

FROM PROJECTS TO SYSTEMS: A COMPARATIVE SYSTEMS-CHANGE PERSPECTIVE ON URBAN CLIMATE RESILIENCE

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ABSTRACT

Climate resilience initiatives in urban contexts are frequently implemented through fragmented, project-based interventions that struggle to achieve long-term sustainability or scale. This paper applies a systems-change lens to examine how climate resilience outcomes differ when interventions are designed as part of an interconnected system rather than as isolated projects. Using a comparative qualitative approach, the paper contrasts project-centric and systems-oriented models of urban climate resilience, drawing on practice-based insights from Indian urban contexts alongside global literature. The analysis highlights the role of governance coordination, institutional ownership, feedback mechanisms, and financing alignment in shaping resilient outcomes. The paper argues that systems-oriented approaches enable greater adaptability, scalability, and durability of climate resilience efforts, and offers practical implications for policymakers, funders, and practitioners working in climate-vulnerable urban settings.

Keywords: *Urban Climate Resilience, Systems Change, Project-Based Interventions, Climate Adaptation, Urban Governance, Institutional Coordination, Sustainable Urban Development, Climate Policy, Adaptive Systems, India.*

1. INTRODUCTION

Urban areas across the world are increasingly at the frontline of climate change impacts. Rapid urbanisation, high population density, informal settlements, and overstretched public systems have intensified cities' exposure to climate risks such as extreme heat, flooding, water scarcity, and public health shocks. In countries like India, these risks are further compounded by socioeconomic inequality, fragmented governance structures, and limited institutional capacity at the local level. As climate impacts accelerate in both frequency and intensity, the question is no longer whether cities need to act, but how climate resilience can be built in ways that are sustainable, scalable, and equitable.

In response to these growing risks, climate resilience efforts in urban contexts have expanded significantly over the past decade. Governments, civil society organisations, international agencies, and the private sector have

launched a wide range of initiatives focused on early warning systems, community awareness, infrastructure upgrades, heat action plans, and livelihood protection. However, many of these interventions continue to be designed and implemented as discrete, time-bound projects. While such project-based approaches often deliver visible short-term outputs, their long-term impact remains limited. Once project funding ends or external support is withdrawn, gains frequently dissipate, and systemic vulnerabilities persist.

A growing body of evidence suggests that climate resilience is not merely a technical or programmatic challenge, but a complex systems problem. Urban climate risks are shaped by the interaction of multiple actors, institutions, policies, financing mechanisms, and behavioural patterns. Fragmented interventions that focus on isolated components of this system are unlikely to produce durable resilience outcomes. Instead, there is increasing recognition of the need for systems-oriented approaches that address underlying structural constraints, align incentives across stakeholders, and embed resilience within existing governance and service delivery mechanisms.

This paper adopts a systems-change lens to examine how climate resilience outcomes differ when interventions are designed as part of an interconnected system rather than as standalone projects. Using a comparative qualitative approach, the paper contrasts two broad models of urban climate resilience: project-centric approaches that prioritise discrete activities and outputs, and systems-oriented approaches that emphasise coordination, institutional ownership, feedback loops, and long-term capacity building. While the analysis is grounded primarily in urban contexts within India, it also draws on global literature and practitioner insights from comparable settings in the Global South.

By comparing these two approaches, the paper seeks to highlight why certain climate resilience efforts struggle to scale or sustain impact, while others demonstrate greater adaptability and durability over time. The analysis aims to contribute to ongoing debates on effective climate action by offering practice-informed insights for policymakers, funders, and practitioners seeking to move beyond pilot projects towards systemic climate resilience in urban settings.

Systems Change and Climate Resilience

Climate resilience is increasingly understood as a multidimensional challenge that extends beyond the implementation of individual projects or technologies. Systems change refers to deliberate efforts to address the underlying structures, relationships, and dynamics that shape outcomes within a complex system. In the context of climate resilience, this includes governance arrangements, institutional roles, financing flows, data and information systems, and the incentives that influence decision-making across actors. Rather than focusing on isolated interventions, systems-oriented approaches seek to understand how different components interact and how change in one part of the system can create ripple effects across others.

