



Urban adaptation for gender equality and social justice

Background Paper prepared for
Progress of the World's Women 2026

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Background Paper prepared for *Progress of the World's Women 2026*

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Acronyms and Abbreviations

ACAP: Accra Climate Action Plan

AGR: Adaptation Gap Report

AMC: Ahmedabad Municipal Corporation

BGAP: Belém Gender Action Plan

CDP: Carbon Disclosure Project

COVID: Corona Virus Disease

DNCC: Dhaka North City Corporation

FEDURP: Federation for Urban and Rural Poor

GAR: Global Assessment Report

GBV: Gender-Based Violence

GGA: Global Goal on Adaptation

GHG: Greenhouse Gas

IPCC: Intergovernmental Panel on Climate Change

LLM: Large Language Model

MSSRF: M. S. Swaminathan Research Foundation

NAP: National Adaptation Plan

NGO: Non-Governmental Organization

PATAMABA: Pambansang Kalipunan ng mga Manggagawang Impormal sa Pilipinas

PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses

SDG: Sustainable Development Goals

SEWA: Self-Employed Women's Association

SZWG: Shenzhen Water Group

UN: United Nations

UNDRR: United Nations Office for Disaster Risk Reduction

Summary

This paper examines how implemented urban climate adaptation actions are meeting goals of gender and social justice. Using a feminist climate justice lens, we analyse peer reviewed literature and self-reported urban adaptation action data. To reorient urban climate action, the paper operationalizes a feminist climate justice lens through the "3Rs" conceptual framework of Recognition, Representation, and Redistribution. Recognition entails acknowledging that climate change affects genders differently and addressing the unequal social norms, legal structures, and labour divisions that reinforce vulnerabilities, while challenging the biologically deterministic stereotypes that frame women merely as passive victims. Representation emphasizes the procedural justice mechanisms required to ensure women's meaningful participation and leadership in environmental decision-making, countering the representation gap where women constitute only 15 per cent of environment ministries and 20 per cent of mayors globally. Redistribution focuses on redistributive justice, aiming to shift resources, power, finance, and technology to address the uneven distribution of climate risks and adaptive capacities, particularly in the face of an annual global adaptation finance gap estimated at USD 284 to 339 billion. By mapping these three pillars onto core urban planning sectors—including health, water, housing, livelihoods, education, and social protection; the paper establishes a multi-dimensional matrix to evaluate the equity outcomes of implemented urban interventions.

Cities house over half the global population and emit nearly 70 per cent of greenhouse gases, face compounding stressors like extreme heat, flooding, and sea-level rise. These risks are deeply gendered and intersect with pre-existing socioeconomic inequalities, resulting in disproportionate impacts on women, and marginalized households, particularly in informal settlements. Historically, climate adaptation research has focused on rural agricultural contexts, leaving the intersection of urban adaptation and its outcomes for gender and social inclusion understudied. Within empirical literature on climate adaptation, urban interventions present the lowest proportion of academic articles addressing the equity and inclusion of marginalized groups, exposing a critical knowledge gap. To address this neglect, this paper provides an empirical evaluation of implemented urban adaptation, exploring how current interventions address differentiated vulnerabilities and proposing a practice-oriented framework to unlock gender equality and social justice.

The methodology combines evidence from three distinct data sources: self-reported urban adaptation disclosures from the 2023 Carbon Disclosure Project (CDP) database, a review of global peer-reviewed empirical research, and six purposively selected, illustrative city case studies. The CDP database captures 5,926 implemented adaptation actions across 910 cities globally, allowing for a comprehensive, cross-city comparison of adaptation portfolios and city-reported development co-benefits. The rapid review of peer-reviewed academic literature (2015–2025) systematically analyses the gendered outcomes of implemented interventions across 23 cities, focusing on who leads, implements, and funds these actions. The six case studies (Barcelona, Manizales, Ahmedabad, Cirebon, Freetown, and Shenzhen), provide context-sensitive, practice-oriented insights into how cities utilize diverse combinations of adaptation levers on the ground to navigate political, financial, and institutional barriers.

National climate adaptation reporting continues to have gaps on mainstreaming urban issues and gender. The 2025 Adaptation Gap Report assessment shows that out of 105 countries, 75 mention gender in relation to adaptation in their Biennial Transparency Reports but over a quarter (30 countries) remain entirely gender-blind, i.e., they do not explicitly acknowledge gender when reporting climate impacts, adaptation priorities, actions implementation, and results. A review of 56 National Adaptation Plans (NAPs) finds that 54 NAP documents mention Gender, 85% of NAP documents position women as a group particularly vulnerable to climate change, but only 16% position women as agents of change.

Urban reporting paints a more varied picture. While 93 per cent of 910 cities in the CDP database acknowledge being at risk from climate hazards, 43 per cent lack a dedicated adaptation policy or plan. Where cities do report co-benefits, they concentrate on health, environment, and social protection. Mapped to SDG 5 targets, redistribution-oriented co-benefits dominate the landscape (accounting for 79 per cent), whereas representation-oriented co-benefits are extremely weak (6 per cent), and crucial pathways targeting the reduction of unpaid care burdens (SDG 5.4) and gender-based violence (SDG 5.2 and 5.3) are entirely absent. This indicates that global urban adaptation is largely designed to reduce physical risks rather than to confront the structural inequalities that shape gendered vulnerability.

Overall, redistribution dominates: 79% of urban adaptation co-benefits self-reported by cities focus on redistribution through livelihood diversification and employment generation. Yet, these linkages, often universal, are not explicitly designed to reach women or marginalized groups. There remains weak evidence on representation: only 12% of urban adaptation co-benefits relate to representation (participation and leadership). Heavy reliance on expert or scientific knowledge for urban adaptation rather than lived experience exacerbates this. Recognition remains uneven and when gender is acknowledged, it is often through biologically deterministic stereotypes that frame women as inherently vulnerable victims of climate change.

The literature review corroborates this, demonstrating that empirical evidence of positive gender outcomes of implemented urban adaptation is sparse. We note emerging evidence on the risk of "feminisation of (adaptation) responsibility," where nature-based and community-led adaptation strategies frequently rely on the unremunerated, voluntary labour of marginalized women to absorb climate shocks and maintain ecological services, effectively shifting the physical and fiscal burden of climate preparedness from the state onto those with the least resources, without redistributing decision-making power or formal governance roles.

To overcome these structural imbalances, the paper identifies seven interconnected levers: policy, governance, capacity, collectives, behaviour, finance, and technology, and illustrate how they combine to unlock gender-just outcomes. For instance, Barcelona's care-centred Superblocks and Freetown's female savings groups mobilize collectives, while Manizales' Guardianas de la Ladera program and Ahmedabad's innovative extreme heat income insurance utilize progressive municipal finance and gender-responsive governance to directly empower marginalized women. Similarly, Shenzhen's Sponge City initiative and Cirebon's Medium-term plan demonstrate how capacity-building and technological co-production can successfully institutionalize supportive care policies and expand female leadership in technical governance roles.

Ultimately, the paper concludes that transforming global urban adaptation requires centring gender equality as an explicit objective. This can be enabled by combinations of levers in finance, policy, collective action, capacities, and behaviour change and must be underpinned by rigorous, intersectional vulnerability audits; dedicated transversal coordination; institutionalizing support that directly reduces and redistributes the unpaid labour that currently absorbs environmental shocks.

Section 1: Introduction

Cities are critical arenas for advancing climate action and gender equality. Responsible for almost 70% of global greenhouse gas emissions and currently home to more than half the world's population, cities are highly vulnerable to different climate impacts and central to adaptation progress.¹ How cities plan and adapt, has direct implications for gender equality and social justice. Reasonably so, gender has gained traction in climate change research and policy² over the past decades, especially following the adoption of the Lima Work Program on Gender by the Conference of Parties (CoP) in 2014.³ Most adaptation policy and research attention has tended to focus on low-income women in rural areas in the Global South. Adaptation action has primarily focused on farmers (46%), with the next most targeted groups being women and fisherfolk (14% and 9%, respectively), mirroring the prevailing focus on agriculture and food security as the major vulnerabilities.⁴ Lesser attention has been paid to the intersection of urban climate action and its outcomes for gender and social inclusion.⁵ Within the peer-reviewed empirical research on adaptation responses to climate change (n=1,682), urban adaptation had the lowest number of academic articles addressing equity and inclusion of marginalized groups⁶, highlighting the need for urban adaptation practice and research to engage with and report equity outcomes more centrally.

This background paper examines the evidence on the outcomes of implemented urban adaptation⁷ from a gender and intersectional perspective, and identifies levers to unlock gender equality and social justice benefits that well-designed and implemented urban adaptation could deliver. Given this objective, we answer two research questions:

1. What is the current evidence on the outcomes of implemented urban adaptation on gender justice outcomes?
2. What are the levers for urban adaptation to deliver gender equality and social justice?

In answering the above questions, we reflect on how current, implemented urban adaptation is addressing differentiated needs and vulnerabilities through place-based action.

The paper is structured into six sections. Section 2 lays out the background and overview of global urban climate action and its impacts on gender justice and equality. In section 3, we discuss the conceptual framework, drawing on a feminist climate justice lens operationalized through the 3Rs of recognition, redistribution, and representation. Section 4 details our

¹ Dodman, D., B. Hayward, M. Pelling, V. Castan Broto, W. Chow, E. Chu, R. Dawson, L. Khirfan, T. McPhearson, A. Prakash, Y. Zheng, and G. Ziervogel, 2022: Cities, Settlements and Key Infrastructure. In: *Climate Change 2022: Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, et al. (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 907–1040, <https://doi.org/10.1017/9781009325844.008>

² Dominguez Britos, A. V., & Stevenson, H. (2026). Who cares about gender? A comparison of parties' commitment to gender equality in the UN climate regime. *Environmental Politics*, 1-23. <https://doi.org/10.1080/09644016.2026.2616987>

³ The 10-Year Lima Work Programme and the Fight for Inclusive Climate Action at COP29 <https://womengenderclimate.org/wp-content/uploads/2025/10/COP29-Statement-1.pdf>. (Accessed December 29, 2025)

⁴ United Nations Environment Programme (2023). *Adaptation Gap Report 2023: Underfinanced. Underprepared. Inadequate investment and planning on climate adaptation leaves world exposed*. Nairobi. <https://doi.org/10.59117/20.500.11822/43796>

⁵ C40 Cities, *Women4Climate: Gender Inclusive Climate Action in Cities*, C40 Cities Climate Leadership Group (2019), <https://www.c40.org/women4climate/resources/women4climate-report-gender-inclusive-climate-action-in-cities/> (Accessed December 16, 2025).

⁶ Araos, M., Jagannathan, K., Shukla, R., Ajibade, I., de Perez, E. C., Davis, K., ... & Turek-Hankins, L. L. (2021). Equity in human adaptation-related responses: A systematic global review. *One Earth*, 4(10), 1454-1467. <https://doi.org/10.1016/j.oneear.2021.09.001>

⁷ In this paper we focus on implemented adaptation which is “observed and implemented responses rather than processes of decision-making, adaptation governance and planning” following the definition by the Global Adaptation Mapping Initiative (Berrang-Ford et al. (2021). A systematic global stocktake of evidence on human adaptation to climate change. *Nature Climate Change*, 11(11), 989-1000.) <https://doi.org/10.1038/s41558-021-01170-y>

methodological approach, which combines evidence from three sources of data: self-reported urban adaptation data from the 2023 Carbon Disclosure Project (CDP) database, a rapid review of peer-reviewed academic literature, and six illustrative city case studies. In section 5, we present our findings based on the analysis of the reviewed literature and data, and in section 6 we draw insights from the analysis to reflect on how urban adaptation can be made more gender-just.

Section 2: Background gender-just urban adaptation

2.1 Urban climate action: a global picture

In cities, climate change exacerbates existing urban environmental stressors such as heatwaves, flooding, rising sea levels, cyclones, and pollution; threatening infrastructure, health, and livelihoods.^{8,9} And the future is bleaker: globally, the number of large cities with mean annual temperatures higher than 29°C (a recognized benchmark for the upper limit of human habitability and well-being) is projected to rise from 17 (2011–2040) to 217 by 2071–2100. This shift will expose around 320 million people, primarily in African and Asian cities, to extreme heat risks.¹⁰ Under a 3.5°C global warming scenario, up to 92% of newly urbanising areas could face drought exposure by 2100, with risk accelerating for most cities by mid-century.¹¹ Compared to the 2020 baseline (estimated at 1.6 billion people exposed in 2020), urban areas may see a 33% increase in population exposure to 1-in-100 year floods by 2050.¹²

These risks are compounded by entrenched poverty, rapid and unplanned urbanization, inadequate services, and deep inequalities, with those living in informal settlements likely to be the worst affected.^{13,14} In Sub-Saharan Africa, 56% of the urban population lives in informal settlements, characterized by limited services, precarious land tenure, and low capacity to cope with climate stressors, making the region a global hotspot for climate vulnerability.¹⁵

⁸ IPCC. Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change; Pörtner, H.-O., Roberts, D.C., Tignor, M., Poloczanska, E.S., Minterbeck, K., Alegria, A., Craig, M., Langsdorf, S., Löschke, S., Möller, V., et al., Eds.; Cambridge University Press: Cambridge, UK, 2022. <https://doi.org/10.1017/9781009325844>

⁹ Angelo, H., & Wachsmuth, D. (2020). Why does everyone think cities can save the planet? *Urban Studies*, 57(11), 2201–2221. <https://doi.org/10.1177/0042098020919081>

¹⁰ Friesen, J., Taubenböck, H. The world's largest cities under climate change and their adaptive capacity to rising heat. *Sci Rep* 15, 32671 (2025). <https://doi.org/10.1038/s41598-025-19954-z>

¹¹ Liu, Q., & Du, M. (2026). Global assessment of drought risk to expanded urban land from 2020 to 2100. *Land Use Policy*, 167, 108040. <https://doi.org/10.1016/j.landusepol.2026.108040>

¹² Rogers, J. S., Maneta, P. P., Sain, S. R., Madaus, L. E., & Hacker, J. P. (2025). The role of climate and population change in global flood exposure and vulnerability. *Nature Communications*, 16(1), 1287. <https://doi.org/10.1038/s41467-025-56654-8>

¹³ Dodman, D., B. Hayward, M. Pelling, V. Castan Broto, W. Chow, E. Chu, R. Dawson, L. Khirfan, T. McPhearson, A. Prakash, Y. Zheng, and G. Ziervogel, 2022: Cities, Settlements and Key Infrastructure. In: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, et al. (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 907–1040, <https://doi.org/10.1017/9781009325844.008>

¹⁴ Shi, L., Chu, E., Anguelovski, I., Aylett, A., Debats, J., Goh, K., Schenk, T., Seto, K. C., Dodman, D., Roberts, D., Roberts, J. T., & VanDeveer, S. D. (2016). Roadmap towards justice in urban climate adaptation research. *Nature Climate Change*, 6(2), 131–137. <https://doi.org/10.1038/nclimate2841>

¹⁵ Dodman, D., B. Hayward, M. Pelling, V. Castan Broto, W. Chow, E. Chu, R. Dawson, L. Khirfan, T. McPhearson, A. Prakash, Y. Zheng, and G. Ziervogel, 2022: Cities, Settlements and Key Infrastructure. In: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, et al. (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 907–1040, <https://doi.org/10.1017/9781009325844.008>

Critically, by 2050, an additional 2.5 billion people are expected to live in urban areas, highlighting the central role cities will play in adapting to climate change.¹⁶

These impacts threaten critical infrastructure, public health, and urban livelihoods. For example, in Kibera, Nairobi, economically poor residents are forced into flood-prone regions due to the unavailability of affordable housing and services in other areas.¹⁷ In Saint Louis, Senegal, informal settlements like Diaminar evolved on low-lying wasteland where recurring floods erode the community's capacity to recover between these events.¹⁸ In India, poorly constructed houses in informal settlements across capital cities lead to indoor temperatures reaching up to 47°C during summers. Such high temperatures compound heat risks already faced by women engaged in home-based work for long durations.¹⁹

Climate impacts are deeply gendered. Women and girls, especially those in poor or women-headed households and informal settlements, disproportionately bear the impacts of climate change, acutely visible during climate disasters. For illustration, during the 2003 French heatwave, 70% of the 15,000 fatalities were women; women make up an estimated 80% of people displaced globally by climate change.²⁰ In Barcelona, women continue to make up 70% of deaths due to extreme heat over the last 25 years, a vulnerability compounded by longer life expectancies and higher rates of fuel poverty.²¹ Extreme temperatures also increase children's (age 10-14) weekly labour time by at least 49 minutes for every day of heat stress, compared to prime-aged adults. This increase is driven by off-farm activities, closely mirroring the increased work burden of women in rural areas.²² This suggests that children often enter the workforce to assist women in sustaining household livelihoods during climate crises. Heat-related stress further aggravates psychological distress, leading to reported spikes in irritability and household violence. The causal relationship between extreme weather events and instances of violence is however contextually specific and must be understood as such since they intersect with social, economic and emotional aspects of climate risk.²³

¹⁶ United Nations, Department of Economic and Social Affairs, Population Division. (2019). World urbanization prospects: The 2018 revision (ST/ESA/SER.A/420). United Nations. <https://population.un.org/wup/assets/WUP2018-Report.pdf>. (Accessed December 29, 2025).

¹⁷ Mulligan, Joe, Jamilla Harper, Pascal Kipkemboi, Bukonola Ngobi, and Anna Collins. 2017. Community-Responsive Adaptation to Flooding in Kibera, Kenya. Proceedings of the Institution of Civil Engineers - Engineering Sustainability 170 (5): 268–80. <https://doi.org/10.1680/jensu.15.00060>

¹⁸ Vedeld, T., Coly, A., Ndour, N.M. et al. Climate adaptation at what scale? Multi-level governance, resilience, and coproduction in Saint Louis, Senegal. *Nat Hazards* 82 (Suppl 2), 173–199 (2016). <https://doi.org/10.1007/s11069-015-1875-7>

¹⁹ MSSRF. (2025). The Impact of Heat on the health of women in India – A Cross-sectional study. M S Swaminathan Research Foundation. https://www.mssrf.org/sites/default/files/2025-11/Heat%20Study%20Report%20Draft%2013_20_11_2025.pdf. (Accessed December 16, 2025).

²⁰ C40 Cities, Women4Climate: Gender Inclusive Climate Action in Cities, C40 Cities Climate Leadership Group (2019), <https://www.c40.org/women4climate/resources/women4climate-report-gender-inclusive-climate-action-in-cities/>. (Accessed December 29, 2025).

²¹ Ajuntament de Barcelona. (2021). II Plan for Gender Justice 2021–2025. Barcelona: Fourth Deputy Mayor's Office for Social Rights, Global Justice, Feminism and LGBTI Affairs. https://base.socioeco.org/docs/noupla_2021-2025-jun-gb-online.pdf (Accessed, December 16, 2025)

²² FAO. 2024. The unjust climate – Measuring the impacts of climate change on rural poor, women and youth. Rome. <https://doi.org/10.4060/cc9680en>

²³ Datzberger, S., Howard-Merrill, L., Parkes, J., & Iorfa, S. K. (2024). How do extreme weather events contribute to violence against children?. *Child Abuse & Neglect*, 158, 107093. <https://doi.org/10.1016/j.chiabu.2024.107093>

Global assessments highlight the gap between planned and implemented adaptation as a whole²⁴, and in cities specifically.^{25,26} As of 2025, 172 countries had established national adaptation policies, plans or strategies. However, out of those, 36 are either expired or at least a decade old. National reporting under the Paris Agreement such as the Biennial Transparency Reports (BTRs) acknowledge and operationalise gender unevenly and out of the 105 BTRs submitted by countries by 31 August 2025, over a quarter (30 countries) are gender-blind, i.e. they do not explicitly acknowledge gender when reporting climate impacts, adaptation priorities, actions implementation, and results.²⁷ 75 countries mention gender in relation to adaptation but no country demonstrates a truly gender-transformative approach.

While the number of cities with adaptation plans has expanded rapidly since the IPCC Fifth Assessment Report, only a limited number of these plans have been implemented.²⁸ This adaptation implementation gap is visible in city-reported data as well: the Carbon Disclosure Project (CDP) dataset from 812 reporting cities globally shows that while 93% cities recognize they are at risk from climate hazards, 43% of the cities still do not have a dedicated adaptation policy or plan for their citizens.²⁹ Some cities like Dhaka in Bangladesh, despite having a national-level plan focusing on coastal protection and agriculture, lack municipal-level human and financial resources to implement localised adaptation plans to manage urban flooding. Moreover, existing plans have a very narrow focus on technical solutions to reducing risks, overlooking barriers to implementation and social-co-benefits that are integral to minimise the risk of maladaptation, especially in rapidly urbanising geographies.³⁰

A major concern in implemented adaptation is also the risk of maladaptation, where interventions may unintentionally yield socio-economically exclusionary outcomes, or shift risk from one community group to another. For example, public blue-green spaces in cities are not equally accessible and/or safe for women and non-binary people, as shown in post-COVID-19 Barcelona. The pandemic offered residents the opportunity to temporarily reclaim neighbourhoods for community use and foster informal care networks. Once the restrictions were lifted, the same spaces reintroduced exclusionary practices such as the commercial

²⁴ UNEP, 2022. Adaptation Gap Report 2022 Too Little, Too Slow - Climate Adaptation Failure Puts World at Risk, 84pp. United Nations Environment Programme. <https://wedocs.unep.org/handle/20.500.11822/41078>.

²⁵ Liss, B. M., Wannewitz, M., Chaves, C. M., Grobusch, L. C., Islam, S., Magnaye, D. C., ... & Garschagen, M. (2025). Mainstreaming climate change adaptation into urban planning—A pragmatic protocol to tackle the implementation gap. *Frontiers in Climate*, 7, 1557352. <https://doi.org/10.3389/fclim.2025.1557352>

²⁶ Araos, M., Jagannathan, K., Shukla, R., Ajibade, I., de Perez, E. C., Davis, K., ... & Turek-Hankins, L. L. (2021). Equity in human adaptation-related responses: A systematic global review. *One Earth*, 4(10), 1454-1467. <https://doi.org/10.1016/j.oneear.2021.09.001>

²⁷ Leiter, T., Njuguna, L., Singh, C., Mugwimi, W., Muller, L., Joshi, N., Vyas, D. 2025. Chapter 3: Global progress on adaptation implementation in United Nations Environment Programme (2025). Adaptation Gap Report 2025: Running on empty. The world is gearing up for climate resilience — without the money to get there [Neufeldt, H. et al.]. Nairobi. <https://wedocs.unep.org/20.500.11822/48798>

²⁸ Dodman, D., B. Hayward, M. Pelling, V. Castan Broto, W. Chow, E. Chu, R. Dawson, L. Khirfan, T. McPhearson, A. Prakash, Y. Zheng, and G. Ziervogel, 2022: Cities, Settlements and Key Infrastructure. In: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, et al. (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 907–1040. <https://doi.org/10.1017/9781009325844.008>

²⁹ CDP (2021) <https://www.dw.com/en/cities-widely-unprepared-for-climate-risks-warns-study/a-57507096> (Accessed February 10, 2026)

³⁰ Dodman, D., B. Hayward, M. Pelling, V. Castan Broto, W. Chow, E. Chu, R. Dawson, L. Khirfan, T. McPhearson, A. Prakash, Y. Zheng, and G. Ziervogel, 2022: Cities, Settlements and Key Infrastructure. In: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, et al. (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 907–1040. <https://doi.org/10.1017/9781009325844.008>

privatisation of public space,³¹ intensifying processes now called ‘green-gentrification’.³² Instead, inspired by insurgent and other alternative urban planning approaches, feminist approaches to urban adaptation imagine cities that put social wellbeing, care and justice at their centre.^{33,34,35}

2.2 Outcomes of urban climate action for gender and social justice

Gender considerations have been progressively gaining prominence in climate policy (Figure 1). In November 2025, at COP30, the Belém Gender Action Plan (BGAP), was adopted, as a nine-year (2026–2034) framework to strengthen gender-responsive climate action, focusing on care work, health, violence against women and girls, safety and protection mechanisms, nature-based solutions and ecosystem-based adaptation.³⁶ The BGAP further acknowledges that climate impacts are shaped by multidimensional factors such as race, disability, and migratory status which acts as a guiding framework for governments, funders and civil society organisations to implement gender transformative outcomes in cities.³⁷

A systematic review of 31 empirical articles on adaptation responses to climate change found that urban adaptation interventions have mixed impacts on gender equality, with 55% of studies reporting positive outcomes whereas 74% documented some form of negative consequence.³⁸ Ecosystem-based adaptation measures like urban agriculture can enhance women's agency and bargaining power, yet they often increase women's unpaid work burden³⁹. Technocratic solutions such as early warning systems and cooling infrastructure fail by design to reach women because they overlook socio-cultural barriers to technology access and do not always ensure women's privacy and safety requirements.⁴⁰ Ultimately, this can reinforce inequalities and unsafe conditions, forcing women to rely on coping strategies such as finding heat relief outdoors rather than at home.⁴¹

³¹ Calderón-Angelich, A., Anguelovski, I., Cuenca, V. C., Cole, H. V., Triguero-Mas, M., Valdivia, B., & Baró, F. (2024). Shifting perceptions of green and blue spaces during the COVID-19 pandemic in gentrifying neighbourhoods: Experiences of inclusion and exclusion by women and non-binary residents. *People and Nature*, 6(6), 2494–2513. <https://doi.org/10.1002/pan3.10722>

³² Oscilowicz, E., Anguelovski, I., García-Lamarca, M., Cole, H. V. S., Shokry, G., Perez-del-Pulgar, C., ... Connolly, J. J. T. (2023). Grassroots mobilization for a just, green urban future: Building community infrastructure against green gentrification and displacement. *Journal of Urban Affairs*, 47(2), 347–380. <https://doi.org/10.1080/07352166.2023.2180381>

³³ UN-Women (2025). Towards Caring Cities: A geospatial analysis in Nepal. Research-in-Action Series UNW and Data-Pop Alliance. <https://asiapacific.unwomen.org/sites/default/files/2025-05/ap-20250396957-26may2025-report-towards-caring-cities-a-geospatial-analysis-in-nepal-hi-res.pdf>.

