W., Washington DC, 17 pp. Available at: <http://hdl.handle.net/10986/34555>

2 IFRC. (2020). Tackling the humanitarian impacts of the climate crisis together. In World Disaster Report 2020. Available at: [IFRC_WDR_ExecutiveSummary_EN_Web.pdf](#)

3 CRED. (2021). 2020: The Non-COVID Year in Disasters. UNDRR. Available at: <https://www.undrr.org/publication/2020-non-covid-year-disasters>

4 Crate, S. A., & Nuttall, M. (2009). Anthropology and Climate Change. In S. Crate & M. Nuttall (Eds.), *Anthropology and Climate Change* (1st ed., pp. 9–37). <https://doi.org/10.4324/9781315530338>

5 NAP Global Network & InsuResilience Global Partnership. (2021). Opportunities for strengthening resilience by integrating climate and disaster risk finance (CDRFI) in national adaptation plan (NAP) processes. Dazé, A., Farrow, T., & Ledwell, C. (authors). International Institute for Sustainable Development. Available at: [napgn-igg-en-2021-integrating-cdfri-in-national-adaptation-plan-processes.pdf \(napglobalnetwork.org\)](#)

6 InsuResilience Global Partnership. (2022). Climate and Disaster Risk Finance and Insurance – Specific Terms. Available at [Glossary - InsuResilience Global Partnership](#)

However, socio-economic differences and cultural norms also play a role in providing access to CDRFI solutions. As a result of discriminatory gender roles, women face lower rates of financial inclusion and less access to financial instruments, especially across developing economies, in which 58% of women had a bank account, compared to 65% of men⁷. According to Global Findex Database 2021⁸, women and the poor are more likely to lack proof of identity or own a mobile phone, live far from a bank branch, and need support to open and effectively use a bank account. In India, only 11% of women have ever taken a microcredit loan, and women's use of microcredit programmes is higher in rural areas (12%) than in the urban regions (9%)⁹. Despite the considerable gap in financial inclusion worldwide, research confirms that women who use a bank account and save increase their household decision-making power¹⁰.

In order to understand how CDRFI approaches can be appropriately designed and effectively deployed to reach this segment, there is a need to take a closer look at the complex conditions of poverty. In particular, a closer gender-differentiated look at how living in financially constrained conditions affects the behaviour and decision-making of poor and vulnerable people would help to inform the design of CDRFI solutions.

While most challenges laid out in this study affect urban poor communities as a whole, this study primarily focuses on identifying barriers to accessing CDRFI with a particular focus on urban poor women to better understand the multiple burdens and socio-economic and cultural disadvantages that increase their vulnerability to climate change and disasters. The study provides an overview of urban poor women's risk perception, coping strategies and adaptation measures, and contributes to the literature examining the lack of CDRFI solutions for the urban poor worldwide. This Indian study also identifies challenges that should be considered when designing CDRFI solutions that are suitable and desired for urban poor households. Evidence is drawn specifically from women who are members of the grassroots organization Mahila Housing SEWA Trust¹¹ (MHT).

Founded in 1994, MHT India focuses on serving mainly self-employed women working in the informal sector in cities to address their housing and habitat needs and issues. This non-governmental organization (NGO) supports the uptake of socio-technical solutions for housing, water and sanitation, energy, livelihoods, land rights, participatory governance, housing/microfinance and building climate resilience.

MHT has knowledge and experience of climate-resilient development in urban slums and microfinance. The organization's recent award-winning engagements carried out through the project 'Women's Action towards Climate Resilience for Urban Poor in South Asia' have been recognized as an initiative for creating inclusive cities for a changing climate by the World Resources Institute Ross Prize for Cities 2020–2021. According to Bijal Brahmbhatt, Director of MHT, "MHT facilitates two Credit Cooperatives with more than 10,000 members with a turnover of USD 5.7 million or EUR 4.6 million. The credit coops are independent institutions. All account holders are members because they are shareholders. These experiences serve as a foundation for moving the dial and designing innovative financial instruments to enhance the resilience of poor communities."

As a member of the InsuResilience Global Partnership, MHT is part of the InsuResilience Centre of Excellence Gender Working Group and provides input directed towards understanding risk from the perspective of those immediately affected. Together with other global partners, MHT provides local knowledge and longstanding expertise, and contributes to the InsuResilience Global Partnership and Centre of Excellence on Gender-smart Solutions.

The findings of this study are intended to inform and enable the adoption of gender-responsive disaster risk financing and insurance approaches as part of comprehensive climate and disaster risk management strategies. The study particularly targets policy makers and practitioners from governmental institutions, civil society, international organizations, academia, insurance authorities and the private sector, who are involved in the research design and implementation of Climate and Disaster Risk Financing and Insurance.

7 Demircuc-Kunt, A. Klapper, L. Singer, D. & Van Oudheusden, P. (2015). Global Findex Database 2014: Measuring Financial Inclusion around the World. The World Bank Group. Available at: [The Global Findex Database 2014 : measuring financial inclusion around the world \(worldbank.org\)](https://www.worldbank.org/publications/globalfindex)

8 Available at: [The Global Findex Database 2021 \(worldbank.org\)](https://www.worldbank.org/publications/globalfindex)

9 Kumar, S. (2022). Financial Inclusion of Women: Current Evidence from India. Observer Research Foundation ORF. Available at: [ORF_IssueBrief_600_Financial-Inclusion-Women.pdf \(orfonline.org\)](https://www.orfonline.org/pdf/publication/Financial-Inclusion-Women.pdf)

10 World Bank (2021). The global Findex database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19. Available at: [Findex2021 MASTER_BookRE.indb \(worldbank.org\)](https://www.worldbank.org/publications/globalfindex)

11 More information about MHT available at: <https://www.mahilahousingtrust.org/>

2 Methodology

This study draws on the knowledge and experience of MHT staff and low-income segment women members of MHT to cover their diverse perspectives on climate change adaptation, risk-reduction, and risk-financing solutions. It seeks to understand the barriers and enabling factors related to engagement with CDRFI by low-income women when financial resources are limited and access is hindered through other factors such as a lack of information, differences in disaster-risk perception or men-centric distribution channels for financial products.

Creating this understanding involved MHT staff and women members being interviewed to comprehend the perspectives of the supply and demand side of CDRFI solutions. MHT members were asked about their perceived climate-related risks and how this might influence the uptake of CDRFI solutions. Three focus-group discussions were conducted, encompassing a total of fifteen women MHT members in the Indian summer months of 2022. Interviews were additionally carried out with seven MHT staff members.

The semi-structured interviews focused on nine guiding questions (see Annex) that explore the perception of the impacts of climate-related events such as floods and heat waves, the actions to reduce them, differentiated by female and male, as well as challenges when adopting CDRFI. All interviews were conducted in person and information was treated confidentially. This study presents the perception and experience of women living in urban areas who are members of MHT. Consequently, the findings do not reflect the situation of all women in India and experiences may differ substantially from those of women living in rural areas.



Members of MHT taking part in a participatory governance workshop in urban India.

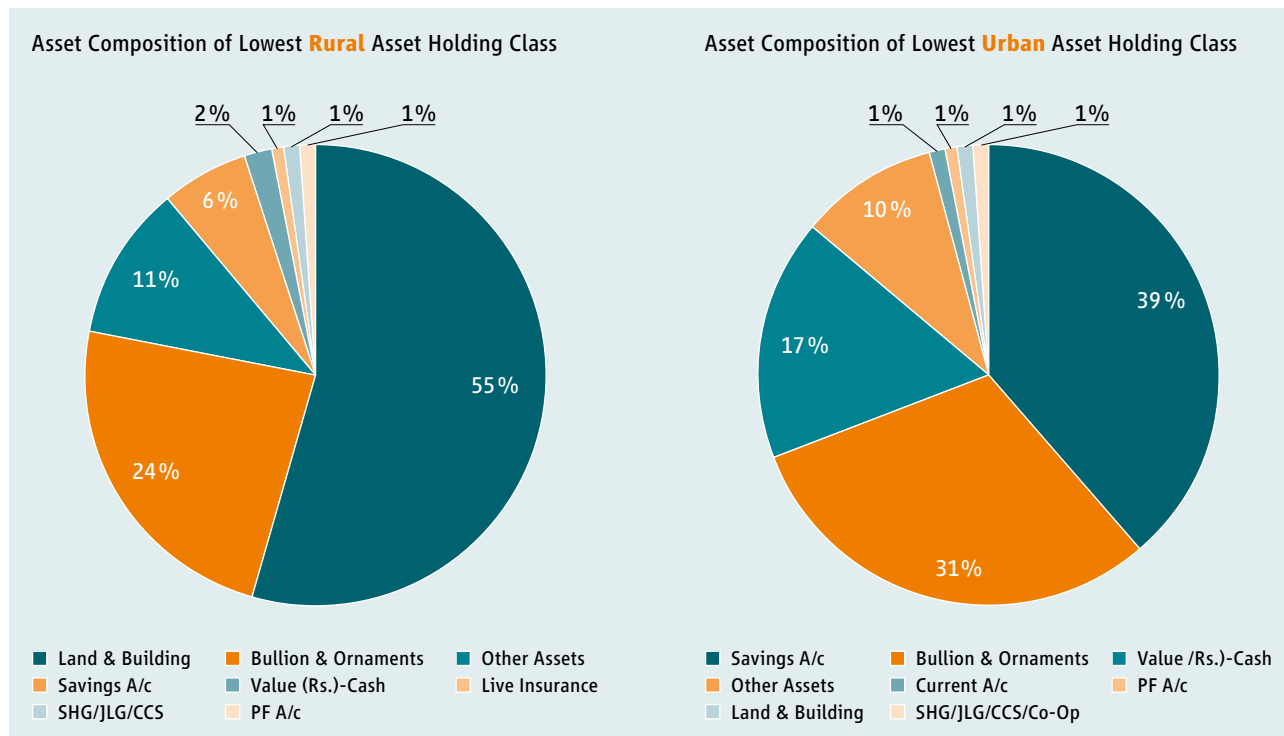
3 Context

In order to understand the barriers to CDRFI, it is important to comprehend the context and setting of people providing evidence for this study. The following section therefore describes the profile of urban poor members based on the data collected from interviews conducted with them, with MHT staff and secondary research.