Traditional project-based approaches to climate resilience typically prioritise clearly defined activities, short implementation timelines, and measurable outputs. These projects are often designed to address specific risks or gaps, such as awareness generation, infrastructure retrofitting, or emergency response capacity. While such interventions can be valuable, they frequently operate in silos and remain disconnected from broader urban planning and governance processes. As a result, they may fail to influence long-term institutional behaviour or policy frameworks, limiting their ability to deliver sustained resilience outcomes.

In contrast, systems-oriented approaches recognise that climate risks are produced and managed through interconnected social, economic, and institutional processes. From this perspective, urban climate resilience depends not only on physical infrastructure or technical solutions, but also on how responsibilities are distributed across agencies, how information flows between actors, how resources are allocated, and how communities are engaged over time. Systems-change efforts therefore emphasise coordination across sectors, alignment of incentives, and the creation of feedback mechanisms that allow learning and adaptation.

A key distinction between project-centric and systems-oriented approaches lies in their treatment of scale and sustainability. Project-based interventions often aim to demonstrate success through pilots, with the expectation that effective models will later be replicated or scaled. However, without changes to the enabling environment—such as policy mandates, budgetary allocations, or institutional capacities—scaling remains dependent on external funding and leadership. Systems-oriented approaches, by contrast, focus on embedding resilience within existing structures, enabling local institutions to absorb, adapt, and sustain interventions beyond the life of a single project.

Systems thinking in climate resilience also highlights the importance of feedback loops and adaptive learning. Urban climate risks are dynamic, evolving in response to demographic change, economic development, and climatic variability. Systems-oriented approaches therefore prioritise continuous monitoring, data use, and iterative decision-making, allowing interventions to be adjusted as conditions change. This adaptive capacity is particularly critical in climate-vulnerable urban contexts, where uncertainty and compounding risks are common. By applying a systems-change lens, this paper seeks to move beyond binary assessments of project success or failure and instead examine how different approaches shape the conditions for long-term resilience. The following sections use a comparative framework to analyse project-based and systems-oriented models of urban climate resilience, highlighting their respective strengths, limitations, and implications for future climate action.

METHODOLOGY

This paper adopts a qualitative, comparative, and practice-informed research approach to examine different models of urban climate resilience. The analysis is based on a review of secondary literature, including policy documents, practitioner reports, and academic studies on climate resilience and systems thinking, combined with experiential insights drawn from the implementation of climate-related programmes in urban contexts.

Rather than focusing on a single empirical case, the paper uses a comparative analytical framework to contrast two broad approaches to climate resilience: project-centric models and systems-oriented models. These approaches are compared across key dimensions such as governance arrangements, stakeholder coordination, scalability, institutional ownership, and sustainability of outcomes. The comparative framework enables an assessment of how different design logics influence long-term resilience outcomes under similar urban climate risk conditions.

The methodology is intentionally exploratory and reflective, aiming to generate practice-relevant insights rather than causal attribution. This approach is particularly suitable for examining complex systems where outcomes are shaped by multiple interacting factors and where controlled experimental designs are not feasible.

Case A: Project-Based Approaches to Urban Climate Resilience

Project-based approaches continue to dominate climate resilience efforts in urban contexts, particularly in low- and middle-income countries. These approaches typically involve time-bound interventions designed to address

specific climate risks or vulnerabilities, often supported by external funding from government schemes, donors, or corporate social responsibility initiatives. Common examples include short-term heat awareness campaigns, pilot early warning systems, community training programmes, and infrastructure-focused interventions such as cooling centres or flood mitigation structures.

A defining feature of project-based climate resilience initiatives is their emphasis on clearly delineated activities and deliverables. Project designs are usually structured around predefined outputs, implementation timelines, and reporting requirements. This clarity can be advantageous in ensuring accountability and demonstrating visible results within limited timeframes. In many urban settings, such projects have contributed to increased awareness of climate risks, improved emergency preparedness, and short-term reductions in vulnerability among targeted populations.

