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MAKING CLIMATE ACTION COUNT

Gender in the Mainstream of Urban Climate Strategies

Aparna Roy
Editor

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Preamble

Aparna Roy

India's cities are at the epicentre of rapid urbanisation and intensifying climate risks. Urban climate impacts are escalating, straining already inadequate infrastructure and deepening existing inequalities. At the heart of this crisis is a critical yet often overlooked truth: climate change is not gender-neutral. Women, particularly those from marginalised and low-income communities, bear the brunt of climate-induced disruptions while having limited access to decision-making spaces that shape urban resilience.

As groundwater sources dwindle, women in informal settlements spend a disproportionate amount of time fetching water for their household. They are also more vulnerable to heat stress, given their overrepresentation in informal labour sectors such as domestic work, street vending, and construction, where exposure to extreme temperatures and air pollution directly

impacts their health. When floods and disasters displace families, women's access to sanitation, reproductive healthcare, and personal safety is often compromised. Mobility constraints, unsafe public transport, and the absence of gender-sensitive urban planning further restrict their economic opportunities. Yet, despite being among the most affected, women are rarely seen as agents of change in climate action. The failure to integrate gender into urban climate policies is not just an oversight—it is a fundamental barrier to sustainable and inclusive resilience-building. If Indian cities are to withstand the climate crisis, they must recognise and prioritise women's leadership, expertise, and agency in shaping solutions. This requires moving beyond tokenistic representation to embedding gender equity at every level of climate governance, urban planning, and economic transition.

This volume, *Making Climate Action Count: Gender in the Mainstream of Urban Climate Strategies,* brings together experts to examine the intersection of gender and climate resilience across urban sectors. The chapters discuss the barriers that women face in accessing, adopting, and leading climate solutions and offer policy recommendations to embed gender-responsive strategies in India's urban climate agenda. Each contribution addresses key questions: How do we build urban infrastructure that centres the needs of women? How can policy frameworks support gender-responsive climate action? What role do women themselves play in driving solutions?

Though the transition to clean energy presents an opportunity to create a more equitable urban future, women continue to face systemic barriers in accessing, adopting, and leading energy solutions. *Neha Kumar* examines how gender-responsive energy policies can accelerate a just and inclusive transition in cities, ensuring that women are not left behind in the shift to renewables. However, access to energy is closely tied to water security, particularly in urban areas, where climate-change-induced water stress exacerbates existing gender inequalities.

Building on this, *Namrata Kabra and Ambika Vishwanath* highlight how women bear a disproportionate burden in urban water access, distribution, and governance. They explore how climate change heightens these challenges and argue for the increased inclusion of women in decision-making to create more sustainable water-management systems. Water security, in turn, is deeply connected to urban food systems; disruptions in water availability impact women-led food supply chains, urban agriculture, and nutrition security.

Shoba Suri and Subhashree Ray, in their article, examine how climate risks threaten urban food security, disproportionately affecting women's ability to provide for their families and communities. They propose interventions to enhance women's agency in food systems and to ensure their leadership in shaping climate-resilient urban nutrition strategies. For women to participate meaningfully in these sectors, they must have access to safe, affordable, and sustainable mobility options in cities.

Aishwarya Raman's essay follows, where she examines how gendered mobility patterns impact women's access to education, employment, and economic opportunities. The author discusses the need for inclusive transport systems that accommodate women's unique mobility needs while contributing to climate-resilient urban infrastructure. Mobility is also crucial in the context of urban health, as women's ability to seek timely medical care is often constrained by inadequate transport and climate-related health risks.

In the sixth chapter, *Vanshica Kant* explores how climate change impacts, such as rising temperatures, air pollution, and vector-borne diseases, exacerbate health disparities among women in urban environments. She calls for gender-responsive health policies that address these risks and build more inclusive urban healthcare systems. Health outcomes are further shaped by disaster preparedness and response, particularly in cities that are prone to climate shocks.

Madhurima Sarkar-Swaisgood, for her part, examines how past urban disasters highlight the need for women-led, community-driven approaches to disaster risk reduction. She argues that integrating women's voices in resilience planning can enhance cities' ability to withstand climate shocks. However, beyond disaster response, long-term resilience depends on recognising and valuing women's unpaid and underpaid labour in urban economies.

Mitali Nikore then discusses how climate change intensifies burdens on women in the care economy, both paid and unpaid. She emphasises the need for policy measures that acknowledge and support women's contributions to caregiving, positioning care work as a critical component of climate adaptation strategies. Urban ecosystems are vital in building climate resilience, yet women's participation in urban greening and nature-based solutions remains limited.

Roshni Nuggehalli examines the barriers that prevent women from actively contributing to urban greening and ecosystem restoration efforts. She highlights the value of traditional ecological knowledge in shaping sustainable urban landscapes and calls for greater inclusion of women in climate adaptation initiatives. Ultimately, a holistic approach to gender and climate action in cities requires structural changes in urban planning and governance.

Ashali Bhandari closes the compendium with an article that underscores the importance of gender-responsive urban planning in ensuring climate-resilient and socially inclusive cities. She identifies critical gaps in current planning frameworks and emphasises the need to integrate women's perspectives in urban design and climate adaptation efforts.

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II
Women's Agency in Sectoral Strategies

Powering Progress: Making Urban Energy Transition Work for Women

Neha Kumar

Just and inclusive urban climate action and finance are urgently needed, with rapid urbanisation outpacing the adaptive capacity of cities in a warming climate. Cities, especially in the Global South, are particularly at risk from climate change due to poor or inadequate infrastructure, increased frequency of extreme weather events, heat stress, large informal settlements, and pollution. In developing countries, especially in fast-growing economies like India, cities also have limited resources and capacities to plan and execute structural transformations to cope with the multidimensional nature of energy transition.

In order to mitigate the consequences of climate change and achieve sustained prosperity, cities need to be better managed in terms of governance, urban planning, adaptive infrastructure creation, and resource mobilisation. This will require a fundamental shift in how cities are governed, designed, and developed.

A resilient city must be inclusive. City development in the era of climate change has the potential to transform the structural inequities that burden women. In India, where cities are poised to be the locus of vast physical and social infrastructure development, a majority of which is yet to be built, appropriate development can create more equitable and sustainable futures. Women, who make up nearly half the population in cities, will need to be productively included in the energy transition as its active agents and beneficiaries.[1]

However, inclusive urban energy transition poses a multilayered challenge that requires political will, inclusive and decentralised energy and climate planning, a culture of safety to lower the barriers to employment and mobility of women, and institutional and societal capacity building. This article examines the climate and energy-transition challenges being faced by Indian cities and highlights approaches, interventions, and policy measures that can make urban energy transition responsive to women's needs.

The Unequal Effects of Warming on Urban Poor Women

Indian cities are warming at an average of 0.53°C each decade, surpassing warming in non-urban regions by 37.73 percent.[2] Cities are also high emitters, accounting for over 75 percent of total emissions.[3] Despite contributing towards state and national Gross Domestic Product, Indian cities face some crucial challenges. As of June 2023, the urban employment rate was 6.6 percent,[4] whereas the unemployment rate was 23.4 percent for youth urban women and 15.9 percent for youth urban men.[5] This is compounded by stagnant wages in the informal economy. For example, Mumbai has a high literacy rate, but only one-fifth of women in the Greater Mumbai area are employed.[6]

A majority of employed women in India are informal labourers and vendors. Without access to proper cooling, shade, or healthcare, these women face higher exposure to heat stress. Rising temperatures also intensify food insecurity, as increased food spoilage and declining agricultural productivity make food less affordable for low-income households, especially affecting women who are responsible for household nutrition. In most cities in India, there is a wide gap between the incomes of the highest and lowest earners. Such concentrated inequity and informality exacerbate the impact of ecological shocks on women, who largely remain structurally disadvantaged.

The Starting Point

For energy transition to succeed for all, the interconnectedness of vulnerabilities needs to be addressed. In this context, cities can be the centre of local economic development opportunities and enhance socioeconomic resilience.

The following recommendations are among a few essential entry points that can help build a strategy for robust and resilient urban energy transition:

- **Focus on gender-disaggregated data for the design, development, and monitoring of energy policies and planning:** A lack of gender-disaggregated data in energy planning and access hinders the measurement of the differentiated impacts of energy policies, investments, and interventions on men and women. Energy access is often linked to economic participation, education, and health outcomes, but without gender-disaggregated data, it is difficult to assess how energy access (or lack thereof) affects women's productivity, safety, and quality of life. Similarly, energy investments that do not consider gender-specific data may inadvertently reinforce existing inequalities. For example, electrification projects might prioritise commercial areas over households, overlooking the disproportionate burden of unpaid domestic labour on women. The absence of gender data also makes it difficult to track progress on global development goals such as SDG 7 (affordable and clean energy) and SDG 5 (gender equality), limiting accountability and targeted interventions.

- **Make gender an essential element of city-level climate action plans:** The "She RISES" (Smart, Holistic, and Equitable Initiatives for Resilient, Inclusive, and Sustainable Environments) framework provides guidelines for Indian cities to develop gender-responsive urban systems.[7] It emphasises securing housing ownership for women, ensuring access to drinking water and sanitation services, and expanding livelihood opportunities for women. These strategies need to be layered with energy-transition priorities that are best formulated through city climate action plans, such as the Mumbai Climate Action Plan.

- **Implement vertical integration with states for transition support:** Energy transition goals will have regional implications because of the location of industries and sectors that are transitioning and the spillover effects on labour movement and job opportunities. Energy transition will also disrupt employment opportunities across sectors. Evidence suggests that, once women are displaced from their jobs, their re-entry into the job market is hindered.[8] The renewable-energy sector, especially in Distributed Renewable Energy systems, has immense job potential.[9] Time-bound transition support through social-protection schemes (such as safety nets for food, pensions for the elderly, health, education, and housing) will require the involvement of states that are experiencing transitions in multiple sectors.

- **Develop gender-focused skill ecosystem for transition:** Innovative energy solutions can empower women economically. For example, the introduction of solar-powered spinning wheels, or *solar charkhas,* in Uttar Pradesh has revolutionised

traditional cotton spinning, doubling production capacity and enabling women to quadruple their monthly income, thereby improving their families' nutrition, healthcare, and education.[10] Similarly, repurposed electric vehicle batteries in Karnataka are providing reliable power to artisans. For instance, a tailoring cooperative utilises these recycled batteries to operate sewing machines during frequent power outages, enhancing productivity and income.[11] The 'Solar Mamas' programme by Barefoot College[12] trains illiterate and semi-literate women to become solar engineers. Tata Power's 'Abha Sakhi' programme[13] trains women in electricity metering, billing, and energy conservation. The trained women educate their communities, promote energy efficiency, and earn a livelihood, which enhances their socio-economic status. Enhancing community awareness and disaster preparedness will be equally important to ensure that women have the skills and resources to adapt to climate challenges.

- **Finance women-led resilient energy transition in cities:** A meagre 0.01 percent of worldwide funding supports projects that address both climate change and women's rights.[14] In 2021-2022, there was an almost US$1.3 trillion increase in the average annual flow of climate finance, but most of this funding was directed towards mitigation and traditionally male-dominated sectors or fell short of proactively addressing the gender gap.[15] Some concessional funding mechanisms, such as the Green Climate Fund, do use a gender-sensitive approach in their resource-allocation decisions.[16] In this context, the United Nations adopted the Sendai Framework, which calls for the inclusion of mainstreaming gender in disaster risk reduction and highlights which gender considerations could be mainstreamed in climate finance.[17] However, current scenarios may underestimate the extent of compounding of urban vulnerability risks and the need for adaptation components, such as investments in infrastructure for water and sanitation systems and cooling shelters. This undervaluation can, in turn, lead to underfunding for crucial infrastructure.