Most of the urban poor members of MHT live in poorly constructed and inadequately ventilated housing communities. Each 100 – 200 sq. ft house is, on average, shared by five to six people. Most of the residents in these areas own their houses but do not have proper legal titles to their homes and they have been residing in the city for over 15 years. Access to secure land tenure is not available in most of these areas. This entails a consequent constant threat of forced evictions, although eviction is not common and families continue to live in such homes for decades.

Most people's residences also lack basic amenities like water supply and sanitation. Even when available, the provision of water and sanitation are often inadequate and of poor quality. For example, even with the availability of individual water connections, a typical household is not supplied with water for more than two to three hours every day, and they typically face significant reductions in water supply during the summer months. The quality of water available in these areas is also an issue, since most areas lack proper sewage systems or have frequent breakdowns leading to the mixing of sewage water with water supply lines. Additionally, stormwater drainage systems are often non-existent or clogged (due to a lack of solid waste management), leading to waterlogging during rainy periods.

Unlike the rural poor, most of the urban poor do not own land¹²



These members mostly work in the informal sector as tailors, embroiderers, domestic helpers, bamboo basket makers, necklace makers, or as sellers in clothes markets and home-based workers. They commute to work on foot, by bicycle or by public transport. They are mostly in the age group of 30-50 years and are married.

The majority of members have completed basic primary school. According to data shared by MHT on their members, monthly income for households ranges from INR 5,000 (USD 61.47) – INR 20,000 (USD 245.89). Most of them have Below Poverty Line cards (BPL),¹³ which make them eligible for government subsidies or social protection programmes.

Interviews with members revealed that their knowledge of social security schemes such as insurance, old-age savings schemes, and health insurance schemes (like Ayushman Bharat¹⁴) was limited. Most members do not actively save in bank accounts but have a small amount of savings at home. Since they are members of MHT, they have some savings with credit cooperatives. Savings are made to pay for their children's education and marriage expenses.

es. These savings become exhausted if there are any emergencies, mainly for health-related expenses. They usually obtain credit from informal sources and credit cooperatives. Very few members are aware of formal saving options and insurance products. The main source of information among MHT's members is the women's groups in the community. Interviews have revealed that most members have one big goal: to get their children educated so they can escape the poverty trap.

"Hum joh kamate hai bacchon ki education mein karcha karte hai."

Whatever we earn goes towards the education of the children.

A MHT member

¹² Dvara Research. (2022). Insights from the All-India Debt and Investment Survey 2019. Available at: [AIDIS_Slide_Deck \(dvara.com\)](https://www.dvara.com/AIDIS_Slide_Deck)

¹³ Below Poverty Line cards (BPL) are issued to households in India which fall below the poverty line as per the state government's defined poverty limit. BPL card holders receive 10kg to 20kg of food grains per family per month at 50% of the economic cost.

¹⁴ Ayushman Bharat PM-JAY is the largest health assurance scheme in the world which aims at providing a health cover of Rs.500,000 (USD 6145) per family per year for secondary and tertiary care hospitalisation to over 10.74 crores poor and vulnerable families (approximately 50 crore members) that form the bottom 40% of the Indian population. The households included are based on the deprivation and occupational criteria of Socio-Economic Caste Census 2011 (SECC 2011) for rural and urban areas respectively.

4 Adverse Socio-economic Preconditions related to Climate and Disaster Risk

MHT works on four climate-related stresses: heat, water scarcity and flooding, including waterborne diseases. For this paper, two principal climate-related stresses – heat and flooding – were identified as the main focus of discussion with MHT.

Flood is a common socio-natural hazard that recurs almost every year in many regions of India and more than once in certain parts of the country. The heavy southwest monsoon rains cause flooding in the northern, northeastern, and southern parts of India. The heavy rain also causes flash floods in many urban areas impacting life and causing severe economic loss. Flash floods resulting from extreme precipitation in combination with sealed soil, dense settlement and rigid economic land use have become increasingly common in India over the past several decades, coinciding with rising temperatures. In terms of economic loss, hydrometeorological hazards (floods and cyclones) cause the majority of loss in the country. Floods in India, China and Nepal caused the most serious losses and damages in Asia in terms of their impact on the population, fatalities, and economic losses. India's annual economic investment needs for adaptation at USD 46.3 billion are expected to be second highest after China. This accounts for 1.7% of India's GDP.¹⁵

In addition, the variation of rainfall distribution also causes extreme heat and drought conditions in many parts of the country, particularly Gujarat, Rajasthan, southern and eastern Maharashtra, northern Karnataka, Andhra Pradesh, and Orissa¹⁶, which makes heat in terms of heat waves and the urban heat island effect another major recurring hazard that the people of India have to contend with.

This section will discuss the influence of socio-economic factors on climate disaster risk affecting the low-income segment, particularly women. The focus-group discussions for this analysis were conducted with women members of MHT so as to understand the impact of heat and flood-related climate stresses on their health, lifestyle, livelihoods, and housing.

Although the whole household gets impacted by climate-related shocks and natural hazards, women and girls with the assigned gender role as primary caregivers for children and the elderly

generally bear the brunt of adverse preconditions relating to their food habits and availability, healthcare and livelihood assets owing to a lack of access to education, property, and resources such as the household budget, technology, or phones. Additionally, they are often responsible for daily management of the household and have to assume this responsibility in times of disaster.

According to the Mobile Gender Gap Report 2020, women's ownership of mobile phones in India is 16% less than that of men, and mobile Internet usage is 50% less. In addition, only 14% of women (compared to 37% of men) in India are found to own smartphones. The gender gap of digitalization through smart phones also represents a limitation to accessing information, including digital banking and access to finance and insurance products. According to interviews with MHT, gender roles influence women's and girls' use of mobile phones, as they are expected to have less contact with people outside the household than men, with the reason being that this is for their protection.

4.1 Risk and risk perception of heat-related stresses

The number of heatwave days in India is increasing rapidly every decade, as the World Meteorological Organization shows¹⁷. The number of days that see extreme heat is continuously increasing, mostly in inland areas, from 413 in 1981-1990 to 575 in 2001-2010 and 600 in 2011-2020. The International Labour Organization has projected that India will lose the equivalent of 34 million full-time jobs in 2030 due to heat stress.¹⁸ As presented in the figure below, the most affected states over such timespans are Andhra Pradesh and Odisha in the southeast and Rajasthan in the northwest.

Women members of MHT interviewed about their risk perception for this study understand that heat (temperature) is increasing yearly. They attribute this increase in temperature, especially in urban areas, to the rise in construction activities, constant cutting down of green cover to make space for increasing urbanization and a lack of open spaces. But most of them do not attribute these changes directly to climate change. According to MHT staff, ex-

15 World Meteorological Organisation WMO. (2021). State of the Climate in Asia 2021 (WMO-No. 1303). Available at: [State of the Climate in Asia 2021](#)

16 UNDRR. (2010). South Asia Disaster Risk Management Programme: Synthesis Report on SAR Countries Disaster Risks. RMSI Private Limited. Available at: [Table of content SAR \(unisdr.org\)](#)

17 World Meteorological Organization (2022). Climate change made heatwaves in India and Pakistan "30 times more likely". Available at: [Climate change made heatwaves in India and Pakistan "30 times more likely" | World Meteorological Organization \(wmo.int\)](#)

18 Ministry of Home Affairs, Government of India. (2019). Beating the heat how India successfully reduced mortality due to heat waves. Available at: <https://ndma.gov.in/sites/default/files/IEC/Booklets/HeatWave%20A5%20BOOK%20Final.pdf>



Water trucks supply urban communities temporarily.

treme heat and excessive rains are considered an “Act of God” by the low-income segment. After a series of sensitization programmes, they came to the realization that climate change had been largely triggered by human activities.

In focus-group discussions, women members also compared the difference in temperature in rural and urban areas. They said that the temperature remains lower in rural areas than in urban areas. They also noted that in rural areas, the usage and requirement of fans are lower, as they can sit in open spaces under the trees, which is a rare occurrence in urban areas.

Heat stress harms the livelihood, lifestyle, and health of the urban poor. These members live in small (100–200 sq. ft), poorly ventilated houses with tin roofs or roofs covered with high-density polyethylene (HDPE). This construction method results in increased temperature (up to 5 degrees Celsius) inside their homes (extreme heat events aggravated by urbanization and the concomitant urban heat island effect is resulting in cities being 5–7 degree centigrade warmer than the surrounding rural areas on summer nights)¹⁹. The heat means that they cannot sleep properly at night and are unable to consume a nutritious diet because the heat

makes it too uncomfortable to cook and eat. Heat-related stresses also lead to health issues like low blood pressure, diarrhoea, dehydration, and body rashes, even though members may or may not attribute heat-related health issues to rising temperatures.

Long heat periods with low levels of precipitation translate into water scarcity and supply issues. Water scarcity is more severe in urban low-income segments due to inadequate infrastructure for transporting water by trucks and for setting up provisional pipelines. It disrupts people’s daily lives, preventing them from working, eating, and cleaning, which in turn causes problems like infections, malnutrition, dehydration, children missing school, etc.

Despite high temperatures, people from low-income segments continue to work outside or at home. In conditions of extreme heat, women and men experience difficulties in commuting to work (by walking or cycling) and working under the sun (e.g., construction workers). When they cannot attend work, they forfeit their daily wages. Women working from home for (or as) small businesses also lose working hours as they cannot work inside the house due to the afternoon heat when temperatures are at their highest.

19 Tong S, Prior J, McGregor G, Shi X, Kinney P. (2021). Urban heat: an increasing threat to global health. *BMJ*. 25;375:n2467. <https://doi.org/10.1136/bmj.n2467>

As a result of heat, monthly household expenses rise because of increased consumption of cold water, ice, and electricity (constant use of fans, in some houses, use of coolers, etc.), prickly heat powders and health (medicine-related) expenditures.

"Private mein jaate hai wahan INR 10,000 (USD 123) tak karch ho jaata hai."

We go to private clinics where sometimes we end up spending INR 10,000.