However, despite these positive outcomes, project-centric approaches often face significant limitations in terms of scale and sustainability. Interventions are frequently implemented in isolation from broader urban planning and governance processes, resulting in limited integration with municipal systems or long-term development strategies. Responsibilities for climate action may remain fragmented across departments or organisations, with limited mechanisms for coordination or shared ownership. As a result, the continuation of project activities often depends heavily on the availability of external funding and individual champions rather than institutional mandates.

Another challenge associated with project-based approaches is their limited capacity to respond to evolving climate risks. Projects are typically designed based on assumptions and conditions identified at the planning stage, leaving little room for adaptation as climatic, social, or economic contexts change. Monitoring and evaluation frameworks may focus on output indicators rather than learning-oriented feedback, reducing opportunities for iterative improvement. Consequently, while project-based interventions may demonstrate success at a pilot level, their ability to deliver long-term, system-wide climate resilience remains constrained.

This case illustrates how project-centric models, despite their contributions, often struggle to move beyond incremental improvements. Without alignment with institutional structures, financing mechanisms, and governance processes, such approaches risk reinforcing fragmented climate action rather than addressing the systemic drivers of urban climate vulnerability.

Case B: Systems-Oriented Approaches to Urban Climate Resilience

Systems-oriented approaches to urban climate resilience differ fundamentally from project-based models in both design and intent. Rather than focusing on isolated interventions, these approaches aim to strengthen the underlying systems that shape how cities anticipate, respond to, and recover from climate risks. Climate resilience is treated as an ongoing governance and development challenge, embedded within institutional processes, policies, and service delivery mechanisms.

A key characteristic of systems-oriented climate resilience is multi-stakeholder coordination. Such approaches recognise that effective climate action requires collaboration across municipal departments, state agencies, civil society organisations, private sector actors, and community groups. Roles and responsibilities are defined not only at the level of individual projects but across the broader system, enabling alignment between planning, implementation, and financing. This coordination reduces duplication of efforts and allows interventions in one sector—such as health, housing, or livelihoods—to reinforce resilience outcomes in others.

Institutional ownership is another defining feature of systems-oriented models. Instead of relying primarily on external implementers, these approaches seek to build the capacity of local institutions to lead and sustain climate resilience efforts. This may involve integrating climate risk considerations into urban planning processes, embedding resilience indicators into routine monitoring systems, or aligning climate actions with existing policy mandates and budgetary frameworks. By anchoring resilience within institutional structures, systems-oriented approaches increase the likelihood that interventions will continue beyond the lifespan of individual projects.

Feedback mechanisms and adaptive learning also play a central role in systems-oriented climate resilience. Data collection, monitoring, and review processes are designed not only for accountability but for learning and course correction. Continuous feedback enables institutions to respond to changing risk profiles, incorporate new information, and refine strategies over time. This adaptive capacity is particularly critical in urban environments where climate impacts intersect with rapid demographic and economic change.

Financing approaches within systems-oriented models tend to prioritise long-term sustainability over short-term outputs. Rather than funding standalone activities, resources are allocated to strengthen enabling functions such as coordination platforms, data systems, workforce capacity, and policy integration. This shift allows climate

resilience efforts to evolve from externally driven initiatives to locally embedded processes, reducing dependency on episodic funding cycles.

Overall, systems-oriented approaches create conditions for climate resilience to be institutionalised rather than intermittently delivered. While such approaches may require greater upfront investment and longer time horizons, they offer greater potential for scalable, durable, and equitable resilience outcomes across urban contexts.

Comparative Analysis: Project-Based versus Systems-Oriented Approaches

A comparative analysis of project-based and systems-oriented approaches to urban climate resilience reveals significant differences in how resilience outcomes are generated, sustained, and scaled. While both approaches aim to reduce vulnerability and enhance adaptive capacity, they operate through distinct logics that shape their long-term effectiveness.