³⁴ Ito Peng and Caren Grown (2024, 24 November) City Learning Labs Concept Note. Change, City hub and network for gender equality https://www.citieschange.org/content/uploads/2025/01/City-Learning-Labs_Concept-Note_Nov-2724-2.pdf. (Accessed December 26, 2025)

³⁵ Henrique, K. P., & Tschakert, P. (2021). Pathways to urban transformation: From dispossession to climate justice. *Progress in Human Geography*, 45(5), 1169–1191. <https://doi.org/10.1177/0309132520962856>

³⁶ United Nations Framework Convention on Climate Change. (2025). The Belém Gender Action Plan: A launchpad accelerating ambitious, effective, and inclusive climate action. <https://unfccc.int/news/the-belem-gender-action-plan-a-launchpad-accelerating-ambitious-effective-and-inclusive-climate>. (Accessed February 13, 2026)

³⁷ WEDO. (2026). Advancing implementation of the Belém Gender Action Plan: Convening at CSW70. <https://wedo.org/resources/advancing-implementation-of-the-belem-gap-csw70/>. (Accessed February 13, 2026)

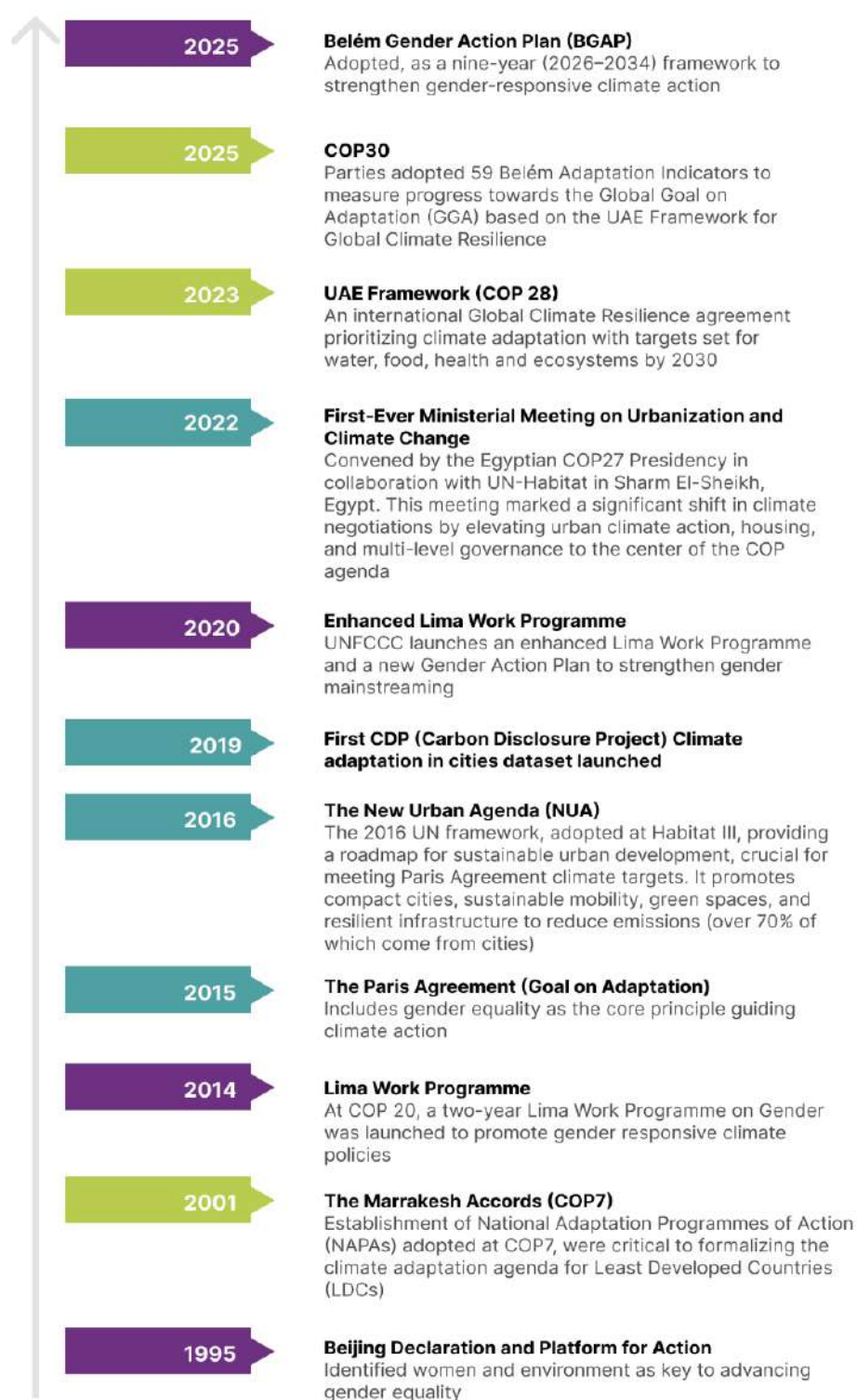
³⁸ Solomon, D. S., Singh, C. & Islam, F. (2021): Examining the outcomes of urban adaptation interventions on gender equality using SDG 5, *Climate and Development*. <https://doi.org/10.1080/17565529.2021.1939643>

³⁹ Rao, N., Patil, S., Singh, C., Roy, P., Pryor, C., Poonacha, P., and M. Genes. (2022). Cultivating sustainable and healthy cities: A systematic literature review of the outcomes of urban and peri-urban agriculture. *Sustainable Cities and Society*. 85 <https://doi.org/10.1016/j.scs.2022.104063>

⁴⁰ Solomon, D. S., Singh, C. & Islam, F. (2021): Examining the outcomes of urban adaptation interventions on gender equality using SDG 5, *Climate and Development*. <https://doi.org/10.1080/17565529.2021.1939643>

⁴¹ MSSRF. (2025). The Impact of Heat on the health of women in India – A Cross-sectional study. M S Swaminathan Research Foundation. https://www.mssrf.org/sites/default/files/2025-11/Heat%20Study%20Report%20Draft%2013_20_11_2025.pdf.

Figure 1. Gender mainstreaming in global climate policy has been progressive. While adaptation gained prominence in the Paris Agreement (2015), the urban agenda has taken longer to enter mainstream climate policy. Green represents a focus on adaptation, blue represents urban focussed agendas, and purple represents focus on gender.



While gender-sensitive strategies identify and reconfigure unequal relations, a transformative approach aims for normative change, such as legislative shifts or transforming how resources are inherited and distributed. While the BGAP is a global-level framework, it doesn't have a specific urban focus, and it relies significantly on sub-national and local levels to initiate change in urban settings. It acknowledges that for climate action to be effective, interventions

at the local levels have to be strengthened, specifically through local governance, infrastructure, and collection and use of gender disaggregated data. The BGAP's core mandates aim for gender responsive planning and intervention, categorized through the following dimensions⁴²:

- **Recognition of differentiated impacts:** The plan mandates national assessments of specific impacts of climate change on health, gender-based violence (GBV), and unpaid care work, identifying the use of granular, gender and age-disaggregated data.
- **Redistributive intent of climate finance:** A primary focus of Priority Area D (gender-responsive implementation and means of implementation) is driving gender-responsive budgeting and creating direct avenues to climate finance through capacity building of grassroots women's organisations and Indigenous peoples.
- **Representation and leadership:** Priority area B focuses on gender balance, participation and women's leadership by identifying institutionalisation of mentorship programmes which can enhance safety and protection of women environmental defenders. This would enable their equal and full participation in climate related decision-making.

Alongside the BGAP, the Global Goal on Adaptation (GGA) was adopted at COP30. The GGA has 59 indicators, including specific gender metrics, to ensure policies and actions are gender-responsive. While targeting specific vulnerabilities, they seek to ensure equal participation, and the use of gender-disaggregated data. The GGA does not focus directly on urban areas but captures it through the theme on Infrastructure and Human Settlements, which is one of the seven thematic areas. Two of the 59 indicators are urban relevant: one on settlement-upgrading programmes involving local communities, and another on relocating vulnerable settlements to safer areas. Water and health indicators such as safe drinking water access, sanitation, health-facility resilience, climate-related mortality permit disaggregation by settlement type, aligning with existing SDG 6 and SDG 11 indicators.

Gender equality and social inclusion within global climate action are inadequately included in adaptation finance needs and flows. Only 20 per cent of Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs) have a dedicated budget for integration of gender equality and social inclusion, and the amount allocated is generally low, averaging 2 per cent of the total proposed budget.⁴³ Of the international public finance for adaptation that is also tagged with gender equality as a principal objective, only 2 per cent is assessed as gender-responsive, with a further 24% considered gender-specific or integrative.⁴⁴

⁴² In this paper, we interpret BGAP's provisions as gender-transformative in its intent, addressing gender justice as part of its intended outcomes.

⁴³ United Nations Environment Programme. (2023). Adaptation gap report 2023: Underfinanced. Underprepared. Inadequate investment and planning on climate adaptation leaves world exposed. UNEP. <https://doi.org/10.59117/20.500.11822/43796>

⁴⁴ The AGR uses three categories drawn from the GCF gender typology: gender-integrative actions mainstream gender as a cross-cutting concern within a broader intervention; gender-specific actions address differentiated needs of gender groups as a significant objective; and gender-responsive actions have gender equality as a principal objective, explicitly designed to redress gender inequalities. These correspond broadly to OECD DAC gender marker scores 1 (significant) and 2 (principal) respectively. Bakhtiari, F., Butera, B., Canales, N., Chapagain, D., Pauw, P., & Watkiss, P. (2023). Finance. Chapter 4 in: UNEP (Ed.), Adaptation Gap Report 2023: Underfinanced. Underprepared. Nairobi: UNEP. <https://doi.org/10.59117/20.500.11822/43796>

Section 3: Conceptual framework

A feminist climate justice lens^{45,46,47} reorients the imagination and metrics used to measure adaptation progress and effectiveness towards actively tackling rather than reproducing structural inequalities and intersectional vulnerabilities. This agenda is commonly operationalised through the 3 Rs framework of recognition, representation, and redistribution⁴⁸ (others add a fourth R to capture reparation but this remains contested and difficult to operationalise).

- Recognition (of gendered and intersectional rights, labour, knowledge):** Acknowledging that climate change affects genders differently and that it is important to address unequal social norms, laws and policies that deny women equal opportunities and reinforce existing inequalities. Current national reporting under the Paris Agreement recognises gender unevenly. The 2025 Adaptation Gap Report assessed national reporting under the Paris Agreement and found that out of 105 countries, 75 mention gender in relation to adaptation in their Biennial Transparency Reports, albeit with considerable variation⁴⁹. Over a quarter (30 countries) remain entirely gender-blind, i.e., they do not explicitly acknowledge gender when reporting climate impacts, adaptation priorities, actions implementation, and results. A review of 56 National Adaptation Plans (NAPs) finds that 54 NAP documents mention Gender, 85% of NAP documents position women as a group particularly vulnerable to climate change, and only 16% position women as agents of change⁵⁰. In cities, while many heat action plans acknowledge gendered impacts of heat, they tend to treat women as a homogeneously vulnerable group, with poor targeting of gender-responsive heat adaptation action.⁵¹ This homogenising narrative leads to poor/incomplete recognition of how gendered roles (productive, reproductive, within and beyond the home) drive and recreate vulnerability to climatic risks (e.g., through pathways of lower health-seeking behaviour among women). At a policy design level, this can lead to poorer targeting of heat-related interventions.

⁴⁵ Neimanis, A., & Hamilton, J. M. (2026). *How to Weather Together: Feminist Practice for Climate Change*. Bloomsbury Publishing. <https://www.bloomsbury.com/uk/how-to-weather-together-9781350467491/>

⁴⁶ Laura Turquet, Constanza Tabbush, Silke Staab, Loui Williams and Brianna Howell. 2023. "Feminist Climate Justice: A Framework for Action". Conceptual framework prepared for Progress of the World's Women series. New York: UN-Women. <https://knowledge.unwomen.org/en/digital-library/publications/2023/11/feminist-climate-justice-a-framework-for-action>.

⁴⁷ Saigal, N., & Shrivastava, S. (2025). Urgent Imperatives: Advancing Gender Equality in Climate Action. *Journal of Human Rights and Social Work*, 1-16. <https://doi.org/10.1007/s41134-025-00391-x>

⁴⁸ Guedes, W. P., Branchi, B. A., Sugahara, C. R., & Ferreira, D. H. L. (2024). Gender-based climate (in) justice: An overview. *Environmental Science & Policy*, 162, 103934. <https://doi.org/10.1016/j.envsci.2024.103934>

⁴⁹ Leiter, T., Njuguna, L., Singh, C., Mugwimi, W., Muller, L., Joshi, N., Vyas, D. 2025. Chapter 3: Global progress on adaptation implementation *in* United Nations Environment Programme (2025). *Adaptation Gap Report 2025: Running on empty. The world is gearing up for climate resilience — without the money to get there* [Neufeldt, H. et al.]. Nairobi. <https://wedocs.unep.org/20.500.11822/48798>.

⁵⁰ Dazé, A. & Hunter, C. (2024). Advancing gender-responsive national adaptation plan (NAP) processes: State of play and promising examples (NAP Global Network synthesis report). International Institute for Sustainable Development. <https://napglobalnetwork.org/wp-content/uploads/2025/01/advancing-gender-responsive-naps.pdf>. (Accessed February 16, 2026)

⁵¹ Singh, C., Vyas, D., Patil, S., Ranjit, N., Poonacha, P., & Surampally, S. (2024). How are Indian cities adapting to extreme heat? Insights on heat risk governance and incremental adaptation from ten urban Heat Action Plans. *PLOS Climate*, 3(11), e0000484. <https://doi.org/10.1371/journal.pclm.0000484>

- **Representation (in leadership and decision-making):** This emphasizes mechanisms to ensure women's voices are present in decision-making processes at all levels and in meaningful ways. The 'representation gap' in climate governance remains, with only 15% of environment ministries and 20% of mayors worldwide being women, even in 2020.⁵² This is ameliorated to some extent in national adaptation reporting with more than half of 58 NAP documents identifying the country's gender ministry or department as having a role in the development of the NAP, part of the institutional arrangements for adaptation, and/or as responsible for specific adaptation actions.⁵³ Institutionalised mentorship and safety for women environmental defenders to challenge the male dominance in decision-making remains a critical priority.⁵⁴
- **Redistribution (of resources and power):** It is critical to address the uneven distribution of climate risks and capacities to adapt by shifting resources, power, and responsibilities to enable women to have equal access to and control over land, resources, technology, and finance. The adaptation finance gap for developing countries is now estimated at USD 284 to 339 billion per year until 2035, and current flows are 12 to 14 times lower than the identified needs.⁵⁵ Furthermore, debt instruments comprise at least 58% of these flows, creating an 'adaptation investment trap' where rising disaster costs increase indebtedness; for example, between 2016 and 2020, Small Island Developing States spent 18 times more on debt repayment than they received in climate finance.⁵⁶ More than half of 58 NAP documents include some evidence that gender has been considered in the implementation strategies for the NAP, either by identifying a role for women and women's organizations or through gender budgeting.

The GGA and BGAP converge to provide national guidance on gender-responsive climate action (Table 1).

⁵² IUCN (2021). New data reveals slow progress in achieving gender equality in environmental decision making <https://iucn.org/news/gender/202103/new-data-reveals-slow-progress-achieving-gender-equality-environmental-decision-making> (Accessed February 27, 2026)

⁵³ Dazé, A. & Hunter, C. (2024). Advancing gender-responsive national adaptation plan (NAP) processes: State of play and promising examples (NAP Global Network synthesis report). International Institute for Sustainable Development. <https://napglobalnetwork.org/wp-content/uploads/2025/01/advancing-gender-responsive-naps.pdf>.

⁵⁴ Conference of the Parties. (2025). Belém gender action plan (2026–2034) (Decision 7/CP.30). United Nations Framework Convention on Climate Change. <https://unfccc.int/documents/655276>. (Accessed April 13, 2026)

⁵⁵ United Nations Environment Programme (2025). Adaptation Gap Report 2025: Running on empty. The world is gearing up for climate resilience — without the money to get there [Neufeldt, H., Hammill, A., Leiter, T., Magnan, A., Watkiss, P., Bakhtiari, F., Bueno Rubial, P., Butera, B., Canales, N., Chapagain, D., Christiansen, L., Dale, T., Milford, F., Niles, K., Njuguna, L., Pauw, P., Singh, C. and Yang, G.]. Nairobi. <https://wedocs.unep.org/20.500.11822/48798>.

⁵⁶ United Nations Environment Programme (2025). Chapter 3: Global progress on adaptation implementation in Adaptation Gap Report 2025: Running on empty. The world is gearing up for climate resilience — without the money to get there [Neufeldt, H., Hammill, A., Leiter, T., Magnan, A., Watkiss, P., Bakhtiari, F., Bueno Rubial, P., Butera, B., Canales, N., Chapagain, D., Christiansen, L., Dale, T., Milford, F., Niles, K., Njuguna, L., Pauw, P., Singh, C. and Yang, G.]. Nairobi. <https://wedocs.unep.org/20.500.11822/48798>.

Table 1. How the Belém Gender Action Plan and Global Goal on Adaptation links to the the three pillars of gender-responsive climate justice

Priority Area under BGAP ⁵⁷	How it links to the Rs	GGA indicators ⁵⁸	How it links to the Rs
Capacity Building, Knowledge Management and Communication	Recognition of differentiated vulnerabilities, needs, and knowledge of diverse groups of women and girls. Improved evidence base Multidimensional factors, including role of men and boys Gender- and age-disaggregated data	“Capturing progress in adaptation...may be reflected through the disaggregation of indicators by...Social categories, which may include demographic and socioeconomic characteristics such as vulnerability, gender, age, disability, race, socioeconomic status, status as Indigenous Peoples, status as migrants, as well as children and young people” (Annex 1a) ⁵⁹	Recognition of gendered and intersectional vulnerability
Gender balance, Participation, and Women's leadership	Representation ensuring full, meaningful, and equal participation of women in decision-making at all levels Leadership and mentorship programmes Safety and protection mechanisms Access to governance roles	“Status of having gender-responsive adaptation plans, policy instruments, and planning processes and/or strategies in place” (Annex 11b) ⁶⁰	Redistribution of power by focussing on procedural and representational justice
Gender-responsive implementation and means of implementation	Redistribution through equitable allocation of resources, finance, and technology to address structural inequalities Gender-responsive budgeting Direct access to finance Technological access	Not mentioned	-

Using a justice lens, the outcomes of urban adaptation on gender and social equity are assessed by drawing on climate change adaptation, urban studies, evaluation research, and gender and feminist studies literature. In this paper, we focus on four types of implemented urban adaptation: Infrastructural or technological, ecosystem or nature-based, institutional and behavioural or cultural (Figure 2). In practice, these categories overlap, for example, a Heat Action Plan might have behavioural actions (changing work timings), infrastructural actions (changing built form to enable passive cooling) as well as technological actions (heat forecasts and warnings using hyperlocal heat island mapping).

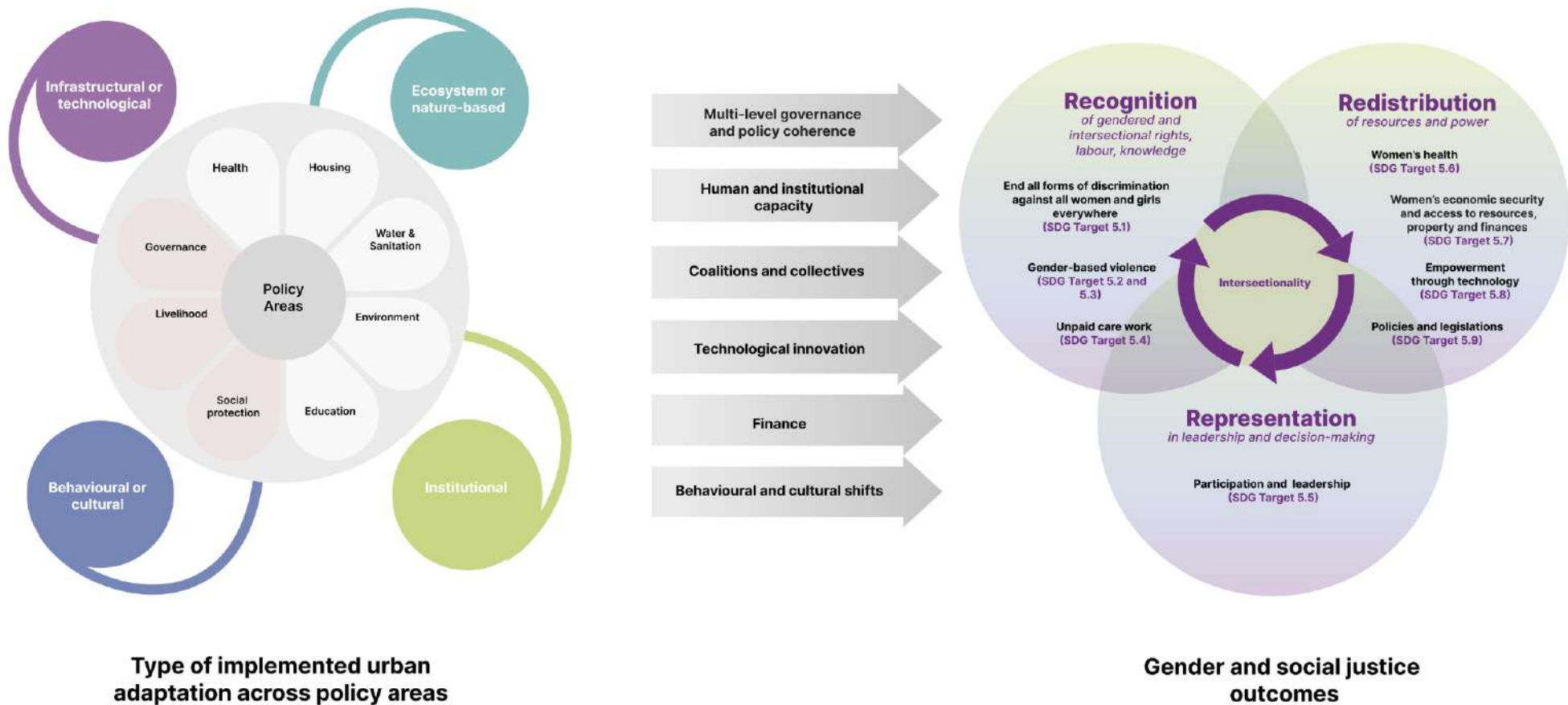
⁵⁷ United Nations Framework Convention on Climate Change. (2025). The Belém Gender Action Plan: A launchpad accelerating ambitious, effective, and inclusive climate action. <https://unfccc.int/news/the-belem-gender-action-plan-a-launchpad-accelerating-ambitious-effective-and-inclusive-climate>. (Accessed February 13, 2026)

⁵⁸ Conference of the Parties serving as the meeting of the Parties to the Paris Agreement. (2025). *Global goal on adaptation* (Decision 12/CMA.7). United Nations Framework Convention on Climate Change. https://unfccc.int/sites/default/files/resource/cma2025_19_adv_.pdf

⁵⁹ Conference of the Parties serving as the meeting of the Parties to the Paris Agreement. (2025). *Global goal on adaptation* (Decision 12/CMA.7). United Nations Framework Convention on Climate Change. https://unfccc.int/sites/default/files/resource/cma2025_19_adv_.pdf

⁶⁰ Conference of the Parties serving as the meeting of the Parties to the Paris Agreement. (2025). *Global goal on adaptation* (Decision 12/CMA.7). United Nations Framework Convention on Climate Change. https://unfccc.int/sites/default/files/resource/cma2025_19_adv_.pdf

Figure 2. Conceptual framework linking urban climate adaptation (left) to gender justice and social inclusion outcomes (right) with the help of adaptation levers. The policy areas draw from real-world sectoral domains used in urban planning; however, governance, livelihood, and social protection are included as cross-cutting areas with significant implications for gender and social justice outcomes.



Type of urban adaptation action: Simply put, adaptation is a process or set of actions to reduce climate risks to human and ecological systems.⁶¹ They can be ‘groundwork’ actions (preparatory work for adaptation such as conducting risk assessments, consulting stakeholders for prioritisation, developing adaptation plans) or adaptation actions (implemented interventions that directly or indirectly reduce risk).⁶² We focus on implemented urban adaptation actions which are “tangible changes to policies, institutions, infrastructure, or behaviours that directly address or reduce vulnerability to climate change impacts.”⁶³ This focus firmly places us in the arena of tracking adaptation progress and its outcomes⁶⁴ rather than replicating previous studies that discuss urban adaptation plans (e.g., in Spain; Europe⁶⁵; India⁶⁶; urban NbS in Africa⁶⁷).

Policy areas: The urban adaptation actions are also mapped onto common sectors (policy areas) used in urban planning. These include policy areas that have a clear link with climate risk and action (e.g., health, water) and those of particular focus for goals around women and child development (e.g., social protection).

- **Health:** Health-related urban adaptation includes strategies such as heat action plans, early warning systems, and strengthened public health services⁶⁸. While there is increasing evidence of health-related adaptation, mainstreaming into urban planning is uneven and insufficient^{69,70}. Singapore’s National Environment Agency is implementing national-level cooling strategies to improve air flow and greenery and strengthening community resilience through targeted awareness campaigns.⁷¹ In New York City, the Climate Resiliency Design Guidelines 2021 classified healthcare facilities as critical and required higher flood protection standards integrating sea level

⁶¹ The IPCC defines adaptation as follows: “In human systems, the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities. In natural systems, the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate and its effects.”

⁶² Araos, M., Berrang-Ford, L., Ford, J. D., Austin, S. E., Biesbroek, R., & Lesnikowski, A. (2016). Climate change adaptation planning in large cities: A systematic global assessment. *Environmental Science & Policy*, 66, 375-382. <https://doi.org/10.1016/j.envsci.2016.06.009>

⁶³ Olazabal, M., & Castán Broto, V. (2022). Institutionalisation of urban climate adaptation: three municipal experiences in Spain. *Buildings & Cities*, 3(1), 570-588. <https://doi.org/10.5334/bc.208>

⁶⁴ Berrang-Ford et al. (2021). A systematic global stocktake of evidence on human adaptation to climate change. *Nature Climate Change*, 11(11), 989-1000. <https://doi.org/10.1038/s41558-021-01170-y>

⁶⁵ Reckien, D., Buzasi, A., Olazabal, M., Spyridaki, N. A., Eckersley, P., Simoes, S. G., ... & Wejs, A. (2023). Quality of urban climate adaptation plans over time. *npj Urban sustainability*, 3(1), 13.

⁶⁶ Singh, C., Madhavan, M., Arvind, J., & Bazaz, A. (2021). Climate change adaptation in Indian cities: a review of existing actions and spaces for triple wins. *Urban Climate*, 36, 100783. <https://doi.org/10.1038/s42949-023-00085-1>

⁶⁷ Kiribou, R., Djene, S., Bedadi, B., Ntirenganya, E., Ndemere, J., & Dimobe, K. (2024). Urban climate resilience in Africa: a review of nature-based solutions in African cities' adaptation plans. *Discover Sustainability*, 5(1), 94. <https://doi.org/10.1007/s43621-024-00275-6>

⁶⁸ Cissé, G., McLeman, R., Adams, H., Aldunce, P., Bowen, K., Campbell-Lendrum, D., Clayton, S., Ebi, K. L., Hess, J., Huang, C., Liu, Q., McGregor, G., Semenza, J., & Tirado, M. C. (2022). Health, wellbeing, and the changing structure of communities. In *Climate Change 2022: Impacts, Adaptation and Vulnerability* (pp. 1041–1170). Cambridge University Press. <https://doi.org/10.1017/9781009325844.009>

⁶⁹ Sheehan, M. C., Freire, M., & Martinez, G. S. (2021). Piloting a city health adaptation typology with data from climate-engaged cities: Toward identification of an urban health adaptation gap. *Environmental research*, 196, 110435. <https://doi.org/10.1016/j.envres.2020.110435>

⁷⁰ Araos, M., Austin, S. E., Berrang-Ford, L., & Ford, J. D. (2016). Public health adaptation to climate change in large cities: A global baseline. *International Journal of Health Services*, 46(1), 53-78. <https://doi.org/10.1177/0020731415621458>

⁷¹ Response to rising temperatures. (2026, July 9) <https://www.nccs.gov.sg/singapores-climate-action/adaptation-efforts/response-to-rising-temperatures/>. (Accessed July 27, 2026)

rise and storm projections to ensure climate resilient healthcare.⁷² In Los Angeles, California's Heat Illness Prevention Standards entails employers to provide hydration, shaded rest recovery, heat monitoring protocols and close observation during acclimatization to prevent heat related illness in indoor and outdoor workers.⁷³ Most national and sub-national health-adaptation strategies acknowledge gendered impacts of climate change especially on pregnant and lactating women, infants, and the elderly, there is sparser evidence on this recognition of differentiated vulnerability and risk being used to design gender-responsive health adaptation actions⁷⁴. For example, pregnant street vendors, home-based workers in tin-roofed houses, and elderly women in urban slums—among the most vulnerable to heat stress—are virtually absent in existing heat-health planning in India⁷⁵.