A MHT member

When they suffer from health-related issues, people from these communities visit nearby private nursing clinics for consultations and treatment. Private clinics do not accept health cards (Ayushman Bharat Health Card²⁰) issued by the government. These cards do not cover Out Patient Department (OPD) consultations. Many members (women and men) face difficulties obtaining these health cards mainly due to lacking the required documents like proof of local address. However, eligible individuals can get the card from anywhere in the country. People who have the cards often fail to access free treatment due to a lack of awareness about the entitlements and coverage afforded by these health cards.

Societal norms mean that women face some additional challenges. Women have to contend with mobility challenges. Men often stay out of the house throughout the day while women are (expected to be) at home. Even if the temperatures within their homes reach unbearable levels, they are not allowed to go out of the house or onto the terrace in many communities. Men may sleep in open areas (like terraces) on hotter nights, but the same behaviour is often not an option for women according to interviews conducted with MHT staff and women members.

Some local community practices dictate how women dress. This generally involves more layers of clothing, often with their heads and faces covered. Traditionally, clothing is made of natural fibres

(like cotton). However, the low-income segment has adopted polyester clothing because of its lower price and the availability of attractive designs. This is a synthetic fibre that is not breathable. Using materials of this nature also leads to health and skin issues.

Water scarcity during hot summers also has a gender-specific impact on health. When women menstruate, rashes and infections due to poor-quality sanitary towels and underwear are a common problem. Women who cannot afford sanitary towels use a cloth. Due to water scarcity during summer, they cannot clean the cloth properly and this leads to infections.

These results show that health risks are strongly interlinked with barriers to the possibility of taking up climate finance and making use of insurance solutions. When family healthcare expenses are difficult to bear, there is little opportunity to save money or pay premiums for climate-risk insurance in the absence of health insurance.

4.2 Risk and risk perception of flooding-related climate stresses

India faced 649 climate events from 1915 to 2015. Out of these 649 events, 302 disasters were triggered by floods, with an average of three floods each year. This accounted for approximately 47% of the total disasters that impacted on India during the past 100 years.²¹ Urban flooding is significantly different from rural flooding, since urbanization increases flood risk by up to three times. Climate models predict that winter rainfall will increase by 20 – 30% by the 2080s. Such an increase could lead to a much larger (up to 200%) increase in flood risk. Poor natural drainage, choking of the drainage system, extreme climate events, and development in river floodplains are the main causes of urban flooding.²²

The growing segment of urban poor faces a higher exposure to climate-related hazards than non-poor and rural populations²³ People living in slums and informal settlements are particularly at risk and this segment of the population is estimated at one billion people worldwide²⁴. Absence of adequate urban planning has resulted in the development of these types of settlements in

20 Ayushman Bharat PM-JAY is the largest health assurance scheme in the world, which aims at providing a health cover of Rs.500,000 (USD 6145) per family per year for secondary and tertiary care hospitalisation to over 107.4 million of poor and vulnerable families (approximately 50 crore members) that form the bottom 40% of the Indian population. The households included are based on the deprivation and occupational criteria of the Socio-Economic Caste Census 2011 (SECC 2011) for rural and urban areas.

21 Tripathi, Prakash. (2015). Flood Disaster in India: An Analysis of trend and Preparedness. *Interdisciplinary Journal of Contemporary Research*. Available at: [\(PDF\) Flood Disaster in India: An Analysis of trend and Preparedness \(researchgate.net\)](#)

22 Rafiq, F. Ahmed, S. Ahmad, S. Ali, A. (2016). Urban Floods in India. *International Journal of Scientific & Engineering Research*. 7(1), 721-734. ISSN 2229-5518. Available at: [\(PDF\) Urban Floods in India \(researchgate.net\)](#)

23 Winsemius, H., Jongman, B., Veldkamp, T., Hallegatte, S., Bangalore, M., & Ward, P. (2018). Disaster risk, climate change, and poverty: Assessing the global exposure of poor people to floods and droughts. *Environment and Development Economics*, 23(3), 328-348. <https://doi.org/10.1017/S1355770X17000444>

24 UN-Habitat (2022). Global monitoring of slums remains a key concern for achieving the right to adequate housing. Available at: [Global Monitoring of Slums | Urban Indicators Database \(unhabitat.org\)](#)



Urban floods during the summer monsoon season, 2018

flood and cyclone-prone coastal areas, deemed undesirable for residential purposes²⁵. Floods affect all of India due to excess and prolonged periods of precipitation. However, the most flood-prone states are Punjab, Haryana, Uttar Pradesh (North), West Bengal, Bihar, Assam (east), Andhra Pradesh (southeast) and Gujarat (west).

Most of the regions in urban areas where low-income people reside are low-lying, with no proper drainage. This means that their houses get flooded every year. It takes two to three days to drain the flood waters. When the urban poor experience floods, they face significant economic and health consequences. They may suffer damage to their homes, lose their livelihoods, and have increased exposure to injuries, pathogens, and waterborne diseases^{26,27}. The homes are tiny with minimal storage spaces, so most of their belongings are arranged on the floor, either packed in small trunks/boxes or piled up by category. Flooding results in damage to and loss of household assets, stored food, appliances, furniture, and important documents. Many people do not realize that they have lost documents until they need to use them.

During severe flooding, people temporarily relocate (distress migration) to makeshift homes over bridges (for a few weeks). People whose residences are next to the river face a risk of crocodiles and snakes getting inside their houses. They need to be on constant watch and exert a high level of vigilance to identify crocodiles in good time and inform the local authorities so that they can evict the reptiles from their homes. This leads to a number of sleepless nights during rain.

Livelihood remains the priority even during severe rains and flooding. But these communities face the destruction of their livelihoods and severe loss of income due to flooding or dampness in their homes. People working from home in businesses like papad-making (chips) and embroidery work need to stop taking on work (for the entire rain season) because of mould growth that might occur on the raw material, inputs or finished product. Family members leaving the house to work face difficulty in commuting.

25 Baker, J. (2012). Climate Change, Disaster Risk, and the Urban Poor. Cities Building Resilience for a Changing World. World Bank.

Available at: <https://doi.org/10.1596/978-0-8213-8845-7>

26 Palacios, A. Gabosi, J. Williams, C. Rojas-Roque, C. (2022). Social vulnerability, exposure to environmental risk factors, and accessibility of healthcare services: Evidence from 2,000+ informal settlements in Argentina. *Social Science and Medicine*. 309, 1-8. <https://doi.org/10.1016/j.socscimed.2022.115290>.

27 Dodman, D. Adelekan, I. Brown, D. Leck, H. Manda, M. Mberu, B. Pelling, M. Ruska, M. Satterthwaite, D. Taylor, F. (2018). A spectrum of methods for a spectrum of risk: Generating evidence to understand and reduce urban risk in sub-Saharan Africa. John Wiley & Sons Ltd, Area. 2019;51:586-594. <https://doi.org/10.1111/area.12510>

Many people also get fevers, skin infections, etc. during heavy rains and flooding. The key reasons for these health issues are damp houses (during the rainy season and after flooding) or getting drenched in the rain (especially children). Flooding also impacts children's schooling, as they skip school during flooding and miss school when the paths (which are generally not properly built and maintained) become impassable. Children miss school because they tend to fall sick due to infections during flooding. One survey conducted by MHT in Jaipur (Rajasthan)²⁸ in one of the largest slums – the Ashraf colony – indicated that on average each household had a child miss school due to flooding for 3.1 days. Flooding has been quoted as one of the severe threats to missing school compared to water scarcity and heat stress.

During flooding, the amount of unpaid and care work that women have to do increases multiply. They become the primary carer for the sick household members, they are responsible for taking care of children on missed school days and they are also responsible for cleaning the house post-flooding. These responsibilities are also a factor in the loss of livelihood for women. Girls are socialized to look after their siblings during a flood. Many girls drop out of school during or after a disaster to reduce household expenses by saving on school fees or assisting the household with tasks such as fetching water²⁹. In terms of gender-related barriers for CDRFI, when girls in particular lack access to education at such stages, this leads to lower literacy rates among women and hence less access to information, insecurities associated with managing finances or accessing welfare, and fewer opportunities to differentiate their sources of income.

Water, sanitation, and health challenges constitute a burden for women in particular³⁰. During the 1998 flood in Bangladesh, there was an increase in rashes and urinary tract infections in adolescent girls because they could not properly wash and dry their menstrual cloths³¹. Adverse health outcomes include early pregnancy loss, premature delivery, stillbirths, delivery-related complications, and infertility³².

According to MHT members, the cloths women use as sanitary towels throughout their cycle are difficult to dry during rainy periods and this forces them to buy regular sanitary towels, adding to their household expenses. There is an overall decrease in household income during flooding while household expenses increase. Health expenditure is the main cause of the increase in household expenses during floods and this leads to greater financial hardship for the urban poor.

4.3 Gender-related barriers to accessing CDRFI in other global contexts

The findings presented above that are typical of the MHT experiences, are also found in other contexts and countries, especially those findings related to the economic and social barriers that women have to cope with in the context of climate-related risk and disasters. An example is the case study developed by the Climate and Development Knowledge Network (CDKN), UNDP and CAMP Alatau³³ in Central Asia. The study shows that barriers drastically reduce women's access to resources and essential services during and after climate-related events. The specific barriers are lack of participation in decision-making processes in relation to power, money, and information. The impacts of the barriers are reflected as women's lack of ability to protect themselves and gender-differentiated needs relating to care and attention during recovery post disaster.

28 Royal Academy of Engineering, Herriot Watt University, Mahila Housing Trust & King's College London. (2021). Climate-resilient slums: a systems approach for inclusive climate impact assessment. Available at: <https://waterresilientcities.shinyapps.io/RAEng/>

29 Indian Institute of Technology Kharagpur. (2016). The impact of flooding in Bihar, India on women: A qualitative study. *Asia Women*. 32(1). 31-52.

Available at: https://www.researchgate.net/publication/307590071_The_impact_of_flooding_in_Bihar_India_on_women_A_qualitative_study

30 UNICEF. (2022). Strengthening sustainable WASH programming in India. UNICEF-India. Available at: [Water, sanitation, and hygiene | UNICEF India](#)

31 Faiz, S. Michaud, S. (2000). Female Adolescents and Their Sexuality: Notions of Honour, Shame, Purity and Pollution during the Floods. *Disasters*. 24(1): 54-70.