Urban Local Bodies are collaborating with multilateral and bilateral funding agencies to access climate finance. The European Investment Bank's 'Gender Focused Climate Finance India' project finances just and green transition by supporting women's social and economic empowerment.[18] Local institutions are also adopting innovative financial solutions to address challenges. For example, the Self-Employed Women's Association in Ahmedabad, Gujarat, implemented gender-sensitive responses to heat waves by increasing the resilience of women and vulnerable populations by providing parametric insurance to recover lost wages due to extreme heat.[19]

Outcome-based financing instruments in the form of social or sustainability bonds and loans and blended finance structures need to be enabled to a greater degree. Examples such as Villgro's Inclusive Climate Action Scaleup Facility, which blends finance to address the financing gap in gender-inclusive climate-technology social enterprises in India, can be scaled up.[20]

Increased and focused collaboration among local governments, the private sector, and specialised institutions, including civil society organisations, can ensure that women-focused energy transition in cities has greater impact and resilience.

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Ripples of Change: Institutionalising Women's Role in Urban Water Governance

Namrata Kabra and Ambika Vishwanath

By 2030, over 40 percent of India's population, approximately 600 million people, is estimated to live in urban areas. By 2050, this population is expected to exceed 800 million people—the largest urban expansion globally.[1] This increase can be partly attributed to an intensification in climate-change events yearly, leading to increased internal displacement[2] and forced migration to cities.[3]

While India's cities aspire to be centres of growth and innovation, these ambitions are challenged by systemic flaws in urban policymaking and planning and threats from climate change; Indian cities are increasingly vulnerable to heat and water stress, with urbanisation alone contributing to a 60-percent increase in warming.[4]

Climate crisis, unplanned urbanisation, and water insecurity are obstacles to urban living. These challenges are disproportionately distributed among different social classes and genders, highlighting the deep-rooted inequities perpetuated by current urban development practices. Women are at the forefront of this crisis. According to Climate Action Network South Asia,[5] women undertake an additional 12-14 hours of work due to climate displacement and migration. The World Health Organization (WHO) highlights[6] that women experience higher mortality rates and a larger decline in life expectancy during and after extreme weather events. According to the Centre for Research on the Epidemiology of Disasters,[7] 85 percent of the deaths occurring during disasters in India are among women and children. Extreme heat affects women more than men because more women tend to be homebound, especially in low-income neighbourhoods in cities,[8] where the 'heat island' or 'wet bulb' effect is higher. Female mortality rates from extreme heat or cascading risks from heat rose from 4.63 percent in 2000-2010 to 9.84 percent in 2010-2019.[9]

A lack of nuanced gender-disaggregated data, where women are not viewed as one homogenous unit, hinders a comprehensive understanding of long-term impacts, such as potential gender-based violence,[10] adverse effects on health and reproductive health,[11] an increase in child marriages[12] and polygamy, and practices such as the taking of a "water wife"[13] during droughts.

Impeding women's full contribution to growth impacts overall urban economic potential. Prevailing gender biases, lack of opportunities, childcare duties, and inadequate water supplies and sanitation facilities restrict women's access to economic opportunities, limiting their participation in the workforce at 24 percent as of 2022.[14] By 2050, India is set to consolidate its position as the fastest-growing major economy. Women could play a crucial role in this transformation; if female workforce participation matched that of males, India could have added approximately US$770 billion of Gross Domestic Product (GDP) by 2025.[15]

Policy discourses where women are siloed in homogeneous categories as victims rather than key stakeholders and agents of change or overlooked altogether are reductive. Cities and their policies can reverse this approach by becoming drivers of transformative and gender-responsive climate action.

Recognising Gender-Differentiated Impacts on Water Security in Urban India

Climate change impact in urban centres is manifested in cascading water insecurities. Access to clean water is a constitutional right, yet inequitable distribution and intermittent supply are pervasive problems. While the Jal Jeevan Mission has expanded piped water coverage, with close to 80 percent of households covered by piping networks,[16] many households do not receive a constant supply of clean water. For example, in Delhi and Bengaluru, two cities that regularly face drought and flooding, water distribution is extremely varied across neighbourhoods. A 2023 study[17] showed that only 2 percent of Delhi's population received a continuous supply of water, while 87 percent received supply only once a day. In Bengaluru, 54 percent were scheduled to receive water every other day. Part of the problem is the skewed focus towards rebuilding or revamping old infrastructure instead of creating sustainable systems of integrated water management, including recycling and reusing water.

Water is neither an equal nor gender-neutral resource when controlled; access, distribution, and governance are shaped by several factors, especially gender. This is most evident in cities during extreme weather events, such as droughts and floods, with women bearing the brunt of their impact.[18] Social and gender norms impose unfair expectations on women, leading them to sacrifice and consume less during food shortages[19] or use their time and energy to collect water in times of extreme stress. Deeply entrenched roles assign women as household water-resource managers, increasing their burden of securing water; women in low-income neighbourhoods in urban areas spend up to five hours per day collecting water.[20]

The lack of availability of water in India impacts women's movement, economic freedom, and socioeconomic empowerment[21] and has a negative impact on their health, education, personal safety,[22] and overall quality of life.[23] Further, the lack of sufficient policy attention to what is often considered a development issue and not a water security or economic security issue exacerbates women's marginalised position. This also translates into an economic crisis for the country. It is estimated that productivity losses from women's water collection are equivalent to INR 10 billion[24] (US$160 billion), approximately 4.7 percent of India's GDP.[25] This systemic neglect[26] highlights the urgent need for comprehensive and transformative policy interventions to empower women as key actors in water resource management. Addressing these gaps requires a shift towards continuous supply, equitable distribution, and stronger institutional accountability to ensure sustainable and inclusive water security.

Strategies to Enhance Women's Participation in Decision-Making

Urban water governance and climate action policies in India often overlook gender considerations,[27] limiting their effectiveness in ensuring equitable water security. Without a deliberate gender-responsive approach and a deeper understanding and acknowledgement that climate and water security efforts are interrelated, existing disparities will be exacerbated.

The G20 New Delhi Leaders' Declaration[28] emphasised the importance of sharing best practices and implementing gender-responsive Water, Sanitation, and Hygiene (WASH) solutions to ensure equitable access to water resources. The need for a focused gender lens was also emphasised within the G20 working groups; for instance, Kubernein Initiative[a] worked with the U20 secretariat to undertake research on what women-led urban frameworks[29] could look like. Gender-positive wording was evident in several of the working group statements and the Leaders' Declaration. However, further action on these fronts is lacking.

Women continue to remain underrepresented in decision-making despite their critical roles in water management. Addressing these structural inequalities requires institutional mechanisms that recognise and integrate women's leadership in water governance at all levels, using depth of gender-disaggregated data and cross-cutting analysis. A bottom-up, participatory governance model that mainstreams the role of women and marginalised communities is key to achieving long-term resilience.

To implement effective gender-responsive water governance, policymakers must:

- Institutionalise such governance by ensuring women's leadership and participation in decision-making bodies.
- Strengthen gender-disaggregated data collection to identify context-specific vulnerabilities and inform inclusive policy actions. It is imperative that this is incorporated not only in the water sector but also across all aspects that affect or are affected by water insecurity to ensure that policy action has a holistic approach.
- Integrate gender considerations into climate finance planning to ensure equitable resource allocation for women, water, and workforce-related projects.
- Research, analyse, and scale up community-led best practices that demonstrate gender-inclusive and climate-resilient water management models.

Embedding gender equity, climate justice, and inclusive governance into water policies will not only address existing disparities but also enhance the effectiveness of climate investments, leading to a more sustainable and socially just water future for India.

The lack of integration of the women, water, and workforce triage limits long-term economic security. Broader representation can promote a wider range of perspectives and innovation within the water sector and related fields. To realise the potential of rapidly changing and shifting cities, it is important to prioritise the perspectives of women, who are not only participants and beneficiaries but also active contributors to the development of cities and their economies. By ensuring that women have equal opportunities and influence in shaping urban development, we can build cities that are environmentally sustainable, socially just, gender-responsive, and inclusive while also being economically viable.[30]

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Harvesting Equity: Empowering Women in Urban Food Systems

Subhasree Ray and Shoba Suri

Rising temperatures, erratic rainfall, and extreme weather events such as droughts and floods have threatened food security, deepened economic vulnerabilities, and restricted access to critical agricultural resources. Additionally, the concomitant pest resistance and soil degradation have reduced crop yields; for instance, maize and sorghum yields in Ethiopia fell by 30 percent over the past decade.[1] Beyond economic impacts, climate risks threaten nutritional security. Rising food prices push households towards cheaper, nutrient-poor foods, increasing malnutrition risks. Moreover, climate change exacerbates gender inequalities in urban food systems, disproportionately impacting women farmers who are at the forefront of urban agriculture. Women face compounded challenges due to uncertain land tenure, limited financial inclusion, and systemic exclusion from climate adaptation strategies and policy support, leaving them with fewer opportunities to build resilience.

Despite growing research on climate change and food systems, the gendered dimensions of climate risks in urban agriculture remain largely overlooked. Current urban food security policies fail to integrate gender-responsive approaches, marginalising women in decision-making and resource distribution; they also risk increasing women's workload.

Ensuring gender considerations in climate-smart and climate-resilient interventions is vital to preventing the deepening inequalities in food systems. Building women's adaptive capacity requires transformative action, including securing land rights, expanding financial inclusion, promoting climate-smart agriculture (CSA), and establishing inclusive governance mechanisms to ensure that women are central to climate adaptation and resilience efforts.

Women in Agri-Food Systems: Climate Risks, Structural Barriers, and their Impact

Women are responsible for producing nearly half of the world's food supply and make up approximately 43 percent of the agricultural workforce, both globally and within developing regions.[2] In Sub-Saharan Africa, women account for over 70 percent of household food production through urban farming initiatives,[3] while in South Asia, women make up about 39 percent of the agricultural workforce.[4] Their contributions extend across crop cultivation, livestock management, and local food distribution networks. Women also play a crucial role in enhancing food system resilience through employing traditional techniques such as seed preservation, crop rotation, and efficient water utilisation, which boost yields and reduce irrigation needs.

Yet, entrenched structural and economic barriers severely limit women's capacity to adapt to climate change. Households headed by women face 8 percent higher income losses from heat stress and 3 percent more losses from flooding compared to those headed by men, thus limiting the former's economic recovery;[5] cyclonic events between October and December 2024 in Bangladesh caused a 26 percent rise in urban food insecurity among women.[6]

Restricted land-ownership and financial exclusion are among the most pressing challenges. Women own less than 10 percent of the world's land, limiting their access to climate finance, credit, and adaptation programmes.[7] In India, for instance, although women account for approximately 73 percent of all farming activities, they own only 12.8 percent of landholdings.[8] Other gender disparities persist, too, with men controlling high-value crops while women primarily engage in subsistence farming.[9]

Limited access to climate finance compounds this disadvantage; despite global progress in financial inclusion from 2014 to 2017, an 8 percent gender gap persists, underscoring the need for targeted actions to promote women's financial access.[10] In Latin America, for instance, women-led farms receive 50 percent less support than men-led ones. Similarly, a case study in India found that women farmers are 40 percent less likely than men to secure agricultural loans, hindering their ability to adopt climate-smart techniques.[11] This financial exclusion results in 20-30 percent lower productivity on women-led farms, reinforcing food insecurity cycles.