- **Water and sanitation:** Urban water and sanitation systems in coastal and delta regions face significant risks from extreme rainfall, sea level rise and prolonged drought. Jakarta is investing in coastal embankment strengthening and drainage system upgrades with water management to deal with recurrent tidal and pluvial flooding.⁷⁶ After the 2015-2018 drought, Cape Town is transitioning into a “water-sensitive city” by expanding supply through groundwater and desalination expansion. This strengthens resilience to water scarcity in the future and increases assurance of water supply to 99.5%⁷⁷. Water and sanitation services are crucially gendered and are first to come under stress during extreme weather events. Emerging evidence from Mangaung Municipality, South Africa⁷⁸ suggests that gender-responsive planning in water and sanitation requires prioritising women's participation in water governance, increasing the availability of sex-disaggregated data on WASH (Water, Sanitation, and Hygiene), challenging social norms around women's leadership, and planning for reducing gender-based violence in water and sanitation.
- **Housing:** Housing adaptation in response to extreme heat, landslides and flooding involves adjustments in building materials, access and affordability of resilient housing, and change in built form (e.g., ventilation, private spaces, place-making in relocation sites). In Dhaka, Bangladesh, reflective cool roofs are being piloted in vulnerable

⁷² NYC Mayor's Office of Climate and Environmental Justice. (2022). NYC Mayor's Office of Climate and Environmental Justice Climate Resiliency Design Guidelines - Version 4.1 <https://www.nyc.gov/assets/sustainability/downloads/pdf/publications/CRDG-4-1-May-2022.pdf>

⁷³ Program, C.-. C., & California, S. O. (2024). CAL/OSHA Heat Illness Prevention Guidance and Resources. <https://www.dir.ca.gov/dosh/heatillnessinfo.html>. (Accessed February 13, 2026)

⁷⁴ Vellingiri S, Dutta P, Singh S, et al. Combating Climate Change-induced Heat Stress: Assessing Cool Roofs and Its Impact on the Indoor Ambient Temperature of the Households in the Urban Slums of Ahmedabad. *Indian J Occup Environ Med* 2020; 24:25–9. https://doi.org/10.4103/ijoom.IJOEM_120_19

⁷⁵ MSSRF. (2025). The Impact of Heat on the health of women in India – A Cross-sectional study. M S Swaminathan Research Foundation. https://www.mssrf.org/sites/default/files/2025-11/Heat%20Study%20Report%20Draft%2013_20_11_2025.pdf.

⁷⁶ Ministry of Environment/Environmental Protection Agency et al. (2025). National adaptation plan (NAP) Republic of Indonesia 2026–2030: On the pathway toward 2035. <https://unfccc.int/documents/653857>

⁷⁷ City of Cape Town. (2020). *Our shared water future: Cape Town's water strategy*. City of Cape Town, Water and Sanitation Department. <https://www.capetown.gov.za/general/cape-town-water-strategy>

⁷⁸ Mgwele, A., Bhanye, J.I., Mocwagae, K.S. (2024). Water and Sanitation for Urban Health: A Gender Perspective on Impacts and Coping Strategies in Mangaung Metropolitan Municipality. In: Matamanda, A.R., Nel, V. (eds) Sustainable Development Goals and Urban Health. Sustainable Development Goals Series. Springer, Cham. https://doi.org/10.1007/978-3-031-68734-1_4

settlements.⁷⁹ In Da Nang, Vietnam, storm- and flood-resilient housing with concrete structures and mezzanine “safety floors” have supported low-income households as this design allows them to remain safe during disasters rather than being evacuated.^{80,81} In Freetown, Sierra Leone, flood-resilient infrastructure in informal settlements focuses on drainage and slope stabilization to reduce vulnerability to floods and landslides and relocates communities from high-risk zones to safer, affordable housing.⁸²

There are emerging examples of gender-responsive and climate-sensitive housing⁸³. Safiya Homes, in Faisalabad, Pakistan deployed an innovative housing loan system enabling communal green spaces, a gated entrance, and full-time security, enabling safety. Zima Homes in Kenya, prioritise gender and climate in housing design and implementation. The homes employ at least 30% women through local community engagement and collaboration with a company Builder; a women-run social enterprise that provides low-income women with construction skills and access to sustainable jobs.

- **Built form, large infrastructure:** Retrofitting or redesigning built form is a key strategy to manage risk in cities and includes city or ward-level changes in urban design, neighbourhood layout, networks of climate infrastructure, and climate-proofing critical infrastructure. Rotterdam, Netherlands has incorporated large-scale multifunctional flood protection infrastructure and water plazas to act as temporary stormwater storage to protect the city’s architecture.⁸⁴ In Shenzhen, China, sunken green space, permeable paving, and green roofs have reduced flood impacts by reducing surface run-off and protecting buildings.⁸⁵ Gender considerations are seldom central to large infrastructural adaptation though access and affordability issues are being increasingly planned for.
- **Livelihoods, labour, jobs:** Livelihood security is key for the urban poor. Urban climate adaptation in the labour sector includes workplace time adaptation, safety standards and public works employment to ensure livelihood during climate hazards. In Barcelona, Spain, the Climate Emergency Plan 2021 identifies heat risk and includes it in labour protection by working hour adaptations and expanded shaded workspaces to reduce productivity loss during heatwaves. The city also promotes green jobs and training in climate related sectors like circular economy and renewable energy to have

⁷⁹ Ali, Z. F., Ema, E. A. K., & Rahman, M. Z. (2023). Cool to be cool: Impact of cool roof coating on the thermal performance of slum houses in Dhaka. In S. Haq & A. Sharag-Eldin (Eds.), ARCC 2023: The research-design interface conference proceedings (pp. 161–167). Architectural Research Centers Consortium.

⁸⁰ ADPC Editorial Team, Perwaiz, A., Parviainen, J., Somboon, P., McDonald, A., Kumar, A., Wilcox, T., Calle, I. T., & Amach, O. (2020). Disaster risk reduction in Vietnam: Status report 2020. United Nations Office for Disaster Risk Reduction (UNDRR).

⁸¹ United Nations Development Programme. (2022, May 13). Storm and flood resilient houses: Successful model and ways forward. <https://www.undp.org/vietnam/press-releases/storm-and-flood-resilient-houses-successful-model-and-ways-forward>

⁸² Aki-Sawyer, Y., & Chikoko, H. (2023). Climate action in Freetown. <https://fcc.gov.sl/wp-content/uploads/2023/01/CAP-Freetown-FINAL.pdf>

⁸³ Rothwell, N., Elias, J., & Robinson, H. J. (2024). Gender-smart, Climate-smart: The ‘double mainstreaming’ of gender and climate within affordable housing in low-income contexts. Coventry, UK: University of Warwick ; Reall Ltd. <https://reall.net/wp-content/uploads/2024/09/Reall-UoW-AKT-Gender-Smart-Climate-Smart.pdf>

⁸⁴ Peinhardt, K. (2021). Resilience through placemaking: Public spaces in Rotterdam’s climate adaptation approach (Discussion Paper). Deutsches Institut für Entwicklungspolitik. <https://doi.org/10.23661/dp1.2021>

⁸⁵ Wang, M., Lu, Y.-C., & Ge, X. (2022). Effect of sponge city construction on urban waterlogging reduction in semi-humid areas of China. *Journal of Water and Climate Change*, 13(9), 3375–3390. <https://doi.org/10.2166/wcc.2022.164>

a resilient local market.⁸⁶ The Gender Assessment and Monitoring of Mitigation and Adaptation (GAMMA) methodology, applied in 14 cities across India, Indonesia, Mexico and South Africa assesses the institutional framework and urban mitigation and adaptation policies for the extent they mainstream gender, highlighting indicators capturing women's contributions to the care economy in addition to the labour/market-driven economy.⁸⁷ There is nevertheless sparse evidence on urban planning and climate adaptation mainstreaming gender through livelihoods and work.

- **Education:** Research shows that each 1% increase in gender equality in the education domain is associated with a 0.4% increase in climate adaptation.⁸⁸ Education can be severely affected by hazards like flash floods, droughts and landslides, damaging infrastructure, student's ability to access school, and higher incidences of dropouts.⁸⁹ Relevant adaptation measures include disaster awareness and preparedness, adaptation literacy, and climate-resilient education infrastructure. In Seoul, the municipal government has expanded "Eco Schools," planting thousands of trees and vegetation in schoolyards, rooftops, walls, and other underutilised school spaces to create shaded and cooler environments.⁹⁰ In Tokyo, Japan, the climate adaptation plan prepares schools for broader disaster and earthquake preparedness systems which involves evacuation planning and inundation protection to infrastructure to maintain continuity in school during typhoons or extreme rainfall.⁹¹ Studies suggest investments in climate-resistant school buildings, community-based learning programs (as tested during COVID-19), and disaster preparedness awareness.
- **Social Protection** measures such as cash transfers, employment guarantee, and risk insurance play an essential role in supporting vulnerable groups during and after climate shocks. In Bangladesh, cash and asset transfers support the urban poor by providing households with capital to enter new income sources.⁹² In Brazil, the Bolsa Familia programme identifies vulnerable urban households and provides them with cash transfers during climate-related disasters; hence, in a way, it also fosters adaptive capacity as most of the times, these families get the opportunity to diversify their livelihoods⁹³. Current social protection is not necessarily adaptive (i.e. climate-responsive) and research has called for improving gender-responsiveness by considering

⁸⁶ C40 Cities Climate Leadership Group. (2021). Barcelona climate emergency action plan 2030. <https://www.barcelona.cat/barcelona-pel-clima>

⁸⁷ Alber, G. (2024). A novel approach to work towards gender-responsive urban climate policy. *Environment & Urbanization*, 36(1), 133-146. <https://doi.org/10.1177/09562478241230037>

⁸⁸ Pinho-Gomes, AC., Woodward, M. The association between gender equality and climate adaptation across the globe. *BMC Public Health* 24, 1394 (2024). <https://doi.org/10.1186/s12889-024-18880-5>

⁸⁹ UNICEF. (2021). The climate crisis is a child rights crisis. <https://www.unicef.org/reports/climate-crisis-child-rights-crisis>

⁹⁰ Seoul Metropolitan Government. (2021, February 3). Seoul to create green forest in "eco schools". <https://english.seoul.go.kr/seoul-to-create-green-forest-in-eco-schools/> (Accessed February 13, 2026)

⁹¹ Government of Japan. (2020). White paper on disaster management in Japan. https://www.bousai.go.jp/en/documentation/white_paper/pdf/R2_hakusho_english.pdf

⁹² Hossain, Z., & Rahman, A. U. (2018). Adaptation to climate change as resilience for urban extreme poor: Lessons learned from targeted asset transfers programmes in Dhaka city of Bangladesh. *Environment, Development and Sustainability*, 20(1), 407-432. <https://doi.org/10.1007/s10668-016-9888-2>

⁹³ Solórzano, A., Cárdenes, I., World Food Programme, & Oxford Policy Management. (2019). Social protection and climate change (Report No. 26). World Food Programme. <https://wfp.tind.io/record/60583?v=pdf>

childcare, parental leave, and other gendered concerns, especially in the informal economy.⁹⁴

Gender justice and social inclusion indicators and outcomes: To assess outcomes of the above adaptation actions, we use gender justice indicators based on Tabbush & Howell (2025), supplemented by mapping SDG 5 targets (purple, in Figure 2). This allows for an expanded understanding of how women's economic security, care work, safety, health, participation and leadership, and empowerment are supported or hindered through urban adaptation. We operationalise gender justice outcomes through the 3Rs framework.

Levers of adaptation: There are various ways to incentivise, enable, and accelerate adaptation to climate change. The Intergovernmental Panel on Climate Change defines an 'enabling condition' as "conditions that enhance the feasibility of adaptation and mitigation options. Enabling conditions include finance, technological innovation, strengthening policy instruments, institutional capacity, multi-level governance, and behaviour and lifestyle change."^{95, 96} UN Women identifies levers of change for gender and social justice as: working with women's organizations, ensuring sustained and adequate financing, engaging local governments, or cities that have fully integrated gender and adaptation in their planning.⁹⁷

We draw on and expand these conceptualisations of levers or enabling conditions, to distil seven key levers of adaptation that help move from urban adaptation actions and urban planning sectors (Figure 2, left) to gender and social equity outcomes (Figure 2, right). These levers are context-specific but interdependent, and adaptation progress depends on multiple levers aligning to support accelerated and transformative action. We reflect on these aspects in Section 5.3. Overall, our conceptual framework moves from urban adaptation actions that are mapped onto urban policy areas (sectoral and crosscutting) to gender and social justice outcomes operationalised through the 3Rs of recognition, redistribution, and representation. Mediating the flow from adaptation to outcomes, are seven adaptation levers.

⁹⁴ Rana, I. A., Khaled, S., Jamshed, A., & Nawaz, A. (2022). Social protection in disaster risk reduction and climate change adaptation: A bibliometric and thematic review. *Journal of Integrative Environmental Sciences*, 19(1), 65-83. <https://doi.org/10.1080/1943815X.2022.2108458>

⁹⁵ IPCC, 2022: Annex II: Glossary [Möller, V., R. van Diemen, J.B.R. Matthews, C. Méndez, S. Semenov, J.S. Fuglestedt, A. Reisinger (eds.)]. In: *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegria, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 2897–2930. <https://doi.org/10.1017/9781009325844.029>

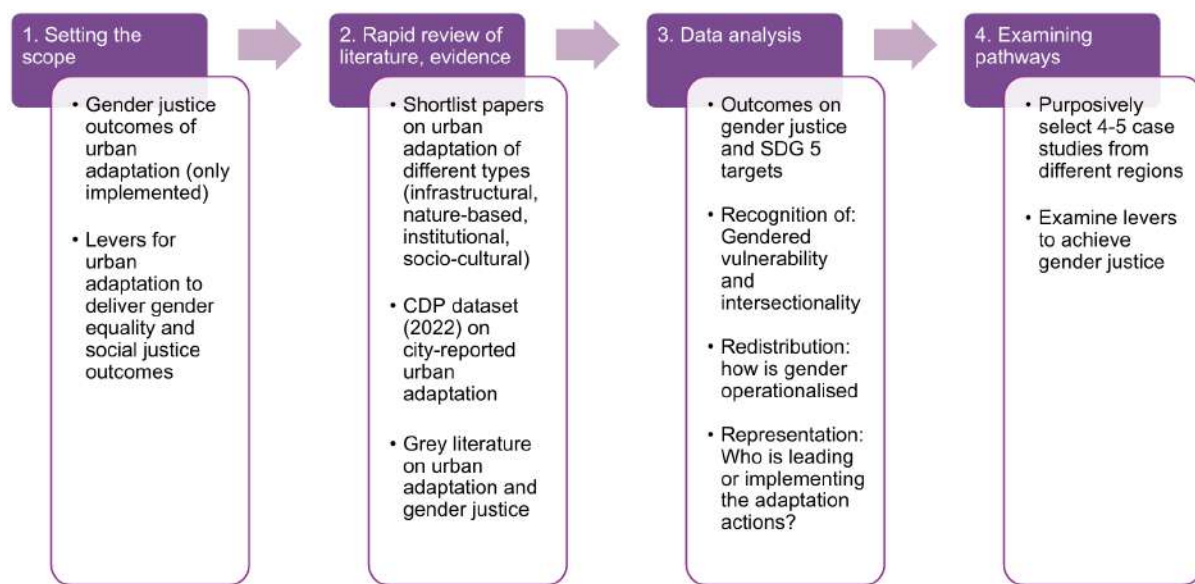
⁹⁶ Wannewitz, M., Petzold, J., & Garschagen, M. (2023). What makes people adapt together? An empirically grounded conceptual model on the enablers and barriers of collective climate change adaptation. *Frontiers in Climate*, 5, 1213852. <https://doi.org/10.3389/fclim.2023.1213852>

⁹⁷ UN Women. (2021). Feminist plan for sustainability and social justice. <https://www.unwomen.org/sites/default/files/Headquarters/Attachments/Sections/Library/Publications/2021/Feminist-plan-for-sustainability-and-social-justice-en.pdf>. (Accessed April 3, 2026)

Section 4: Methodological approach

We use three sources of data to collect evidence on urban adaptation actions and its possible gender and social justice outcomes. We reviewed (1) self-reported urban adaptation data from the 2023 Carbon Disclosure Project (CDP) database, (2) peer-reviewed academic literature using rapid review method, on the different types of urban adaptation and actors involved, and (3) illustrative cases from grey literature, transnational municipal network reports and publications. The sources of data and subsequent analysis are detailed below.

Figure 3. Summary of methodological approach



4.1 Self-reported urban adaptation data at city level

This study utilizes the [2023 Carbon Disclosure Project \(CDP\) database](#), which documents 5926 self-reported, implemented urban adaptation actions across 910 cities globally. The CDP Cities dataset is one of the most comprehensive standardized global repositories of municipal climate disclosures, compiling information reported voluntarily by local governments through structured questionnaires that capture climate hazards, adaptation actions, their co-benefits, jurisdiction and cost of actions, etc.

The 910 cities report adaptation actions against a typology of action groups (ecosystem-based actions, engineered and built environment actions, technological actions, educational/informational actions, services actions, behavioural actions, government policies and programs actions, laws and regulations actions, economic actions, no adaptation action in place, Other) allowing cross-city comparison of adaptation portfolios ([see Annex A3.1](#)). Cities are further asked to report co-benefits generated by each action, selecting from 55 co-benefit types defined by CDP spanning dimensions such as economic productivity, public health, ecosystem services, social protection, and institutional capacity ([see Annex A3.2](#)). The dataset was filtered to include only the 5,703 actions across 862 cities where at least one co-benefit was reported.

To analyse gender and social justice outcomes of urban adaptation actions, the 55 co-benefit types were coded into nine policy areas: Health; environment; social protection; economic & labour; infrastructure; governance; GHG mitigation; education; and others. These policy areas are consistent with those used in urban planning and development frameworks.

Next, each co-benefit type was mapped to SDG 5 targets, which are embedded in the 3Rs framework (as conceptualised in Figure 2). For each co-benefit type, we determined whether

a plausible direct or indirect pathway to one or more of the SDG5 targets could be established. Thus, while the CDP dataset provides insights on adaptation co-benefits, the implications for gender and social justice outcomes are inferred by us.

4.2 Review of literature

Rapid review: To answer our first research question and evaluate the current evidence on the outcomes of implemented urban adaptation on gender justice outcomes in cities, we undertook a rapid review⁹⁸ of the global, peer-reviewed literature by employing a systematic rapid review methodology (see Annex A2). We operationalised this by focussing on assessing outcomes of different types of implemented urban adaptation on gender justice⁹⁹. We examined different types of adaptation strategies, who is leading these strategies, and outcomes.

Illustrative case studies: We purposively chose six case studies to examine levers to enable gender-just urban adaptation. These case studies were picked from the grey literature, IPCC reports, UN reports, studies from transnational municipal networks such as Cities Alliance, ICLEI (International Council for Local Environmental Initiatives), C40 Cities and reports by organisations across the globe working on climate adaptation strategies. We chose the cases to cover different hazards; urban adaptation types (i.e; infrastructural or technological, ecosystem or nature-based, institutional and behavioural or socio-cultural, or combinations); gender focus (how is gendered vulnerability and intersectionality recognised and operationalised); actors leading and implementing the adaptation action; and geographical regions. We then assessed them to identify levers in the implemented adaptation actions that have or can help unlock gender and social justice outcomes (e.g., financial, governance-related, behavioural, or a combination etc.).

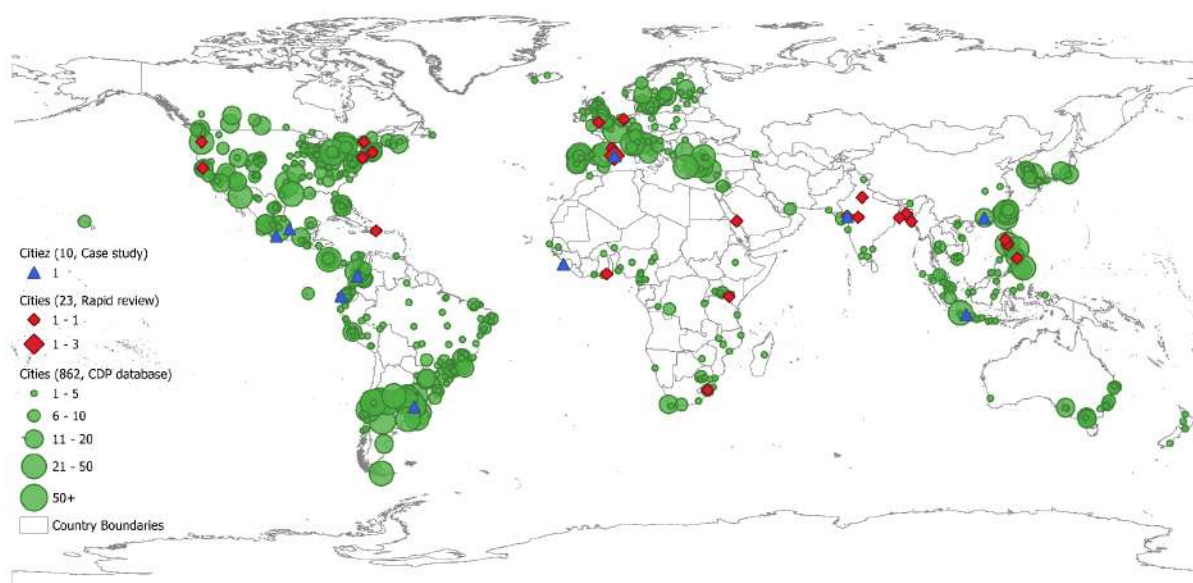
⁹⁸ Garritty, C., Hamel, C., Trivella, M., Gartlehner, G., Nussbaumer-Streit, B., Devane, D., ... & King, V. J. (2024). Updated recommendations for the Cochrane rapid review methods guidance for rapid reviews of effectiveness. *bmj*, 384. <https://doi.org/10.1136/bmj-2023-076335>

⁹⁹ Tabbush, C., & Howell, B. (2025). Gender Equality and Climate Policy Scorecard: A framework for assessing country performance on gender-responsive climate action 30 years after Beijing. *Statistical Journal of the IAOS*, 41(3), 705-722. <https://doi.org/10.1177/18747655251371005>

Section 5: Findings

In this section, we examine the evidence of the outcomes of implemented urban adaptation on gender equity and social justice, through self-reported data on urban adaptation followed by insights from the peer reviewed literature. The CDP dataset provides information on the city-reported co-benefits of urban adaptation actions, which also have implications for gender-related targets (Section 5.1). We then examine the evidence on reported gender outcomes of implemented interventions in the peer-reviewed literature (Section 5.2), noting that empirical evidence of outcomes is very sparse. We use six city-specific case studies to illustrate how different cities use suites of adaptation actions to advance gender equality and social justice.

Figure 4. Map of cities whose data has been assessed, across self-reported urban adaptation (CDP dataset, 910 cities); case studies (6 cities), and a literature review (23 cities).

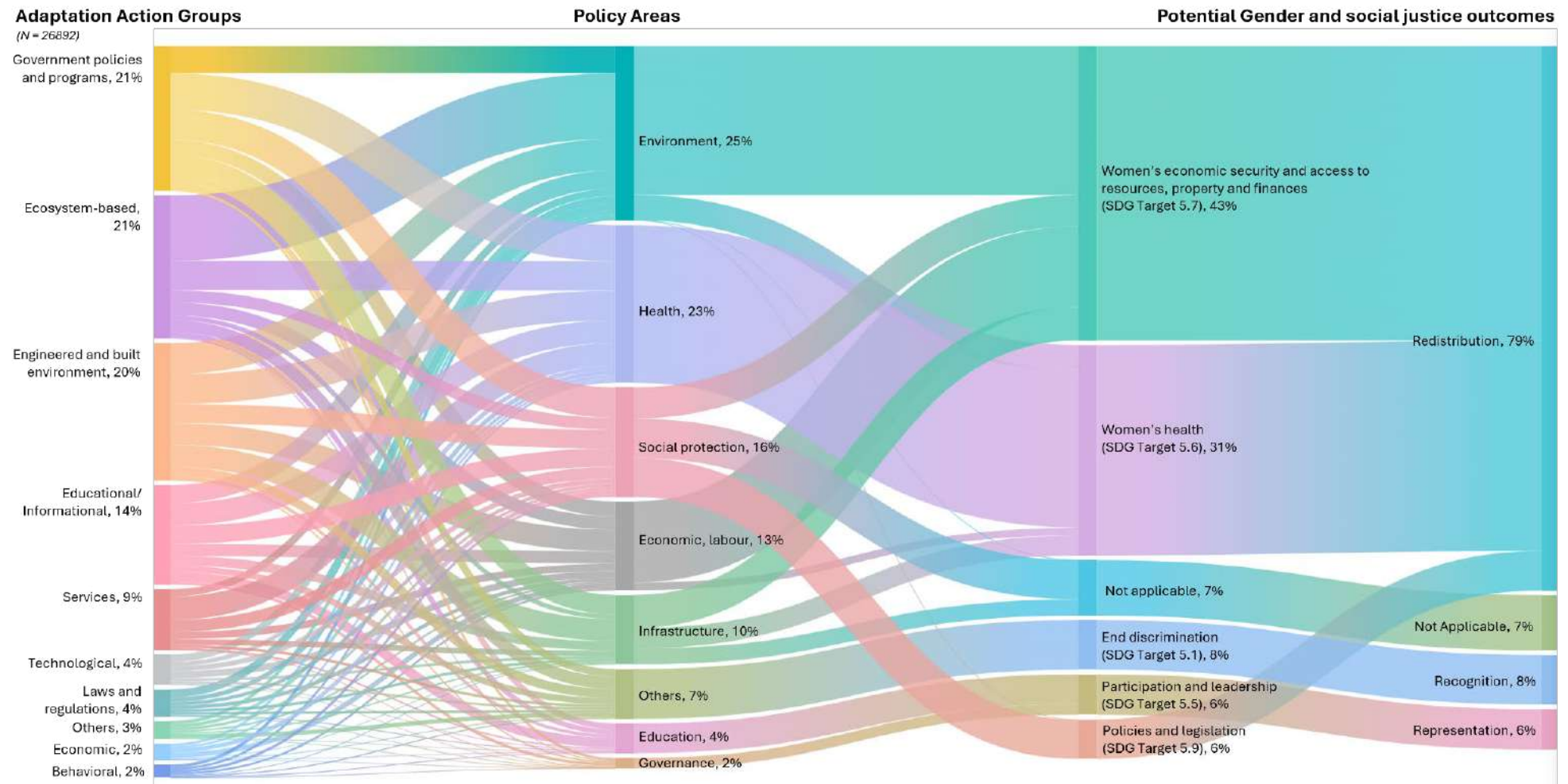


5.1 Gendered outcomes of self-reported global urban adaptation

Cities are increasingly undertaking climate change adaptation, moving beyond a focus on climate risk reduction alone toward a broader framing that integrates development co-benefits. Adaptation actions are increasingly positioned as multi-functional interventions capable of generating simultaneous gains across social, economic, and environmental domains. Global self-reported data from 910 cities in the 2023 CDP dataset documents 5,926 implemented adaptation actions out of which 862 cities logged 26,892 co-benefit mentions through 5703 adaptation actions, averaging nearly five co-benefits per action.

Most interventions contribute to overlapping policy objectives, reflecting the interconnected nature of urban adaptation actions. Yet this breadth does not necessarily translate into gender justice: co-benefits overwhelmingly concentrate on health, environment, and social protection, while pathways to reducing unpaid care burdens and gender-based violence remain entirely absent from self-reported urban adaptation.

Figure 5. Flow of co-benefits from urban climate adaptation actions (left) through nine policy area categories (centre) to SDG Target 5 (right) leading to 3Rs. Band width is proportional to the frequency of co-benefit mentions. Urban climate adaptation types are self-reported by cities, see Annex A3.1 for illustrative examples of adaptation actions under each type. Source: CDP Cities Dataset, 2023.