Available at: [Female Adolescents and Their Sexuality: Notions of Honour, Shame, Purity and Pollution during the Floods \(unwomen.org\)](#)

32 Grippo A, Zhang J, Chu L, Guo Y, Qiao L, Zhang J, Myneni AA, Mu L. (2018). Air pollution exposure during pregnancy and spontaneous abortion and stillbirth.

Reviews on Environ Health. 25;33(3): 247-264. <https://doi.org/10.1515/reveh-2017-0033>

33 Khan, Diana. (2013). Putting a spotlight on gender in climate risk assessments. CDKN Asia.

Available at: [Putting a spotlight on gender in climate risk assessments | Climate & Development Knowledge Network \(cdkn.org\)](#)



During heat, women face an increased strain to access clean water.

In the same way, the OECD Gender, Institutions and Development Database³⁴ presents an enduring gender wage and productivity gap globally across all economic sectors. In the Pacific regions, for instance, women generate 30% and men produce 80% of annual income. This translates into economic barriers for women and hinders the countries and regions from achieving resilience through CDRFI. The OECD states that ‘restricting job opportunities for women has been costing the region approximately USD 44 billion a year’³⁵.

The lack of representation in decision-making processes referred to for the MHT members during the interviews is reflected globally. The lack of participation in decision-making processes increases the lack of representation in CDRFI public policies and subsequently affects the specificity of women’s needs during implementation of CDRFI mechanisms. Up to 2012, the assessment carried out by UNDP³⁶ shows that only five out of 3,864 (0.13%) projects of the Climate Development Mechanism included gender considerations within project documentation. In the same way, UNDP³⁷ shows that until 2016, only 0.01% of all worldwide funding supported projects that address climate change and women’s rights. Up to 2015, women’s representation in decision-making was poor since only 2% of all bilateral aid was directed towards initiatives that had women’s economic empowerment as a principal objective. In 2016, 7% of Finance Ministers globally were women and bodies of major climate funds were 22% female.

Barriers identified in the Latin American and the Caribbean (LAC) region.

Over a period of more than 12 years, the Microinsurance Catastrophe Risk Organization (MiCRO)³⁸ has been working to close the protection gap against climate-related disasters in the Latin American and the Caribbean (LAC) region. MiCRO has learned that women are more realistic in understanding their vulnerability to climate change and their coverage needs, however the offer continues to be limited. The barriers identified by MiCRO in the LAC region are related to low income, poor assets, lack of participation in household and community financial decision-making, and a lack of access to information on disaster risk management and financial services.

The conclusion on gender-specific barriers to accessing CDRFI is that such barriers (as identified in the Indian context with MHT members) are context-specific. However, the international literature and other regional examples demonstrate that the barriers identified in India have much in common with barriers found globally.

34 OECD (2022). Gender, institutions and development database. Organisation for Economic Co-operation and Development. Available at: [Gender, Institutions and Development Database 2012 \(GID-DB\) \(oecd.org\)](https://data.oecd.org/gender/gender-institutions-and-development-database-2012-gid-db/)

35 Ibid.

36 Habtezion, Senay. (2016). Gender and climate finance. UNDP & Ministry of Foreign Affairs of Finland.

Available at: [UNDP Gender and Climate Finance Policy Brief 5-WEB.pdf](#)

37 UNDP (2016). Gender and Climate Finance. Ministry of Foreign Affairs of Finland. Available at: [UNDP Gender and Climate Finance Policy Brief 5-WEB.pdf](#)

38 [MiCRO - Home - Microinsurance Catastrophe Risk Organization MiCRO \(microrisk.org\)](#)



Sun reflective painting for roofs in urban areas.

5 Adaptation Measures and Coping Strategies of the Urban Poor to inform CDRFI Solutions

Urban poor communities adopt both financial and non-financial mechanisms to adapt and reduce the impact of heat and flood-related stresses. The focus for these households is to adopt adaptation measures targeting physical improvement to housing. This is because one of the most relevant underlying causes for the risks is the way people's homes are constructed and the part of the city where their houses are located. An additional factor is that most of these houses are built in illegal colonies where the government has the power to demolish houses. Generally, the urban poor do not have enough resources to invest in building a better home because other needs (like education and health) take priority. Neither can they move to a new locality since this may disrupt a child's education or result in a longer commute to work and eventual loss of livelihood.

Men prefer to adopt the cheapest coping and adaptation solution as they spend less time in the house than women. Women like to adopt long-lasting solutions to improve their lifestyles and those of their family. Solutions for the urban poor should be accessible, affordable, aspirational, sustainable, and user-friendly.

5.1 Adaptation measures for heat-related stresses

Adaptation to heat-related stresses involves poor urban households consuming cooler foods, like cold water, ice, aerated drinks, etc. They also use prickly heat powder, which relieves the effects of heat and provides a cooling sensation. It has antibacterial properties that kill germs and protect the body from infections arising from excessive sweating. They also use other products like hair oil to give a cooling sensation. During the daytime, people migrate under the bridge for shade, and cooler temperatures when the inside temperature of their home becomes unbearable.

Adaptation measures for housing adopted by the urban poor can range from traditional efforts to temporary modifications of house structures and more modern solutions. The solutions provided by MHT can reduce indoor temperatures by up to 6 degrees Celsius. Women who have adopted these solutions increased their daily income by three times, since their overall work productivity improved, and they also reduced electricity expenditure. MHT credit cooperatives play an important role in making the solutions affordable.



Modular roof with air lite ventilation.

Traditional adaptation methods by the community (based on the interviews with low-income segment women)
Adding husk bunches to the roof of the house
Sun reflective paint
Increase the height of the roof
Modified roof (Modroof) made of paper waste and coconut husk
Bamboo roof
Air lite ventilators
Green roofing

Solutions provided by MHT through credit co-operatives

(Based on the interviews with MHT staff and management)

S. No	Solutions	Cost	Mode of financing
1	Bamboo roof	Rs.14,000 (USD 176)	Credit from MHT credit cooperative or microfinance organizations
2	Sun reflective paint	Rs.25 per square foot (USD 0.31 per square foot)	Own funds
3	Modified roof (Modroof)	Rs.100,000-120,000 (USD 1584)	Credit from MHT credit cooperative or microfinance organizations
4	Green roofing	Rs.500 (USD 6.27)	Own funds
5	Air lite ventilators	Rs.2900 (USD 36.38)	Own funds or advance from informal sources like employers

More details on the adaptation measures can be found in the annex.



Green roof in urban area.

According to the Urban Climate Change Research Network (UCCN)³⁹, 30 cities and 11 states in India have developed head action plans that incorporate early warning systems to combat the impacts of climate change scenarios with temperatures +1.5 to 3.3°C and precipitation from –13 to +28%. This target changes in outdoor working hours, outlines improvements in health-service responses and promotes social/mass media dissemination strategies to sensitize communities. The early warning systems alert residents and authorities one week before a heatwave, allowing city officials to plan their response.

5.2 Adaptation measures for flood-related stresses

Most of the solutions adopted by the urban poor for flood-related stresses are designed to protect housing. Households start preparations for protecting their homes months before the rains start. Most families also repair the roof and walls of their homes every two to three years. Repairing the roof costs INR 15,000 (USD 184.35) to INR 20,000 (USD 245.81). Households meet this cost by taking out a loan from a credit cooperation or from microfinance institutions.

Roofs covered with High-Density Polyethylene (HDPE) sheets and brick embankments outside the door to the house are the most common solutions adopted by households every year before the rains. The roof is covered with HDPE sheets to prevent leakage. Brick embankments are built outside the door of the house to stop water from entering. Households usually incur a cost of INR 3,000 (USD 36.87) for these adaptation solutions each year.

A warning intervention in the form of a flash flood alarm has been designed by MHT to help people prepare for monsoon flooding. In addition, through awareness meetings, MHT teaches community members how to identify the settlements most sensitive to flooding/inundation. Yellow and red signs are posted at the entrance of houses (see annex for more detail).

39 Urban Climate Change Research Network (2022). A summary of The Future We Don't Want research on the dangers of increasing urban heat. Available at: [Heat Extremes - C40 Cities](#)

6 Approaches for financial protection

While presenting adaptation and coping measures and (potential) approaches for financial protection, it is important to highlight that the larger goal is to build up the climate resilience of poor urban communities. That is why MHT introduces capacity building approaches for women to access services from the city governments, demonstrates technical solutions for housing and habitat improvement, and in particular, has an awareness raising and behaviour change communication component for women on climate risks and climate risk insurance. The approaches for financial protection may include savings, credit, and insurance, as illustrated below with examples, but should not be limited to these.

As mentioned above, women's ownership of mobile phones in India is 16% less than that of men, and mobile Internet usage is 50% less. In addition, only 14% of women (compared to 37% of men) in India are found to own smartphones. This significantly deters women's access to and use of mobile-based digital financial services, including CDRFI. Progress in access to finance depends on the mobile phone much more than the banking system. Ubiquitous and affordable Internet access is a prerequisite to further progress in access to finance.