Systematic exclusion from climate policy and governance structures further restricts women's ability to adapt to climate change. Current policies inadequately address gender disparities in climate adaptation, perpetuating exclusion in finance and governance. Only 6 percent of national climate adaptation plans address gender considerations, and just 3 percent of global climate finance supports agriculture, with even less directed to women-led initiatives.[12] In India, women make up 50 percent of the agricultural workforce but hold fewer than 8 percent of leadership roles in food policy councils.[13] Social norms also limit their participation in cooperative and climate governance bodies, excluding them from resource access and adaptation decisions. Legal and policy restrictions add to these issues; for instance, zoning laws in Ghana criminalise urban farming, disproportionately affecting women reliant on informal food production. Technological barriers also play a role. Women are underrepresented in agricultural extension programs, digital literacy initiatives, and climate adaptation training. Digital financial services, while promising, remain underutilised due to low digital literacy and limited access to technology among women.

Gendered time poverty, driven by unequal domestic responsibilities, worsens climate adaptation challenges. Women spend four hours daily on unpaid labour, compared to the one to two hours spent by men.[14] Climate impacts, such as water scarcity, increase this burden. In Bangladesh, extreme weather has caused a 30 percent rise in time spent collecting water and fuel, reducing female participation in agricultural activities and leadership roles in urban food governance.[15]

Strengthening Women's Agency in Climate Adaptation and Urban Food Security

Without targeted interventions, climate risks will further entrench food insecurity and gender inequalities in urban food systems. A growing body of evidence underscores the importance of securing women's land rights, expanding financial inclusion, promoting CSA, and strengthening women-led cooperatives as pivotal strategies for enhancing urban food security in the face of climate change.

For instance, studies indicate that, when women gain legal ownership of land, their agricultural productivity increases by 20-30 percent and they are more likely to invest in climate-resilient practices.[16]

Some key interventions to build women's climate resilience include:

- **Adopting gender-responsive financial products that allow alternative credit metrics, flexible repayment structures, and risk-mitigation solutions:** Expanding low-interest micro-loans, climate adaptation grants, and agricultural insurance is key to bridging gender gaps. Models like Mann Deshi Mahila Sahakari Bank[a] and Odisha's Climate Change Action Plan[b] can enhance women's access to climate finance.

- **Mandating gender quotas in agricultural governance to ensure inclusive decision-making:** Odisha's Climate Change Action Plan demonstrates how women's self-help groups can lead climate adaptation, emphasising the need for gender-balanced representation in governance.

- **Scaling digital climate solutions:** India's digital literacy programmes have resulted in improved financial awareness, as evident from the increase in the population with bank accounts, from 53 percent in 2014 to 80 percent in 2024.[17] A similar model should be applied to mobile-based climate alerts and early warning systems for women farmers.

- **Formally integrating urban agriculture into climate adaptation plans:** Municipal policies should protect women-led urban farms, preventing land conflicts and ensuring sustainable food production for climate resilience.

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[a] The first co-operative bank for women in rural India.

[b] Also known as the Odisha State Action Plan on Climate Change, it outlines strategies and actions to mitigate and adapt to the impacts of climate change in the state.

Table 1: Key Interventions for Strengthening Women's Agency in Climate Adaptation and Urban Food Security in India

Intervention	Key Points	Initiative Details
Providing Secure Land Tenure	Legal land ownership boosts women's agricultural productivity by 20-30 percent.	India (Kudumbashree)[18]
Adopting Climate-Smart Agriculture (CSA) for Resilience	CSA techniques increase crop productivity by 25-30 percent and reduce food shortages by 17 percent.[19]	The adoption of the direct seeded rice method in Odisha, India, has reduced water usage and labour and enhanced climate resilience.[20] Similarly, implementation of the System of Rice Intensification in Tamil Nadu, India, has increased rice yields with less water, improved productivity, and enhanced food security.[21]
Scaling Up Gender-Sensitive Climate Finance and Policy Frameworks	Only 3 percent of global climate finance is directed towards agriculture, with even less benefiting women farmers.	Odisha's Climate Change Action Plan has supported women farmers by raising awareness on heat stress, training them in climate-resilient practices, improving their access to climate information, and empowering them through community-based vulnerability assessments. It also leverages women's self-help groups to disseminate information and help adapt to extreme weather events like heatwaves.[22]
Enhancing Financial and Digital Literacy	Financial and digital literacy increases awareness of money management and self-employment. Digital tools like mobile apps and e-learning platforms also aid in knowledge dissemination.	India's digital literacy programmes have improved women's bargaining power and financial knowledge.[23] For example, the National Digital Literacy Mission can help promote women's access to and literacy in digital tools.[24]
Innovative Financial Products for Women Entrepreneurs	Tailored commercial banking products empower women entrepreneurs.	Mann Deshi Mahila Sahakari Bank is India's first bank for and by rural women. It provides affordable, timely, and customised credit to women entrepreneurs, empowering them through financial services and literacy programmes.[25]

Source: Authors' own, from various sources.

Conclusion

As the impacts of climate change intensify, addressing the gender gap in climate finance, governance, and urban food policy is paramount. Failure to act will perpetuate the systemic exclusion of women farmers from adaptation resources, exacerbating food insecurity and economic instability in urban areas. Promoting women's active participation in climate governance and financial decision-making is not only a matter of social equity but also a strategic imperative for achieving sustainable urban food systems. Women's contributions are pivotal to enhancing resilience, driving inclusive policy reforms, and fostering equitable resource distribution. Therefore, closing the gender gap is not merely a recommendation but an essential pathway to building adaptive, just, and sustainable urban food systems capable of withstanding future climate shocks.

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Moving Forward: Bridging Gender and Climate Gaps in Urban Mobility

Aishwarya Raman

Urban mobility is an enabler of economic participation, social inclusion, and climate resilience. However, across Indian cities, gendered transport barriers continue to limit women's mobility. These challenges are particularly acute in mid-sized urban centres, where unstructured first- and last-mile connectivity, safety concerns, and climate-induced disruptions exacerbate mobility constraints, forcing women into longer, costlier, and riskier commutes.[1] Survey data from the Ease of Moving Index (EoMI) 2022 highlights that, while women's reliance on public transport remains high, unreliable transit networks, heat stress, and air pollution restrict their access to jobs, education, and essential services.[2]

Climate change is not gender-neutral. Embedding a climate-resilience lens into urban mobility planning is essential to ensure equitable access to opportunities. Beyond mobility

barriers, climate change has introduced new risks, including heat stress, flooding, and worsening air quality, disproportionately impacting women who rely on shared mobility (public transport and intermediate public transport networks) and active mobility (walking and cycling). These factors also exacerbate economic vulnerabilities, limiting access to employment and entrepreneurship opportunities, healthcare, and education. Climate-adaptive public transport security, last-mile connectivity, and workforce mobility solutions can mitigate exclusionary mobility patterns.

This article draws on feminist urbanism, labour economics, and climate justice frameworks to examine climate-driven mobility disruptions across 40 Indian cities. It also examines global best practices and policy interventions. Case studies from Colombia, Mexico, Japan, Sweden, and Denmark illustrate strategies such as real-time safety monitoring, climate-proofed transit hubs, shared mobility electrification, and employer-supported transport benefits. This article also integrates EoMI data with global evidence on climate-responsive mobility to identify gaps in India's urban transport policies and outlines key interventions to build a climate-resilient, gender-inclusive mobility ecosystem.

Understanding Gendered Mobility and Climate Resilience: Data and Approach

This article draws on gender-disaggregated data from 50,488 respondents across 40 Indian cities, collected as part of the EoMI study.[3] The survey data provides insights into how climate-induced mobility disruptions disproportionately affect women, particularly in cities with weaker multi-modal transport integration. The survey, conducted using stratified, random, and intercept sampling methods, captures diverse mobility patterns across urban centres of varying population sizes, categorised as follows:[4]

- Promising Cities (<10 lakh residents)
- Rising Cities (10-20 lakh residents)
- Booming Cities (20-40 lakh residents)
- Mega Cities (>40 lakh residents)

Women comprised 40 percent of respondents (20,033 women respondents), while the remaining participants comprised men, transgender, and non-binary individuals, which allowed for a comparative assessment of mobility experiences across genders. The analysis of stated preferences of mobility is supplemented by a review of global best practices in climate-adaptive transport planning. Overall, the analysis focuses on climate-related disparities in access, affordability, and safety in urban transport, illustrating how women's economic agency and workforce participation are constrained by mobility disruptions.

Global Climate-Resilient Mobility Models and Lessons for India

This section presents key findings from the analysis of gender-disaggregated data from the EoMI study and examines climate-resilient mobility solutions from global models, focusing on public transport security, overall urban mobility networks, and workforce mobility.

Enhancing Public Transport Security Amidst Climate Risks

Women's safety concerns in transit intersect with service disruptions that result from climate events, creating compounded risks that discourage mobility and limit economic agency. EoMI data reveals that, while public transport usage among women is the highest in Mega Cities (78 percent), perceived safety remains alarmingly low, with only 33 percent of women feeling secure in transit spaces. The situation is similar in Rising Cities (61 percent usage, 36 percent safety perception) and Promising Cities (60 percent usage, 34 percent safety perception), highlighting that greater access does not guarantee safer mobility.[5]

Although only 3 percent of women across India reported direct harassment, 32 percent stated that they feel unsafe in public transport, revealing how perceived risk influences travel choices.[6] Women's presence in cities is often policed, limiting their ability to freely occupy public spaces.[7] Koskela's concept of "fearscapes" states that fear, rather than crime itself, constrains women's mobility decisions.[8] These mobility constraints intensify in climate-vulnerable urban corridors, where weather-induced transit disruptions heighten insecurity for women navigating unreliable systems.

Climate events such as flooding, extreme heat, and poor air quality exacerbate delays and overcrowding and increase risks of theft and gender-based violence in public transport. Poorly ventilated, unshaded transit hubs become unsafe spaces in extreme heat, while flooded streets and transit breakdowns force women into taking longer and unsafe routes. Climate-resilience strategies need to address these security concerns to ensure that extreme weather events do not reinforce mobility exclusions.

Latin American cities provide effective models for gender-sensitive security planning within climate adaptation frameworks. Bogotá's *Ella Se Mueve Segura* ("She Moves Safely") initiative integrates real-time surveillance, artificial intelligence (AI)-based monitoring, and climate-proofed transit hubs to improve women's confidence in public transport. The programme also incorporates improved urban lighting and cooling zones to mitigate risks from heat stress for women reliant on outdoor transit spaces.[9]

Similarly, Mexico City's *Viajemos Seguras* ("Traveling Safely") programme uses real-time harassment reporting, emergency response units, and climate-adaptive transit zoning to address mobility insecurities heightened by climate change.[10]

In India, integrating climate-adaptive safety measures in transit hubs is essential for mitigating extreme weather risks and mobility insecurity faced by women:

- Heat shelters, secure waiting areas, and AI-powered monitoring systems can enhance safety in high-risk transit hubs, particularly in overcrowded, poorly ventilated, or flood-prone areas.[11]
- Real-time incident reporting mechanisms must be embedded within urban resilience planning, ensuring that harassment response teams operate within climate risk frameworks.

By aligning women's safety interventions with climate adaptation policies, cities can strengthen mobility security, enhancing women's socioeconomic agency in climate-resilient urban environments.