CDP classifies urban adaptation actions into groups, for example, sea walls, improved drainage, and cool pavements are categorised as engineered and built environment actions. We find that the 5,926 implemented adaptation actions map onto co-benefit types (as reported by cities themselves). These co-benefits are not evenly distributed across adaptation action groups, and where they originate shapes what kinds of outcomes are possible (Figure 5).

Government policies and program actions and ecosystem-based actions generate the largest share of co-benefits (21% each). Government policies and programs include interventions across disaster planning, community-based programs, and hazard-specific interventions, with co-benefits concentrated in health and social protection. Ecosystem-based actions have co-benefits flowing into the environment and health domains, reflecting the multi-functional character of green infrastructure, ecological restoration, and afforestation interventions, which simultaneously improve urban cooling, air quality, flood regulation, and livelihoods. Engineered and built environment actions (20%), have co-benefits distributed across health, infrastructure, social protection, and economic and labour domains. Together, these three groups generate over 60% of all co-benefit mentions.

Educational and informational actions (14%) hold co-benefits primarily in health, social protection, and education while services (9%) have notable contributions to health and social protection through water and sanitation delivery, social safety nets, and public health services. Technological, legal, economic, and behavioural action groups each contribute less than 5% of co-benefit mentions, though technological actions show a relatively higher concentration in economic and labour co-benefits, and behavioural actions despite their small share, disproportionately contribute to social protection co-benefits. This pattern reveals that the co-benefit landscape of urban adaptation is dominated by three action types whose gender pathways are largely structural and indirect: cities are investing in policies, ecosystems, and built environments, with co-benefits accruing primarily to health and environment, and less systematically to the governance and economic dimensions most directly linked to women's agency and voice.

Next, we map these urban adaptation co-benefits onto the 3Rs - recognition, redistribution, and representation and find:

- **Redistribution dominates:** SDG 5.6, 5.7 & 5.9 accounts for 79% of mapped co-benefits through adaptation, most visible in environmental and health-sector interventions followed by economic co-benefits (livelihood diversification, employment generation) and social protection. No co-benefits map to SDG 5.8 (empowerment through technology) in this dataset.
- **Representation is weak:** SDG 5.5 (participation and leadership) accounts for only 6% of co-benefits, driven almost entirely by education and governance actions; indicating that inclusive governance is not yet systematically embedded in adaptation planning.
- **Recognition:** SDG 5.1 (ending discrimination) accounts for 8% of co-benefits by social protection and infrastructure actions. Notably, SDG 5.4 (unpaid care work) and SDG 5.2/5.3 (gender-based violence) are entirely absent from the reported adaptation co-benefits landscape. This is possibly because urban adaptation actions are largely designed to reduce physical climate risk, not to address the structural conditions that produce gendered vulnerability in the first place. The reduction in gender-based violence, though well-documented as a climate impact in the literature, does not feature as a co-benefit of adaptation action; similarly, no action in the dataset generates a co-benefit linked to reducing unpaid care burdens, despite strong evidence that water, sanitation, and proximity-to-services investments can do exactly this.

Overall, urban adaptation co-benefits are skewed towards redistribution, with minimal attention to representation or recognition, highlighting a persistent gap in addressing the

structural drivers of gender inequality. However, these findings are contained to the CDP dataset and do not necessarily reflect the entire universe of implementation urban adaptation.

This sets the stage for examining evidence from implemented adaptation in the peer-reviewed literature.

5.2 Gendered outcomes of urban adaptation: empirical data

The evidence on the outcomes of *implemented* urban adaptation for gender and social justice is sparse, highlighting a real gap in peer-reviewed knowledge. Whatever evidence is available is from very few cities, often those connected to transnational municipal networks, with larger cities more represented than smaller ones. Within this small literature, cities are predominantly adapting to rapid-onset hazards through combinations of adaptation actions.

5.2.1 Overview of implemented urban adaptation

Cities are increasingly integrating climate adaptation into urban planning but the outcomes for gender, intersectionality, and social justice remain underreported. Across the 19 papers reviewed, 23 distinct cities are examined (red, Figure 4). The cities discussed in the papers are concentrated in the Global South, with 12 out of the 19 papers focussing on cities in Asia and Africa, indicating that the bulk of documented evidence on gendered climate impacts, or lack thereof in urban adaptation is emerging from rapidly urbanising, climate-vulnerable regions of the Global South. Seven papers examine cities in the Global North, three of which centre on Barcelona, Spain, which comes across as an exemplar in gender integrated urban planning.

We first report the landscape of the available evidence and then discuss the emerging gendered outcomes.

Climate hazards: Climate hazards include sudden-onset hydrometeorological hazards such as floods and heatwaves, and slow-onset hazards such as droughts and sea-level rise¹⁰⁰, which shape exposure, vulnerability, and risk. 16 of 23 cities in the reviewed papers implemented actions to combat extreme heat and urban heat island effects, while nine addressed flooding, six faced droughts and cyclones, and four cities dealt with landslides. In India, an analysis of 100 Smart Cities interventions shows that urban flooding is a major risk in cities such as Surat, Coimbatore, and Bhubaneswar.¹⁰¹ Extreme heat is faced by many cities such as Barcelona and Cox's Bazaar, both of which have designed interventions to address them in different ways^{102, 103}. This suggests that urban adaptation is currently still concentrated around only acute or visible risks, specifically ones affecting infrastructure and/or public health such as heat or flooding, rather than slower-onset risks like water scarcity.¹⁰⁴

Type of urban adaptation action: Urban adaptation interventions usually involve a range of actions across sectors (Table 2). Cities which demonstrate a combination of infrastructural or technological measures, for example, along with multi-level governance arrangements tend to

¹⁰⁰ United Nations Office for Disaster Risk Reduction. (2025). Hazard definition & classification review: Technical report. United Nations Office for Disaster Risk Reduction & International Science Council. <https://doi.org/10.24948/2025.05>

¹⁰¹ Bhattacharya, R., & Mukherjee, S. (2025). Climate Crisis and "City Citizens": A Look into the Gender-Inclusive Disaster Management Policies of Indian Smart Cities. In A. Sarkar & N. Bandyopadhyay (Eds), *Gender-Transformative Approaches for Climate Change Adaptation* (pp. 397–424). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-90236-9_20

¹⁰² Mombelli, S., March, R. G., Cucchiatti, F., Marquet, O., & Reyes, P. (2026). Are Barcelona's climate shelters accessible to vulnerable residents? A mobility justice analysis. *Cities*, 168, 106487. <https://doi.org/10.1016/j.cities.2025.106487>

¹⁰³ Sultana, Z., Mees, H. L. P., Mallick, B., Driessen, P. P. J., & Bailey, A. (2025). Rising temperatures, rising vulnerabilities: Individual and community adaptation to heat stress in urban slums of Bangladesh. *Sustainable Cities and Society*, 132, 106803. <https://doi.org/10.1016/j.scs.2025.106803>

¹⁰⁴ Singh, C., Jain, G., Sukhwani, V., & Shaw, R. (2021). Losses and damages associated with slow-onset events: Urban drought and water insecurity in Asia. *Current Opinion in Environmental Sustainability*, 50, 72–86. <https://doi.org/10.1016/j.cosust.2021.02.006>

result in more gender or socially just outcomes. To illustrate, the Ahmedabad Heat Action Plan integrates early warning systems with municipal health governance and community outreach to informal sector workers¹⁰⁵, while in Barcelona, the climate shelters are embedded within broader gender-responsive urban planning frameworks.¹⁰⁶ However, when infrastructural adaptation actions do not take into account both governance requirements and community needs, they fail to address structural inequalities. For example, Accra's Climate Action Plan (ACAP) prioritises waste and transport infrastructure, but does not consider how these systems address the specific socio-economic needs and mobility patterns of the urban poor.¹⁰⁷

Similar is the case for ecosystem-based adaptation (EbA). While the literature suggests EbA holds significant potential for inclusive adaptation with women taking on roles in decision-making¹⁰⁸, if not integrated into larger climate action plans, it carries a huge risk of "feminisation of responsibility".¹⁰⁹ Women bear the unremunerated labour of maintaining community-led nature-based services without formal governance or benefit-sharing mechanisms to actually address structural inequalities.¹¹⁰

In cities that have some form of institutional adaptation, there is a wide gap between formal inclusion and actual transformatory impact on the ground. In many cases, gender is operationalised as biological stereotypes without corresponding changes in funding, budgets, capacity, data, accountability mechanisms, or adequate representation in implementing bodies.¹¹¹ Several behavioural adaptation actions including those that are community-led rely heavily on women's voluntary labour. In Cebu and Mandaue, while women dominate de-facto decision-making, they take on positions of heavy labour in disaster management committees, while men hold less labour-intensive board roles. This adds to the triple-work burden¹¹² (productive, reproductive, and community work) of women where women's unpaid workloads increase significantly.¹¹³

¹⁰⁵ Guin, P., Rajeshwari, B., & Mahajan, B. (2024). What determines how governance indicators shape policy processes? Evidence from three environmental issues in India. *Environmental Policy and Governance*, 34(6), 691–708. <https://doi.org/10.1002/eet.2117>

¹⁰⁶ Berner, H., De Gregorio Hurtado, S., & Gualini, E. (2025). Strategies for urban climate adaptation: Pathways towards equitable resilience in Barcelona and Berlin. *Cities*, 161, 105836. <https://doi.org/10.1016/j.cities.2025.105836>

¹⁰⁷ Adjaisson, D., & Amoah, A.-B. (2024). Assessing Accra's Climate Action Plan as a case of vertical integration to achieve sustainable development. *Environment, Development and Sustainability*, 28(4), 8943–8966. <https://doi.org/10.1007/s10668-024-05341-7>

¹⁰⁸ Ofreneo, R. P., & Hega, M. D. (2016). Women's solidarity economy initiatives to strengthen food security in response to disasters: Insights from two Philippine case studies. *Disaster Prevention and Management*, 25(2), 168–182. <https://doi.org/10.1108/DPM-11-2015-0258>

¹⁰⁹ Hlahla, S., Simatele, M. D., Hill, T., & Mabhaudhi, T. (2022). Climate–Urban Nexus: A Study of Vulnerable Women in Urban Areas of KwaZulu-Natal Province, South Africa. *Weather, Climate, and Society*, 14(3), 933–948. <https://doi.org/10.1175/WCAS-D-20-0180.1>

¹¹⁰ Ramalho, J. (2019). Empowerment in the era of resilience-building: Gendered participation in community-based (disaster) risk management in the Philippines. *International Development Planning Review*, 41(2), 129–148. <https://doi.org/10.3828/idpr.2018.25>

¹¹¹ Ramalho, J. (2019). Empowerment in the era of resilience-building: Gendered participation in community-based (disaster) risk management in the Philippines. *International Development Planning Review*, 41(2), 129–148. <https://doi.org/10.3828/idpr.2018.25>

¹¹² Moser, C. O. N. (1993). *Gender planning and development: Theory, practice, and training*. Routledge.

¹¹³ Ofreneo, R. P., & Hega, M. D. (2016). Women's solidarity economy initiatives to strengthen food security in response to disasters: Insights from two Philippine case studies. *Disaster Prevention and Management*, 25(2), 168–182. <https://doi.org/10.1108/DPM-11-2015-0258>

Table 2. Details of the type of urban adaptation actions documented in the reviewed literature

Type of urban adaptation definition ¹¹⁴	Reporting cities	Examples from the literature
Infrastructural or Technological Interventions enabling, implementing, or undertaking technological innovation or infrastructural development to enable climate adaptation is defined as an infrastructural or technological action. These actions typically involved physical modifications to the urban environment or the deployment of new tools to manage climate risks.	18 cities (17 papers)	<ul style="list-style-type: none"> ● Santo Domingo Norte: Encasement of streams in drainage pipes¹¹⁵ ● Surat, Pune and Bhubaneswar: Construction of flood-resistant infrastructure and rooftop solar plants as part of the Smart City Mission¹¹⁶ ● New York City: State and community-led initiatives such as the Red Hook Wi-Fi, a solar-powered mesh network used for emergency management initiated by the Red Hook community members, demonstrates how localised tools can enable justice outcomes¹¹⁷.
Ecosystem or Nature-based Interventions focussing on enhancing, protecting, or promoting ecosystem services, such as implementing greening strategies or increasing urban tree canopies to address urban heat stress. In the cities documented, these actions ranged from municipal tree-planting and vertical gardening at the neighbourhood levels to city wide programmes to maintain urban green spaces	12 cities (10 papers)	<ul style="list-style-type: none"> ● Dhaka: State-led tree-planting initiatives to provide thermal comfort for vulnerable community groups ● Surat: Canal corridor development with greenbelts as part of the Indian Smart Cities Mission ● Amsterdam and Toulouse: Expanded tree canopy and urban greening through local food production
Institutional Actions aiming to enhance multi-level governance and institutional capabilities through policy instruments, gender mainstreaming in urban plans, and innovative financial mechanisms like gender-responsive budgeting. Institutional change is critical because these are the instruments or actions through which gender justice frameworks are introduced into planning.	16 cities (15 papers)	<ul style="list-style-type: none"> ● New York City: Climate adaptation planning incorporates social vulnerability and equity considerations, which also includes gender, but these remain largely embedded in assessment frameworks and are not operationalised through gender mainstreaming, gender budgeting or any other implementation mechanism¹¹⁸. ● Manila: Integration of informal trust networks into formal risk governance. These community-led networks ensured that women-headed households, frequently overlooked by state services, gained access to essential resources during floods¹¹⁹

¹¹⁴ Berrang-Ford et al. (2021). A systematic global stocktake of evidence on human adaptation to climate change. *Nature Climate Change*, 11(11), 989-1000. <https://doi.org/10.1038/s41558-021-01170-y>

¹¹⁵ Sletto, B., Luguana, A. M. L., Rakes, K., & Stycos, M. (2022). Intersectionality, gender, and project-induced displacement in the informal city: The struggle over stormwater development in Los Platanitos, Dominican Republic. *World Development*, 158, 105972. <https://doi.org/10.1016/j.worlddev.2022.105972>

¹¹⁶ Bhattacharya, R., & Mukherjee, S. (2025). Climate Crisis and "City Citizens": A Look into the Gender-Inclusive Disaster Management Policies of Indian Smart Cities. In A. Sarkar & N. Bandyopadhyay (Eds), *Gender-Transformative Approaches for Climate Change Adaptation* (pp. 397–424). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-90236-9_20

¹¹⁷ Camponeschi, C. (2022). Integrative resilience in action: Stories from the frontlines of climate change and the Covid-19 pandemic. *Frontiers in Sustainable Cities*, 4, 933501. <https://doi.org/10.3389/frsc.2022.933501>

¹¹⁸ Camponeschi, C. (2022). Integrative resilience in action: Stories from the frontlines of climate change and the Covid-19 pandemic. *Frontiers in Sustainable Cities*, 4, 933501. <https://doi.org/10.3389/frsc.2022.933501>

¹¹⁹ Porio, E. E., zuluEta, J., & Trixie, B. P. (2025). Gender, Social Capital, and Well-Being in Disaster- Prone Communities in the Philippine. *Journal of Asian Sociology*, 54(2), 191–214. <https://doi.org/10.21588/dns.2025.54.2.005>

<p>Behavioural or Cultural</p> <p>Actions enabling lifestyle or behavioural changes at the individual or household level, often leveraging social capital and informal trust networks to adjust to environmental risks. Most examples of adjustments in behaviour or cultural shifts are for efficient resource management during climate stress. Another commonly represented behavioural action is to inculcate awareness and nudge a mindset shift. Behavioural changes are also presented as a move towards better public health.</p>	<p>16 cities (16 papers)</p>	<ul style="list-style-type: none"> ● Nairobi: Community-led arrangements such as NGO supported female-led cooperatives that have created governance models for vertical farming ¹²⁰. ● Indore: Coping strategies against water scarcity where people collectively negotiate access to municipal water tankers and mutually share water by adjusting their water-use schedules. ¹²¹ ● Pietermaritzburg: Communities adjust their planting cycles in order to avoid crop failure due to flooding. ¹²² ● Cebu and Mandaue: The cultural tradition of <i>bayanihan</i> or volunteering/collective action is leveraged to drive community-led disaster risk reduction ¹²³. ● Manila: Informal trust networks are bridged with formal disaster committees to integrate gender equity into disaster risk governance. ¹²⁴ ● Cox's Bazar: Interventions focus on awareness-raising to shift cultural mindsets regarding women's visibility in public spaces enabling them to be a part of frontline disaster response. ¹²⁵ ● New York City: Integrative resilience focuses on providing trauma-informed care and healing to restore agency to marginalised groups ¹²⁶. ● Nairobi: Vertical gardening is used to foster a culture of self-sufficiency and improve dietary diversity. ¹²⁷
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¹²⁰ Otieno, J. A., Omia, D. O., & Amwata, D. A. (2025). Vertical gardening undergirds household food security: Evidence from Nairobi's Kibera informal settlements. *Frontiers in Sustainable Food Systems*, 9, 1654777. <https://doi.org/10.3389/fsufs.2025.1654777>

¹²¹ Agarwal, S., Kothiwala, K., Verma, S., Verma, N., & Vishvakarma, K. (2023). Perseverance in the Face of Water Scarcity in Hot Summer Seasons: A Case Study of Slum Communities in Indore, India. In D. Mookherjee, G. M. Pomeroy, & L. T. T. Huong (Eds), *Urban Transformational Landscapes in the City-Hinterlands of Asia* (pp. 177–199). Springer Nature Singapore. https://doi.org/10.1007/978-981-19-8726-7_11

¹²² Hlahla, S., Simatele, M. D., Hill, T., & Mabhaudhi, T. (2022). Climate–Urban Nexus: A Study of Vulnerable Women in Urban Areas of KwaZulu-Natal Province, South Africa. *Weather, Climate, and Society*, 14(3), 933–948. <https://doi.org/10.1175/WCAS-D-20-0180.1>

¹²³ Ramalho, J. (2019). Empowerment in the era of resilience-building: Gendered participation in community-based (disaster) risk management in the Philippines. *International Development Planning Review*, 41(2), 129–148. <https://doi.org/10.3828/idpr.2018.25>

¹²⁴ Porio, E. E., Zulueta, J., & Trixie, B. P. (2025). Gender, Social Capital, and Well-Being in Disaster-Prone Communities in the Philippines. *Journal of Asian Sociology*, 54(2), 191–214. <https://doi.org/10.21588/dns.2025.54.2.005>

¹²⁵ Tanjeela, M., & Rutherford, S. (2018). The Influence of Gender Relations on Women's Involvement and Experience in Climate Change Adaptation Programs in Bangladesh. *Sage Open*, 8(4), 2158244018812620. <https://doi.org/10.1177/2158244018812620>

¹²⁶ Camponeschi, C. (2022). Integrative resilience in action: Stories from the frontlines of climate change and the Covid-19 pandemic. *Frontiers in Sustainable Cities*, 4, 933501. <https://doi.org/10.3389/frsc.2022.933501>

¹²⁷ Otieno, J. A., Omia, D. O., & Amwata, D. A. (2025). Vertical gardening undergirds household food security: Evidence from Nairobi's Kibera informal settlements. *Frontiers in Sustainable Food Systems*, 9, 1654777. <https://doi.org/10.3389/fsufs.2025.1654777>

Actors engaged in adaptation action: Actors engaged in urban adaptation were analysed across leadership and coordination, on-ground implementation, and funding support which directly dictate the possibility of achieving gender just outcomes. Evidence from 19 papers showed that state-led climate adaptation actions are the most common model, where municipal or national government bodies lead the design and funding of actions. 18 of the 23 cities discussed in the papers document state-designed climate adaptation actions. In 14 of these cities, the interventions were primarily state-led, with implementation undertaken by government institutions and, in some cases, supported by external organisations through technical assistance. One such example is the Accra Climate Action Plan (ACAP) which is designed, funded and implemented by the Government of Ghana and Accra Metropolitan Assembly (AMA) with technical assistance from C40 cities leadership group.¹²⁸

Three cities (Nairobi, New York city and Manila) feature community-led adaptation design. In Manila, Local Government Units and women-led Community-Based Organizations with the support of NGOs have initiated community-level disaster preparedness. In New York City, the Red Hook community developed community disaster readiness plans for its residents.¹²⁹ An outlier is Kibera's informal settlements in Nairobi, where NGOs and residents of the settlement have set up female-led cooperatives through self-funding and NGO support, creating local governance models for vertical farming, without state support.¹³⁰

Scale of implemented adaptation action and policy areas: The papers were analysed to understand what instrument was used to implement the climate adaptation action, based on the scale of the action, its legal implications, and its physical form. Across the 19 papers, climate action plans were the most common instrument with 40% of cities having implemented them. Responses to heat stress were largely addressed at the city-level through climate resilience or Heat Action Plans such as in the case of Ahmedabad, Dhaka and Barcelona. While some cities had plans, they relied on more pointed thematic strategies as part of their city-wide plans to ensure adaptation action. This was documented in nine cities which used strategies to manage flooding, heat, and dengue (Bristol, Amsterdam, Kolkata, Barcelona, Riyadh, Pietermaritzburg, Cebu city, San Mateo and Sta. Barbara). Barcelona and Santo Domingo Norte Municipality had built interventions in the form of construction of climate shelters and encasement of a polluted stream by the construction of a road.

We now turn to outcomes of the above urban adaptation actions.

5.2.2 Outcomes of gender justice

Recognition of gendered and intersectional rights, labour, knowledge

How is gendered and intersectional vulnerability recognised in the urban adaptation literature? In the 19 papers reviewed, only 10 cities (12 papers) recognise gendered vulnerability. The understanding of vulnerability remains reductive where gender is often viewed only as a demographic variable, overlooking key social factors and socio-economic development patterns driving structural change. For instance, Berlin's heatwave analysis as part of its climate action plan recognises gender alongside identifying intersecting factors of socio-economic status and age. However, this does not translate into practical measures and instead of targeting plans and solutions towards the identified vulnerable groups, only

¹²⁸ Adjaisson, D., & Amoah, A.-B. (2024). Assessing Accra's Climate Action Plan as a case of vertical integration to achieve sustainable development. *Environment, Development and Sustainability*, 28(4), 8943–8966. <https://doi.org/10.1007/s10668-024-05341-7>

¹²⁹ Camponeschi, C. (2022). Integrative resilience in action: Stories from the frontlines of climate change and the Covid-19 pandemic. *Frontiers in Sustainable Cities*, 4, 933501. <https://doi.org/10.3389/frsc.2022.933501>

¹³⁰ Otieno, J. A., Omia, D. O., & Amwata, D. A. (2025). Vertical gardening undergirds household food security: Evidence from Nairobi's Kibera informal settlements. *Frontiers in Sustainable Food Systems*, 9, 1654777. <https://doi.org/10.3389/fsufs.2025.1654777>

population data is used.¹³¹ Thus, there is recognition of gendered vulnerability, but this does not carry through in adaptation action.

Recognition of gendered vulnerability in some cities extends beyond the biological and demographic, to a product of social norms and labour burdens. For instance, the DNCC Climate Action Plan (2024) in Dhaka, acknowledges the heightened vulnerability of low-income slum populations to heat stress, particularly women, because domestic duties and social norms restrict their access to shaded public spaces.¹³² Similarly, in the Philippines, women are identified as bearing the triple burden of productive, reproductive, and community work, which limits their participation in decision-making.¹³³ While recognising gender differences in vulnerability, there is a fine line between viewing women as vulnerable and viewing them as victims. In the Philippines, discourses often frame women as marginalised victims¹³⁴, and in Pietermaritzburg, women and the elderly are described as having an inherently low capacity to prepare for or respond to risks.¹³⁵

Intersectionality: Intersectionality or an understanding that vulnerability is shaped by intersecting or overlapping identities such as age, class, economic status, migration status amongst others, is significantly less prevalent in the literature reviewed. Social vulnerability includes “...people at susceptible life stages like pregnancy, childhood and old age, people with existing health conditions (e.g., chronic disease, disability), occupationally exposed people (e.g., lack of access to safe jobs, language barriers, or transportation to employment), people disadvantaged by race, ethnicity, socio-economic status, and people living in vulnerable locations.”¹³⁶

Five out of 23 city interventions reviewed discuss the impacts of intersectionality on adaptation action. In Manila, adaptive capacity is recognised as being shaped by the interaction of gender and socio-economic status with geographical risks and institutional access.¹³⁷ In Barcelona’s urban plans, age, migration status, and income are specifically incorporated alongside gender, to evaluate the accessibility of climate shelters.¹³⁸

Recognition of intersectionality and gendered vulnerability also extends to the lack of access to or control over resources. In Nairobi’s Kibera, women’s vulnerability is linked to their exclusion from formal land ownership and reliance on informal arrangements. While women

¹³¹ Berner, H., De Gregorio Hurtado, S., & Gualini, E. (2025). Strategies for urban climate adaptation: Pathways towards equitable resilience in Barcelona and Berlin. *Cities*, 161, 105836. <https://doi.org/10.1016/j.cities.2025.105836>

¹³² Sultana, Z., Mees, H. L. P., Mallick, B., Driessen, P. P. J., & Bailey, A. (2025). Rising temperatures, rising vulnerabilities: Individual and community adaptation to heat stress in urban slums of Bangladesh. *Sustainable Cities and Society*, 132, 106803. <https://doi.org/10.1016/j.scs.2025.106803>

¹³³ Ofreneo, R. P., & Hega, M. D. (2016). Women’s solidarity economy initiatives to strengthen food security in response to disasters: Insights from two Philippine case studies. *Disaster Prevention and Management*, 25(2), 168–182. <https://doi.org/10.1108/DPM-11-2015-0258>

¹³⁴ Ramalho, J. (2019). Empowerment in the era of resilience-building: Gendered participation in community-based (disaster) risk management in the Philippines. <https://doi.org/10.3828/idpr.2018.25>

¹³⁵ Hlahla, S., Simatele, M. D., Hill, T., & Mabhaudhi, T. (2022). Climate–Urban Nexus: A Study of Vulnerable Women in Urban Areas of KwaZulu-Natal Province, South Africa. *Weather, Climate, and Society*, 14(3), 933–948. <https://doi.org/10.1175/WCAS-D-20-0180.1>

¹³⁶ Malloy, J. T., Ashcraft, C. M., Kirshen, P., Safford, T. G., Aytur, S. A., & Rogers, S. H. (2022). Implementing just climate adaptation policy: An analysis of recognition, framing, and advocacy coalitions in Boston, U.S.A. *Frontiers in Sustainable Cities*, 4, 928230. <https://doi.org/10.3389/frsc.2022.928230>

¹³⁷ Porio, E. E., zuluEta, J., & Trixie, B. P. (2025). Gender, Social Capital, and Well-Being in Disaster- Prone Communities in the Philippine. *Journal of Asian Sociology*, 54(2), 191–214. <https://doi.org/10.21588/dns.2025.54.2.005>

¹³⁸ Mombelli, S., March, R. G., Cucchiatti, F., Marquet, O., & Reyes, P. (2026). Are Barcelona’s climate shelters accessible to vulnerable residents? A mobility justice analysis. *Cities*, 168, 106487. <https://doi.org/10.1016/j.cities.2025.106487>

play a central role in food distribution and maintaining garden plots, precarious land rental arrangements hinder women's adaptive capacity.¹³⁹

Gendered work and care: A recurring theme across the literature is one of the feminisation of responsibility and triple-work burden.¹⁴⁰ In the Philippines and Bangladesh, community-based disaster risk management often empowers women as individual agents but reinforces a triple-work burden. Women are expected to absorb the unremunerated labour of community recovery (e.g.: early warning during climate emergencies) on top of their existing domestic and productive responsibilities.¹⁴¹ There are several successful examples of spaces or infrastructures built around care work such as Barcelona's "Care Superblocks" and "VilaVeïnas" centres that attempt to redress this by supporting carers through shared childcare and legal services, making their work visible by acknowledging care as a critical role in averting climate impacts.¹⁴²