In project-based models, climate resilience efforts are typically bounded by fixed timelines, predefined activities, and externally driven objectives. Success is often measured through the completion of outputs, such as the number of beneficiaries reached or activities delivered. Although these interventions can demonstrate short-term effectiveness, their reliance on external funding and implementers limits their ability to influence institutional behaviour. As a result, resilience gains may remain localised and vulnerable to reversal once project support ends. Systems-oriented approaches, by contrast, prioritise changes in how institutions function and interact over time. Rather than focusing solely on outputs, these approaches emphasise processes such as coordination, learning, and integration within existing governance structures. Resilience is pursued as an emergent property of a well-functioning system rather than as the direct result of individual activities. This shift enables greater continuity, as climate considerations become embedded within routine decision-making and service delivery.

Scalability also differs markedly between the two models. Project-based interventions often struggle to scale beyond pilot locations due to contextual specificity and the absence of enabling policies or resources. Systems-oriented approaches, however, focus on creating replicable processes—such as planning frameworks, data systems, and institutional arrangements—that can be adapted across contexts. This process-oriented scalability allows resilience efforts to expand without proportional increases in external support.

Sustainability and equity outcomes further distinguish the two approaches. Project-based models may prioritise easily reachable populations or visible outputs, potentially overlooking marginalised groups or long-term needs.

Systems-oriented approaches, through their emphasis on inclusive governance and institutional accountability, offer greater potential to address structural inequalities that exacerbate climate vulnerability. By aligning resilience efforts with public systems, these approaches can contribute to more equitable and enduring outcomes. Overall, the comparison highlights that while project-based approaches play an important role in initiating climate action, systems-oriented models are better suited to delivering sustained urban climate resilience. The findings underscore the need for a strategic shift from fragmented interventions towards system-level design and implementation.

Implications for Policy, Funders, and Practice

The comparative analysis presented in this paper offers several implications for stakeholders involved in designing and implementing urban climate resilience initiatives. For policymakers, the findings highlight the importance of moving beyond fragmented, project-driven approaches towards integrated governance frameworks that embed climate resilience within routine planning and service delivery processes. This includes clarifying institutional roles, strengthening inter-departmental coordination, and aligning climate objectives with existing urban development and public health priorities.

For funders, including development agencies and corporate social responsibility programmes, the analysis underscores the need to rethink how climate resilience is financed. Short-term, output-focused funding cycles may deliver visible results but often fail to generate durable change. Systems-oriented financing that supports enabling functions—such as data systems, coordination platforms, institutional capacity building, and long-term monitoring—can create conditions for sustained resilience outcomes. Funders can play a critical role by incentivising collaboration, learning, and institutional ownership rather than isolated project delivery.

Practitioners implementing climate resilience initiatives face the challenge of balancing immediate risk reduction with long-term systems strengthening. The findings suggest that practitioners can enhance impact by designing interventions that intentionally connect with existing institutions, policies, and community structures. Building feedback mechanisms, documenting learning, and facilitating coordination across actors can help translate project-level successes into system-wide change. Importantly, systems-oriented practice requires patience, adaptability, and a willingness to engage with complexity, but offers greater potential for scalable and equitable climate resilience.

CONCLUSION

Urban climate resilience is increasingly recognised as a complex challenge shaped by interconnected social, institutional, and environmental factors. While project-based approaches have played an important role in initiating climate action and addressing immediate risks, their limitations in terms of scale and sustainability are becoming increasingly apparent. This paper has argued that climate resilience efforts designed through a systems-change lens offer greater potential to deliver durable and equitable outcomes in urban contexts. Through a comparative analysis of project-centric and systems-oriented approaches, the paper highlights how coordination, institutional ownership, adaptive learning, and financing alignment influence long-term resilience outcomes. Systems-oriented models enable climate action to move beyond isolated interventions towards embedded processes that can adapt to evolving risks and contexts.

As climate impacts continue to intensify, the urgency of shifting from projects to systems becomes increasingly clear. Policymakers, funders, and practitioners must work collaboratively to design climate resilience initiatives that strengthen the systems upon which cities depend. Future research can build on this analysis by examining specific institutional pathways and governance mechanisms that enable systems change in diverse urban settings.

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