Strengthening Climate-Resilient Urban Mobility Networks

Addressing connectivity gaps requires integrating gender-responsive solutions within climate adaptation strategies. EoMI data highlights that, while 78 percent of women in Mega Cities rely on public transport, access drops in Booming Cities (68 percent), Rising Cities (61 percent), and Promising Cities (60 percent). The challenge is acute in mid-sized cities, with 73 percent of women in Promising Cities and 72 percent in Rising Cities depending on intermediate public transport for last-mile connectivity. Additionally, 42 percent of women in Promising Cities and 37 percent in Rising Cities rely on walking for the first mile, which exposes them to heat stress, flooding, and air pollution—factors that worsen mobility precarity.[12]

Existing transport systems fail to account for women's trip-chaining behaviours, which interweave commuting with caregiving responsibilities, market visits, and household errands. Overlooking multi-stop mobility increases time poverty, transport costs, and economic exclusion.[13] Scholars have underscored that Indian transport policies favour male commuting patterns, resulting in longer, costlier, and less safe commutes for women.[14] With climate change worsening mobility constraints, these gaps will only deepen.

The World Bank has underscored the need for climate-adaptive mobility planning, emphasising that, without gender-responsive interventions, climate-induced transport breakdowns will entrench economic disparities.[15] In Denmark and Sweden, demand-

responsive transit models integrate real-time route planning, minimising climate exposure and ensuring flexible transport that accommodates caregiving travel.[16] These systems optimise first- and last-mile mobility, shortening wait times and reducing climate risks for women juggling work and caregiving. Colombia's transport electrification model demonstrates that integrating climate adaptation in public transport enhances accessibility and resilience.[17]

India can adopt the following climate adaptation strategies to ensure safe, efficient, and low-emissions mobility solutions for women:

- Develop climate-proof transit hubs with shaded walkways, cooling infrastructure, and well-lit waiting areas to mitigate heat stress and extreme weather risks.
- Expand demand-responsive shared mobility options, such as women-driven fleets and state-supported transit, ensuring safe and affordable caregiving-related travel.
- Electrify last-mile transport, reducing reliance on high-emission, heat-trapping intermediate public transport (IPT) networks while improving accessibility in climate-vulnerable areas.
- Undertake targeted electrification of public transport and IPT, such as autorickshaws and taxicabs, in underserved areas to ensure that connectivity remains resilient during climate emergencies.

By embedding climate adaptation within urban transport planning, India can ensure that women's mobility is safe, efficient, and resilient to climate shocks, strengthening women's economic participation and urban mobility freedoms.[18]

Leveraging Public-Private Partnerships

Safe, affordable, and efficient transport is critical to economic participation; yet, mobility barriers continue to limit women's economic engagement, particularly in mid-sized cities. EoMI data highlights that 11 percent of women in Booming Cities and 13 percent in Promising Cities have turned down job opportunities due to transport barriers, compared to just 4 percent in Mega Cities. Family-imposed mobility restrictions are also higher in Rising Cities (32 percent) than in Mega Cities (7 percent), underscoring how transit insecurity and affordability concerns hinder women's labour force participation.[19]

These constraints are intensified by climate-induced mobility disruptions, which disproportionately impact low-income, transport-dependent women in heat-prone, flood-vulnerable, and poorly connected urban corridors. According to the Economic Advisory Council to the Prime Minister, in India, urban women's labour force participation

increased by 25 percent from 2017-18 to reach 25.4 percent in 2022-23 but remains far below the 69-percent workforce expansion among rural women during the same period (reaching 41.5 percent in 2022-23).[20] High commute costs, unreliable transit services, and extreme weather events continue to widen these urban-rural disparities, increasing economic uncertainty for women in climate-affected urban regions.

India's fare-free public transit schemes—which have been implemented in some states, such as Delhi, Tamil Nadu, and Karnataka—have enhanced mobility access for women, particularly in lower-income groups.[21] However, these policies fail to address workplace-linked transit gaps, especially for women employed in climate-vulnerable industries such as manufacturing, retail, and informal labour markets. Japan's employer-supported commuter subsidies and tax incentives provide a useful case study for public-private mobility solutions, but studies indicate that such interventions alone have not improved women's long-term workforce retention, notably in climate-sensitive urban environments.[22]

In India, a more integrated, climate-responsive mobility model is essential, combining:

- Employer-backed transit incentives, ensuring that low-income women workers in climate-affected zones receive subsidised or free transport during extreme weather events.
- Workplace mobility credits and childcare-linked transit benefits, enabling flexible travel solutions for women balancing caregiving and employment responsibilities.
- Last-mile electrification in industrial and employment corridors, prioritising women workers' access to safe, climate-adaptive transport options in urban heat islands and flood-prone areas.

By aligning gender-sensitive transit policies with climate resilience planning, India can ensure that, in a rapidly warming world, mobility is no longer a barrier to women's economic agency.

Conclusion

India's transition to climate-resilient urban mobility must be gender-inclusive to ensure equitable access and economic participation. Women's exclusion from transport is not merely an infrastructure gap but also a policy and governance failure that restricts workforce retention, economic agency, and environmental sustainability.

Achieving a gender-equitable, climate-adaptive urban future requires secure and accessible transit infrastructure, demand-responsive transport networks, and policies that accommodate caregiving responsibilities and multi-stop travel patterns. Addressing

these structural barriers is essential to ensuring that urban mobility systems empower rather than constrain women's economic agency and participation in a rapidly warming world.

To bridge gendered mobility gaps, policymakers must strengthen last-mile connectivity, expand access to safe public transport, and integrate gender-sensitive security measures. Enhancing IPT, workplace-backed travel subsidies and electrified last-mile mobility can improve women's workforce participation in climate-vulnerable urban areas. Additionally, transport systems must reflect caregiving responsibilities and trip-chaining patterns to foster inclusive and adaptive urban mobility.

By integrating gender-sensitive adaptation strategies into transport planning, Indian cities can mitigate climate risks while expanding mobility choices for women, creating safer, more accessible, and climate-resilient urban environments. As climate change exacerbates mobility vulnerabilities, integrating climate-adaptive transit policies, resilient infrastructure, and equitable transport electrification is critical. By linking mobility access, workforce participation, and climate resilience, gender-responsive transport planning can ensure that women shape the future of resilient, inclusive, and climate-conscious cities.

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Rising Above Heat: Pathways for Inclusive Urban Climate Resilience

Vanshica Kant

The United Nations (UN) Secretary-General's 2024 'Call to Action on Extreme Heat' underscored the multisectoral impacts of extreme heat and the need for joint action.[1] The first-of-its-kind joint initiative, which brings together the expertise and perspectives of 10 specialised UN agencies on extreme heat, followed mounting evidence that heat waves are becoming more frequent, intense, and longer. Between 2018 and 2022, an average of 86 days per year had health-threatening temperatures.[2]

Urban areas experience higher temperatures than surrounding rural areas, known as the Urban Heat Island (UHI) effect, due to waste heat emissions, urban geometry, heat-absorbing materials, concentrated energy-use traps, and reduced vegetation.[3] This makes urban centres more susceptible to heat extremes that worsen air quality, impact hydration, compound susceptibility to heat strokes, create cardiovascular

complications and kidney diseases, and lead to death. Cities, despite occupying less than 2 percent of the earth's surface, are home to 60 percent of the world's population and 80 percent of global Gross Domestic Product (GDP); by 2050, it is expected that 2.5 billion more people will settle in cities, of which 90 percent will be in Asia and Africa.[4] The number of cities exposed to extreme temperatures is estimated to nearly triple by 2050.

Besides inland urban areas, coastal cities are facing the threat of marine thermal heating,[5] with an increase in marine heat waves (periods of abnormally high ocean temperatures).[6] In 2023, ocean heat content reached its highest level in 65 years.[7] A 2024 study by the Indian Institute of Tropical Meteorology warns that the Indian Ocean is expected to experience surface warming of 1.4-3°C between 2020 and 2100, which will intensify cyclones and monsoons and lead to a rise in sea levels.[8] Marine heat waves in the Indo-Pacific region are projected to increase from 20 days per year to 220-250 days per year, pushing the tropical Indian Ocean into a basin-wide near-permanent heat-wave state by the end of the 21st century.[9] Warming oceans and marine heat waves will, in turn, impact marine habitats, coral reef systems, fisheries, and tourism.

Manifestations of Heat: A Layered Threat

Thermal inequality compounds the challenge of extreme heat. Heat will not be evenly distributed between or within cities. The most rapid temperature rise will occur in the tropics, where a disproportionate number of vulnerable people live below the poverty line. In Asia, temperatures have far exceeded the Wet Bulb Globe Temperature[a] of 35°C.[10] Low- and middle-income countries (LMICs) like India face the most intense heat and have limited access to affordable cooling. In 2024, India recorded a total of 554 heat-wave days, up from 230 heat-wave days observed in 2023.[11] By 2030, 34 million Indians are estimated to face job losses due to heat stress-related productivity decline,[12] and 4.5 percent of India's GDP is likely to be at risk by 2030 due to lost labour hours from extreme heat and humidity.[13]

Heat has a disproportionate and hidden toll on women, whose social contexts, economic realities, and physiological makeup put them at greater risk during heat waves.[14] Women typically lack access to land, assets, and credit; have lower labour-force participation than men; and continue to face social and economic discrimination.

[a] Wet Bulb Globe Temperature is a measurement of heat stress in direct sunlight that considers air temperature, humidity, wind speed, and solar radiation, providing a more accurate assessment of heat than a simple air-temperature reading.

Globally, women spend about 25 percent more time battling ill health compared to men.[15] A three-country study in the Asia-Pacific region demonstrates that 60 percent of women experience a rise in unpaid work during heat waves.[16] These tasks especially include child and elderly care and household management, which erode their capacity for paid work and overall economic self-sufficiency.[17] Gender-based violence also escalates during extreme weather events.

Higher body-fat percentage and lower water content affect women's heat tolerance and hydration thresholds, while hormonal fluctuations during menstrual cycles, pregnancy, and menopause can make it tougher to regulate body temperature.[18] Further, heat exposure can impair female reproductive health, causing menstrual irregularities and decreased fertility.[19]

Heat waves also affect maternal health. Temperatures above 20°C increase the likelihood of low birth weight, pre-term delivery, and stillbirth. Every 1°C rise in maternal heat exposure is linked to a 27-42 percent increase in the risk of miscarriage or stillbirth.[20] Studies have demonstrated that pregnancy lowers women's tolerance to heat as physiological changes escalate metabolic demands, increase internal body temperatures, and make women susceptible to heat stress and dehydration, in turn exposing the mother and her foetus to life-threatening risks.[21] Extreme heat is also associated with gestational hypertension and diabetes, which can lead to mortality or long-term health issues.[22]

According to surveys, over 40 percent of female home-based workers report reduced working hours and earnings during periods of increased temperatures, with a 30 percent drop in productivity.[23] Evidence from LMICs indicates that women engaged in outdoor occupations and caregiving tasks are disproportionately impacted due to their limited engagement with early warning systems and low access to cooling solutions. In India, for instance, women are severely impacted by heat-related time poverty; in Pakistan, periods of extreme heat result in a rise in miscarriages; in Tajikistan, harsh weather stress has demonstrated a reduction in breast-milk production.[24]

Heat Resilience Solutions: Global and Local Case Studies

The unequal impact of heat implies that heat resilience adaptation and mitigation efforts, from improving green and blue infrastructure and preparing heat action plans to developing early warning systems and providing shaded zones and cooling shelters, must be gender-responsive. In recent years, international development finance and operations aimed at climate change have evolved from being gender-blind to targeting gender-specific and gender-transformative climate action.[25] The following case studies illustrate notable efforts towards this end.