Gender-based violence: The intersection of rapid-onset climate-related disasters and gender-based violence against women (GBV) creates a multiplicative effect that exacerbates already existing social epidemics of violence, posing a critical threat to the achievement of SDG Targets 5.2 and 5.3¹⁴³. According to Ruiz et al., (2026), this phenomenon is driven by key factors such as pre-existing gender hierarchies, rigid divisions of labour, and the breakdown of social networks that previously offered protection. As evidenced in the reviewed literature, responsive urban adaptation actions have begun to address these risks by integrating safety and protection into city planning. For instance, in the cities of Philippines, the implementation of Family Development Committees within Homeowner Associations (HOAs) has allowed for collective intervention in domestic abuse cases¹⁴⁴. Similarly, Barcelona's Plan for Gender Justice reconfigures urban design around social networks of care work, aiming to prefiguratively eliminate anything that could precede violence¹⁴⁵. In Indian smart cities such as Surat, the development of safe public corridors and improved lighting specifically targets women's safety and mobility¹⁴⁶. These interventions, however, often overlook the slow violence¹⁴⁷ of chronic environmental stress. The incremental, often invisible harm erodes household stability resulting in psychological distress and escalating domestic tensions. For these efforts to be implemented effectively, climate risk management must move

¹³⁹ Otieno, J. A., Omia, D. O., & Amwata, D. A. (2025). Vertical gardening undergirds household food security: Evidence from Nairobi's Kibera informal settlements. *Frontiers in Sustainable Food Systems*, 9, 1654777. <https://doi.org/10.3389/fsufs.2025.1654777>

¹⁴⁰ Ramalho, J. (2019). Empowerment in the era of resilience-building: Gendered participation in community-based (disaster) risk management in the Philippines. *International Development Planning Review*, 41(2), 129–148. <https://doi.org/10.3828/idpr.2018.25>

¹⁴¹ Tanjeela, M., & Rutherford, S. (2018). The Influence of Gender Relations on Women's Involvement and Experience in Climate Change Adaptation Programs in Bangladesh. *Sage Open*, 8(4), 2158244018812620. <https://doi.org/10.1177/2158244018812620>

¹⁴² Amorim-Maia, A. T., Anguelovski, I., Chu, E., & Connolly, J. (2024). Governing intersectional climate justice: Tactics and lessons from Barcelona. *Environmental Policy and Governance*, 34(3), 256–274. <https://doi.org/10.1002/eet.2075>

¹⁴³ Ruiz, A. M., Muñoz, L., Walsh, T., Hardy, G., Ranjbari, B., Contreras, M. M., Leslie, S. L., & Nevitt, M. (2026). A scoping review of rapid-onset climate-related disasters & gender-based violence against women. *Climate Risk Management*, 52, 100809. <https://doi.org/10.1016/j.crm.2026.100809>

¹⁴⁴ Ramalho, J. (2019). Empowerment in the era of resilience-building: Gendered participation in community-based (disaster) risk management in the Philippines. *International Development Planning Review*, 41(2), 129–148. <https://doi.org/10.3828/idpr.2018.25>

¹⁴⁵ Mombelli, S., March, R. G., Cucchiatti, F., Marquet, O., & Reyes, P. (2026). Are Barcelona's climate shelters accessible to vulnerable residents? A mobility justice analysis. *Cities*, 168, 106487. <https://doi.org/10.1016/j.cities.2025.106487>

¹⁴⁶ Bhattacharya, R., & Mukherjee, S. (2025). Climate Crisis and "City Citizens": A Look into the Gender-Inclusive Disaster Management Policies of Indian Smart Cities. In A. Sarkar & N. Bandyopadhyay (Eds), *Gender-Transformative Approaches for Climate Change Adaptation* (pp. 397–424). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-90236-9_20

¹⁴⁷ Ruiz, A. M., Muñoz, L., Walsh, T., Hardy, G., Ranjbari, B., Contreras, M. M., Leslie, S. L., & Nevitt, M. (2026). A scoping review of rapid-onset climate-related disasters & gender-based violence against women. *Climate Risk Management*, 52, 100809. <https://doi.org/10.1016/j.crm.2026.100809>

beyond technocratic risk reduction and incorporate gender-responsive protection and support mechanisms.¹⁴⁸

Representation in leadership and decision-making

An important insight is that procedural justice outcomes of participation and leadership are most inconsistently achieved in all the cases discussed in the rapid review. Most of the urban adaptation actions, in the form of plans, strategies, agendas etc., rely heavily on expert or scientific knowledge rather than lived experience. There are some instances of grassroots leadership that stand out such as in the case of Santo Domingo Norte, Dominican Republic, where the women-led organisation Mujeres Unidas successfully challenged male-dominated leadership to secure replacement housing and community representation in stormwater projects that had initially caused major displacement and social fractures in the community.¹⁴⁹

Redistribution of resources and power

Redistributive outcomes are most tangible in early adopter cities where climate adaptation is linked to broader social policy. This is evidenced in the material relief in energy and finance as evidenced by Barcelona's Energy Advice Points (PAEs), which serve as a critical redistributive lever. Anchored by the Barcelona City Council, PAEs are physical service centres where residents can receive information and technical assistance regarding their household utilities. This provision was integrated into the city's broader Climate Plan of 2018-2030, with a long-term goal of achieving zero energy poverty by 2030.¹⁵⁰ The staff help residents reduce their energy expenditure by analysing their utility bills and identifying more efficient tariffs. This ensures that marginalised households are not hit with reconnection fees or forced to choose between paying for utilities and other essential needs like food and/or medicine. They redistribute benefits of green technologies and energy efficiency such that they are also accessible to low-income residents of the city. By mid-2022, they had prevented over 108,000 energy cuts, with 65% of these requests made by women who disproportionately face energy poverty.¹⁵¹ In Nairobi's Kibera settlements, the implementation of vertical gardening (cultivating crops in stacked containers, repurposed sacks, or hydroponic systems), has empowered women to achieve food sovereignty, bypassing lack of formal land ownership.¹⁵² The collective management of gardening spaces has provided households economic relief and improved nutrition.

Redistribution is happening at city scale too. For example, Manizales, Colombia uses 'Collective Voluntary Insurance' to redistribute risk where wealthier property owners' taxes cross-subsidize insurance coverage for low-income residents in areas prone to landslides (See Box 2). The scheme uses the property-tax payment mechanism to reach the lower-income property owners, who are themselves exempt from property tax. However, since the coverage is structured around property ownership, those without formal tenure including renters and informal settlers, may fall outside its protective reach. Whether such market-based redistribution mechanisms can adequately address gendered inequalities in asset ownership

¹⁴⁸ MSSRF (2025). The Impact of Heat on the Health of Women in India – A Cross-sectional study. M S Swaminathan Research Foundation. https://www.mssrf.org/sites/default/files/2025-11/Heat%20Study%20Report%20Draft%202013_20_11_2025.pdf

¹⁴⁹ Sletto, B., Luguana, A. M. L., Rakes, K., & Stycos, M. (2022). Intersectionality, gender, and project-induced displacement in the informal city: The struggle over stormwater development in Los Platanitos, Dominican Republic. *World Development*, 158, 105972. <https://doi.org/10.1016/j.worlddev.2022.105972>

¹⁵⁰ Amorim-Maia, A. T., Anguelovski, I., Chu, E., & Connolly, J. (2024). Governing intersectional climate justice: Tactics and lessons from Barcelona. *Environmental Policy and Governance*, 34(3), 256–274. <https://doi.org/10.1002/eet.2075>

¹⁵¹ Amorim-Maia, A. T., Anguelovski, I., Chu, E., & Connolly, J. (2024). Governing intersectional climate justice: Tactics and lessons from Barcelona. *Environmental Policy and Governance*, 34(3), 256–274. <https://doi.org/10.1002/eet.2075>

¹⁵² Otieno, J. A., Omia, D. O., & Amwata, D. A. (2025). Vertical gardening undergirds household food security: Evidence from Nairobi's Kibera informal settlements. *Frontiers in Sustainable Food Systems*, 9, 1654777. <https://doi.org/10.3389/fsufs.2025.1654777>

and extend protection to non-owners remains a critical area for further empirical investigation.¹⁵³ In India, the Ahmedabad Heat Action Plan introduced the 'extreme heat income insurance,' which provided financial payouts to female informal workers to compensate for lost wages during dangerous temperature spikes.¹⁵⁴

Technology functions as a redistributive lever that can bypass structural barriers like restricted mobility and lack of assets. During Hurricane Sandy in New York City, the Red Hook Wi-Fi, a community-based solar-powered network, was used as a technological interface for residents to restore communication and coordinate safety efforts independently of state infrastructure¹⁵⁵. In Barcelona, technology is used in the form of Geographic Information System (GIS) analysis specifically to account for walking speeds of older women and mobility constraints of migrants. This ensures that the vulnerable population are prioritised in the design of Climate Shelters. This design recognises differential needs by using granular and intersectional data and thereby redistributes funds to build for those with limited private resources and with greater exposure to heat risk.¹⁵⁶

Gender-just outcomes for health require integrated health systems during times of climate crises and disasters. As an illustration, in Santo Domingo Norte, a project-induced displacement for a stormwater project caused significant emotional distress and social instability for women and vulnerable groups, which was only addressed when Mujeres Unidas (an advocacy and support organization) secured replacement housing to restore community networks. Here housing is directly linked to women's health.¹⁵⁷ In this regard, the Ahmedabad Heat Action Plan is a good example of an institutional shift successfully targeting women's health. By implementing early warning systems and heat-health protocols specifically for pregnant women and outdoor workers, the plan reduces heat-related mortality.¹⁵⁸ In Nairobi (Kibera), the introduction of vertical gardening has significantly improved dietary diversity, allowing households to integrate leafy greens and herbs into their meals to improve overall nutritional health.¹⁵⁹ While these interventions are implemented at differing scales, they each have an impact on the overall health of women and marginalised community groups.

5.3 Levers of gender justice

As explained in Section 3, we identify seven levers that enable and accelerate urban climate action: these include multi-level governance, policy and legal instruments, human and

¹⁵³ United Nations Office for Disaster Risk Reduction. 2025. Global Assessment Report on Disaster Risk Reduction 2025: Resilience Pays: Financing and Investing for Our Future. United Nations.

¹⁵⁴ Guin, P., Rajeshwari, B., & Mahajan, B. (2024). What determines how governance indicators shape policy processes? Evidence from three environmental issues in India. *Environmental Policy and Governance*, 34(6), 691–708. <https://doi.org/10.1002/eet.2117>

¹⁵⁵ Camponeschi, C. (2022). Integrative resilience in action: Stories from the frontlines of climate change and the Covid-19 pandemic. *Frontiers in Sustainable Cities*, 4, 933501. <https://doi.org/10.3389/frsc.2022.933501>

¹⁵⁶ Mombelli, S., March, R. G., Cucchiatti, F., Marquet, O., & Reyes, P. (2026). Are Barcelona's climate shelters accessible to vulnerable residents? A mobility justice analysis. *Cities*, 168, 106487. <https://doi.org/10.1016/j.cities.2025.106487>

¹⁵⁷ Sletto, B., Luguana, A. M. L., Rakes, K., & Stycos, M. (2022). Intersectionality, gender, and project-induced displacement in the informal city: The struggle over stormwater development in Los Platanitos, Dominican Republic. *World Development*, 158, 105972. <https://doi.org/10.1016/j.worlddev.2022.105972>

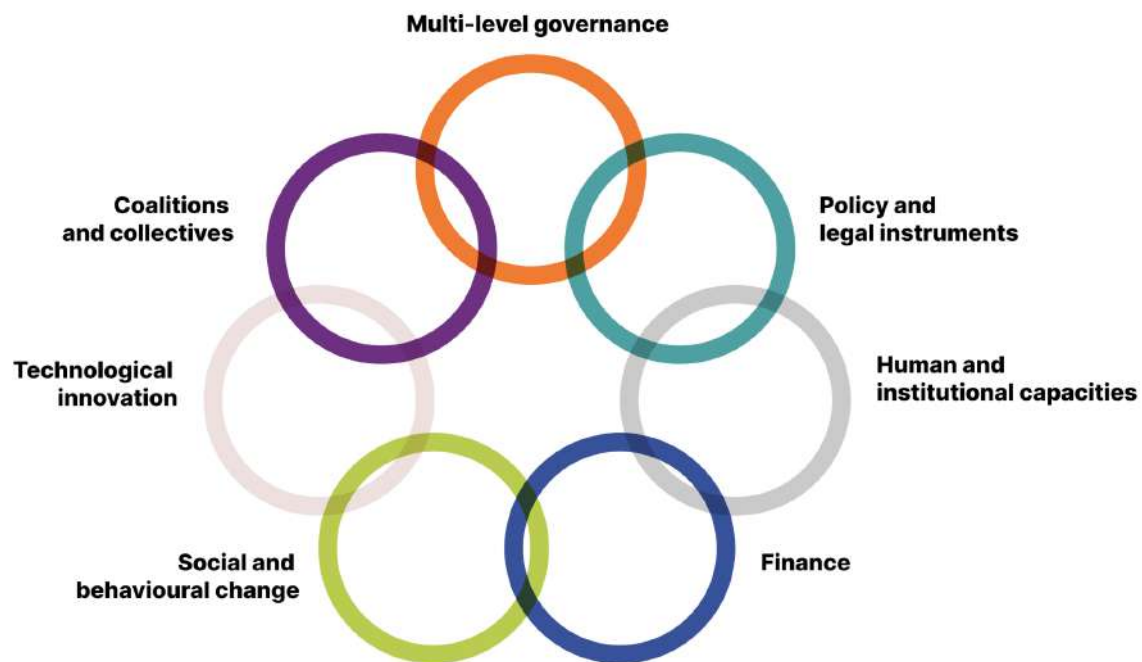
¹⁵⁸ Guin, P., Rajeshwari, B., & Mahajan, B. (2024). What determines how governance indicators shape policy processes? Evidence from three environmental issues in India. *Environmental Policy and Governance*, 34(6), 691–708. <https://doi.org/10.1002/eet.2117>

¹⁵⁹ Otieno, J. A., Omia, D. O., & Amwata, D. A. (2025). Vertical gardening undergirds household food security: Evidence from Nairobi's Kibera informal settlements. *Frontiers in Sustainable Food Systems*, 9, 1654777. <https://doi.org/10.3389/fsufs.2025.1654777>

institutional capacities; finance; social and behavioural change; and technological innovation from the IPCC¹⁶⁰ and coalitions and collectives from UN Women¹⁶¹ (Figure 6).

Most of the evidence converges on the importance of multi-level governance and institutional capacities as key levers that unlock or leverage other levers for gender and social justice outcomes. This importantly recentres attention on municipal governments as key actors that can be buttressed by non-governmental actors and supported by national or provincial governments depending on context.

Figure 6. Seven Interconnected adaptation levers that enable social and gender justice outcomes adapted from the IPCC¹⁶² and UN Women¹⁶³



5.3.1 Policy and legal instruments

Recognition of gendered and intersectional vulnerabilities and adaptive capacities in formal planning instruments is the first step towards gender mainstreaming, while representation within urban or climate plans is the next. In New York City, integration of marginalized experiences is observed through community-driven action plans like in the case of the Northern Manhattan Climate Action Plan. This plan was co-created by residents through a

¹⁶⁰ IPCC, 2022: Annex II: Glossary [Möller, V., R. van Diemen, J.B.R. Matthews, C. Méndez, S. Semenov, J.S. Fuglestedt, A. Reisinger (eds.)]. In: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 2897–2930. <https://doi.org/10.1017/9781009325844.029>

¹⁶¹ UN Women. (2021). Feminist plan for sustainability and social justice. Accessed April 2026, from <https://www.unwomen.org/sites/default/files/Headquarters/Attachments/Sections/Library/Publications/2021/Feminist-plan-for-sustainability-and-social-justice-en.pdf>

¹⁶² IPCC, 2022: Annex II: Glossary [Möller, V., R. van Diemen, J.B.R. Matthews, C. Méndez, S. Semenov, J.S. Fuglestedt, A. Reisinger (eds.)]. In: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 2897–2930. <https://doi.org/10.1017/9781009325844.029>

¹⁶³ UN Women. (2021). Feminist plan for sustainability and social justice. <https://www.unwomen.org/sites/default/files/Headquarters/Attachments/Sections/Library/Publications/2021/Feminist-plan-for-sustainability-and-social-justice-en.pdf> (Accessed April 13, 2026)

participatory process that prioritised the lived experiences of frontline communities to address economic inequality alongside climate risks.¹⁶⁴ Barcelona's Plan for Gender Justice (Box 1) imagines Barcelona as a caring city through which city authorities can reconfigure the city's physical and institutional culture around social networks of care work.¹⁶⁵

In Manila, the bridging of local women's groups with decentralised Community Disaster Preparedness Committees is a primary lever for inclusive adaptation to flooding and heat stress.¹⁶⁶ In 2009, two Magna Carta were passed in the Philippines; one for homeowners and the other for women.¹⁶⁷ The Magna Carta for Homeowners acts as a legal lever that allows Homeowner Associations in the Philippines to be delegated as point of contacts or authorities of local governance and disaster risk management. This legally recognised and formal integration allows municipal disaster agendas to be facilitated at the neighbourhood level, including informal housing neighbourhoods and marginalised settlements.

The 'Magna Carta of Women' framed the vulnerability of women and girls to disasters as a rights-based issue, explicitly addressing gender-based violence, reproductive, mental, and physical health, access to information, and livelihood support as critical concerns during and after disasters. However, while this legislation exists, it has not been implemented or carried forward into any subsequent legislations, showing a clear gap in the conceptualisation of gender issues within urban adaptation action and the lack of sufficient technical knowledge, personnel, or funding for its implementation. In fact, subsequent legislations in the country continue to overlook pluralistic social backgrounds of women and marginalised groups.¹⁶⁸

¹⁶⁴ Camponeschi, C. (2022). Integrative resilience in action: Stories from the frontlines of climate change and the Covid-19 pandemic. *Frontiers in Sustainable Cities*, 4, 933501. <https://doi.org/10.3389/frsc.2022.933501>

¹⁶⁵ Mombelli, S., March, R. G., Cucchiatti, F., Marquet, O., & Reyes, P. (2026). Are Barcelona's climate shelters accessible to vulnerable residents? A mobility justice analysis. *Cities*, 168, 106487. <https://doi.org/10.1016/j.cities.2025.106487>

¹⁶⁶ Porio, E. E., zuluEta, J., & Trixie, B. P. (2025). Gender, Social Capital, and Well-Being in Disaster- Prone Communities in the Philippine. *Journal of Asian Sociology*, 54(2), 191–214. <https://doi.org/10.21588/dns.2025.54.2.005>

¹⁶⁷ Ramalho, J. (2019). Empowerment in the era of resilience-building: Gendered participation in community-based (disaster) risk management in the Philippines. <https://doi.org/10.3828/idpr.2018.25>

¹⁶⁸ Ramalho, J. (2019). Empowerment in the era of resilience-building: Gendered participation in community-based (disaster) risk management in the Philippines. <https://doi.org/10.3828/idpr.2018.25>

Box 1 Gender-just urban adaptation planning in Barcelona

Barcelona is an urban adaptation frontrunner: it won the 2018 ‘Covenant Cities in the Spotlight’ award and was acknowledged for leading fair or citizen-led climate action by the C40 network. In 2018, it launched its comprehensive 2018–2030 Climate Plan to combat rising temperatures and water scarcity, through 242 actions across five areas (people first, starting at home, transforming communal spaces, climate economy, and building together) and 18 actions (e.g., no energy or water supply cuts, conserving the seafront, cultural action for the climate) Satoras et al. 2020). Critically, the plan states four strategic goals of mitigation, adaptation, climate justice, and promoting citizen action. With intentional goals on gender equity and social justice, Barcelona’s climate resilience plan forefronts the need to tackle structural inequalities in accessing the built environment, health services, energy, housing, and transport (Satoras et al. 2020; Amorim-Maia et al. 2024).

Implemented adaptation: Barcelona’s Climate Plan implements a range of strategies including green infrastructure (increasing tree canopy to 30%), climate shelters (100% population living within a five-minute walk from a climate shelter by 2030), and climate-compatible urban design (permeable pavements). Refugis Climàtics (Climate Shelters) is a network of infrastructures to provide thermal comfort to vulnerable groups in public facilities, such as schools, libraries, and civic centres, as well as shaded outdoor areas, parks, and gardens.

- The “**Climate Shelters in Schools**” project transformed 11 public primary schoolyards into climate shelters through innovative techniques that applied green (vegetation and shading), grey (improvements in insulation and ventilation) and blue (incorporation of water points) measures (Sanz-Mas et al. 2025).
- **Superilles (Superblocks)** focus on street pedestrianization and landscaping to reduce carbon emissions and noise pollution, improve air quality, and expand pedestrian and communal space. They are often identified as a feminist urban planning strategy transforming 400x400m grids into car-free, green, and safe public spaces which shift up to 60% of road space away from cars toward pedestrians and play areas; prioritising care, community interaction, and accessibility.¹⁶⁹



*Image 1. Result of the improvements made to the Sant Antoni Superblock on Parliament Street.
Author: Mariona Gil; Source: Ajuntament of Barcelona, www.barcelona.cat*

Barcelona’s “intersectional climate justice” practice: In 2017, Barcelona launched a “Government Bill for Democratizing Care Work”, aimed at making Barcelona a “Caring City”. The Bill recognises the social value of care work and the right to care and be cared for and consists of 68 initiatives aimed at a fairer distribution and responsibility of care work. In 2016, it developed a Plan for Gender Justice (2016–2020) as the city Council’s fundamental instrument for eliminating gender inequalities and promoting equality between women and men, and among women.

Barcelona's Plan for Gender Justice¹⁷⁰ which advocates for implementing urban planning with a gender perspective, moving away from traditional technocratic planning to reconfigure the city's physical and institutional culture around the social networks, tasks of everyday life and care work, fundamentally challenging the male-centric norms that continue to dictate urban design and planning. The plan specifically aims to support the needs of residents across intersections of gender, class, age and migration status. This is seen in the provision of municipal aid to those that experience energy poverty and livelihood insecurity. The bill alongside the plan, considers the precarious livelihoods of migrant informal care workers, single mothers, and senior women who face the burden of unequal distribution of care work. As part of the 68 interventions implemented by the Plan for Gender Justice, the Vilaveïna community care hubs identify and connect caregivers and support their wellbeing. These centres have already been implemented with the Superblock model to pacify and make neighbourhood spaces more comfortable for people and work.¹⁷¹

- **Leadership and intentional goalsetting:** Left-wing Mayor with an explicit agenda of creating a greener, more liveable, and inclusive city while working to reduce social and economic inequalities through a feminist urbanism lens. This agenda put care at the centre of urban planning and used place-based approaches to tackle intersecting vulnerabilities of frontline residents
- **Institutional innovation:** Institutional experimentation and innovation such as positioning itself as a pioneer among transnational city networks, willingness to persist on unpopular policies, work across agencies and actors to institutionalize climate justice
- **Place-based, coproduced solutions:** Coproduction with multiple actors at different stages, ensured inclusion and helped redistribute the benefits of climate action more fairly. For example, 141 organizations (e.g., private sector, NGOs, schools) were involved in developing a joint commitment by the City Council and citizen organizations to implement five strategic measures and seven priority projects (led by the Council) and to define and develop nine citizen-led projects (involving 135 people from 86 organizations).

5.3.2 Multi-level governance

Multi-level governance is critical for gender-responsive climate adaptation in cities because it helps align decision-making, resources, and knowledge across scales, ensuring that gendered experiences such as unequal access to infrastructure, services, and decision-making, are incorporated into adaptation planning.¹⁷² Coordinated governance systems have higher chances of supporting clear adaptation priority setting, overcoming siloed approaches, and ensuring policy coherence across sectors and scales.¹⁷³

Accra's Climate Action Plan (ACAP) uses vertical integration to align municipal waste and transport strategies with national goals¹⁷⁴. The DNCC Climate Action Plan in Korail, Dhaka also stresses on the need for improved coordination between the DNCC, national agencies, and NGOs to effectively implement climate adaptation measures and surpass the barriers to access of services, and resources, for slum communities.¹⁷⁵

¹⁶⁹ Amorim-Maia, A.T. Mobilising Intersectional Climate Action: Lessons from Barcelona <https://www.urbanet.info/intersectional-climate-action-lessons-barcelona>, 11 May 2021. (Accessed on 20 February 2026)

¹⁷⁰ Ajuntament de Barcelona. (2021). II Plan for Gender Justice 2021–2025. Barcelona: Fourth Deputy Mayor's Office for Social Rights, Global Justice, Feminism and LGBTI Affairs. https://base.socioeco.org/docs/noupla_2021-2025-jun-gb-online.pdf

¹⁷¹ Muzzini, E. and Torres, S. (2023). "Resilience in Action: Barcelona's Superblock Programme". Thematic Review Series: Council of Europe Development Bank, Paris. <https://coebank.org/en/news-and-publications/ceb-publications/resilience-in-action-barcelonas-superblock-programme/>

¹⁷² Alber, G. (2024). A novel approach to work towards gender-responsive urban climate policy. *Environment & Urbanization*, 36(1), 133–146. <https://doi.org/10.1177/09562478241230037>

¹⁷³ Gonzales-Iwanciw, J., Dewulf, A., & Karlsson-Vinkhuyzen, S. (2020). Learning in multi-level governance of adaptation to climate change—a literature review. *Journal of Environmental Planning and Management*, 63(5), 779–797. <https://doi.org/10.1080/09640568.2019.1594725>

¹⁷⁴ Adjaison, D., & Amoah, A.-B. (2024). Assessing Accra's Climate Action Plan as a case of vertical integration to achieve sustainable development. *Environment, Development and Sustainability*, 28(4), 8943–8966. <https://doi.org/10.1007/s10668-024-05341-7>

¹⁷⁵ Sultana, Z., Mees, H. L. P., Mallick, B., Driessen, P. P. J., & Bailey, A. (2025). Rising temperatures, rising vulnerabilities: Individual and community adaptation to heat stress in urban slums of Bangladesh. *Sustainable Cities and Society*, 132, 106803. <https://doi.org/10.1016/j.scs.2025.106803>

In the Philippines, cities demonstrate higher levels of disaster management capacity because of better integration of formal municipal structures with informal community networks as discussed above.¹⁷⁶ In Manizales, Colombia, women's leadership is prioritised (Box 2) with dedicated capacity strengthening and consequent visibility in key roles earlier undertaken by men.

¹⁷⁶ Porio, E. E., zuluEta, J., & Trixie, B. P. (2025). Gender, Social Capital, and Well-Being in Disaster- Prone Communities in the Philippine. *Journal of Asian Sociology*, 54(2), 191–214. <https://doi.org/10.21588/dns.2025.54.2.005>

Box 2 Guardianas de la Ladera programme in Manizales, Colombia

Manizales is the capital of the Caldas department, situated in the Colombian Central Mountain Range of the Andes. The city is built on precarious ridgelines and steep slopes. Its unique topography makes it highly susceptible to multiple hazards, including soil instability, heavy seasonal rains, and seismic activity, which frequently result in landslides. Manizales has become a global model for disaster risk management by shifting from reactive to more proactive emergency responses.

Implemented adaptation: This transition is anchored in established frameworks such as "Biomanizales" (environmental policy) and the "Bioplan" (local environmental action plan). These technical measures are significantly enhanced by a governance model that prioritizes the participation of its most vulnerable citizens.^{177,178} The city's strategy successfully combines three core elements to reduce disaster risk:

- Land-Use Regulation: Prioritizing risk-informed planning to prevent construction in high-danger zones.
- Building Codes: Enforcing stringent seismic and structural standards to ensure resilience.
- Watercourse Management: Implementing public works and management systems to control runoff and stabilize slopes.