6.1 Savings

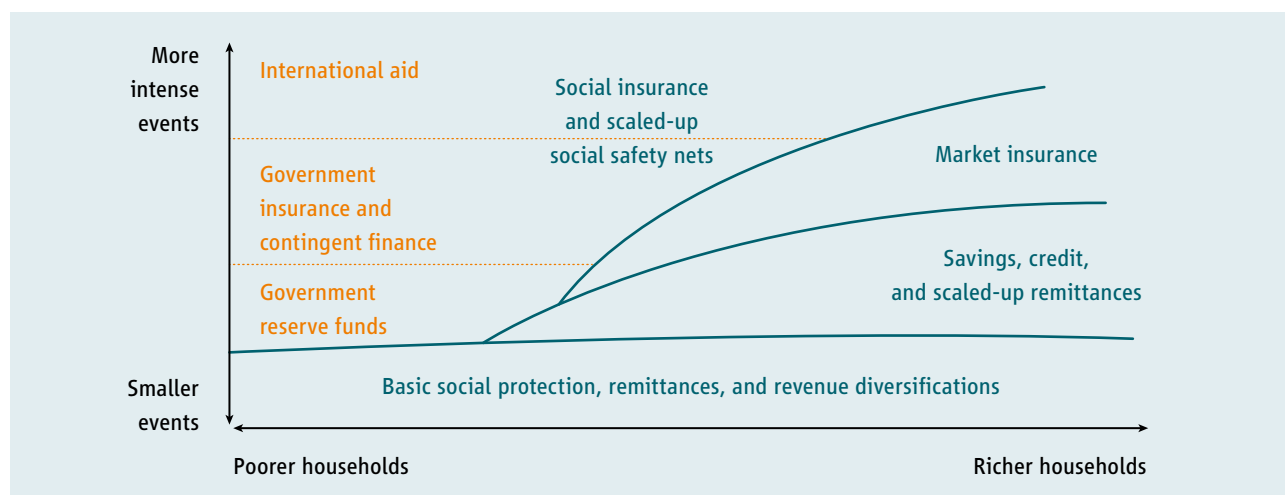
Ownership of bank accounts in India has more than doubled in the past decade, from 35% in 2011 to 78% in 2021. This outcome stemmed partly from a policy launched in 2014 that leveraged universal biometric identification cards (Aadhaar cards) to boost account ownership among unbanked adults.

According to the All-India Debt and Investment Survey (AIDIS) (2019) conducted by the National Statistical Office, 80.7% of women in rural areas and 81% in urban areas had bank deposit accounts. This is an improvement over the 77% of women estimated to own bank accounts in India, as reported by the last Global Findex Report (2017), which surveyed a similar demographic cross-section. The gender gap in bank-account ownership has come down over the past few years (from 20% in 2014 to 6% in 2017) because of the roll-out of Pradhan Mantri Jan Dhan Yojana (PMJDY) (zero-balance) accounts. Currently, just over half the PMJDY account holders are women.

As of August 2022,

- 56% PMJDY account holders are women
- 67% PMJDY accounts are in rural and semi-urban areas
- 319.4 million RuPay cards has been issued to PMJDY account holders
- About 54 million PMJDY account holders received direct benefit transfer from the Government under various schemes in June 2022

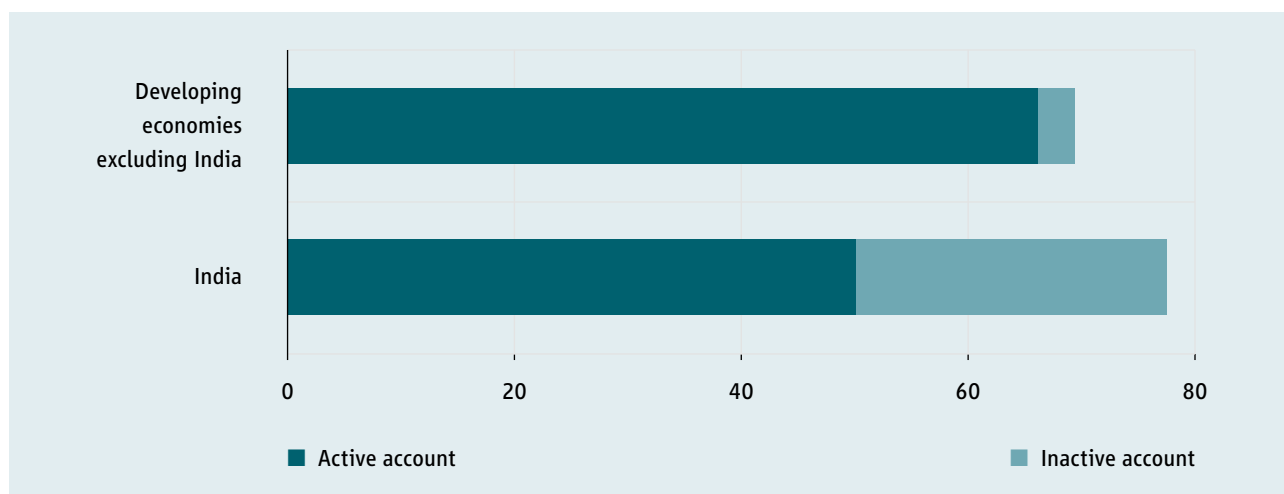
Poorer households need different types of solutions.



(© World Bank)

In India, about one-third of account owners had an inactive account in the past year

Adults with an account (%), 2021



Source: Global Findex Database 2021.

However, the Global Findex 2021 showed that 30% of unbanked adults said they do not have an account because a family member already has one. In most countries, this reason is more likely to be reported by women than by men.

According to the Global Findex Report 2021: "In India, a government workfare programme that reached over 100 million people showed that paying women their benefits directly into their own (which is generally PMJDY) account (and not into the account of a male household head) increased women's financial control, influenced gender norms preventing women from working and incentivized women to find employment, compared with those paid in cash."

Despite increased account ownership, India has very high numbers of inactive accounts, indicating low usage. The Global Findex Report 2021 found that the share of account owners with an inactive account varies across developing economies, but it is exceptionally high in India at 35%, the highest in the world – 42% of women account owners had an inactive account, and 30% of men account owners had an inactive account (Global Findex Database, 2021). Indian bank-account holders do not use their accounts because of distance from a financial institution, lack of trust and lack of need to use the account.

The urban poor save a small amount of money for emergencies, and these savings may or may not involve formal financial products. Informal savings are stored in concealed places within the household, like inside the spice jar or under the mattress. These people do not have a dedicated savings fund for heat or flood-related stresses. Most of the savings are general savings or are dedicated for the purpose of a child's education.

6.2 Credit

Access to finance is particularly difficult for people living in informal settlements due to the absence of formal financial institutions willing or able to provide housing loans for 'insecure' tenures. Mortgageable products usually require formal financial institutions. Microfinance institutions are slightly more accessible but the amounts they can lend are not enough for improvements to housing.

According to the AIDIS survey, the loan rejection rate for businesses owned by women is 2.5 times higher than for men. This is due to various reasons such as lack of collateral, weak property rights, various cultural barriers, difficult access to a guarantor, etc. Women from low-income households often access credit from microfinance institutions (MFIs), which offer collateral-free loans for income-generating activities at high-interest rates. Most of these loans require members to pay a weekly instalment to the MFI. But the amount provided as credit is too low to make an impact in their business.

Given the difficulties of accessing credit through financial institutions, borrowing only from family and friends is common in emerging economies like India. According to the global Findex Report 2022, 33% of adults in India mainly use family or friends to raise money for emergencies. In India, informal credit continues to fill the gap that is not yet covered by formal credit. People still access credit from informal sources for emergencies (medical or other).

The urban poor depend heavily on credit from informal sources like borrowings from employers or friends to manage the risks of heat and flood-related stressors. Larger value credit (greater than

INR 15,000 (USD 184.35) is needed for house repairs (roof, walls). These larger amounts are borrowed from formal sources of credit like credit cooperatives (e.g., MHT), SHG groups or microfinance institutions.

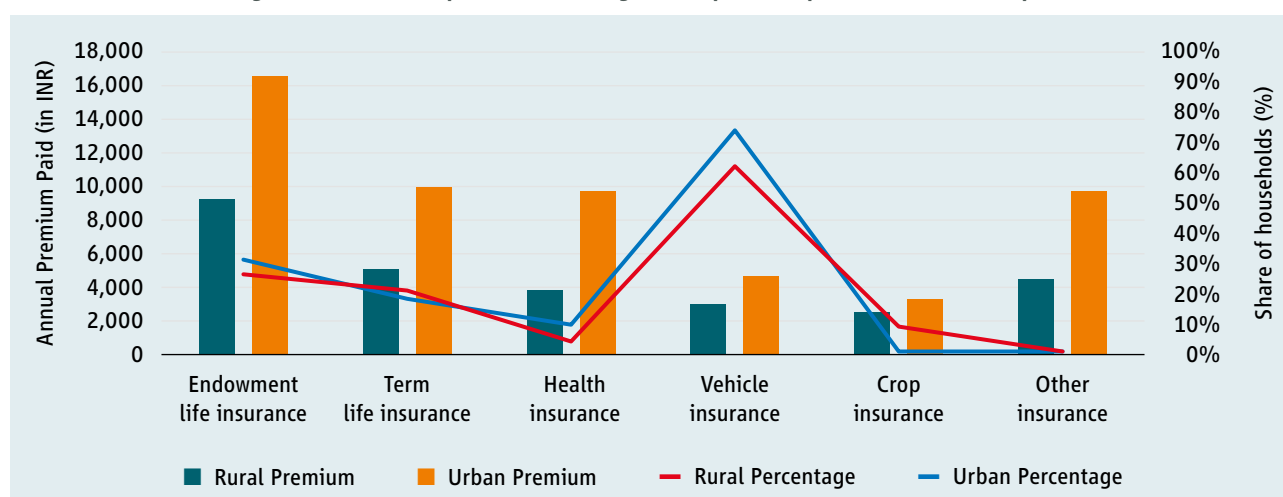
6.3 Insurance

The urban poor lack knowledge and awareness about life, health, and accident insurance options. Generally, the members of this section of society access insurance in two ways:

- › Bundled with another product like credit
- › As endowment insurance plans⁴⁰, insurance (as a standalone product) is considered an investment option and not a risk management tool by this segment. Due to their prolonged exposure to endowment products, people expect premiums to be returned if they have not made a claim
- › Endowment plans are used to save for longer-term goals, primarily for education or weddings

Most households have never had access to any insurance that protects their assets and livelihoods in the event of a shock.

Share of households owning different insurance products and average annual premiums paid for each insurance product⁴¹



Health insurance uptake remains low. This exacerbates any vulnerabilities resulting from an increase in diseases due to climate change. According to a UNISDR report, climate change is expected to alter the distribution of important vector species (for example, mosquitoes). This may increase the spread of disease to new areas lacking a robust public health infrastructure. High-altitude populations outside stable endemic malaria transmission areas may be particularly vulnerable to increases in malaria due to climate warming. Climate change may also affect the seasonal transmission and distribution of many other diseases transmitted by mosquitoes (dengue, yellow fever) and by ticks (Lyme disease, tick-borne encephalitis).