Improving Female Participation in Urban Leadership and Governance: Global Chief Heat Officers

In 2021, the Atlantic Council's Climate Resilience Center appointed eight Chief Heat Officers (CHOs), a network of local climate leaders focused on delivering a unified response to extreme heat to safeguard their cities,[26] operating across Los Angeles and Miami in the United States (US), Freetown in Sierra Leonne, Athens in Greece, Melbourne in Australia, Dhaka in Bangladesh, and Santiago in Chile. In addition, a Global CHO as a global advisor and advocate on extreme heat was appointed by UN-Habitat.[27]

CHOs expand local heat research, policy, governance, finance, and operations. Importantly, all CHOs so far are women.[28] This decision reflects a recognition of the importance of incorporating women's leadership in climate resilience and the crucial role that women play in addressing heat-related vulnerabilities, particularly in vulnerable communities. It will be valuable to expand the CHO network to more LMICs, including India.

Gender-Responsive City-Level Heat Action Plans: The Ahmedabad HAP

The Ahmedabad Heat Action Plan (HAP), launched in 2013 in Ahmedabad, India, is South Asia's first city-wide initiative to combat extreme heat and reduce heat-related illnesses and deaths.[29] Women played a critical role in both the implementation and impact of the plan, ensuring that traditionally marginalised populations, particularly women, receive adequate protection from heat stress. The Ahmedabad HAP provides a model for integrating women's leadership and participation in climate-resilience efforts.

Future HAPs must strengthen gender-sensitive strategies, ensure greater representation of women in decision-making, and provide social and economic protections for women in exposed occupations. Women's participation can enhance the effectiveness, inclusivity, and sustainability of urban interventions in climate health and ensure that climate adaptation and public health strategies address the vulnerabilities and needs of different genders.

Gender Financing and Investments for Urban Heat: Parametric Insurance

Parametric insurance is a type of insurance coverage that pays out based on predefined triggers, such as a specific temperature threshold, rainfall amount, or earthquake magnitude, rather than actual loss assessments.[30] This model ensures faster payouts, reduced administrative burden, and improved financial resilience for communities affected by climate disasters.

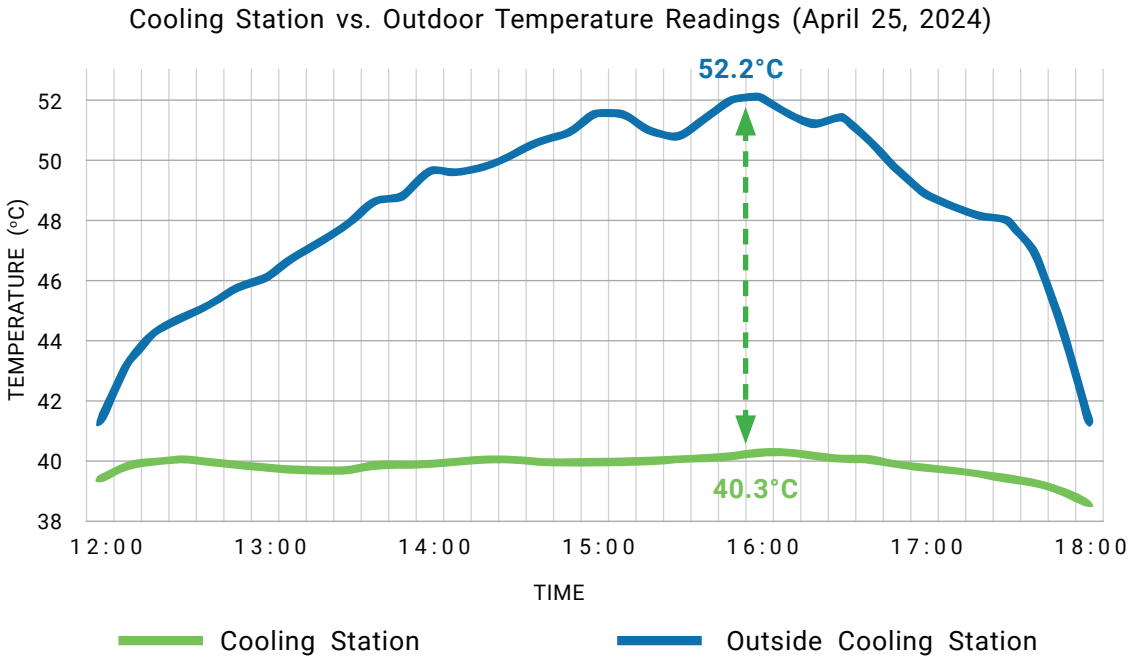
Since 2024, Climate Resilience for All, Self Employed Women's Association (SEWA), Swiss Re, and Blue Marble have collaborated to create and implement a parametric insurance policy.[31] The model covers part of the informal-sector income lost by 50,000 members of SEWA across 23 participating cities when they are unable to perform work due to extreme temperatures.[32]

Gender-Responsive Urban Heat Infrastructure: Cooling Shelters

Access to cooling is influenced by socio-economic factors. Women's limited access to electricity, air conditioning, cooling centres, well-ventilated homes, and green spaces translates into 60 percent more women than men lacking adequate cooling.[33] Creating safe spaces for communities to escape heat will have a positive impact on women through reduced heat-related illnesses, improved thermal comfort, and increased community resilience.

In April 2024, Mahila House Trust and Jodhpur Nagar Nigam North introduced a first-of-its-kind net-zero cooling station in a heat-vulnerable ward in Jodhpur North, which was identified through a HAP vulnerability assessment. The station includes mist-sprinkler fans, cooling curtains, and wind towers to reduce temperature; drinking-water corners, ORS, and first-aid kit facilities; and a sitting area with benches.

Figure 1: Hourly Temperature Difference Inside and Outside a Cooling Station During Peak Heat Hours in Jodhpur, India (12-6 p.m.)



Source: MHT and NRDC[34]

The HEAT Framework

A universal, human-centred heat framework that is multi-stakeholder and cross-sectoral is the need of the hour, and international organisations, multilateral development banks, and global development institutions must work to provide a global framework and investment roadmap that addresses the intersectional nature of heat.

One such effort is the HEAT[b] Framework—an outcome of the 2025 Bellagio Center Convening Program,[c] which aims to develop a unified, systemic, and human-centred response to heat in collaboration with global thought and action leaders.[35] Focusing on institutional, infrastructural, and cross-sectoral interventions, the framework rests on four pillars:[d]

- **Pillar 1**: Health-sector adaptation and resilience strategies and operations
- **Pillar 2**: Enablers that facilitate need identification and solution deployment
- **Pillar 3**: Architectonics and the built environment
- **Pillar 4**: Technologies and digital tools

The Heat and Health Bellagio Convening established a consensus on encapsulating the following qualities in this framework:

- **Gender-First**: It must solve for heat with women at the centre and incorporate female leadership and management in design and delivery.

- **Human-Centred**: It must provide a model for building a heat and health landscape that is fair, accessible, inclusive, and representative of all.

- **Coalition-Driven**: It must engage with a wide spectrum of global and local partners to design extreme heat and cooling solutions.

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[b] The four domains under this framework are Health, Enablers, Architectonics, and Technologies.

[c] Formulated and curated by the Asian Development Bank (ADB), in partnership with the Rockefeller Foundation as the hosting organisation and its Community of Heat Practitioners.

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- **Systems-Focused**: It must use systems change management to achieve heat-proofed and healthier cities, seas, and populations by developing and mainstreaming heat-centric and sensitive policies, programmes, projects, processes, and practices.

- **Outcomes-Based**: It must focus on measuring concrete and sustained heat results, such as equity, physical and psychological safety, and wellness, rather than one-time or piecemeal commitments without demonstrated change.

- **Win-Win**: It must democratise and decentralise heat and health solutions to provide better outcomes for everyone everywhere.

This investment-focused heat framework promises to spur gender-centred heat solutions, comprehensive policy reforms, heat-resilient infrastructure development, and accessible and affordable cooling technologies that lie at the gender-urban-climate-health intersection.

Multilateral development banks, international organisations, governments, development partners, philanthropic foundations, and civil society organisations play a foundational role in shaping the heat resilience landscape, mainstreaming gender across climate action in cities, and operationalising a gender-first, human-centred, and outcomes-based heat framework.

Activating a gender-transformative approach in heat-related integrated and standalone projects, conceptualising and delivering women-led heat programs, and investing in building and upgrading gender-first heat services and infrastructure will protect and enhance the health of women, support their productivity, reduce female time poverty, and empower their overall adaptive capacity.

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First Responders: Strengthening Women-Centred Climate Preparedness in Urban Areas

Madhurima Sarkar-Swaisgood

Climate change has intensified the frequency and severity of natural disasters across South Asia, placing particular strain on countries like India, where large populations live in environmentally fragile zones. Floods, droughts, cyclones, and heat waves are becoming more frequent, intersecting with persistent socioeconomic inequalities in ways that expose certain groups, especially women, to disproportionate risk.[1] This article examines how rising climate threats deepen gendered vulnerabilities and highlights the role of inclusive policies, community leadership, and strong social protection in sustaining resilient livelihoods. While India is the focal example due to its demographic scale and diverse ecological contexts, the insights apply across the South Asia region, where many lives and economies are tied to climate-sensitive sectors such as agriculture, fisheries, and forestry.

Disasters in South and South-West Asia have affected over three billion people in the past five decades, inflicting economic damages exceeding US$485 billion.[2] India consistently reports some of the highest numbers in disaster impact, with an estimated 43 million people affected annually.[2] Although environmental hazards are not inherently selective, a web of social disadvantages—limited decision-making power, wage inequality, and restricted mobility—renders women more vulnerable to catastrophic events.[3] Older people, persons with disabilities, and religious or ethnic minorities share similar risks as they often reside in marginalised areas with weaker infrastructure and fewer resources. Climate threats exacerbate systemic inequities and impede recovery unless they are deliberately addressed through targeted interventions and policy reforms.

Women are acutely exposed for a number of reasons linked to their social roles, such as the burden of collecting water and firewood or performing unpaid care work that surges in the aftermath of disasters.[3] In many rural households, women rely on local farmland for both subsistence and income, yet they often have little to no legal claim on this land. When floods devastate fields, relief packages and rebuilding grants might be channelled through male landowners, excluding women from formal assistance.[4] In urban areas, many women work in the informal sector and lack stable incomes or insurance. Such precarious circumstances mean that they must cope with the immediate and long-term repercussions of climate shocks without robust safety nets.[5]

Severe events such as cyclones or storm surges reveal these vulnerabilities most starkly. Coastal communities along the Bay of Bengal in India regularly experience landfalling cyclones, which bring high winds, heavy rains, and flooding. Protective infrastructure like embankments and multipurpose cyclone shelters is vital here.[6] Yet, women often lack a voice in deciding where or how these structures are built and face cultural barriers that sometimes deter them from sheltering in mixed-gender spaces. Even where shelters exist, inadequate lighting and a lack of separate sanitation facilities pose safety and hygiene risks. Such shortfalls can be particularly dire for pregnant or nursing mothers, who struggle to find suitable conditions in evacuation environments.

A related problem surfaces in drought-prone areas like Maharashtra and Rajasthan, where successive monsoon failures wipe out crops, degrade incomes, and create persistent water scarcity.[3] Here, women shoulder the burden of household provisioning. When local wells run dry, they must walk longer distances to secure water—a task made more dangerous by increasing heat waves. These hardships degrade their health, constrain their time, and limit opportunities for paid employment or education. The cycle of climate-induced shocks and deepening gender disparities poses a serious threat to sustainable development, putting entire communities at risk.[7]

Elevating Women's Leadership for Community-Led Resilience

Despite these intersecting hazards and longstanding inequalities, women in India and across South Asia have showcased considerable resilience through community institutions and local innovations, such as self-help groups (SHGs). In flood-prone regions, SHGs have established grain banks to supply staple foods when disaster disrupts commercial supply chains, preventing severe hunger.[6] These groups also partner with agricultural extension workers to adopt flood-resilient crop varieties that reduce damage from inundations. In drought-affected districts, SHGs frequently pool resources to implement small-scale water-harvesting systems or communal irrigation schemes, making it possible to maintain certain levels of agricultural output during erratic rainfall.