Image 2. Since 2021, Emas by Veolia has operated the Guardians of the Hillside program. Female heads of household perform key tasks such as cleaning drainage ditches, removing waste, maintaining geotechnical structures, and monitoring the terrain for every sign, contributing to the protection of communities and reducing the risk associated with the city's mountainous geography and rainfall.
<https://www.facebook.com/VeoliaCo/posts/%EF%B8%8F-cuando-la-prevenci%C3%B3n-tiene-rostro-de-mujer-%EF%B8%8Fdesde-2021-emas-by-veolia-opera-el/1213288594250973/>

A cornerstone of this strategy is the inclusion of marginalized groups, specifically women, in leadership and active risk reduction roles. The city recognizes that intersectional and gender-responsive action is essential for transformative climate adaptation. By employing women as "Guardians," the city provides leadership opportunities in local bodies, which can enhance the overall quality and outcomes of climate governance. These women are directly involved in the maintenance of slopes and watercourses, turning a technical engineering requirement into a social empowerment program that addresses the structural drivers of exclusion. This approach moves beyond traditional "invisible" roles for women in urban bodies to making them visible leaders in community safety.

In Manizales, the employment of women from informal settlements directly targets the "vulnerability gap" where the poorest residents face the greatest exposure to hazard-related shocks. Because women in these areas often experience "intersecting deprivations" such as poverty, unsafe housing, and limited political power, employment in risk management serves as a tool for social learning and empowerment. This participation allows women to influence decisions regarding the fair distribution of adaptation resources, ensuring that risk reduction measures serve the

entire community rather than just affluent areas. Furthermore, providing stable incomes to these women helps stabilize household consumption, preventing them from falling deeper into poverty traps after extreme weather events.

The city complements this inclusive employment with an innovative collective voluntary insurance policy designed for the poorest strata. Developed through a strong alliance between the local government and the National University of Colombia, this policy uses catastrophic risk maps to provide a financial safety net for low-income households. The experience in Manizales proves that "resilience pays"; every dollar avoided in asset loss through proactive slope maintenance and insurance is estimated to be repaid twice in wellbeing benefits for the community. By integrating women-led physical maintenance with financial risk transfer tools, Manizales has created a model where environmental protection and gender equity reinforce one another.

The experience in Manizales demonstrates that resilience pays by protecting lives and stabilizing household incomes in the face of a volatile climate future. By preventing asset losses through integrated planning and inclusive employment, the city effectively doubles the "wellbeing benefits" for its poorest residents, as every dollar of asset loss avoided through risk reduction provides significant consumption stability for low-income households.

5.3.3 Human and institutional capacity

Having the knowledge, skills, and awareness to recognise and address gendered vulnerabilities and design adaptation to address these inequalities is critical to inclusive urban adaptation.^{179, 180} Gendered inequalities in access to education, resources, and decision-making power directly shape adaptive capacity, making institutional support and capacity-building essential for equitable outcomes.

In Ahmedabad, the use of a single nodal agency, which is the Ahmedabad Municipal Corporation (AMC) provides a clear chain of command to implement the Heat Action Plan.¹⁸¹ The municipality developed institutional capacity by building strategic coalitions with grassroots networks like SEWA and Mahila Housing Trust to bridge implementation gaps. Human capacity is strengthened by training frontline workers to engage communities on heat action strategies using colour-coded tools to enable communication with digitally excluded populations (Box 3).

While adaptation actions exist as policies and plans, more detailed instruments to implement them are still nascent, with most cases of successful implementation noted in the Global North, in cities such as Berlin, Amsterdam and Barcelona through pointed urban planning strategies. A critical advancement in building institutional capacity is the shift toward transversal coordination, which breaks down departmental silos to link climate action with social policy as seen in the case of Barcelona. Barcelona has established a dedicated Climate Change and Sustainability Office in 2020 to institutionalise climate adaptation efforts. Further, to ensure gender-responsive capacity, the city's Municipal Management Body for Gender and Time Policy deployed 38 gender mainstreaming units across departments to assess all climate

¹⁷⁷ United Nations Office for Disaster Risk Reduction. (2025). Global Assessment Report on Disaster Risk Reduction 2025: Resilience pays: Financing and investing for our future. United Nations. <https://www.undrr.org/gar/gar2025>

¹⁷⁸ Intergovernmental Panel on Climate Change. (2023). Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (Core Writing Team, H. Lee & J. Romero, Eds., pp. 35–115). IPCC. <https://doi.org/10.59327/IPCC/AR6-9789291691647>

¹⁷⁹ Alber, G. (2024). A novel approach to work towards gender-responsive urban climate policy. *Environment & Urbanization*, 36(1), 133–146. <https://doi.org/10.1177/09562478241230037>

¹⁸⁰ Aghdam, S. R., Ghasemzadeh, B., Pazhuhan, M., Babaeimorad, B., Parisi, L., & Sharifi, M. (2026). Gendering urban resilience: A critical approach to policymaking for sustainable and inclusive cities. *Cities*, 170, 106578. <https://doi.org/10.1016/j.cities.2025.106578>

¹⁸¹ Guin, P., Rajeshwari, B., & Mahajan, B. (2024). What determines how governance indicators shape policy processes? Evidence from three environmental issues in India. *Environmental Policy and Governance*, 34(6), 691–708. <https://doi.org/10.1002/eet.2117>

plans through a feminist lens.^{182, 183} Despite local efforts, many cities in the Global South such as KwaZulu-Natal in South Africa, have a "paucity of fiscal support" that discourages municipalities and officials from developing long-term gender-responsive frameworks.¹⁸⁴ Without political will and gender budgeting, institutional capacity remains restricted to reactive, short-term measures.

¹⁸² Mombelli, S., March, R. G., Cucchiatti, F., Marquet, O., & Reyes, P. (2026). Are Barcelona's climate shelters accessible to vulnerable residents? A mobility justice analysis. *Cities*, 168, 106487. <https://doi.org/10.1016/j.cities.2025.106487>

¹⁸³ Amorim-Maia, A. T., Anguelovski, I., Chu, E., & Connolly, J. (2024). Governing intersectional climate justice: Tactics and lessons from Barcelona. *Environmental Policy and Governance*, 34(3), 256–274. <https://doi.org/10.1002/eet.2075>

¹⁸⁴ Hlahla, S., Simatele, M. D., Hill, T., & Mabhaudhi, T. (2022). Climate–Urban Nexus: A Study of Vulnerable Women in Urban Areas of KwaZulu-Natal Province, South Africa. *Weather, Climate, and Society*, 14(3), 933–948. <https://doi.org/10.1175/WCAS-D-20-0180.1>

Box 3 Building Institutional Capacity in Ahmedabad's Heat Action Plan

Ahmedabad's Heat Action Plan was made in response to Ahmedabad's deadly heatwave in 2010, which reported a maximum temperature of 46.8°C and 1344 deaths¹⁸⁵.

Implemented adaptation: Addressing this threat, Ahmedabad Municipal Corporation (AMC) reoriented its approach to disaster management from reactive to anticipatory, partnering with multiple organizations to pilot the Heat Action Plan in 2013 and implementation in 2014. Key to this shift was a focus on heat risk literacy and incentivising behaviour change. The plan included simple communication tools that triggered behavioural shifts by facilitating easy understanding of climate risk across all literacy levels. For example, a color-coded heat warning system (yellow, orange and red) based on temperature thresholds.¹⁸⁶ To ensure that alerts are reached by all, visual illustrative pamphlets in Gujarati, were distributed which prioritized cooling practices like maintaining hydration and putting on light coloured cotton clothing.



Image 4. Women-Led Heat Mapping Campaign where 50 trained women volunteers from low-income settlements covered 200 km of the city, collecting real-time data on urban heat and humidity. Women led installation of heat sensors on vehicles, used mobile app, and will contribute to a comprehensive dataset on heat exposure, anchored by Mahila Housing Trust.

Leveraging network for normative shifts: The plan was designed based on 300 surveys in informal houses with information on 1650 individuals. This allowed recognition of differential impacts like women having lesser recovery time than men as they face double work burdens inside and outside the home. AMC developed coalitions with grassroots networks like the Self-Employed Women's Association (SEWA) and Mahila Housing Trust to engage with female informal workers such as street vendors, construction labourers, and waste recyclers. It reaches the most vulnerable populations like slum dwellers and outdoor workers by having outdoor sessions. It has also addressed the gendered digital and literacy divide by mobilising SEWA employees and AMC volunteers with verbal warnings and distribution of ORS (Oral Rehydration Solution) at worksites.¹⁸⁷

The Heat Action Plan has also fostered representation by incorporating women into its adaptation strategies by enabling collaborations between slum dwellers associations and women's organizations like Dalit Women's Collective which promote local adaptation measures like solar reflective white paint on roofs. These local adaptation measures reduce temperature by 4-5°C proving how multi-actor planning can help in building climate resilience and empower women in decision making.

The strongest outcome of the plan has been better public health and reduction in summertime mortality, an estimate of 1190 deaths reduced annually. The plan also includes protocols for pregnant women and neonates who are at high risk.¹⁸⁸ It has strengthened and improved the public health system in treating acute health illness. The plan is piloting "Extreme Heat Income Insurance", an intervention launched in 2023 that directly addresses Women's Economic Security (SDG Target 5.7) and provides financial payouts during extreme and dangerous heat to compensate for lost wages and establish a form of social protection for vulnerable workers.¹⁸⁹ While it is still evolving, it shows how a culture of inclusive adaptation planning allows for experimentation and learning.

5.3.4 Coalitions and collectives

Grassroots coalitions and collectives, including women's groups have played a crucial role in advancing gender-responsive climate adaptation by generating locally grounded knowledge, enhancing meaningful participation, articulating context-specific needs, and enabling inclusive decision-making in cities.¹⁹⁰

In San Mateo, Philippines, the women-led organisation Buklod Tao serves as the official civil society representative in the Barangay Disaster Risk Reduction and Management Committee (BDRRMC), ensuring community-based priorities are recognised legally. Similarly, in Ahmedabad, the involvement of the Mahila Housing Trust in the development and implementation of the Heat Action Plan ensured that the specific needs of women informal workers were addressed.¹⁹¹ In Sta. Barbara, Philippines, the municipal government works closely with a women-led organisation PATAMABA to build the capacity of women leaders to facilitate community gardens and in the longer run, food security for their neighbourhoods.¹⁹² Coalitions and collectives cannot enable equitable urban adaptation in isolation and work best when part of multi-actor networks, as seen in the case of Cirebon in Indonesia (Box 4), demonstrating amplified action when state-non-state actors come together.¹⁹³

¹⁸⁵ Shah, T., Mavalankar, D., Ahmedabad Municipal Corporation, Indian Institute of Public Health-Gandhinagar, & Natural Resources Defense Council. (2015). Addressing vulnerability to the health risks of extreme heat in urbanising Ahmedabad, India. <https://assets.publishing.service.gov.uk/media/57a08984e5274a27b2000105/CDKN-Ahmedabad-Paper.pdf>

¹⁸⁶ Knowlton, K., Kulkarni, S., Azhar, G., Mavalankar, D., Jaiswal, A., Connolly, M., Nori-Sarma, A., Rajiva, A., Dutta, P., Deol, B., Sanchez, L., Khosla, R., Webster, P., Toma, V., Sheffield, P., Hess, J., & Group, A. H. a. C. S. (2014). Development and implementation of South Asia's first Heat-Health Action Plan in Ahmedabad (Gujarat, India). *International Journal of Environmental Research and Public Health*, 11(4), 3473–3492. <https://doi.org/10.3390/ijerph110403473>

¹⁸⁷ Trahan, A., Walshe, R., & Mehta, V. (2023). Extreme heat, gender, and access to preparedness measures: An analysis of the heatwave early warning system in Ahmedabad, India. *International Journal of Disaster Risk Reduction*, 99, 104080. <https://doi.org/10.1016/j.ijdr.2023.104080>

¹⁸⁸ Hess, J. J., Lm, S., Knowlton, K., Saha, S., Dutta, P., Ganguly, P., Tiwari, A., Jaiswal, A., Sheffield, P., Sarkar, J., Bhan, S. C., Begda, A., Shah, T., Solanki, B., & Mavalankar, D. (2018). Building Resilience to climate change: Pilot evaluation of the impact of India's first heat Action Plan on All-Cause Mortality. *Journal of Environmental and Public Health*, 2018, 1–8. <https://doi.org/10.1155/2018/7973519>

¹⁸⁹ MSSRF. (2025). The Impact of Heat on the health of women in India – A Cross-sectional study. M S Swaminathan Research Foundation. https://www.mssrf.org/sites/default/files/2025-11/Heat%20Study%20Report%20Draft%2013_20_11_2025.pdf

¹⁹⁰ Aghdam, S. R., Ghasemzadeh, B., Pazhuhan, M., Babaeimorad, B., Parisi, L., & Sharifi, M. (2026). Gendering urban resilience: A critical approach to policymaking for sustainable and inclusive cities. *Cities*, 170, 106578. <https://doi.org/10.1016/j.cities.2025.106578>

¹⁹¹ Guin, P., Rajeshwari, B., & Mahajan, B. (2024). What determines how governance indicators shape policy processes? Evidence from three environmental issues in India. *Environmental Policy and Governance*, 34(6), 691–708. <https://doi.org/10.1002/eet.2117>

¹⁹² Ofreneo, R. P., & Hega, M. D. (2016). Women's solidarity economy initiatives to strengthen food security in response to disasters: Insights from two Philippine case studies. *Disaster Prevention and Management*, 25(2), 168–182. <https://doi.org/10.1108/DPM-11-2015-0258>

¹⁹³ Rao, N., Marzi, E., Baudish, I., Laila, A., Conti, C., and C. C. Hicks, (2025). Citizen voice and state response in the context of food system transformations, *Food Policy*, Volume 134, <https://doi.org/10.1016/j.foodpol.2025.102879>.

Box 4 Gender-Responsive Local Planning in Cirebon, Indonesia

Cirebon City, located on the northern coast of West Java, Indonesia, is a strategic port city and a metropolitan hub that has grown rapidly in recent decades. The urban village of Kesepuhan is particularly vulnerable due to its high-density settlements and its location at the mouth of several rivers, which makes it susceptible to coastal flooding, sea-level rise, and intense river overflows. These environmental stressors are compounded by a gentle topographic slope and heavy sedimentation that slows water flow into the sea. Moreover, the village has a long history of poverty and poor health with women, as part of their household, having responsibilities of taking care of the home, children and the elderly.

Implemented adaptation: In response to the above challenges, local authorities and researchers implemented an adaptation initiative focused on mainstreaming gender sensitivity into local climate change adaptation policy and strategy.¹⁹⁴ This aimed to ensure that resilience-building efforts were not gender-blind and consciously addressed the differential vulnerabilities and roles of both men and women in the face of increasing coastal risks. Gender mainstreaming was preceded by gender analysis and surveys that were conducted across 8 different variables of literacy, education, livelihoods, health, mobility, roles in decision-making, access to resources, status of female-headed households.

Key findings from this analysis were that while women in Cirebon city often have legal control over family assets like land and housing, they earn significantly lower wages than men, typically less than \$75 per month, and struggle with a double burden of domestic caregiving and working in the informal sector. The surveys also found that men have more knowledge of climate change than women. By explicitly identifying these gaps, the intervention prioritised gender-responsive outcomes where the distribution of benefits is equitable and women are recognized as essential agents of change due to their strong neighbourhood-level social networks.



Image 3. Settlement conditions in Kesepuhan Village. Photo by Nila Ardhyarini H. Pratiwi in <https://www.iied.org/sites/default/files/pdfs/migrate/10792IIED.pdf>

Gender and social justice outcomes of the development plans: In Indonesia, the Medium-term development plan is a planning document for five years consisting of a vision, mission, and programme. Insights from the analysis were integrated into the Local Medium-Term Development Plan. This ensured that climate adaptation becomes a legally endorsed government priority, institutionalising gender dimensions within the city's official vision, mission, and budget allocations. At the local level, a critical policy instrument is the Musrenbang (participatory development planning deliberations), which provide a platform for community leaders to propose gender-responsive programs directly to local government boards.

Collectives and coalition building: The actors leading and funding the gender mainstreaming formed a diverse coalition of government and non-governmental bodies. The Urban and Regional Development Institute (URDI) led

the research and strategy design in coordination with national ministries, including the Ministry of Women's Empowerment and Child Protection. The local government of Cirebon City has received training on gender integration in climate change adaptation, organised by the Ministry of Women's Empowerment and Child Protection, in cooperation with several national and international non-governmental institutions.

The case demonstrates that urban adaptation is effective and equitable when:

- gender dimensions are mainstreamed into legal, mid-term development frameworks that address structural causes of marginalisation and ensure long-term budgeting for resilience.
- multi-level and multi-actor governance is leveraged, including partnerships between local government, NGOs, and academic institutions, facilitating the creation of specialised working groups that can bridge technical knowledge with community-based expertise.
- continuous capacity building and education for local officials and marginalised residents is carried out, leading to shifts in cultural norms and enhanced adaptive capacity.

5.3.5 Social and behavioural change

Gender roles are socially constructed, and culturally codified and reproduced. Gender norms, beliefs, and everyday practices directly shape how individuals and societies perceive risks and act on adaptation. Thus, it is no surprise that shifting behaviour and culture is a necessary lever for gender-responsive adaptation.

Awareness and behavioural shifts: Behavioural change is often triggered by simple communication tools, such as the color-coded alerts in Ahmedabad that make climate risk understandable across literacy levels.¹⁹⁵ The Red Hook Community in New York City used community-wide drills to simulate emergency scenarios based on resident-led plans¹⁹⁶. In Dhaka, female volunteers often work alongside men to record rainfall trends or disseminate early warnings, but now with more awareness in the city, they do not encounter the same level of community resistance found in rural districts. This perspective shift has also created a 'positive attitude' among other residents, reinforcing the perception that the inclusion of women is vital to the success of community and public health projects.¹⁹⁷

Social capital and trust networks: To implement localised actions, many communities leverage their social relationships, inter-personal ties and community trust to cooperation and mutual assistance. This plays a pivotal role in enhancing adaptive capacities in times of climate crises as seen in the Philippines, where the cultural tradition of bayanihan or voluntary collective action is used to drive community-led risk reduction strategies.¹⁹⁸ Similarly, in Indore, the urban health resource centre (UHRC), an NGO, trains women's collectives to use negotiation as a lever to secure free municipal water tankers during droughts.¹⁹⁹ These networks also act as informal safety nets that facilitate the flow of risk information, pooling of

¹⁹⁴ Pratiwi, N. A. H., Rahmawati, Y. D., & Setiono, I. (2016). Mainstreaming gender in climate change adaptation: A case study from Cirebon, Indonesia (Asian Cities Climate Resilience Working Paper Series 39). International Institute for Environment and Development (IIED). <https://www.iied.org/sites/default/files/pdfs/migrate/10792IIED.pdf>

¹⁹⁵ Guin, P., Rajeshwari, B., & Mahajan, B. (2024). What determines how governance indicators shape policy processes? Evidence from three environmental issues in India. *Environmental Policy and Governance*, 34(6), 691–708. <https://doi.org/10.1002/eet.2117>

¹⁹⁶ Camponeschi, C. (2022). Integrative resilience in action: Stories from the frontlines of climate change and the Covid-19 pandemic. *Frontiers in Sustainable Cities*, 4, 933501. <https://doi.org/10.3389/frsc.2022.933501>

¹⁹⁷ Tanjeela, M., & Rutherford, S. (2018). The Influence of Gender Relations on Women's Involvement and Experience in Climate Change Adaptation Programs in Bangladesh. *Sage Open*, 8(4), 2158244018812620. <https://doi.org/10.1177/2158244018812620>

¹⁹⁸ Ramalho, J. (2019). Empowerment in the era of resilience-building: Gendered participation in community-based (disaster) risk management in the Philippines. *International Development Planning Review*, 41(2), 129–148. <https://doi.org/10.3828/idpr.2018.25>

¹⁹⁹ Agarwal, S., Kothiwali, K., Verma, S., Verma, N., & Vishvakarma, K. (2023). Perseverance in the Face of Water Scarcity in Hot Summer Seasons: A Case Study of Slum Communities in Indore, India. In D. Mookherjee, G. M. Pomeroy, & L. T. T. Huong (Eds), *Urban Transformational Landscapes in the City-Hinterlands of Asia* (pp. 177–199). Springer Nature Singapore. https://doi.org/10.1007/978-981-19-8726-7_11

funds, and coordination of household responses (e.g., sharing food or cooking spaces) when formal state infrastructure is absent or limited.²⁰⁰

5.3.6 Finance

Adequate, accessible, and well-aligned climate finance is essential for gender and socially just urban adaptation. The larger literature shows that climate finance is often structured in ways that exclude women, through biases toward large-scale, mitigation-focused investments and barriers such as limited access to credit, collateral, and decision-making spaces.²⁰¹ Financial support is also the most direct channel to redistribute outcomes in cities, by enabling women's access to resources such as land and credit so as to support household and community adaptation efforts.

Only four cities (Barcelona, Pietermaritzburg, Accra and Sta. Barbara) reported financial systems which sustainably implement gender-inclusive interventions. Within these, Accra and Barcelona have state-led or national funding mechanisms whereas Sta. Barbara, Philippines relies on an independently run microfinance system. The remaining cities rely heavily on volunteerism or erratic external funding. So far, Barcelona is the only city that has gender-responsive budgeting as part of its gender justice plans.

In Pietermaritzburg, social grants act as a financial lever, although most often a reactionary response to stabilise women's agrarian livelihoods.²⁰² In the Philippines, the women-led organisation PATAMABA developed their own independently run microfinance systems to support urban gardening enterprises by using savings and mutual aid components with support from private entities.²⁰³ Barcelona successfully utilised European Union (EU) funding to expand its climate shelter network.²⁰⁴ An illustrative example of state-led financing is Freetown (Box 5) where women's savings and loan groups are helping provide social security and buffer against shocks.

²⁰⁰ Otieno, J. A., Omia, D. O., & Amwata, D. A. (2025). Vertical gardening undergirds household food security: Evidence from Nairobi's Kibera informal settlements. *Frontiers in Sustainable Food Systems*, 9, 1654777. <https://doi.org/10.3389/fsufs.2025.1654777>

²⁰¹ Barsulai, C. (2025). Gender and Access to Climate Finance Why it Matters, the Barriers and Emerging Recommendations for Inclusive Climate Action, GIZ. <https://www.adaptationcommunity.net/wp-content/uploads/2025/08/Gender-Access-Climate-Finance.pdf>

²⁰² Hlahla, S., Simatele, M. D., Hill, T., & Mabhaudhi, T. (2022). Climate–Urban Nexus: A Study of Vulnerable Women in Urban Areas of KwaZulu-Natal Province, South Africa. *Weather, Climate, and Society*, 14(3), 933–948. <https://doi.org/10.1175/WCAS-D-20-0180.1>

²⁰³ Ofreneo, R. P., & Hega, M. D. (2016). Women's solidarity economy initiatives to strengthen food security in response to disasters: Insights from two Philippine case studies. *Disaster Prevention and Management*, 25(2), 168–182. <https://doi.org/10.1108/DPM-11-2015-0258>

²⁰⁴ Mombelli, S., March, R. G., Cucchiatti, F., Marquet, O., & Reyes, P. (2026). Are Barcelona's climate shelters accessible to vulnerable residents? A mobility justice analysis. *Cities*, 168, 106487. <https://doi.org/10.1016/j.cities.2025.106487>

Box 5 Women's political participation in urban resilience: Transform Freetown Agenda

Freetown, the capital city of Sierra Leone, has seen an increase in unplanned urban growth, leading to severe environmental and climatic shifts including higher temperatures, rainfall and rising sea level risks for its entire population.²⁰⁵ The city is geographically constrained by the Atlantic coast and steep hillsides, forcing informal settlements to expand into hazardous areas prone to coastal flooding and landslides, exacerbated by the mining of stone and sand, mangrove destruction and unchecked deforestation across the city. Freetown has a long history of civil war and sexual violence which has further marginalised the status of women and girls, apart from their traditional household responsibilities. Within these settlements, social security is fragile, as residents often lack land tenure (in informal settlements), as is access to basic services such as water. Women face specific risks such as gender-based violence during attempts to secure water during climate-induced shortages.²⁰⁶

Implemented adaptation: In 2018, the election of Mayor Yvonne Aki-Sawyer provided a crucial formal platform in the form of the Transform Freetown Agenda, a city-wide resilience plan led by the Office of the Mayor that prioritises environmental management and deliberative consultations. As part of the agenda, a partnership was formed between the informal Federation for Urban and Rural Poor (FEDURP) networks and the formal Freetown City Council, creating a mutually reinforcing model of multi-level-participatory governance. FEDURP is a women-led network of over 3000 residents from Freetown's informal settlements. These women are actively engaged in flood risk management, being trained and training other citizens on flood and disaster management as part of the community disaster management committee (CDMC). However, the central component of the network is the establishment of savings and loans groups, which serve as a critical informal social security mechanism. The intervention creates a safety net and social infrastructure for women in these settlements. The intervention works in the following way

- **Social security through financial inclusion:** These savings and loans groups (which is about 10 to 15 women per community) provide financial security for poor households, allowing women to save money for starting a new business or for childcare.
- **Protecting assets:** The groups also use bank accounts for any transfers and this ensures that women's earned income is protected from damage or being lost during climatic events like floods, which frequently destroy cash inside houses.
- **Equity and privacy:** The groups further emphasise financial self-reliance for women, protecting them from predatory or exploitative lending practices that could lead to blackmail, emotional or sexual exploitation.

Collectives and coalitions building: The Transform Freetown Agenda also shows strength in its coalition building to enact change. With the leadership of the Mayor Yvonne Aki-Sawyer of the Freetown City Council (2018-present), the grassroots network FEDURP primarily handles the implementation alongside a consortium of NGOs. For instance, community-generated data collected by FEDURP and its partner, the Centre of Dialogue on Human Settlement and Poverty Alleviation (CODOHSAPA), has been formally incorporated into the Transform Freetown Agenda. Moreover, Freetown now has a dedicated climate action strategy based on insights from this for the years 2022-2030.

²⁰⁵ USAID, Policy summary: The nexus of fragility and climate risks (2019). <https://www.strausscenter.org/publications/policy-summary-the-nexus-of-fragility-and-climate-risks/> (accessed March 3, 2026).

²⁰⁶ Georgetown Institute for Women, Peace and Security & Equality Fund, *Women building resilient cities: Gender-sensitive urban climate adaptation in an era of rapid urbanization* (2020), <https://giwps.georgetown.edu/wp-content/uploads/2020/06/Women-Building-Resilient-Cities.pdf> (accessed March 3, 2026).

5.3.7 Technological innovation

Adaptation technologies such as innovations for water, energy, or critical infrastructure can either reinforce or reduce gender inequalities. When co-produced with women and aligned with everyday practices, technological innovation can enhance women's agency, access to resources, and adaptive capacity, unlocking potentially transformative change. There are many technological innovations presented in the literature reviewed.

Ten cities (Nairobi, Delhi, New York city, Barcelona, Berlin, Jeddah, Sta. Barbara, Cox's Bazaar, Dhaka, Santo Domingo Norte) document technological solutions to address gender inequity. The Red Hook Wi-Fi in New York, a community-based solar-powered network, acted as a vital lever for restoring communication and agency during Hurricane Sandy.²⁰⁷ In Nairobi, the introduction of hydroponic systems and recycled materials enabled women to bypass land ownership constraints and achieve slum food sovereignty.²⁰⁸ The Smart Cities Mission in India has planned many integrated solutions to improve climate adaptation using technology. Some of them involve women in implementation, such as women-led rainwater harvesting, a decentralised technology system to improve water security and include local women's knowledge within adaptation interventions, as in the case of Bhubaneswar.²⁰⁹ In Shenzhen (Box 6), the innovative Sponge Cities approach was integrated with social justice outcomes, focussing on promoting women into technical and leadership roles and supportive care infrastructure.