Historically, access to health insurance has remained low among Indian households (not simply among low-income Indian house-

holds). According to the National Family Health Survey (NFHS), adoption of health insurance over the past seven years has increased considerably from 29% (in 2015-2016) to 41% (in 2020-2021). But this rate of adoption is still not enough. According to the October 2021 report from NITI Ayog⁴² (Indian Government think tank), at least 30% of the population, or 400 million individuals, are devoid of any financial protection for health. The same report stated that "more than 90% of health insurance coverage is either by the Government for the public, or by the Government for its employees, or in the form of private employer support. Households taking up health insurance on their own are less than 1% in most demographic segments, except for the urban population belonging to the third, fourth, and fifth expenditure quintiles." Health insurance ownership is higher among higher income classes (rural and urban populations).

40 An endowment insurance plan is a life insurance contract designed to pay a lump sum after a specific term or on death. Typical maturities are ten, fifteen or twenty years up to a certain age limit. Some policies also pay out in the case of critical illness. Policies are typically traditional with-profits or unit-linked.

41 Agrawal, N. Ponnathpur, R. Seetharaman, S. Sharma, M. (2022). Insights from the All-India Debt and Investment Survey 2019. Dvara Research. Available at: <https://www.dvara.com/research/wp-content/uploads/2022/02/AIDIS-Slide-Deck.pdf>

42 National Statistical Office of India. (2019). Key Indicators of Social Consumption in India: Health. Government of India. Available at: https://www.mospi.gov.in/documents/213904/301563/KI_Health_75th_Final1602101178712.pdf/1edceec8-a4af-f357-b675-837e015ae20c

The Indian Government has launched many schemes to bring a large fraction of the population within the ambit of health insurance. “The Ayushman Bharat scheme (ABPMJAY) aims to cover the bottom 40% of the population subsuming many state Government health schemes intended for low-income households. Despite well-intentioned measures, actual uptake and usage remain low, owing to multiple barriers such as awareness, exclusion, and accessibility. Few women members have enrolled for Government insurance products like PMJBY (Pradhan Mantri Jeevan Jyoti Beema Yojana) and PMSBY (Pradhan Mantri Suraksha Beema Yojana). They continue to remain unaware of the product benefits and how the insurance works.”⁴³

Out-of-pocket expenses (OOPes) account for 48.2% (in 2018-2019) of national health expenditure in India.⁴⁴ Such reliance on OOPe creates a huge burden on low-income households, further

increasing income inequality and the medical poverty trap. OOPes on health due to extreme heat and floods impact the cashflow of poor households. Only 15% of Indian patients⁴⁵ have health insurance of any kind, and more than 60% of consumer health-care spending is for out-of-pocket expenses. The high expense of healthcare keeps many from receiving the regular check-ups and preventative care required to prevent illness.

Women members that we interviewed were aware of health insurance but found the product to be unaffordable or (at least) found it difficult to pay a yearly premium of INR 12,000 (USD 147.49) for health insurance coverage (INR 200,000 (USD 2458) is the sum insured for a whole family) because of their limited cashflows. They would prefer to pay a monthly premium instead. Insurance premium payment is the last priority in their expense basket.

The All-India Disaster Mitigation Institute’s Afat Vimo programme⁴⁶

The All-India Disaster Mitigation Institute (AIDMI), an NGO based in Gujarat, India, led the development of a community micro-insurance scheme to provide coverage against loss of life and assets in the wake of the 2001 Gujarat earthquake. The Afat Vimo (‘Disaster insurance’) scheme was developed as a result, together with an accompanying Child’s Right to Safer Schools Campaign, focusing on disaster prevention and resilience for schoolchildren and educators.

It took two years of consultation between communities, insurance brokers, government and other stakeholders before a workable system was finalized, targeting the very poorest households. Importantly, this combined a low premium of USD 4.50 annually with potential payouts of up to USD 1,560. It was also carefully designed to incorporate various risks that the poor were exposed to in their daily lives.

Despite initial concerns about its long-term sustainability, the scheme has been in operation for a decade and has been replicated in 17 cities across the country. In addition to its insurance services, the policy also provides additional activities, such as awareness raising and capacity development to support disaster prevention.

When it comes to climate-risk insurance specifically, the only large-scale CDFRI solution available for low-income segments in India is crop insurance (which focuses on rural areas). India has a Weather Based Crop Insurance Scheme covering only Farmers, PMFBY (Pradhan Mantri Fasal Bima Yojana – Prime

Minister’s Crop Insurance Programme). This scheme does not cover other rural poor segments like labourers, small businesses (which constitute 60% of the rural population), etc. This scheme is highly subsidized by the government (to the extent of 90% subsidy⁴⁷).

43 Agrawal, N. & Ganesan, P. (2022). Health insurance ownership in India. Dvara Research. Available at: <https://www.dvara.com/research/wp-content/uploads/2022/08/Health-Insurance-Ownership-in-India.pdf>

44 Ministry of Health and Family Welfare of India. (2022). National health accounts estimated for India 2018-19, Government of India https://nhsrcindia.org/sites/default/files/2022-09/NHA%202018-19_07-09-2022_revised_0.pdf

45 Ibid.

46 More about the All India Disaster Mitigation Institute (AIDMI) at: [All India Disaster Mitigation Institute \(aidmi.org\)](http://All India Disaster Mitigation Institute (aidmi.org))

47 Indian Express. (2016). Pradhan Mantri Fasal Bima Yojana: Crop insurance plan to entail Rs 8.8K cr outgo. New Delhi, January 14. Available at: <https://indianexpress.com/article/business/business-others/pradhan-mantri-fasal-bima-yojana-crop-insurance-plan-to-entail-rs-8-8k-cr-outgo/>

According to the Agriculture Census 2015-2016, the percentage share of women operational holders was only 13.87% in 2015-2016, a marginal increase from 12.79% in 2010-2011. A woman's ownership in farming is directly related to the presence of men within the family. Women become the primary farmer of the family due to death, disease, or migration of men. They generally try to sustain the scale of agriculture that is handed over to them. They are then often trapped in "the vicious cycle of low investment, low access to institutional credit and insurance, low return, and low expansion and growth".⁴⁸

Some members have had bad experience of losing money due to fraudulent insurance agents, leading to a lower level of trust in insurance as a useful instrument. These experiences get amplified through word of mouth in communities. Hence, the low-income segment is only likely to adopt insurance as a solution when they have seen evidence of the product working for people within their local community.

According to MHT, no customized insurance products are available yet for urban poor to cover heat and flood risks for the urban poor in India. Parametric weather-based insurance⁴⁹ products are available only for crops. Currently, MHT is designing parametric weather-based insurance for its urban members that targets faster claim settlements. Parametric weather-based insurance would give out a fixed payout to households if the temperature or rain crosses a certain trigger level. Historical weather data would be used to determine the trigger levels. The fixed payout allows households to use the claim to meet their needs at their discretion. According to MHT, it would be the first time such a climate disaster risk insurance product has been designed for the urban poor. The product is in the research and design phase and will be piloted primarily with MHT's members over the next two years. According to MHT, these are the specific challenges that insurers face in designing products for the urban poor:

- Availability of a large beneficiary base in different regions to underwrite the product and spread the risk remains a challenge. If insurance companies were to develop a fixed payout product, they would require a commitment of a large beneficiary base from MHT in varied geographies to diversify the risk.

- Developing an affordable product (with a premium of INR 200-500 (USD 2.5 – 6.14) per month) for this segment with the flexibility to make monthly premium payments remains a challenge. Due to strained cashflows, paying a lump-sum yearly premium is not feasible for low-income households. "Saving up"⁵⁰ is a challenge compared to "saving down" for the low-income segment⁵¹. People could be encouraged to pay during good times to be able to skip payments during difficult times.
- Lack of availability of operational weather dataset with Indian Meteorological Department (IMD)
- Approval of IRDAI (Insurance and Regulatory Development Authority of India) for product distribution remains a challenge. If approval from IRDA is not received, then MHT's credit co-operative would roll the scheme out as a solidarity insurance product.

It should also be noted that if heat waves and floods occur annually or every two to three years, the costs for an insurance product will rise significantly, if there is not enough diversification among households, e.g., through geographic dispersion. Subsidisation with a sustainable plan to phase out subsidies would then be necessary.

Index Based Parametric insurance is focused on the loss of assets (fixed or movable). Very little or no work has been done to protect against livelihood protection or loss of individual income. In 2020, an insurance company in India launched the first-of-its-kind Livelihood Protection Insurance Cover dedicated to protecting daily-income earners from the grievous impact of weather vagaries on their income and livelihood. This product has been approved under IRDAI's sandbox guidelines. It has been designed such that "the weather risk is monitored from automated weather stations operated by the Indian Meteorological Department (IMD) or by private independent third parties involved in the supply of weather data. The claim is then automatically calculated using this procured weather data. Hence, the claims will be settled by comparing the actual weather with the defined benchmark."⁵² No further details were available on the implementation and adoption of this product.

48 Jain, Harshita, A Study on the Barriers faced by Women Farmers in Accessing Agricultural Insurance in India & Policy Recommendations (November 28, 19). Available at: <http://dx.doi.org/10.2139/ssrn.3762738>

49 According to the Berkeley Center for Law, Energy & the Environment, parametric (or index-based) insurance involves the standard premium and pay-out structure of traditional insurance. Still, bases pay-outs on the occurrence of pre-determined "trigger" events rather than the incurrence of a loss and submission of a claim (as is the case for traditional indemnity- or loss-based policies). The trigger is typically determined based on an agreed index of weather or natural phenomena, allowing the policyholder (often a government) to protect against the anticipated financial loss of a catastrophic natural event without having to assess and claim actual damage. Rather than damage incurred, claimants are compensated based on the value of the index, which serves as a proxy for damage.

Source available at: [Insuring-Extreme-Heat-Risks-Dec-2020.pdf \(berkeley.edu\)](https://www.reliancegeneral.co.in/Downloads/Reliance%20General%20Insurance%20Launches%20Livelihood%20Protection%20Insurance%20for%20Daily-income%20earners.pdf)

50 Saving up is when a person accumulates funds to a targeted sum in order to make a purchase.

51 Saving down refers to loans. In this case, access by a household to a lump sum amount to serve an immediate need. Then they deposit smaller amounts over time to repay.