Nature-based solutions offer additional pathways to shore up resilience. Coastal mangroves, wetlands, and local forests serve as natural shields against cyclonic storms, helping to mitigate wave action and reduce saltwater intrusion. Women's cooperatives have led reforestation efforts in India's Sundarbans, planting mangrove saplings that not only protect settlements from storm surges but also create livelihoods through eco-tourism and sustainable fishing.[8] In Himalayan and sub-Himalayan areas, afforestation activities curb landslides, boost water retention, and foster biodiversity. These projects rely on women's intimate knowledge of local ecosystems and underscore how the environment and community well-being can be advanced when women are placed at the centre of planning.[9]

Nevertheless, grassroots initiatives alone cannot comprehensively shield communities from the mounting threats of climate change. Effective disaster risk reduction necessitates supportive legal frameworks, reliable funding, and a willingness among local and national institutions to integrate women's leadership into formal governance mechanisms. Civil society organisations, humanitarian agencies, and government bodies can help scale up women-led projects by providing technical training, financial resources, and channels to communicate lessons learned. In many cases, women already act as the most trusted conduits for sharing critical early warnings, but their influence often wanes at higher levels of decision-making. Ensuring representation for women in district-level planning committees or state-level agencies can be transformative.

Major floods and prolonged droughts, such as those that recur in India's Gangetic plain or its western semi-arid zones, underscore the importance of bridging local efforts with top-down support. Women's networks can highlight on-the-ground needs—such as the urgent repair of embankments or better-coordinated food distribution—while state agencies can facilitate cross-border collaboration when rivers cross

multiple countries. In the long run, this synergy between community insight and government capacity underpins the kind of disaster governance that tackles the complexities of climate risk.

Policy Pathways and Social Protection for Inclusive Preparedness

Social protection has emerged as essential in addressing both immediate post-disaster relief and long-term resilience. Social protection encompasses various policy tools, including cash transfers, public works programmes, food aid, and crop insurance. One ESCAP analysis indicates that increasing social protection coverage to around 11 percent of Gross Domestic Product could lower poverty rates even during severe climate scenarios.[6] This is pivotal for women who, lacking formal employment or property rights, might otherwise be sidelined in the distribution of disaster assistance. Carefully designed transfer programmes can direct funds to women's bank accounts, giving them more agency in household decision-making and post-disaster reconstruction.

In India, the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) is a prominent example. This programme guarantees each rural household 100 days of wage employment, which can become a crucial safety net when drought or floods slash agricultural yields.[6] By channelling new income to women, MGNREGA can help communities recover more swiftly. It invests in local labour for climate-resilient infrastructure projects, such as constructing check dams or repairing embankments. In addition to stabilising earnings, this approach discourages distress migration that can fracture families and disrupt children's education. Moreover, aligning MGNREGA's public works with climate adaptation activities amplifies the benefits for local ecosystems. Parallel lessons can also be found beyond India. In the Philippines, the Pantawid Pamilyang Pilipino Program adapted its requirements after Typhoon Haiyan to accommodate emergency cash transfers—a step that prevented many women-headed households from sliding deeper into poverty. In Fiji, following Cyclone Winston, top-up support to existing social assistance gave marginalised communities the means to rebuild basic infrastructure. These case studies highlight how flexibility in social protection systems can improve outcomes for vulnerable populations, including women, older adults, and those with disabilities.[6]

Beyond national borders, shared river basins like the Ganges, Brahmaputra, and Meghna necessitate transboundary data exchange and planning. Collaboration among India, Bangladesh, and Nepal is vital for accurate flood forecasting and early warning. Evacuation protocols and early warning systems must account for women and children, who may have limited mobility or face inhibitions on travel. Meaningful cooperation

across borders also involves reconciling different administrative procedures, ensuring that communities receive timely hazard information and can prepare accordingly.[10] Local governance structures represent an additional lever for inclusive preparedness. While national policies define overarching disaster management strategies, panchayats or municipal councils decide on land use, resource distribution, and community infrastructure. Bolstering women's representation in these local bodies often results in changes in spending priorities, with a greater focus on reinforced clinics, child-friendly evacuation spaces, and essential storage facilities for food and medicines. Although many of these measures are small in scope, they have tangible benefits when disasters strike. Realising these reforms can be challenging as it demands both technical expertise and sustained political commitment to gender equality.

Despite obstacles, promising developments are underway. In coastal Odisha, several multipurpose shelters have been refurbished to include better lighting, screened-off areas for privacy, and facilities accessible to people with disabilities. Civil society organisations assist local governments in evacuation drills tailored to women's needs, including procedures for carrying infants or supporting older relatives with mobility issues.[11]

Yet, in many parts of rural India, bridging the information gap is as critical as improving infrastructure. Advanced climate modelling, remote sensing, and geospatial analysis can anticipate monsoon shortfalls or predict cyclonic paths with greater accuracy, but these insights must reach remote villages effectively.[12] For women with limited digital access, community radio broadcasts and word-of-mouth networks can deliver life-saving updates about when to evacuate or how to protect livestock.[13] By training female community leaders in interpreting meteorological bulletins, early warnings can become more inclusive and actionable.

The stakes for climate resilience in India and across South Asia will continue to mount. As temperatures rise and extreme weather becomes more common, lower preparedness will translate into more severe social and economic losses, particularly among women and marginalised groups. Conversely, deliberate and well-funded interventions that emphasise women's leadership, robust social protection, and nature-based solutions can break the cycle of poverty exacerbated by repeated disasters. A comprehensive approach to climate resilience must be rooted in local realities, reflect national commitments to leaving no one behind, and incorporate regional collaboration. Flexible financing for social programmes like MGNREGA,[14] introducing micro-insurance, and undertaking broad-based ecosystem restoration projects can

ensure that even coastal or arid zones prone to cyclical hazards evolve into safer, more adaptive communities. Being cognisant and embedding gender perspectives at each stage—from local panchayats to intergovernmental dialogues—can solidify the idea that resilience is neither purely technical nor infrastructural; it is fundamentally about empowering people. Moving women and other vulnerable groups to the centre in planning, governance, and resource allocation heralds a more equitable future—one capable of withstanding not just an isolated flood or drought but also the enduring climate volatility of our times.

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Caring for the Future: Integrating Care Work in Urban Climate Action

Mitali Nikore, Brinda Juneja, and Aditi Verma

While climate action frameworks increasingly recognise gender gaps, they continue to overlook care work, particularly women's unpaid contributions. Integrating care is crucial not only for achieving social justice but also for building truly resilient societies. This article explores gender gaps in care, the disproportionate impact of climate change on women, and the current integration of gender into climate action mechanisms. It proposes a roadmap for integrating care work into climate resilience, mitigation, and adaptation efforts in India, highlighting global practices and providing policy recommendations and gender-responsive climate strategies.

Care work, understood as the labour involved in caring for others and oneself, is essential for the sustainability of societies and economies. The International Labor Organization (ILO) estimates that nearly 75 percent of global unpaid care work is performed by women and that a majority of this is

unpaid or underpaid.[1] Gender gaps in unpaid care and domestic work are especially pronounced in South Asia. Research by Nikore Associates[a] shows that Indian women spend about eight times more hours on care work than men.[2] This systematic undervaluation of women's care work leads to market failures, such as low labour-force participation of women, motherhood wage penalties, and low remuneration for care workers.

The effects of climate change, such as unseasonal rainfalls and prolonged heatwaves, intensify women's caregiving burden. Recent research from the Potsdam Institute shows that women in emerging economies spend, on average, 23 minutes per day collecting water.[3] In a high-emissions scenario, as water sources become scarce and distant, the time spent on water collection could rise by 30 percent globally and up to 40 percent in Sub-Saharan Africa and Southeast Asia.[15] Furthermore, research from South Asia finds that heat exhaustion and related illnesses increase women's care work by almost 1.5 times.[4]

In recent years, there has been a growing recognition of gender considerations in climate action frameworks. The Paris Agreement explicitly calls for gender-responsive approaches,[5] particularly in mitigation and adaptation actions, while the United Nations Framework Convention on Climate Change Gender Action Plan (2019) provides guidance for integrating gender into climate policies.[6] The Commission on the Status of Women Agreed Conclusions (2022) emphasised eliminating the unequal burden of unpaid care work exacerbated by climate change, promoting work-life balance, and investing in social services and parental leave, among other measures.[7]

Estimates suggest that unpaid care work contributes approximately US$10.8 trillion annually to the global economy, equivalent to 13 percent of global Gross Domestic Product (GDP).[8] In emerging economies, this figure is higher; recent estimates for India place the economic value of women's unpaid domestic and care work between 15 percent and 17 percent of GDP in 2019-20.[9] However, a UN Women analysis found that, as of 2023, only 12 out of the 133 reviewed Nationally Determined Contributions (NDCs) acknowledged women's unpaid care work. This gap underscores the need for more substantial global commitments to integrating care work within climate policies.[10]

While the integration of care considerations into climate action frameworks is still in its early stages, some countries and initiatives from the Global South, including India, are creating gender-intentional interventions that prioritise care work and care workers.

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[a] The authors are affiliated with Nikore Associates.

EUROCLIMA+, an organisation focused on supporting ecosystems and vulnerable communities in improving their resilience to climate change, is actively integrating care work into just-transition policies in Latin America, recognising unpaid care work as a key component of resilience and decarbonisation efforts.[11] A notable initiative includes investments in green and low-emission infrastructure (such as water, sanitation, energy, and transport), which reduces the care burdens on women who spend a disproportionate amount of time collecting water and fuel in rural areas.

Cambodia's policy actions include initiatives to reduce women's care work through agricultural improvements and climate-resilience measures.[12] Key action plans such as Cambodia's NDCs and the Cambodia Climate Change Strategic Plan (2014-2023) aim to address gender-differentiated climate vulnerabilities and integrate gender-sensitive approaches into climate change responses. These policies aim to improve agricultural productivity and diversification. Additionally, efforts to enhance climate resilience in health service delivery and infrastructure repair seek to increase women's access to essential resources and mobility, thereby alleviating their care burdens.

Initiatives in India include the Jal Jeevan Mission, launched in 2019, which aims to provide tap water to all households, and the Pradhan Mantri Ujjwala Yojana, launched in 2016, to ensure 100 percent access to liquefied petroleum gas (LPG) connections for rural and Below Poverty Line households that previously relied on traditional cooking fuels such as firewood, coal, and cow dung cakes—both aimed at reducing women's burden of domestic work. By providing tap water to nearly 78 percent of rural households[13] and distributing over 103 million LPG connections as of August 2024,[14] these programmes have reduced women's time poverty resulting from collecting water and cooking with traditional fuels. Public-sector investments in the care economy include schemes like Palna Ghar, launched in 2022 to set up crèches at Anganwadi centres, and the National Social Assistance Programme, launched in 1995, which provides cash support to elderly persons.

Integrating Care Considerations into Climate Action: A Roadmap for India

Countries must develop a roadmap for integrating care considerations into climate resilience, mitigation, and adaptation measures. Specifically, India can consider five key areas of intervention.