²⁰⁷ Camponeschi, C. (2022). Integrative resilience in action: Stories from the frontlines of climate change and the Covid-19 pandemic. *Frontiers in Sustainable Cities*, 4, 933501. <https://doi.org/10.3389/frsc.2022.933501>

²⁰⁸ Otieno, J. A., Omia, D. O., & Amwata, D. A. (2025). Vertical gardening undergirds household food security: Evidence from Nairobi's Kibera informal settlements. *Frontiers in Sustainable Food Systems*, 9, 1654777. <https://doi.org/10.3389/fsufs.2025.1654777>

²⁰⁹ Bhattacharya, R., & Mukherjee, S. (2025). Climate Crisis and "City Citizens": A Look into the Gender-Inclusive Disaster Management Policies of Indian Smart Cities. In A. Sarkar & N. Bandyopadhyay (Eds), *Gender-Transformative Approaches for Climate Change Adaptation* (pp. 397–424). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-90236-9_20

Box 6 Sponge cities, Shenzhen, China

Shenzhen is a coastal mega-city located on the Pearl river delta, in Southern China, and an early adopter of China's Sponge Cities initiative. Shenzhen has experienced rapid urbanisation primarily driven by its unique status as an 'economic super laboratory', with the built-up area growing to such an extent that previously impervious surfaces were replaced intensively by concretised built structures. With a current estimated population of 18 million (from 30,000 in the 1970s), this sudden change in land-use disrupted the natural water flow and caused major instances of urban flooding and water pollution.



Image 5. Sponge City in China <https://waterbucket.ca/qi/2022/01/05/the-sponge-city-concept-marks-a-transformative-change-of-chinas-water-management-from-the-engineering-oriented-paradigm-to-a-more-holistic-and-nature-based-approach/>

Implemented adaptation: In response to excessive urban flooding, Shenzhen became a leading pilot for the Sponge City concept, which officially targets 80% urban land coverage by 2030. The sponge city framework uses various strategies to implement the concept:

- **Nature-based techniques:** Using building blocks which mimic natural systems to catch, clean, and store rainwater. Key interventions include green roofs, using engineered soil to absorb rain and reduce surface temperatures by up to 9°C and permeable pavements on roadways and sidewalks to allow water infiltration
- **Ecological and economic benefits:** Designing a shift from grey hard infrastructure such as dams and pipes to functional green infrastructure such as rain gardens and wetlands so that the city reduces the burden on water treatment plants and creates/retains water for dry seasons. A project within Shenzhen, the Honey Lake Park transformed an abandoned agricultural land into a multifunctional space that uses retention ponds and diverse landscape elements to slow runoff while providing the local community, amenities like libraries and play centres.

Gender and social justice outcomes of the sponge city concept: Women often serve as primary caregivers and household managers, making them more susceptible to environmental disruptions that threaten family stability and access to food, water, and fuel.²¹⁰ The Climate-Resilient and Smart Urban Water Infrastructure Project which was implemented in 2015 up to 2024, involving Shenzhen Water Group (SZWG) and the Asian Development Bank (ADB), enhanced urban resilience against water-related disasters, extreme weather events (heat/floods), water contamination, and sanitation gaps, through the sponge city strategies. Key gender outcomes of the project include:

- **Workforce inclusion and leadership** (SDG Target 5.5, 5.9) : SZWG implemented a **Gender Action Plan** that successfully promoted women in technical and leadership roles. The representation of women in mid and senior-level management at SZWG increased from 3 in 2019 to 12 in 2023.
- **Institutionalising care giving support** (Unpaid care work (SDG Target 5.4): Women in senior leadership advocated for key reforms such as the childcare leave policy, recognising the specific need to balance unpaid care work with professional advancement.
- **Education and knowledge platforms** (SDG Target 5.8): Women-led community education activities focussed on water safety, sanitation, and smart water technologies. Furthermore, 35% of participants in SZWG's career advancement training at the Shenzhen Water Academy were women, receiving specialised training in sponge city technologies.
- **Women's mental health** (SDG Target 5.6): During Covid-19, the SZWG women's committee provided psychological counselling, with women making up 62% of the users, prioritising women's health during crises.²¹¹

This project demonstrates that infrastructure can be designed both for functional purposes, along with improving liveability and reducing long-term disaster risk. Here, infrastructure is upgraded in a targeted manner to be utilised as a public good for the local community, especially women, reducing the time they spend on household water management. Successful urban adaptation requires comprehensive and inclusive planning, aligning resilience with regional development plans and Sustainable Development Goals (SDG 5, 6, and 13). Most importantly, providing opportunities for women to take on leadership and participation in local bodies such as the SZWG enhances climate governance and socially just outcomes.²¹²

²¹⁰ Development Asia. (2025, May 22). Women as agents of change: Shaping resilience through sponge cities. <https://development.asia/case-study/women-agents-change-shaping-resilience-through-sponge-cities>. (Accessed February 26, 2026)

²¹¹ Development Asia. (2025, May 22). Women as agents of change: Shaping resilience through sponge cities. <https://development.asia/case-study/women-agents-change-shaping-resilience-through-sponge-cities>. (Accessed February 26, 2026)

²¹² Dodman, D., B. Hayward, M. Pelling, V. Castan Broto, W. Chow, E. Chu, R. Dawson, L. Khirfan, T. McPhearson, A. Prakash, Y. Zheng, and G. Ziervogel, 2022: Cities, Settlements and Key Infrastructure. In: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, et al. (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 907–1040. <https://doi.org/10.1017/9781009325844.008>

Section 6: Enabling equitable urban adaptation

Cities concentrate people, assets, emissions, and risks, making climate change an important policy challenge in an urbanising world. Global assessments^{213,214} converge on a clear message: urban areas are simultaneously major contributors to greenhouse gas emissions and hotspots of climate vulnerability, especially to heat extremes, flooding, water scarcity, sea-level rise, and air pollution. There is also unequivocal evidence that climate risks and responses in cities are deeply gendered^{215,216}, shaped by unequal access to housing, infrastructure, livelihoods, mobility, and decision-making power. While many urban adaptation efforts have co-benefits for gender and social justice, these are often not intentional or planned, hence not only are they not reported, but there is also a missed opportunity in terms of maximising these benefits.

While evidence of implemented urban adaptation having gender justice outcomes are present, they are concentrated in a few cities. There appears to be more evidence around diagnosing the problem (of gender impacts of climate change) than designing and piloting solutions (of how to implement gender-transformative urban adaptation). The evidence we reviewed suggests some ways forward. All of these potential solutions require multiple types of urban adaptation strategies, beyond infrastructural and technical. They require constellations of actors and networks to come together towards shared goals; and necessitate the unlocking of multiple levers, most prominently governance alongside human and institutional capacities to advance a gender-transformative urban climate action agenda.

6.1 Cities are adapting to climate change

Global self-reported data from 910 cities note a range of adaptation actions. Structural and physical interventions form the largest share of reported urban adaptation, followed by social, institutional and ecosystem-based actions. However, the data doesn't explore the interlinkages between these different action groups or explicitly report gender and social justice outcomes.

Most cities are adapting primarily to high-visibility, acute hazards like storms and floods (24% of reported hazards), followed by extreme temperature (18%), while slower-onset risks like drought and land degradation remain underrepresented. While disasters undoubtedly adversely affect women and children, in particular, it is the slow-onset events that add additional time burdens to women's everyday domestic and care tasks, create uncertainty of livelihoods and food security, thereby enhancing both mental and physical stress.

What is needed then is closer attention and investment in ensuring clean and safe air and water, now enshrined under the Right to a Healthy Environment, adopted by 110 countries at the United Nations General Assembly in July 2022.²¹⁷ In addition to clean air and water, this right entails safe and sustainable ecosystems, the protection from pollution and environmental

²¹³ Dodman, D., B. Hayward, M. Pelling, V. Castan Broto, W. Chow, E. Chu, R. Dawson, L. Khirfan, T. McPhearson, A. Prakash, Y. Zheng, and G. Ziervogel, 2022: Cities, Settlements and Key Infrastructure. In: *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [H.-O. Pörtner, D.C. Roberts, et al. (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 907–1040. <https://doi.org/10.1017/9781009325844.008>

²¹⁴ UN Habitat, 2024. World Cities Report. <https://unhabitat.org/wcr/>

²¹⁵ Solomon, D. S., Singh, C. & Islam, F. (2021): Examining the outcomes of urban adaptation interventions on gender equality using SDG 5, Climate and Development. <https://doi.org/10.1080/17565529.2021.1939643>

²¹⁶ Aghdam, S. R., Ghasemzadeh, B., Pazhuhan, M., Babaeimorad, B., Parisi, L., & Sharifi, M. (2026). Gendering urban resilience: A critical approach to policymaking for sustainable and inclusive cities. *Cities*, 170, 106578. <https://doi.org/10.1016/j.cities.2025.106578>

²¹⁷ United Nations Environment Programme. (2022, July 28). In historic move, UN declares healthy environment a human right. <https://www.unep.org/news-and-stories/story/historic-move-un-declares-healthy-environment-human-right>. (Accessed April 16, 2026)

degradation, access to information and participation in environmental decision-making as well as legal remedies and accountability mechanisms. Addressing these elements would address the justice dimensions we have outlined in this paper: recognizing specific vulnerabilities, redistributing resources to address them, and ensuring equitable representation. Several of our case studies have demonstrated pathways for achieving these goals.

6.2 Outcomes for gender and social justice are positive but evidence is sparse

The current landscape of urban climate adaptation reveals a significant shift towards multi-functional and multi-stakeholder interventions that generate diverse co-benefits. Over 60% of all reported co-benefits, flowing largely from engineered interventions and ecosystem-based actions, are concentrated in just three domains: health, environment, and social protection. While these are key priorities, they do not always translate into gender justice. This is because critical areas like unpaid care work and gender-based violence (GBV) are left almost entirely unaddressed. Applying a 3Rs lens, redistribution-oriented outcomes dominate (79% of co-benefits), representation is weak (6%), and recognition is limited (8%) and concentrated narrowly on ending discrimination, with care work, safety, and bodily autonomy is entirely absent, signalling that cities are generating co-benefits without yet confronting the structural drivers of gender inequality.

State-led infrastructural projects often prioritise engineering efficiency over social equity, leading to potentially maladaptive outcomes. Community-led groups serve as essential safeguards to redirect these outcomes. While community-led interventions have more gender and socially just outcomes, current models of adaptation actions frequently rely on the unremunerated labour of marginalised women, leading to what Ramalho (2019)²¹⁸ terms the feminisation of (adaptation) responsibility where adaptation solutions (especially community-led or nature-based solutions) often rely on unpaid female labour. The state thus governs at a distance by shifting the cost of climate preparedness onto those with the least resources. Without formal institutional support or financial remuneration, building resilience can equally become an exercise in exploitation rather than redistribution of power.

What is then needed is attention to alleviating the burdens of domestic and care work on women. This can be done through improvements in the provision of basic needs such as clean drinking water and clean fuel supply, but also strengthening public services focused on care, in particular childcare, eldercare and health care. While strengthening public health is increasingly acknowledged as a key adaptation action, especially in the context of rising heatwaves and impacts of air and water pollution on health, care and domestic services lack the same attention. Responsibility needs to go alongside rights, hence ensuring women's rights needs to underpin the feminisation of responsibility.

Urban climate adaptation is never a neutral process and must recognise complex subjectivities of women and marginalised communities. Even in global North cities which include women and marginalised groups in public benefits, there are instances of exclusion and tokenism. The Transform Freetown Agenda provides a good example of gender mainstreaming and gender analysis accompanying the formulation and implementation of the agenda, providing concrete information on final outcomes. If differentiated needs, priorities and outcomes are not documented, plans can slip into a one-size-fits-all approach, treating citizens as homogenous units, thereby not just making structural oppression invisible, but potentially carrying the risk of reproducing environmental and social injustices.

Global policy agreements emphasise integrating gender-responsiveness into climate finance, capacity building, and adaptation strategies, most notably through the recent Belém Gender

²¹⁸ Ramalho, J. (2019). Empowerment in the era of resilience-building: Gendered participation in community-based (disaster) risk management in the Philippines. <https://doi.org/10.3828/idpr.2018.25>

Action Plan. Cities, home to more than 50% of the global population²¹⁹, play a critical role in achieving goals of inclusive and effective adaptation to climate change. The solutions for mainstreaming gender and social justice in urban adaptation can and will take many pathways. Some cities are leveraging different types of actor networks, some are experimenting with governance and financial instruments, and others are choosing to focus on inclusive development to build adaptive capacities. Designing urban adaptation that acknowledges and mainstreams gender and social justice requires a careful understanding of the structural drivers of uneven adaptation; building human and institutional capacities to design gender-responsive urban adaptation; a rigorous, data-driven approach to priority setting; as well as robust MEL (Monitoring Evaluation and Learning) systems to track adaptation outcomes. Our diagnosis begins to outline how this can be done (Table 3).

Table 3. Moving from current technocratic approaches to a gender-responsive approach in urban adaptation

Feature	Technocratic Approach	Gender-responsive Approach
Objective	Reducing exposure to hazards and protecting infrastructure	Centring goals of social and gender justice in climate adaptation
Focus	Predominant focus on visible/acute risks such as rapid-onset events	Expanded focus which includes slow-onset events and structural vulnerabilities such as water scarcity, uneven care burdens
Actors	State-led; dominated by technical experts and scientific knowledge	Co-production involving grassroots collectives and lived experience
Success metrics	Hazard-specific (e.g., flood levels reduced, heat islands mapped).	Addressing everyday climate risks through reduced care burdens, financial inclusion, and increased agency.
Inclusion	Gender as a demographic variable, women as homogenous group, uneven attention to intersectionality	Gender and intersectionality as central pillars with focus on recognition, representation, and redistribution of rights and resources when planning, designing, and implementing adaptation

6.3 Adaptation levers work in combinations to unlock gender justice outcomes

The evidence analysed converges to identify multiple levers that enable urban adaptation to have gender and social justice outcomes. Many of the lessons are what we know from beyond the arena of climate action, and draw on decades of learning from women's groups and collectives, grassroots organisations, and gender and feminist studies. Overall, levers include policy and legal reform to recognize gender concerns and rights, multi-level governance that mainstreams gender and social justice in climate adaptation design and practice; adequate human and institutional capacities to undertake priority setting and implementation of inclusive adaptation; sustained, adequate, and timely financing; leveraging collectives and coalitions that work in and beyond climate change (to address structural vulnerabilities); attention to behavioural and cultural factors mediating adaptive capacities and adaptation outcomes; and harnessing technological innovation in ways that are effective and inclusive.

Policy and legal instruments ensure an enabling environment for gender equality practices to be implemented. Being justiceable, they also demand accountability. Claims-making around gender justice laws and policies have been central to the women's rights agenda and a key strategy of women's movements²²⁰. This is illustrated by the Philippines' 2009 Magna Carta of Women, which pioneeringly codified disaster vulnerability as a rights-based issue with legal

²¹⁹ Dodman, D., B. Hayward, M. Pelling, V. Castan Broto, W. Chow, E. Chu, R. Dawson, L. Khirfan, T. McPhearson, A. Prakash, Y. Zheng, and G. Ziervogel, 2022: Cities, Settlements and Key Infrastructure. In: *Climate Change 2022: Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, et al. (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 907–1040. <https://doi.org/10.1017/9781009325844.008>

²²⁰ Rao, N and P. Cagna (2018). Introduction: Feminist Mobilization, Claims Making and Policy Change for Gender Equality. *Development and Change*. 49(3): 708-713. <https://doi.org/10.1111/dech.12393>

mandates for health, safety, and livelihoods.²²¹ However, the subsequent failure of the 2010 DRRM Act in the Philippines to carry these mandates forward also demonstrates that legal instruments and policies require active administrative enforcement for translation into action. Equitable legal and policy frameworks are central to ensuring gender justice, hence it is important to deploy gender mainstreaming units across all departments to review climate and development plans through a feminist lens, ensuring that the needs and priorities of differently vulnerable groups are adequately addressed.

Governance levers can overcome planning silos, given that women's roles span across production and reproduction. The Belem Gender Action Plan rightly noted that gender-responsive climate action needs to focus on care work, health, violence against women and girls, safety and protection mechanisms, nature-based solutions and ecosystem-based adaptation, most of these not traditionally considered a part of climate action and adaptation interventions. Infrastructure and technology interventions dominate, with some attention to ecosystem-based, institutional and behavioural or cultural interventions. Structural inequalities and power relations, that shape the gender divisions of labour or resource access and control, are hardly considered. Climate governance then needs to bring in multiple sectors and departments - those focusing on women and children, labour, finance, apart from climate and the environment - and multiple stakeholders to make governance processes fit for purpose.

Building capacities at multiple levels is key to supporting women's leadership in the formal governance of adaptation planning and implementation. Enabling women leaders to access critical climate information and knowledge is important, alongside developing tools and methods that enable learning and knowledge exchange. Equally important however is the sensitisation of governmental employees and professionals, to enable the development of equitable working partnerships. Simple language and common frameworks can help such collaboration as seen in the case of the Ahmedabad Heat Action Plan. Importantly, both individual and institutional capacities need to be recognized formally, moving away from informal volunteerism or unpaid care work to paid roles in community disaster management (e.g., in Manizales). Finally, women have to be represented at all levels of decision-making (e.g., Shenzhen) and not only restricted to community scales.

Coalitions and collectives: The role of collective action and feminist solidarity in demanding rights, ensuring fair working conditions, dealing with environmental challenges or providing social support is well documented. Just outcomes are more likely when women's grassroots groups are directly involved in adaptation design and implementation processes. Involving groups like the Mahila Housing Trust (Ahmedabad) or Buklod Tao (Philippines) enable adaptation actions to serve informal workers and/or low-income groups. Facilitating direct access to climate finance for grassroots women's organizations as mandated by the BGAP, can then have transformative outcomes.

Behavioural and cultural levers are critical but insufficient. Gender-responsive climate adaptation depends on transforming social norms and behaviours, as gendered roles shape risk perception, participation, and the effectiveness of adaptation actions. While simple communication, inclusive participation, and strong community networks (e.g. women's collectives and trust-based systems) can shift attitudes, enhance cooperation, and enable more equitable and locally effective adaptation outcomes, they could potentially overlook deep structural divides. Behaviours are often not just a result of individual choice, but of structural constraints, hence while individual behaviour change is important, it needs to be facilitated by creating an enabling environment. Care-work is often central to this enabling environment, yet to what extent care needs are identified and provided for, is not clear. International benchmarks set by the OECD (Organisation for Economic Co-operation and Development)

²²¹ Ramalho, J. (2019). Empowerment in the era of resilience-building: Gendered participation in community-based (disaster) risk management in the Philippines. <https://doi.org/10.3828/idpr.2018.25>

and ILO (International Labour Organization) recommend allocating at least 1 percent of Gross Domestic Product (GDP) to child care services to ensure equitable access and quality.²²²

Finance levers lead directly to redistributive justice: Cities must institutionalize gender-responsive budgeting. Currently, Barcelona is the only city in the CDP dataset successfully implementing this mechanism to align climate funding with social equity. State-led redistributive relief during times of crises (e.g., Ahmedabad's Extreme Heat Income Insurance) can provide support for marginalised women and outdoor workers²²³ while community-led initiatives (e.g., vertical gardening in Kibera) strengthen economic agency by removing the barrier of landownership to access financial security. Gender-responsive budgeting remains key to ensure public spending does not increase unpaid care burdens.

6.4 Conclusion

Adapting to climate change is deeply gendered. While many examples exist of good practice at municipal and intra-city levels, scaling needs state intervention, coordination and regulation. Robust planning requires a multi-sectoral, multi-stakeholder process of consultation to identify intersecting vulnerabilities and co-produce solutions. Engaging with women's collectives, community coalitions and non-state actors is central to this process. Without this, existing inequalities can be misrecognized and exacerbated, especially in urban areas because they concentrate risk and inequity. Adaptation research has drawn on advances in gender and development studies and feminist political ecology to reiterate that technocratic approaches and piecemeal gender mainstreaming does not achieve much, and for transformative change, recognising and addressing deeper power imbalances and normative stances is crucial. These include recognition of the uneven division of care labour alongside threats to women's bodily integrity. Doing this in the context of heightening climate risks and widening adaptation gaps is not straightforward or linear.

There are some lessons we can draw from the discussion of the various levers above:

- Policy and legal instruments: A written recognition and commitment through policy and legal measures is key to ensuring implementation and accountability by creating the mechanisms for doing so.
- Governance: Representation of all key stakeholders including communities and women and other marginalised groups amongst them is key to ensure that governance mechanisms are not just inclusive, but respond to diverse needs.
- Human and institutional capacity: It is critical to move away from women's unremunerated volunteerism, adding to work burdens, to formal, paid roles in community disaster management interventions. This would also imply the need to build appropriate skills and capacities.
- Finance: While institutionalising gender responsive budgeting is important, there is equally a need for facilitating direct access to climate finance for grassroots women's groups to ensure transformative outcomes
- Coalitions and collectives: Just outcomes are more likely when women's grassroots groups are involved in every phase of adaptation, i.e., from design to implementation, to ensure actions serve informal workers and low-income groups. They serve the function not just of implementation but equally ensuring accountability.

²²² OECD (2025), *Reducing Inequalities by Investing in Early Childhood Education and Care, Starting Strong*, OECD Publishing, Paris, <https://doi.org/10.1787/b78f8b25-en>.

²²³ Guin, P., Rajeshwari, B., & Mahajan, B. (2024). What determines how governance indicators shape policy processes? Evidence from three environmental issues in India. *Environmental Policy and Governance*, 34(6), 691–708. <https://doi.org/10.1002/eet.2117>

- **Technological levers:** Technologies should be co-produced with women and designed to bypass structural barriers. Further, designers should be trained in gender-sensitive approaches to prevent reinforcing existing inequalities.

These levers work best in combinations to unlock gender justice outcomes, as evidenced in the six illustrative case study boxes. Ensuring such convergence and coordination would require:

- **Conducting intersectional vulnerability audits** that move beyond demographics to analyse how social norms, land tenure, and labour burdens shape risk.
- **Establishing transversal coordination units** that break down departmental silos by creating dedicated mainstreaming units (e.g., Barcelona) to link climate action with social policy.
- **Institutionalizing care-work support** through the use of urban design to acknowledge, respond to and reduce the unpaid care work that currently absorbs climate shocks and places disproportionate burden on women and girls.
- **Leveraging coalitions and collectives** to legally integrate them into formal disaster governance (e.g., Magna Carta for Homeowners).

What is clear is that urban adaptation that reorients its ambition towards gender-responsiveness, invests money and capacities in designing and implementing inclusive adaptation, and meaningfully works on recognising, representing, and redistributing the differential benefits and capacities to adapt, have a higher chance of just outcomes.

Annexure

A1 Conceptual Framework

Table A 1. Preliminary data extraction and analysis plan which will examine reported urban adaptation by type (Berrang-Ford et al. 2021) and actors, and then examine outcomes based on gender and social justice aspects. Gender justice outcomes are based on Tabbush & Howell 2025 but supplemented by mapping SDG 5 targets.

Policy area	Type of urban adaptation action	Actor leading adaptation	Gender justice indicators	Justice outcomes
Health	Infrastructural or technological (Enabling, implementing, or undertaking technological innovation or infrastructural development)	State-led	End all forms of discrimination against all women and girls everywhere (SDG Target 5.1)	Recognition (who is vulnerable, intersectionalities and masculinities)
Water and sanitation	Ecosystem or nature-based (Enhancing, protecting, or promoting ecosystem services)	Community-led	Gender-based violence (SDG Target 5.2 and 5.3)	
Housing	Institutional (Enhancing multilevel governance or institutional capabilities)	Coalitions, collectives etc.	Unpaid care work (SDG Target 5.4)	
Livelihoods, labour, jobs	Behavioural or cultural (Enabling, implementing, or undertaking lifestyle and/or behavioural change)	Other (private sector etc)	Participation and leadership (SDG Target 5.5)	Representation (in decision-making, prioritisation of adaptation)
Education		Mixed	Women's health (SDG Target 5.6)	Redistribution (how is gender operationalised (gender-blind to gender-transformative))
Social protection			Women's economic security and access to resources, property and finances (SDG Target 5.7)	
			Empowerment through technology (SDG Target 5.8)	
			Policies and legislations (SDG Target 5.9)	

A2 Rapid review methodology

The rapid review process is unlike a traditional systematic review, which is more comprehensive in its literature survey in its focus to answer a very refined research question, and is more time and resource intensive. In our study, we use the rapid review approach as a way to restrict the review process by providing a timely synthesis for policy-relevant discussion²²⁴, which is less exhaustive. We do this by mapping a broader understanding of justice outcomes of implemented urban adaptation actions. This approach is particularly justified here as the evidence (based on literature) on gender-responsive adaptation actions remain fragmented and inadequately documented across urban geographies.

Eligibility criteria: Following the approach outlined by Garrity et al. (2024)²²⁵, specific inclusion and exclusion criteria were applied to develop a search strategy, screen and identify literature for analysis. The following were the criteria that were outlined:

1. Type of adaptation: The review focussed exclusively on implemented urban adaptation (in the form of policies, projects, programs, pilots, or case studies) that directly address or reduce climate vulnerability. This meant we excluded papers whose focus were literature reviews, conceptual frameworks and methods like forecasting, scenario mapping, risk assessments and speculative methods.
2. Context: The interventions must be situated or implemented in urban or peri-urban areas.
3. Gender focus: The urban interventions also had to document or discuss particular outcomes related to gender justice, intersectionality, or specific SDG 5 (Gender equality) targets.
4. Timeline: The search was limited to literature from 2015 to 2025, aligning with the 2015 Paris Agreement²²⁶ which includes gender equality and gender-responsive adaptation in its preamble, and the 2014 UN Lima Work Program on Gender²²⁷ and 2015 IPCC Fifth Assessment Report.²²⁸
5. Language: English was the primary language for study selection. This meant that all articles not in English were excluded from the review.