52 Reliance General Insurance. (2020). Coverage Report: Reliance General Insurance Launches Livelihood Protection Insurance for Daily-income earners.

Available at: <https://www.reliancegeneral.co.in/Downloads/Reliance%20General%20Insurance%20Launches%20Livelihood%20Protection%20Insurance%20for%20Daily-income%20earners.pdf>



7 Conclusion & Recommendations

The barriers to accessing Climate and Disaster Risk Finance and Insurance are directly interlinked with the context outlined above and the risks people living in urban low-income settings face. Economic constraints, cultural gender norms and resulting behav-

ioural patterns, and structural barriers not only reduce the possibility of accumulating savings and financing insurance but also increase gender inequalities and reduce access to information, financial literacy, and shared responsibility for household income.

Summary of climate-related impacts and increased vulnerability of urban poor communities, especially women members of MHT⁵³

Climate stress	Risk drivers	Impact on poor communities	Additional burden on women and girls
Extreme heat	<ul style="list-style-type: none"> • Micro-climatic conditions • Poorly ventilated dwellings • No access to cooling spaces/lack of trees • Expensive cooling technologies • Outdoor workspaces 	<ul style="list-style-type: none"> • Loss of income due to extreme heat causing financial hardship • Reduced working hours and productivity of people and small businesses • Increased stress, fatigue, and illness due to heat and water scarcity • Increased mortality of the elderly and children • Increased costs for healthcare and electricity 	<ul style="list-style-type: none"> • Increased caregiving role for children and the elderly • Discriminatory gender norms impacting health and economic opportunities, e.g., traditional clothing, lack of access to education and resources, expectation of women staying inside the house during hot periods • Increased costs for sanitary products, or increased health risks due to sanitary products causing infections
Flooding	<ul style="list-style-type: none"> • Settlement in low-lying areas • Flood-prone construction (below road level) • Lack of stormwater drainage • Lack of sewage lines or blocked/broken drainage • Insecure land tenure 	<ul style="list-style-type: none"> • Loss of life and livelihood assets during floods • Increased health risk due to water contamination, mould, waterborne diseases, and danger of reptiles • Financial hardship due to disruption of income-generating activities and increased costs for damages and healthcare • Closing of home-based businesses due to mould • Temporary relocation can lead to eviction and loss of home, businesses, and documents 	<ul style="list-style-type: none"> • Increased caregiving role and responsibility for cleaning up after floods • Increased drudgery of accessing clean water • Reduced access to education for girls • Discriminatory gender norms, e.g., inconvenient clothing and lack of ability to swim • Sexual harassment and lack of privacy at shelters • Increased costs for sanitary products • Lack of property rights to claim government aid

53 Information based on interviews with MHT staff and focus group discussions with MHT women members.

The barriers can be perceived in four main spheres: cultural, behavioural, structural, and economic, and are all interrelated. Cultural barriers such as discriminatory gender norms limit access to resources, skills, education, and economic development. Economic barriers limit the possibility of changing cultural norms and behaviours through women's economic empowerment, and have an effect on health, security, and education. Interlinked with these are structural barriers such as the low density of financial advisory

services, banks, and the lack of any kind of CDRFI product for the urban poor. With this lack of financial institutions on the supply side comes the lack on the demand side from urban poor beneficiaries, who are not provided with the information on how these financial institutions could support them. The informality of work, which is particularly the case for women, poses a problem to access CDRFI when solutions depend on proof of regular income or assets.

Summary of barriers to accessing CDRFI
No CDRFI solutions tailored to the needs of the urban poor are in place yet; most banking solutions are designed for men and lack specific needs of women; there is a need for solutions that address informality of employment and tenure
Lack of awareness and understanding among the urban poor of climate risk and how they directly impact their lives, livelihoods, income, and expenditure
While most women in India have bank accounts, the lack of physical places to go and access face-to-face advisory services and the lack of mobile phone penetration among women create barriers to access financial services
Informality of income and lack of tenure/formal property rights, especially among women (in-cash income leads to lack of formal proof of regular income); no access to bank loans without proof of income
Lack of affordable insurance solutions for the urban poor that consider irregular, informal income and the fact that valuing property is difficult when houses are built gradually over a period of years
Cultural beliefs and gender norms prevent women and girls from leaving the house, owning a mobile phone and using it for financial services, and accessing information on CDRFI solutions (if existing)
Lack of sex-disaggregated data on potential CDRFI beneficiaries in urban poor communities leads to a lack of CDRFI solutions that address the needs of the urban poor
Unpaid care and domestic work limits women's economic activity. Unpaid work increases with climate shocks and stresses.
Reduced access to education, particularly for girls, leads to lower literacy rates among women and lower access to information, insecurities with managing finances or accessing welfare, and fewer opportunities to differentiate their sources of income
Higher health risks increase expenditures and reduce economic activity and thus the ability of urban poor to save money or participate in finance and insurance solutions

Recommendations

The recommendations are based on the entry points identified in this study to address barriers to CDRFI and increase the ability of those people most vulnerable to climate risk to access CDRFI solutions. Furthermore, the following includes needs for research and for further development of solutions that have been lacking for the urban poor to date.

In accordance with UNDP⁵⁴, this study encourages the development of gender-responsive institutional structures, guidelines, and tools for all CDRFI mechanisms as a key component to make action on climate adaptation more comprehensive at regional, national, and local levels. The SMART principles by the InsuResilience Global Partnership and various resources provided by the InsuResilience Centre of Excellence on Gender-smart Solutions can inform the design and implementation of gender-responsive CDRFI solutions (see boxes 1 and 3)

- Collecting sex-disaggregated data in urban poor communities is a crucial first step towards designing suitable CDRFI solutions. Qualitative data such as interviews can help to understand and assess the specific needs of the most vulnerable. The goal should be to include the perspective of the urban poor when designing CDRFI solutions.
- Establishing communication channels suitable to reach urban poor communities can help to increase awareness and an understanding of climate risks, the effects on lives and livelihoods, and how financial tools can help to reduce and manage risk.
- There is an urgent need to raise awareness among credit co-operatives, private and public financial institutions, and academia that CDRFI solutions for the urban poor are lacking and that there is a particular demand for new solutions that address gender-differentiated needs.

54 UNDP. (2013). Overview of linkages between gender and climate change. UNDP Asia-Pacific. Available at: [PB1-AP-Overview-Gender-and-climate-change.pdf \(insurresilience.org\)](https://insurresilience.org/PB1-AP-Overview-Gender-and-climate-change.pdf)

- › Insurance solutions are not always the most obvious solution for the urban poor. In addition to the payment difficulties of the most vulnerable, insurance solutions should consider that they should be used mainly for residual risks and for special shocks and disaster events. For that degree of flooding and intensity of heat waves that occur annually, long-term solutions such as loans and savings measures may make more sense, as the recurrent costs for insurance would otherwise increase too much.

Box 1

One of the key recommendations for effective CDRFI solutions for the most vulnerable is to consider the **SMART Principles**.⁵⁵ Developed in a collaborative multi-stakeholder process by members of the InsuResilience Global Partnership (IGP), these principles aim to build a joint understanding on how to maximize the effectiveness of premium and capital support for insurance to serve the most vulnerable people as a crucial element of comprehensive climate and disaster risk financing strategies. The SMART Principles are also a response to the G7 Foreign and Development Ministers' agreement under the UK's G7 presidency in 2021. The principles include

- › Sustainable impact for the most vulnerable,
 - › Value for Money,
 - › Accessibility,
 - › Resilience-building incentives, and
 - › Transparency and consistency.
-
- › Due to substantial changes in hydrometeorological conditions affecting temperature, humidity and precipitation, different regions worldwide, including India, are experiencing an increase in biological vectors as mosquitoes. These vectors can transmit viruses, bacteria, and parasites. Many mechanisms use parametric insurance for linking CDRFI to health insurance and social protection in order to combat this threat. The India National Social Health Protection therefore needs to consider CDRFI as a concrete measure for mitigating the economic impacts of biological vectors (influenced by climate change) as well as integrating CDRFI into the national and local strategies geared to social protection. This approach allows the CDRFI mechanism to be implemented for comprehensive interven-

tions in order to cover hydrometeorological and biological hazards and to address systemic risk. An example of a parametric insurance for dengue is presented throughout the E-ZY Dengue Plan of the Philippines⁵⁶ in which the parametric trigger is represented by the value of thrombocytopenia or platelet count < 100,000 cubic millimetres.

- › Organizations like MHT can offer monthly subscription-based health plans to their members. MHT can partner with health-care service providers to offer such health plans. These health plans are able to finance consultations with a doctor, lab tests and medicines. This can help the members to get timely and affordable medical treatment. Such health subscriptions can be bundled with weather-based insurance and credit for home improvement. Package products of this nature can assist the urban poor in adaptation and risk reduction.

Box 2

Climate risks and rising health expenditure are closely linked. This study shows that urban poor communities and particularly women as primary care takers suffer from a lack of access to health treatments as well as having difficulty in accessing financial advisory services and digital banking via phones. Therefore, it is important to think about climate risk insurance more broadly and to start in a market where potential beneficiaries have a higher acceptance of insurance solutions, such as health or life insurance. This has the potential to gradually increase the coverage against residual health, life, and climate risk.

The **SAGABI partnership** (GIZ, Allianz, and the digital healthcare platform BIMA Ghana) uses mobile channels to increase access to insurance and health services for these low-income consumers. SAGABI used BIMA's existing health insurance policy in Ghana to test new approaches for mobile insurance, through combining face-to-face and digital engagements to enhance customer awareness and trust, improve customer engagement, and inform data-driven decision-making, and offering tailored and interactive digital health content and messages to drive product utilisation and customer engagement. In addition to health protection, it also promotes digital inclusion. More information about the approach can be found in a [video](#) and a [report](#).