Care Infrastructure at TVET Facilities

Enhancing women's participation in Technical and Vocational Education and Training (TVET) programmes for reskilling and upskilling in green jobs is a key gender-mainstreaming measure in climate action. Yet, caregiving responsibilities often

constrain women's and girls' participation in these programmes. In this context, TVET programmes for green jobs must provide childcare facilities to enable women's participation. Programme schedules should also account for women's care responsibilities, ensuring greater accessibility and inclusion.

Gender-Sensitive, Time-Saving Care Infrastructure

Climate vulnerability assessments must analyse impacts on care work, specifically addressing how resource constraints—such as water scarcity, worsening soil quality, or extreme heat waves leading to droughts—affect caregivers. These assessments should prioritise climate-resilient infrastructure that reduces care burdens, such as tap-water supply, piped gas, irrigation infrastructure, and nature-based farming solutions. Moreover, urban and rural transport planners should consider care workers' mobility needs to encourage them to shift towards using public transport. Climate finance should also support programmes that provide access to clean energy, water, and sanitation, which can reduce the burden of unpaid care work.

Green Care Infrastructure and Services

New investments in care facilities, such as childcare centres and eldercare homes, should be powered by renewable energy, such as solar panels, and follow green building standards with climate-resilient features to enhance sustainability. Additionally, providing incentives for care workers, such as subsidies and tax rebates for purchasing electric vehicles, can promote green mobility and lower transportation costs for in-home and community-based care workers.

Care Infrastructure in Disaster Preparedness

Disaster preparedness often overlooks the critical need for childcare and eldercare facilities, despite women typically serving as primary caregivers during crises. Emergency shelters should have designated spaces for children, the elderly, and persons with disabilities, and relief efforts must support caregivers and dependents. Integrating gender-responsive planning into disaster policies could help protect care services, reducing the burden on women.

Incorporating Critical Questions on Care in India's National Climate Policies and Actions

UN Women and International Union for Conservation of Nature have developed a gender equality and climate policy scorecard to assess how NDCs mainstream gender dimensions.[16] The scorecard includes unpaid care as one of the five key dimensions of gender equality. The Government of India can use such tools to ensure that unpaid care is adequately considered in climate actions.

Conclusion

Changing weather patterns and the increased likelihood of extreme temperatures as a result of climate change increase the burden on care workers, particularly women in the Global South. Initiatives from countries in Asia and Latin America demonstrate that, when care work is properly valued and supported through policy interventions, it creates a multiplier effect, enhancing both economic productivity and climate resilience. However, there remains a policy gap, with only 12 out of 133 NDCs explicitly addressing care work. Moving forward, achieving truly inclusive climate actions will require India to consider five key elements in its NDCs: care infrastructure at TVET facilities for green jobs, gender-sensitive green infrastructure, green care infrastructure and services, care facilities in disaster preparedness, and the integration of critical questions on care work and care workers into national climate policies and actions.

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Rooted in Resilience: Nature-Based Solutions for Participatory Climate Action in Cities

Roshni K. Nuggehalli

Cities are responsible for 60-80 percent of the world's energy consumption and 75 percent of greenhouse gas emissions.[1] At the same time, they are deeply impacted by climate change, extreme weather events, and resource shifts. These impacts are felt most strongly in the Global South and among the most marginalised within cities.[2]

In India, 34 percent of the population live in cities; cities are projected to contribute to 75 percent of the country's Gross Domestic Product by 2030.[3] Fifty-four percent of India's urban mitigation potential till 2050 is concentrated in cities that have populations of less than one million, while 25 percent is in cities that have a population of over five million.[4] This means that a projected 400 million additional people who will be living in urban areas by 2050 will be impacted by the changing climate.[5] Existing systemic gender gaps will exacerbate women's exposure and their vulnerabilities to

climate change in cities while limiting their ability to adapt and build resilience. Research has shown that climate displacement has led to an increase in the number of hours that women work, often even sacrificing food due to gender norms.[6]

Adopting Nature-Based Solutions in Informal Settlements

Nature-based solutions (NbS),[a] both blue and green,[b] are providing increasing opportunities for cities to respond to climate-change-induced hazards, risks, and vulnerabilities. There are a range of NbS that can be applied in urban settings, from urban forests and open green spaces to river floodplains,[7] which can deliver social, economic, and environmental benefits. In cities, NbS can help combat extreme heat through localised cooling and improved ventilation. Simultaneously, blue-green infrastructure can reduce stormwater runoff and localised flooding events while gradually improving aquifer recharging through permeability. Evidence suggests that NbS can help achieve over 30 percent of the climate mitigation needed to meet the emissions goals of the Paris Agreement.[8]

India's Nationally Determined Contributions have centred NbS for achieving the country's ambitious goals of sustainable development and just transition. In Indian cities, both metro cities and Tier-2 and Tier-3 cities, NbS has the potential to meet natural ecosystem restoration and rejuvenation goals.

There is increasing potential to apply NbS across informal settlements in the country, where climate-change impacts are felt most acutely. NbS in informal settlements and public housing can improve liveability by creating ecosystem services that are often missing in these locations. Additionally, urban NbS designed through a gender lens can contribute to social equity, ensuring that women and other vulnerable groups are central to urban climate-adaptation efforts.[9] Even when implemented at a small scale, these processes can improve the resilience of informal settlements as a habitat-improvement intervention while providing climate-adaptation and inclusivity benefits.

However, there are several barriers to the development of well-functioning blue-green spaces in informal settlements, including complex community dynamics, insecurity of tenure, limited open spaces, and lack of financial resources. For NbS in poorer neighbourhoods, a mere focus on scientific blue-green aspects is not sufficient;

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[a] NbS is an umbrella concept that covers a range of ecosystem-based approaches and natural processes designed to protect, restore, or modify natural ecosystems to meet socioeconomic needs and build long-term environmental resilience. See: https://portals.iucn.org/library/sites/library/files/documents/2016-036.pdf

[b] Blue-green infrastructure is a combination of natural and designed elements, in both water bodies and green spaces.

instead, adequate time needs to be dedicated to building social stewardship and ownership.[10] This is particularly true when ensuring the inclusivity of impacts. Women and other marginalised groups are unable to comprehensively benefit from NbS due to intersecting vulnerabilities and barriers such as extensive care work, limited mobility, and lack of control over resources.[11] Therefore, intentional planning and support are required to ensure that households are actively involved in the design, development, and sustainability of impactful NbS for women.

Case Study: 'Chalo, Basti Badlein'[12]

In the Mumbai Metropolitan Region, the non-profit Youth for Unity and Voluntary Action (YUVA)[c] has partnered with local residents of *bastis* (informal settlements) to enable participatory NbS interventions through the 'Chalo, Basti Badlein' initiative. Poor waste management, poor sanitation, and open spaces used to consume drugs and alcohol were highlighted as critical barriers to NbS work at the *basti* level. These challenges are especially pronounced for women and young people, whose structural lack of access to open spaces and greening is coupled with low awareness of scientific practices of greening. Time poverty is also a challenge. Women have stated that fatigue after long hours of employment and care work makes it difficult to engage in other processes. Additionally, some have to convince their families that participating in community processes is productive and socially beneficial.

Despite challenges, women and young people are at the forefront of the 'Chalo, Basti Badlein' initiative. This engagement is facilitated by an approach that works around the realities and challenges of these individuals. The NbS work proceeds as a co-creative process and at a pace that is suitable for the participating women and young people. Together with local government and ecology experts, women and young people profiled soil types, the extent of percolation, and local ecology features to make decisions about plantation. Plants suitable to chosen areas are used to re-green spaces. Detailed plans for plant hydration, manure, and care are implemented over the long term.

The initiative goes beyond increasing green cover and groundwater recharging to an ecosystem-based approach that foregrounds community participation and ownership in order to design and establish inclusive and accessible spaces. In over two years, eight such rejuvenated spaces have been created that prioritise safety, blue-green solutions, and community ownership.

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[c] The author is affiliated with YUVA.

Although the solution primarily benefits the community at the ground level, the partnership between diverse stakeholders—from the government to ecology experts—demonstrates the benefits of a collaborative, community-driven model of nature for all.

Co-Benefits of Blue-Green Infrastructure in *Bastis*

Evidence indicates that NbS in public spaces in informal settlements leads to increased green cover as well as providing the benefits of cooling, shade, and fresh air. These initiatives often involve de-concretisation in favour of soil, thus improving resilience to heavy rains and preventing local water stagnation. Improved waste disposal is a co-benefit in areas where waste-management practices are adopted as part of blue-green solutions.

The most notable social benefits of such initiatives are increased accessibility of green cover and safe spaces for interaction, especially for women and children, who are the primary users of these spaces. Collaborative NbS work helps people claim their right to cleaner environments and safe and accessible public spaces while enabling community ties and social cohesion. These initiatives also demonstrate the importance of a collaborative partnership between diverse stakeholders.

Inclusive Scaling of Micro-NbS in *Bastis*

When NbS design is ecologically sound and socially sensitive, there is tremendous scope for ensuring ecosystem and social benefits. However, challenges persist, including limited public space, the complexity of governance in informal settlements, and intersecting vulnerabilities that prevent women and other marginalised groups from meaningful participation in and ownership of NbS process. A participatory process, which includes adequate analysis, participatory planning, collaborative implementation, and local ownership, can ensure inclusive NbS that is replicable, sustainable, and includes community voices.[13]

- Inclusive NbS can be scaled through Urban Local Bodies (ULBs) as part of climate action planning and budgeting. Additional schemes like AMRUT[d] can be aligned with NbS goals as many blue-green infrastructure actions for NbS are linked with AMRUT goals.

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[c] The Atal Mission for Rejuvenation and Urban Transformation (AMRUT) by the Government of India focuses on improving basic infrastructure, especially in areas such as water supply, sewerage and sanitation, and green spaces.

- To ensure the participation and ownership of women and other marginalised groups, informal settlements in cities must be mapped and the most vulnerable settlements identified where NbS can provide vital adaptation and resilience benefits. This should be done for all informal settlements, irrespective of tenure status, to ensure that the most marginalised, particularly women, living in these settlements are not excluded. When this process is undertaken in a participatory way, it begins to build ownership in the community towards the NbS approach.

- For NbS in informal settlements, permissions and budgets for implementing the solutions are necessary, without which long-term sustainability becomes difficult. Women and other community groups can pursue these permissions with support from ULBs, city climate cells, and private players, such as organisations engaged in Corporate Social Responsibility.

- Blue-green solutions should be co-designed after priority sites are identified. Co-design must include the participation of technical experts like soil scientists, biodiversity experts, landscape architects, and water management experts alongside women, youth, and residents' organisations within the community. Civil society organisations (CSOs) and/or academic institutions need to be involved in facilitating and supporting co-design processes in order to mitigate barriers to women's participation and investment in these processes.

- Relevant and intentional facilitation by CSOs and other stakeholders can promote ownership within the community to ensure that the implementation and maintenance of the final NbS proceeds collaboratively. This includes establishing clearly outlined roles for ULBs, other local authorities, civil society groups, and the community towards achieving a shared goal.

Enabling a bottom-up, inclusive approach to NbS in informal settlements is central to ensure the inclusion of women and marginalised groups, community ownership, and long-term sustainability. Such an approach can help reinforce the idea that climate action is not only about infrastructure but also about enabling communities to drive meaningful, long-term change.

This approach also highlights the need for gender-sensitive climate policies that recognise and support women's participation in climate action in cities. Equally critical is political support and financing for greening, alongside addressing questions related to aspects of NbS, such as water circularity and space utilisation. Participatory processes such as those developed by YUVA and other CSOs can ensure that NbS is owned by the most marginalised in a city—women and young people.