Using the eligibility criteria and research questions as a base, we formulated a search string with relevant keywords and search terms to retrieve literature. We used the conventional systematic review approach of selecting at least two electronic bibliographic databases - Scopus and Web of Science. The search strategy was developed with reference to the Global Adaptation Mapping Initiative (GAMI) screening protocol for adaptation-related responses²²⁹. We retrieved the literature during December 2025 and January 2026. We conducted the search in two parts. First, we utilised proximity indicators in our search strings to ensure

²²⁴ Khangura, S., Konnyu, K., Cushman, R. et al. Evidence summaries: the evolution of a rapid review approach. *Syst Rev* 1, 10 (2012). <https://doi.org/10.1186/2046-4053-1-10>

²²⁵ Garrity, C., Hamel, C., Trivella, M., Gartlehner, G., Nussbaumer-Streit, B., Devane, D., ... & King, V. J. (2024). Updated recommendations for the Cochrane rapid review methods guidance for rapid reviews of effectiveness. *bmj*, 384. <https://doi.org/10.1136/bmj-2023-076335>

²²⁶ United Nations Framework Convention on Climate Change. (2016). Paris Agreement. https://unfccc.int/sites/default/files/english_paris_agreement.pdf (Accessed March 3, 2026)

²²⁷ United Nations Framework Convention on Climate Change. (2014). Lima work programme on gender. UNFCCC. https://unfccc.int/files/meetings/lima_dec_2014/decisions/application/pdf/auv_cop20_gender.pdf (Accessed on March 3, 2026)

²²⁸ Intergovernmental Panel on Climate Change. (2014). Climate change 2014: Synthesis report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (Core Writing Team, R. K. Pachauri & L. A. Meyer, Eds.). IPCC. <https://www.ipcc.ch/report/ar5/syr/> (Accessed March 3, 2026)

²²⁹ Fischer, A. P., Callaghan, M., Berrang-Ford, L., Nielsen, M., Sotnik, G., Villaverde Canosa, I., Haddaway, N., Biesbroek, R., Harper, S., Minx, J., Coughlan de Perez, E., Reckien, D., & Van Aalst, M. (n.d.). The Global Adaptation Mapping Initiative (GAMI): Part 2 – Screening protocol (Version 1). Protocols Exchange. <https://dx.doi.org/10.21203/rs.3.pex-1241/v1>

relevance and tighten the results from the two source databases. In January of 2026, we supplemented the results of this search using a search string without proximity indicators to examine if there may be any other evidence of implemented urban adaptation actions in cities that we may have overlooked by narrowing the scope. The following search strings were used:

With proximity indicators

```
TITLE-ABS-KEY(
  (urban OR cities OR "urban area*" OR municipal OR metropolitan OR "peri-urban"
  OR periurban OR "peri urban")
  AND 'climat*'
  AND (adapt* OR resilien* OR (risk NEAR/3 (manag* OR reduc*)))
  AND (adapt* NEAR/3 (implement* OR intervention* OR project* OR polic* OR
  program* OR "case stud*" OR pilot))
  AND (gender OR wom?n* OR female* OR intersectional* OR masculin* OR "gender
  just*" OR "gender outcome*"))
  AND PUBYEAR > 2014
```

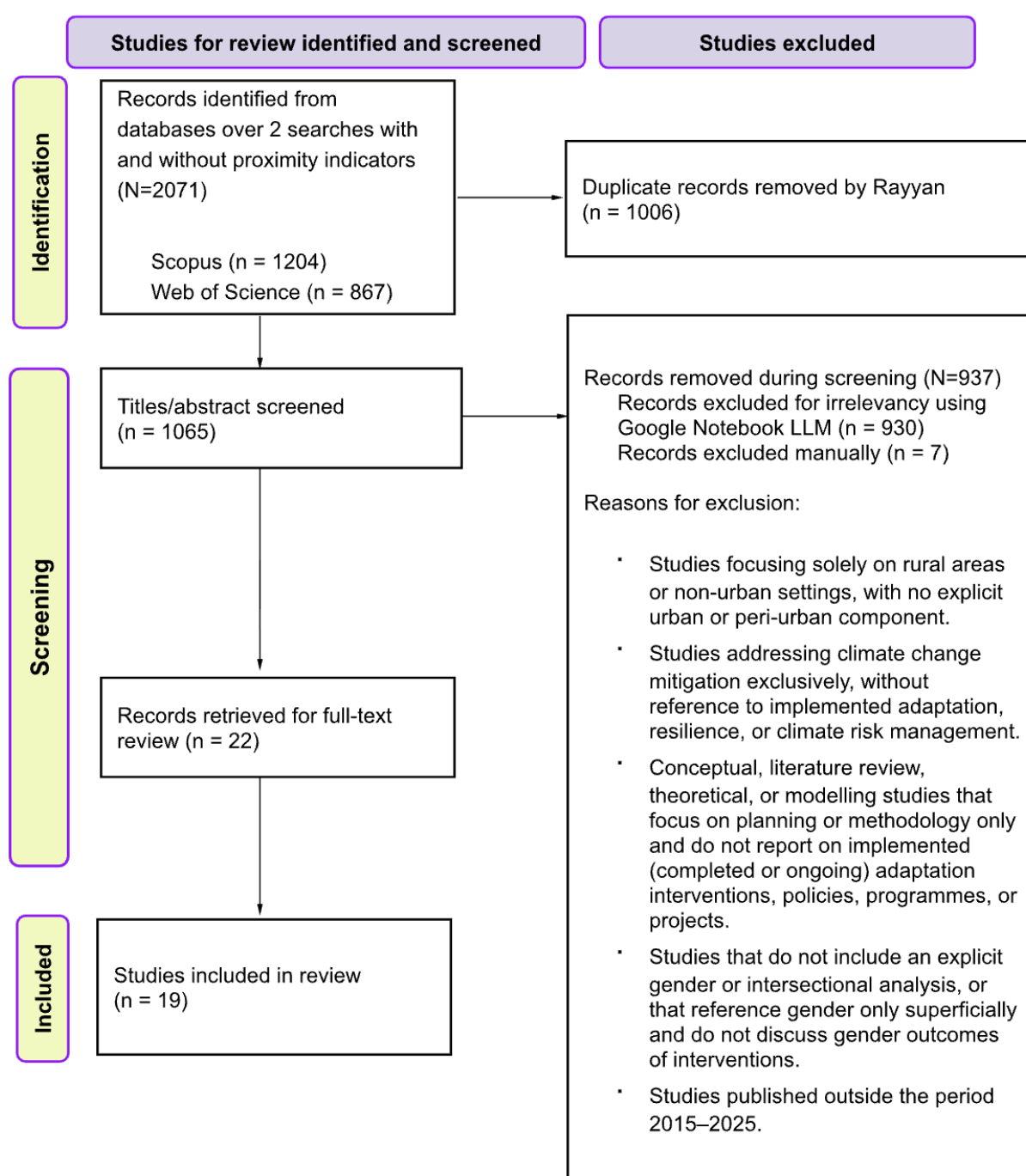
Without proximity indicators:

```
TITLE-ABS-KEY(
  (urban OR cities OR "urban area*" OR municipal OR metropolitan OR "peri-urban" OR
  periurban OR "peri urban")
  AND 'climat*'
  AND (adapt* OR resilien* OR risk OR manag* OR reduc*)
  AND (implement* OR intervention* OR project* OR polic* OR program* OR "case
  stud*" OR pilot)
  AND (gender OR wom?n* OR female* OR intersectional* OR masculin* OR "gender
  just*" OR "gender outcome*"))
  AND PUBYEAR > 2014
```

The entire search yielded a total of 2071 papers which were imported into the web-based systematic review software Rayyan, which identified 1006 duplicates, with a total of 1065 papers to be screened.

Screening: The study selection began with a two-step screening. The first step was an automated title screening using Google Notebook LLM of the total 1065 papers to prepare a shortlist of final relevant papers. This list was manually checked. The result yielded a total 119 papers. This was followed by a manual title and abstract screening of the 119 papers shortlisted. For both steps, the same exclusion criteria were used. Papers were excluded if they lacked a focus on implemented action, were implemented in rural settings, or failed to document any gendered impacts of adaptation actions. In this process, we identified a total of 22 relevant papers for a full-text analysis. The review and selection process along with the exclusion criteria is outlined in a PRISMA flow diagram in Figure A1 below.

Figure A 1. PRISMA flow diagram of the review process



Coding and Analysis: A data extraction table (Table A2) was developed to analyse and synthesise the final list of the 22 identified papers. We coded the papers against the type of urban adaptation action, levers of adaptation action, the actors engaged in the adaptation action, how gender, intersectionality, and vulnerability are recognised and gender justice indicators and outcomes.

Table A 2. Rapid review approach - scope and design based on Garritty et al. 2024²³⁰.

Rapid review approach	Steps followed
Setting a focussed research question	What is the current evidence on the outcomes of implemented urban adaptation on gender justice outcomes?
Setting the eligibility criteria	Inclusion criteria: <ul style="list-style-type: none"> • Type of adaptation: Only implemented urban adaptation (project/policy/program/pilot/case studies) • Context: Interventions situated only in cities and peri-urban areas • Gender focus: interventions also had to document or discuss particular outcomes related to gender justice, intersectionality, or specific SDG 5 targets. • Language: Focus on anglophone research Search timeline: 2015-2025 (in line with the 2015 Paris Agreement, 2014 UN Lima Work Program on Gender and 2015 IPCC Fifth Assessment Report)
Developing the search strategy	<ul style="list-style-type: none"> • Identifying at least 2 electronic bibliographic databases: Scopus and Web of Science • Creating a search string with relevant search terms and keywords based on the research questions and eligibility criteria - with and without proximity indicators
Study selection	Manual title and abstract screening and Google Notebook LLM supported screening to create a shortlist of relevant papers
Data Extraction	Based on Table A1 (Annex)
Synthesis	Reported in Sections 4, 5 and 6

This below table is a codebook for the analysis on outcomes of urban climate adaptation on gender outcomes. The aim is to review global literature on the gender outcomes of implemented climate adaptation actions across cities.

²³⁰ Garritty, C., Hamel, C., Trivella, M., Gartlehner, G., Nussbaumer-Streit, B., Devane, D., ... & King, V. J. (2024). Updated recommendations for the Cochrane rapid review methods guidance for rapid reviews of effectiveness. *bmj*, 384. <https://doi.org/10.1136/bmj-2023-076335>

Table A 3. Definition of key terms in the conceptual framework and analysis

Term	Definition		Reference
Location - City and Country [WHERE]	Name of city/urban areas where the implemented adaptation action is documented. If there are more than one cities, add names of all cities/urban/peri-urban areas with a semicolon.		NA
Start and end date of implementation	When was the implemented adaptation action implemented? When was the implemented action or running of the action completed, or is it still ongoing?		NA
Climate Hazard	Climate hazards here refer to: Short-term climate stressors: Rapid-onset extreme weather events, such as floods, heatwaves, and droughts. Long-term climate stressors: Slow-onset climatic changes, such as water/soil salinity, rising average temperatures, higher rainfall variability, and sea-level rise What is the climate hazard that the implemented action is addressing? If more than one, list all with a semicolon		
<p>Implemented climate adaptation type</p> <p>What type of climate adaptation action is described in the paper?</p> <p>These are categorized by the scale of the action, its legal implications, and its physical form (if any).</p>	Agenda	High-level, often aspirational frameworks or sets of priorities that set a long-term direction for development and sustainability at national or global scales	
	Plan	Detailed documents that translate high-level agendas into specific local actions, targets, and timeframes. Plans often include vulnerability assessments and performance indicators.	
	Strategy	A broad thematic approach or pathway used to integrate climate concerns into existing urban planning cultures or across multiple policy sectors (e.g., health, housing, and energy)	
	Scheme/ Program	Specific, organised initiatives or service delivery models implemented under a plan. These often involve recurring activities or the management of existing public facilities. These are part of policies or plans (e.g.: mobility networks, climate action groups etc.).	
	Built intervention	Physical alterations to the city, including large-scale infrastructure (roads, flood embankments), nature-based solutions, or technological installations implemented at the site or neighbourhood or individual household level	
	Policy	Formal regulatory instruments, legislation, or mandatory standards established by government (state) bodies to enforce compliance and provide a legal basis for climate action	
WHAT is the type of adaptation action?	Infrastructural or Technological	Enabling, implementing, or undertaking technological innovation or infrastructural development to enable climate adaptation	Berrang-Ford et al. (2021). A systematic global stocktake of evidence on human adaptation to climate change. <i>Nature Climate Change</i> , 11(11), 989-1000.
	Ecosystem or nature-based	Enhancing, protecting, or promoting ecosystem services to improve adaptive capacities	
	Institutional	Enhancing multilevel governance or institutional capabilities to coordinate adaptation actions	
	Behavioural or cultural	Enabling, implementing, or undertaking lifestyle and/or behavioural change to adapt to the climate hazard	
Term	Definition		Reference
Levers of	Multi-level	Multi-level governance involves vertical	Bauer, A., & Steurer,

Term	Definition		Reference
adaptation actions	Governance	coordination (relations between governmental levels) and horizontal coordination (networking between policy areas and state/non-state actors) to bridge institutional divides.	R. (2014). Multi-level governance of climate change adaptation through regional partnerships in Canada and England. <i>Geoforum</i> , 51, 121-129. Berrang-Ford et al. (2021). A systematic global stocktake of evidence on human adaptation to climate change. <i>Nature Climate Change</i> , 11(11), 989-1000.
	Institutional Capacity	Institutional capacity entails the strengths, resources, and skills available within a system or institution to anticipate, cope with, and recover from climatic events	United Nations Office for Disaster Risk Reduction. 2025. Global Assessment Report on Disaster Risk Reduction 2025: Resilience Pays: Financing and Investing for Our Future. United Nations.
	Policy instruments	A diverse range of activities such as training, research and development, awareness campaigns to produce and share information	Cities, Settlements and Key Infrastructure. In: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, et al. (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 907–1040, doi:10.1017/9781009325844.008
	Integration of gender and adaptation in urban plans	The systematic process of gender mainstreaming to ensure that gender differences in adaptation needs, capacities, and decision-making are an integral dimension of city development. This involves transitioning from gender-blind plans (which fail to recognize different needs) to gender-transformative plans that fundamentally change underlying societal norms and power structures to create more equitable relations	UN Women, Her4Climate: A Women-Centred Tool for Assessing Responses to Climate Impacts in Cities (New York: UN Women, 2022.), https://www.unwomen.org/en/digital-library/publications/her4climate (Accessed December 2025)

Term	Definition		Reference
	Finance: Ensuring sustained and adequate financing	The deployment of market-based instruments (financing) and direct expenditure (funding) to meet the upfront costs of climate resilience. Adequacy is measured by the ability to bridge the adaptation finance gap - the difference between estimated financial needs in developing countries and actual international public flows	UNEP, 2022. Adaptation Gap Report 2022 Too Little, Too Slow - Climate Adaptation Failure Puts World at Risk, 84pp. United Nations Environment Programme; IPCC AR6 (2020)
	Technological Innovation	The development and deployment of new tools and systems—such as AI (Artificial intelligence)-powered analytics, smart grid platforms, or sustainable batteries—that demonstrate the potential to help communities adapt to climate risks	UNDRR - GAR (2025)
	Behavioural and Lifestyle Change	Autonomous or planned actions taken by institutions, individuals or households to adjust to environmental risks, such as making physical changes to homes or relocating from hazards	Berrang-Ford et al. (2021).
	Role of coalitions	Is there an existing role of local governments or past/ongoing/planned collaborations with women' s groups to facilitate the implemented climate adaptation action?	NA
Actors	Who is leading or designing the adaptation action?	Who takes the lead and coordinates the development and implementation of the adaptation action? Detailed list of actors: Note names of all actors such as municipal government; civil society etc that are initiating and designing the adaptation action	
	Who is implementing the adaptation action?	Who handles the direct implementation of the adaptation action? (e.g.: Private org., community groups, NGO etc.)	
	Who is funding the action?	Who is funding the implementation action? Note names of all funding groups	
Gender, intersectionality, and vulnerability	How is gendered vulnerability discussed? (descriptive)		Stadler, L., Benya, S., Ziervogel, G., & Holden, P. (2025). Integrating intersectionality into climate risk assessments: Review of gendered vulnerability in South Africa. WIREs Climate Change, 16(1), e70035. https://doi.org/10.1002/wcc.70035
	How is intersectionality discussed (descriptive)		
	In what ways are gender issues considered in the implemented action	Can be any of these: Gender-blind, Gender-specific, Gender-neutral, Gender-sensitive	
Gender justice indicators	End all forms of discrimination against all women and girls everywhere (SDG Target	Women's economic security refers to women's equal rights and access to economic resources, including ownership and control over land, property, inheritance, financial services, natural resources, and other forms of productive assets. SDG Target 5.7 specifically calls for reforms to give women equal rights to economic resources and access to ownership	United Nations (2015). Transforming our world: the 2030 Agenda for Sustainable Development

Term	Definition		Reference
	5.1); Women's economic security and access to resources, property and finances (SDG Target 5.7)	and control over property in accordance with national laws.	
	Unpaid care work (SDG Target 5.4)	Unpaid care work includes domestic and caregiving responsibilities such as childcare, elder care, cooking, cleaning, and household management that are not financially compensated. SDG Target 5.4 calls for recognizing and valuing unpaid care and domestic work through public services, infrastructure, social protection policies, and the promotion of shared responsibility within households and families.	
	Gender-based violence (SDG Target 5.2 and 5.3)	Unpaid care work includes domestic and caregiving responsibilities such as childcare, elder care, cooking, cleaning, and household management that are not financially compensated. SDG Target 5.4 calls for recognizing and valuing unpaid care and domestic work through public services, infrastructure, social protection policies, and the promotion of shared responsibility within households and families.	
	Women's health (SDG Target 5.6)	Women's health under SDG Target 5.6 refers specifically to ensuring universal access to sexual and reproductive health and reproductive rights, in accordance with international agreements and national legislation. This includes access to family planning, information, education, and healthcare services related to reproductive health.	
	Participation and leadership (SDG Target 5.5); Policies and Legislations (SDG Target 5.9)	Participation and leadership refer to women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic, and public life (Target 5.5). Target 5.9 calls for the adoption and strengthening of sound policies and enforceable legislation to promote gender equality and the empowerment of all women and girls.	
	Empowerment through technology (SDG Target 5.8)	Empowerment through technology refers to enhancing women's use of enabling technologies—particularly information and communications technology (ICT)—to promote women's empowerment, economic participation, access to information, and inclusion in digital spaces.	

A3 CDP Data

A3.1 CDP-defined adaptation action groups (with actions)

Table A 4. CDP-defined adaptation action groups with most reported actions as example

No.	Action Group	Most reported actions
1	Behavioural actions	Accommodation Changing cropping practices, patterns, and planting dates (including crop-switching) Changing livestock and aquaculture practices Citizen dietary shift Livelihood diversification Managed retreat/planned relocation Soil and water conservation
2	Economic actions	Cash transfers Disaster contingency funds Economic diversification measures Financial incentives (including taxes and subsidies) Financial support to expand local food production (including urban agriculture programs, community gardens, etc.) Financial support to improve market access for local food producers Insurance (including index-based weather insurance schemes) Microfinance Payments for ecosystem services Revolving funds Water tariffs
3	Ecosystem-based actions	Adaptive land-use management Afforestation and reforestation Biodiversity monitoring Bushfire reduction and prescribed fire Community-based natural resource management Conservation and replanting mangrove forest Controlling overfishing Ecological corridors Ecological restoration (including wetland and floodplain conservation and restoration) Ex situ conservation and seed banks Fisheries co-management Green infrastructure Increasing biological diversity Soil retention strategies Watershed preservation
4	Educational/Informational actions	Community engagement/awareness campaigns on the climate and health benefits of sustainable healthy diets Community engagement/education Early warning and response systems Engagement with retailers (including restaurants) to expand and encourage sustainable, healthy food choices Flood mapping Heat mapping and thermal imaging Landslide risk mapping

No.	Action Group	Most reported actions
		Measuring days with extreme air pollution due to climate events Incorporating climate change into long-term planning documents Public preparedness (including exercises/drills) Real time risk monitoring Sea level rise modelling Systematic monitoring and remote sensing Undertaken source-related studies to understand sources of air pollution
5	Engineered and built environment actions	Beach nourishment Building codes Cool pavement Cooling centres, pools, water parks/plazas Diversifying water supply (including new sources) Flood and cyclone shelters Flood defence, such as flood levees and culverts Hazard resistant infrastructure design and construction Improved drainage Increase resilience of and/or diversify power/energy supply Municipal water efficiency retrofits Other, please specify Other, please specify: green roofs Permeable pavements Resilience and resistance measures for buildings Sea walls and coastal protection structures Sewage works Shading in public spaces Smart metering in households Storm and wastewater management Transport and road infrastructure adaptation Upgrading existing water supply infrastructure Water storage and pump storage White roofs
6	Government policies and programs actions	Adaptive management Air quality initiatives Community-based adaptation Development of targeted plan/program to address selected hazard(s) Disaster planning and preparedness Disease prevention measures Ecosystem-based management Municipal/jurisdictional food procurement policies that align with guidelines for sustainable, healthy diets (including school procurement, etc.) Municipal/jurisdictional food procurement policies that support sustainable food production practices (including school procurement, etc.) Public health policies to improve nutrition (including improved access to healthy foods) Public policies to encourage citizen dietary shift to sustainable, healthy diets (including incentivizing purchase of low-carbon foods, plant-based or alternative proteins) Sustainable forest management

No.	Action Group	Most reported actions
7	Laws and regulations actions	Building standards Fishing quotas Land zoning laws (including restrict development in at risk areas) Land zoning laws to increase local food access (including grocery stores, farmers markets, community gardens, etc.) Law to support disaster risk reduction Preservation of local and regional agricultural space Protected areas Water efficiency regulations or standards Water use restrictions
8	Services actions	Ensure access to resilient secure, sustainable and safely managed sanitation services Ensure all waste generated is collected ensure residual waste disposed of adequately in an engineered sanitary landfill Essential public health services Food donation and redistribution of food surplus Municipal services (including water and sanitation) Municipal services to reduce food waste (including composting) Social safety nets and social protection Vaccination programs
9	Technological actions	Building Insulation Conservation agriculture Genetic techniques Mechanical and passive cooling New crop and animal varieties Renewable energy technologies Second-generation biofuels Traditional technologies and methods Water recycling/reclamation Water saving technologies (including rainwater harvesting)

A3.2 Category coding for Co-benefits

Table A 5. Category coding for Co-benefits

S.no.	Co-benefits	Category	Potential Outcomes for Gender Justice
1	Business/technological innovation	Economic, labour	Women's health (SDG Target 5.6)
2	Disaster preparedness	Environment	Women's health (SDG Target 5.6)
3	Disaster risk reduction	Environment	Women's health (SDG Target 5.6)
4	Do not know	Not included in analysis	NA

S.no.	Co-benefits	Category	Potential Outcomes for Gender Justice
5	Enhanced climate change adaptation	Environment	Policies & legislations (SDG Target 5.9)
6	Improved climate change adaptation	Environment	Policies & legislations (SDG Target 5.9)
7	Eradication/Reduction of poverty	Social Protection	Women's economic security and access to resources, property and finances (SDG Target 5.7)
8	Fewer or no households and businesses forced from homes/places of work	Economic, labour	Women's economic security and access to resources, property and finances (SDG Target 5.7)
9	Greater access to data for informed decision-making	Governance	Participation and leadership (SDG Target 5.5)
10	Greater resource efficiency (e.g., food, water, and energy)	Environment	Women's economic security and access to resources, property and finances (SDG Target 5.7)
11	Greater resource security (e.g., food, air, and water)	Environment	Women's economic security and access to resources, property and finances (SDG Target 5.7)
12	Greening the economy	Economic, labour	Not applicable
13	Improved access to and quality of infrastructure and mobility services	Infrastructure	End discrimination (SDG Target 5.1)
14	Improved air quality	Environment	Women's health (SDG Target 5.6)
15	Improved education and public awareness on climate issues	Education	Participation and leadership (SDG Target 5.5)
16	Improved labour conditions	Economic, labour	Women's economic security and access to resources, property and finances (SDG Target 5.7)
17	Improved mental wellbeing/quality of life	Health	Women's health (SDG Target 5.6)

S.no.	Co-benefits	Category	Potential Outcomes for Gender Justice
18	Improved mobility and access	Infrastructure	End discrimination (SDG Target 5.1)
19	Improved physical health	Health	Women's health (SDG Target 5.6)
20	Improved preparedness for health service delivery	Health	Women's health (SDG Target 5.6)
21	Improved public health	Health	Women's health (SDG Target 5.6)
22	Improved road safety	Infrastructure	Women's health (SDG Target 5.6)
23	Improved waste management	Infrastructure	Women's health (SDG Target 5.6)
24	Improved water/soil quality	Environment	Women's economic security and access to resources, property and finances (SDG Target 5.7)
25	Improvements in employment and social community	Economic, labour	Women's economic security and access to resources, property and finances (SDG Target 5.7)
26	Increased access to energy	Infrastructure	Women's economic security and access to resources, property and finances (SDG Target 5.7)
27	Increased economic production	Economic, labour	Women's economic security and access to resources, property and finances (SDG Target 5.7)
28	Increased energy security	Social Protection	Women's economic security and access to resources, property and finances (SDG Target 5.7)
29	Increased food security	Social Protection	Women's economic security and access to resources, property and finances (SDG Target 5.7)
30	Increased labour productivity	Economic, labour	Women's economic security and access to resources, property and finances (SDG Target 5.7)
31	Increased security/protection for	Social Protection	Policies & legislations (SDG Target 5.9)

S.no.	Co-benefits	Category	Potential Outcomes for Gender Justice
	poor/vulnerable populations		
32	Increased resilience of the most vulnerable population	Social Protection	Policies & legislations (SDG Target 5.9)
33	Increased social inclusion, equality and justice	Social Protection	End discrimination (SDG Target 5.1)
34	Increased transparency and accountability	Governance	Participation and leadership (SDG Target 5.5)
35	Increased water security	Environment	Women's economic security and access to resources, property and finances (SDG Target 5.7)
36	Increased/improved green space	Environment	Women's economic security and access to resources, property and finances (SDG Target 5.7)
37	Landscape improvement	Environment	Women's economic security and access to resources, property and finances (SDG Target 5.7)
38	Job creation	Economic, labour	Women's economic security and access to resources, property and finances (SDG Target 5.7)
39	Others	Others	Not applicable
40	Protected/improved biodiversity and ecosystem services	Environment	Women's economic security and access to resources, property and finances (SDG Target 5.7)
41	Reduced congestion	Infrastructure	Women's economic security and access to resources, property and finances (SDG Target 5.7)
42	Reduced costs	Economic, labour	Women's economic security and access to resources, property and finances (SDG Target 5.7)
43	Reduced disaster/disease/contami	Health	Women's health (SDG Target 5.6)

S.no.	Co-benefits	Category	Potential Outcomes for Gender Justice
	nation-related health impacts		
44	Reduced disruption of energy, transport, water or communications networks	Infrastructure	Women's economic security and access to resources, property and finances (SDG Target 5.7)
45	Reduced fuel/energy poverty	Social Protection	Women's economic security and access to resources, property and finances (SDG Target 5.7)
46	Reduced GHG emissions	Others	Not applicable
47	Reduced health costs	Health	Women's health (SDG Target 5.6)
48	Reduced health impacts from extreme heat or cold weather	Health	Women's health (SDG Target 5.6)
49	Reduced natural resource depletion	Environment	Women's economic security and access to resources, property and finances (SDG Target 5.7)
50	Reduced noise/light pollution	Environment	Women's health (SDG Target 5.6)
51	Reduced premature deaths	Health	Women's health (SDG Target 5.6)
52	Resource conservation (e.g., soil and water)	Environment	Women's economic security and access to resources, property and finances (SDG Target 5.7)
53	Revenue generation	Economic, labour	Women's economic security and access to resources, property and finances (SDG Target 5.7)
54	Shift to more sustainable behaviours	Environment	End discrimination (SDG Target 5.1)
55	Undertaken in collaboration with Indigenous peoples	Governance	Participation and leadership (SDG Target 5.5)

This background paper examines whether currently implemented urban climate adaptation is advancing gender equality and social justice. To answer this, the authors analyse and synthesise evidence from the 2023 Carbon Disclosure Project (CDP) database covering 910 cities, a rapid review of peer-reviewed literature across 23 cities, and six in-depth, illustrative case studies, including Barcelona's feminist Superblocks, Manizales' slope-stabilizing Guardians of the Hillside program, and Shenzhen's Sponge City initiative. The analysis draws on feminist climate justice theory to highlight progress on the "3Rs" of Recognition, Representation, and Redistribution. The findings highlight that implemented adaptations growing but insufficiently meets gender-responsive goals, warning of the dangerous "feminisation of responsibility," where the burden of urban climate adaptation shifts onto the unremunerated, voluntary physical labour of marginalized women and collectives. The paper also highlights how combinations of seven interconnected and actionable levers of change; spanning policy, multi-level governance, institutional capacity, collectives, behavioural shifts, finance, and technology; is essential to scale existing action.