55 InsuResilience Global Partnership Smart Principles: Enhancing affordability and sustainability of climate risk insurance through smart premium and capital support. Available at: [Principles approved: Enhancing affordability and sustainability of climate risk insurance through smart premium and capital support - InsuResilience Global Partnership](#)

56 ETIQA. (2022). E-ZY Dengue plan, Philippines. Available at: <https://www.etiqa.com.ph/dengue-plan/>

- › The experience of the MHT in India indicates that insurance products work most effectively when being offered as a package solution combined with savings and credit products provided by credit cooperatives or microfinance institutions. Funding to subsidize the premium cost for weather-based insurance for heat and flood over the initial two years could help to develop habits within the community relating to insurance as a useful tool (see Box 1 about SMART Principles). This finding is supported by the publication 'Mainstreaming Gender and Targeting Women in Inclusive Insurance: Perspectives and Emerging Lessons'.⁵⁷

Box 3

The **Microinsurance Catastrophe Risk Organization (MICRO)** mentioned in section 4.3, which addresses CDRFI barriers in Latin America, understood that it is very important: i) to put technology at the service of women, ii) to design insurance focused on the needs and contexts of women, for example, insurance that does not require ownership of assets, iii) to have insurance that is affordable, iv) to set up accompanying programmes in order to improve understanding of risk and its repercussions on the economy of families and finally, v) to institute solutions that are economically sustainable so that they do not depend on government subsidies. Government subsidies are important to boost the market, improve the product and increase penetration in the segment. However, they inevitably need to be structured to be dismantled over time.

- › Currently, workshops on climate and disaster risk sensitization organized by MHT are mostly being held with women. According to the interviews for this study, there is a need to increase awareness among men about the impact of climate change on the health and everyday life of their household members. Since men spend less time at home, they may not feel the need for investment in house modifications. Involving men in disaster risk sensitization sessions can expand their understanding of the impact imposed by climate stressors on their families. If they are given these insights, men might be more willing to work together with women in order to take decisions and make better preparations for family members. According to the MHT, philanthropic grants are needed by organizations like MHT to raise awareness about climate and disaster risk, and adaptation measures in the low-income segment.
- › Product solutions for the urban poor relating to managing climate and disaster risks could be offered as a combination of pre- and post-disaster financial protection tools with a focus on reaching women and men. A combined approach could be achieved by building a disaster-resilient microfinance programme, including a calamity fund for microfinance organizations to facilitate a better response to their urban clients during climate shocks and stresses. Alternatively, providing access to information for urban poor about pre- and post-disaster CDRFI solutions and offering a choice of either option can help members to decide which product suits them best in relation to their local context and capabilities.

⁵⁷ Klein, B. Knoess, J. (2017). Mainstreaming gender and targeting women in inclusive insurance: Perspectives and emerging lessons. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH: Available at: [Full+Women+&+Inclusive+Insurance+BMZ_Web.pdf \(ifc.org\)](#)

Box 4

Further key publications on Gender and CDRFI by the **InsuResilience Centre of Excellence on Gender-smart Solutions** complement these recommendations:

- [Applying a Gender Lens to Climate Finance and Insurance](#)
- [Integrating Gender Considerations into Different Models of Climate Risk Insurance \(CRI\)](#)
- [Step-by-Step Guidance: A Gender-smart Approach to Monitoring and Evaluation \(M&E\) of Climate and Disaster Risk Finance and Insurance \(CDRFI\) Programmes | Centre of Excellence for Gender-smart Solutions \(insuresilience.org\)](#)
- [Toolkit for Policymakers: A Gender-responsive Approach for Climate and Disaster Risk Finance and Insurance \(CDRFI\) | Centre of Excellence for Gender-smart Solutions \(insuresilience.org\)](#)
- [Step-by-Step Guidance: Gender-Lens Investing in Climate and Disaster Risk Financing and Insurance \(CDRFI\) Solutions](#)
- Find more on <https://coe.insuresilience.org/>



Women living in urban poor communities carry the burden of multiple responsibilities on their shoulders. For CDRFI solutions, it is essential to be designed with the perspectives of the beneficiaries and not without first-hand understanding of their experiences.

8 Annex

I. Guiding questions on perceptions of climate-related hazards, their impact, and actions to reduce them.

Perception of climate-related hazards	
Questions	Prompts
1. In the last 5 to 10 years, what changes do you feel in the climate?	Changes during summer, rains, winter. For example- Increased heat in summer, untimely, excessive or no rains, reduced cold in winter.
2. What could be the reasons for these changes in the climate?	For example – cutting down trees, increased population, pollution, industries.
Impacts	
3. Due to extreme heat nowadays, what has been the impact in your life?	<ol style="list-style-type: none"> 1. Impact on their occupation or livelihood, e.g., hawkers unable to do business in the daytime. 2. Impact on their living conditions 3. Impact on food and nutrition. 4. Impact on living expenses – e.g., cost of electricity. 5. Impact on their and family health. 6. Impact on life – Loss of life.
4. Due to erratic rains causing flooding nowadays, what kind of impact have you experienced in your life?	<ol style="list-style-type: none"> 1. Impact on their occupation or livelihood, e.g., hawkers, small businesses unable to do business. 2. Impact on their living conditions – sanitation issues. 3. Impact on food and nutrition. 4. Impact on living expenses, reconstruction of house. 5. Impact on health (waterborne diseases). 6. Impact on life – Loss of life 7. Impact on assets – loss of business stocks, damage to household assets.
Actions for reducing the impacts	
5. The challenges that you are facing due to extreme heat, what actions have you taken or thought of to reduce the challenges?	<ol style="list-style-type: none"> 1. No action or solution: What are the challenges they see no solution for. 2. Mitigated risks: What are the challenges they have taken action to mitigate and what are the steps they have taken. 3. Transferred risks, e.g., health insurance.
6. The challenges that you are facing due to flooding, what actions have you taken or thought of to reduce the challenges?	<ol style="list-style-type: none"> 1. No action or solution: What are the challenges they see no solution for. 2. Mitigated risks: What are the challenges they have taken steps to mitigate and what are the steps. 3. Transferred risks, e.g., health insurance?
Gender disaggregated challenges	
7. Is there any difference in the challenges that arise due to heat and flood between male and female actors?	<ol style="list-style-type: none"> 1. Cultural differences. 2. Political differences. 3. Economic differences.
8. Is there any difference in the actions taken by male and female actors for addressing the challenges due to heat and flooding?	<ol style="list-style-type: none"> 1. Difference in techniques or materials. 2. Difference in prices and financing the investments.
9. What are the challenges you face in adopting the solutions that you have mentioned for solving the risks that you face due to heat and flooding?	<ol style="list-style-type: none"> 1. Lack of funds. 2. Lack of credit for fixing house repairs, e.g., roof. 3. Lack of awareness about insurance options.

II. Traditional methods used by the community (based on interviews with women in the low-income segment)

Against heat

- › **Adding husk bunches to the roof of the house** brings down the roof's temperature when they are sprinkled with water to cool the house. This is the most widely adopted and affordable solution.
- › **Sun reflective paint** – Solar reflective white paint can be applied to the outside of roofs. This helps to reduce the inside temperature of a house by 4 to 5 degrees Celsius. Many households have also started adopting this measure. The local government has also incorporated this solution in its heat action plan. The product costs around INR 25 (USD 0.30) per square foot. Solar paint is durable for four years without maintenance. The limitation remains that this solution can't be used on kachha (non-concrete) roofs and tiled roofs.
- › **Increase the height of the roof** – People whose houses have walls of tin can increase the height of the roof. This promotes ventilation inside the house, leading to a reduction of heat within the home. As houses are not well-ventilated, people also make use of electric cooling appliances like fans and desert coolers.
- › **Modified Roofs (Modroofs)** are water-proof modular roofs made of paper waste and coconut husk that reduce temperatures inside the home and provide an eco-friendly alternative to RCC (Reinforced Cement Concrete) roofs. They are also easily dismantled and reinstalled. The inside temperature of the house drops by 7 to 8 degrees Celsius with installation of a Modroof. This is the most effective, long-lasting (lasts for 20-25 years), portable and aspirational solution available for low-income households. Modroofs look like a conventional concrete roof, and this makes them aspirational for poor women. Affordability is a barrier to adoption of this solution. Installation of a Modroof costs INR 100,000 – 120,000 (USD 1584). Some families have installed the Modroof by taking out credit from the MHT credit cooperative or other microfinance institutions. MHT has a special loan product for the installation of the Modroof. The loan is provided at an affordable interest rate of 14% per annum. Modroof loans are secured loans. It has therefore been possible to design special products at low-interest rates.
- › **Bamboo roof** is made from resin-coated bamboo mats that are pressed to form strong, lightweight, weather-resistant panels. The roof costs INR 14,000. The roof remains durable for over 25 years and can be reinstalled in a new house. The bamboo roof can reduce indoor temperatures by up to 5 degrees.
- › **Air Lite ventilators** are made from fibre sheets to improve air circulation in the home. These ventilation systems also lower temperatures and filter natural light better to reduce electricity consumption and help with indoor pollution. This solution costs around INR 2,900 (USD 35.64).
- › **Green roofing** involves potted plants being placed on roofs to create a barrier that prevents asbestos or tin roofs from getting too hot. Green roofing costs INR 500 (USD 6.14) a house and lowers the room temperature by 2.5 degrees Celsius. The availability of fresh vegetables along with supporting cooling of the house and green roofing serves two purposes. The roof of the house is used as a base for vegetation. People plant bottle gourds, tomatoes, and plants with lightweight vegetables. This allows them to work towards growing vegetables without chemicals and get cooling inside their homes.

Against Flooding

- › **Water Alarm (flash flood alarm)** – A household-level warning intervention designed by MHT to ensure people can prepare for monsoon flooding. An alarm helps people to wake up with an alarm sound when rainwater reaches a certain level. This allows people to better prepare and shift their valuables to a safer place. This enables households to take timely action and avoid losses.
- › **Flood warning signage** – Signs are put in yellow and red colour at the entrance of houses. Through awareness meetings, MHT sensitizes community members to identify the slums most sensitive to flooding/inundation. After identification, members act to mark the houses' entrances with yellow and red colours. This action would improve the resistance of individuals to flooding by making them aware that when the water level touches a yellow sign, they need to be alert and start moving their things to safer places. If the level rises to a red sign, then immediate action is required, like calling a corporation to pump out excess water and move to an identified safe shelter.

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