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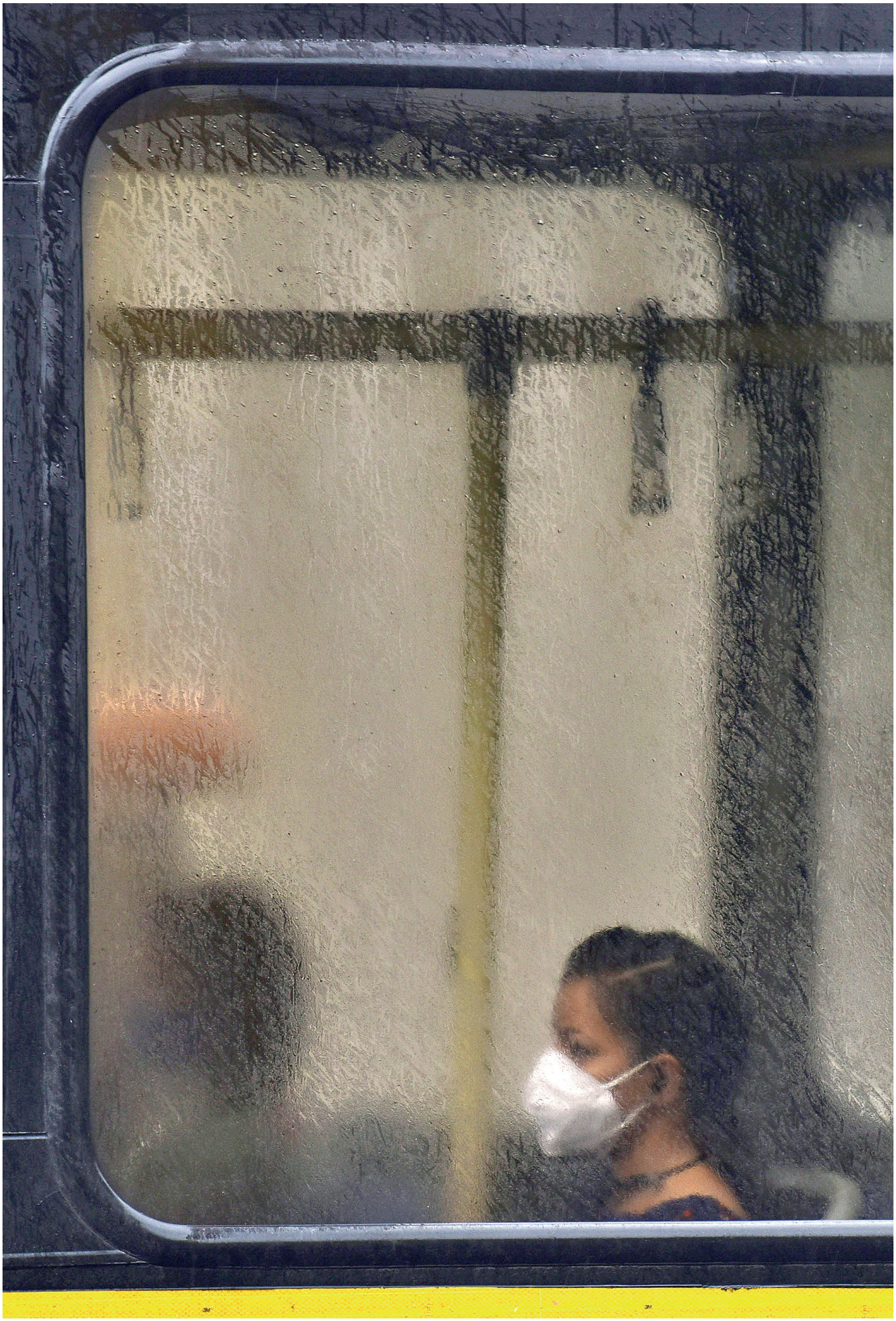
III

Rethinking Urban Design



Shaping Cities, Transforming Lives: Gender-Responsive and Climate-Resilient Urban Planning

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Urban planning and design go beyond just allocating and guiding the use of resources—they shape people's experiences in cities through factors such as well-lit footpaths, the proximity of local grocery shops, safe parks for children to play in the vicinity of homes, and the commute required to access workplaces. Planning reflects the norms and values that shape society, which can inadvertently reinforce existing inequities.[1]

Cities are inherently gendered, mainly to the disadvantage of women.[2] The emergent risks associated with climate change also result in gendered experiences during extreme events. Studies have shown that women are more likely to experience higher rates of mortality than men during climatic shocks like extreme heat or cyclones;[3] during the 2010 heat wave in Ahmedabad, mortality rates among women were much higher than among men.[4] Women are also more susceptible

to stress and gender-based violence during and after disasters.[5] This is due to gendered inequities that limit girls' and women's access to information, mobility, and decision-making.[6]

Cities, where climate risks are magnified,[7] can leverage planning—the process of "guiding and directing the use and development of land, urban environment, urban infrastructure and related ecosystem and human services"[8]—to transform urban environments into sustainable, inclusive, and thriving places. Urban planning has the potential to address the root causes of vulnerability while creating spaces for women to serve as agents of change. However, current planning processes are often technocratic and male-dominated.[9] There is a need for reforms that challenge dominant frameworks to build climate-resilient cities that work for everyone.

The Unequal City

Historically, urban planning and design have reflected social norms that confined women primarily to domestic spaces.[10] This has resulted in cities that are designed for men's convenience and do not account for the multiplicity of functions that women perform. For example, single-use zoning,[a] characterised by the separation of work, social, and residential life, was built around the assumption that men would travel to centralised workplaces (downtowns) while women remain at home (in residential enclaves).

However, even as more women have entered the workforce and reclaimed their right to participate in public life, these outdated planning principles have not evolved to accommodate their physical, social, or economic needs. Women are disproportionately more likely to "trip-chain"—a travel pattern that combines multiple stops in one journey (such as buying groceries, fulfilling caregiving responsibilities, and commuting)—as they play multiple roles in the household.[11] However, limited access to safe, affordable, and well-connected transportation networks forces women to spend more time navigating the city. Existing transportation networks and single-use zones create structural barriers that reinforce broader societal inequalities by limiting women's autonomy, safety, and access to essential services and opportunities.

[a] Zoning is an urban planning tool that designates specific areas for different types of development. It can be single-use, where areas are restricted to only residential or only commercial activities, or mixed-use, where residential and commercial activities co-exist.

Climate Change and Women at Risk

The systemic inequities embedded in urban systems impact women's day-to-day lives and shape how they experience and cope with climate-induced risks like floods, heat waves, or drought. This is especially pronounced for urban poor women, especially those living and working in informal contexts, without urban infrastructure like safe housing or basic services like healthcare.[12] Coping mechanisms driven by poor urban infrastructure for women result in worse health outcomes for urban poor women. For example, limited access to public toilets forces women to reduce their water intake to avoid relieving themselves outdoors, which can lead to dehydration, severe health impacts, and death.[13]

Women in South Asia also work disproportionately in informal sectors[14] as domestic workers, construction labourers, and street vendors. Without adequate cooling, shade, healthcare, or social safety nets like paid leave, managing illnesses linked to climate risks becomes more difficult and results in a loss of income. For example, in South Asian cities, female street vendors struggle to work during heat waves due to the lack of shade or cooling.[15] Additionally, 43 percent of women engaged in home-based informal work reported income losses[16] due to climate impacts, which deepens their economic vulnerability and limits their ability to adapt to and recover from climate change.

The Indian Context

The gendered inequities embedded in urban systems around the world are also reflected in Indian cities. A study conducted across 140 Indian cities revealed that 52 percent of women declined educational and livelihood opportunities because of safety concerns when travelling within the city[17]—a direct consequence of mobility systems that fail to account for women's safety needs. These inequities limit women's agency, financial independence, access to information, and thus, their ability to adapt to climate risk.

India is the sixth most vulnerable country to climate risks[18] and is projected to witness rapid urbanisation, with 400 million people expected to live in cities by 2050.[19] Much of the infrastructure and services that will shape the future of Indian cities are yet to be built. Therefore, this is an opportune moment to dismantle existing urban planning approaches in favour of a feminist, climate-responsive approach.

However, sustainable and inclusive urban transition is hindered by institutional challenges. Urban local bodies have limited autonomy in implementing climate action and lack financial independence, which constrains their ability to raise funds that would address gendered disparities in service and infrastructure provision. Furthermore, most Indian cities lack statutory master plans,[20] which are key tools for guiding sustainable, gender-responsive growth. These challenges are compounded by a shortage of qualified urban planners[21] and the prominence of a male-dominated planning approach that fails to incorporate gendered perspectives into decision-making. Overcoming these barriers requires not just incremental reforms but also a fundamental reimagining of urban planning that centres on equity and inclusion.

Implementing Gender-Responsive Planning in Indian Cities

Key principles of gender-responsive urban planning and design must be established to make cities more inclusive for women and gender minorities. The World Bank's *Gender Inclusive Planning Handbook*[22] emphasises that urban planning should:

- Actively include and promote the agency of women, girls, and gender minorities in decision-making processes
- Address deep-rooted gender inequities that hinder equal access to services, infrastructure, tenure, safety, and climate resilience
- Foster cities that support the full social and economic inclusion of all marginalised groups

In light of these, Indian cities must adopt the following measures.

Increase Women's Leadership in Urban Decision-Making

Studies have shown that increased female representation in urban governments fosters more inclusive and sustainable cities. While some Indian states have seen the increased participation of women in urban governance and administration, barriers persist, such as limited professional experience, gender biases, and the lack of familial support.[23] With global forums like the Conference of Parties increasingly recognising the link between gender and climate resilience, local leaders must champion women's leadership in climate action to drive equitable and effective urban transformation. Addressing these gaps requires targeted investments in mentoring programmes to build female leadership and in sensitivity training within local administrations to combat gender biases.

Understand Gendered Urban Experiences

A nuanced understanding of women's experiences in urban spaces is crucial for designing solutions that meet their needs. Decision-makers in cities can collect gender-disaggregated data, especially in vulnerability assessments,[24] or conduct safety audits and ethnographies to capture lived experiences to better understand how women navigate the city and use services and infrastructure. These insights are critical for co-creating targeted, user-centric solutions that not only drive equitable urban development but also strengthen resilience to climate risks by addressing the inequities that heighten women's vulnerability.

Mainstream Gender in Urban Investments and Programmes

Facilitating a shift to address women's needs and vulnerabilities requires integrating gender into climate action and urban planning. One strategy is to use measurable frameworks with indicators and key questions that assess the gendered impact of projects and their role in climate resilience. Another approach is reworking design standards to address safety concerns that disproportionately affect women; for example, better lighting on pedestrian paths can create safer mobility conditions for women while supporting low-carbon transportation.

Participatory planning is another approach that can help integrate women's needs into service provision. In Bengaluru, community groups successfully advocated for a bus stop with routes and a design that worked for women across all weather conditions and times of day.[25] This case highlights the importance of integrating local women's voices into every stage of planning and implementation.

Finally, gender budgeting can be a powerful tool to ensure that women actively participate in decision-making processes and that financial resources are allocated to support gender-inclusive and climate-resilient urban solutions.

Rapid urban growth in Indian cities offers an unprecedented opportunity to build cities that work for women and ensure climate resilience. Women's heightened vulnerability to climate risks stems from deep-rooted structural inequities in urban systems, such as restricted mobility, inadequate safety nets, prevailing cultural and social norms, and gaps in essential services. By addressing these inequities and centring women's needs in urban planning and governance, Indian cities can lead the way in creating inclusive, resilient urban spaces that work for everyone.

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Endnotes

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