



LEARN BRIEFING

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Catalyzing the Potential of Artificial Intelligence in Promoting Urban Resilience in East African Cities



Executive Summary

East African cities stand at a critical juncture, facing escalating climate-induced shocks such as floods and heatwaves while simultaneously presented with the transformative potential of Artificial Intelligence (AI). A proactive and strategic adoption of AI is a necessity for building urban resilience. AI offers powerful tools for predictive analytics, resource optimization, and enhanced decision-making in disaster management, infrastructure planning, and public service delivery. However, realizing this potential requires moving beyond importing foreign models and confronting foundational challenges, **including fragmented data ecosystems, digital divides, and ethical governance gaps.**

Drawing from expert insights and regional context, during a cross-city policy dialogue titled: *Catalyzing the Potential of AI in Promoting Urban Resilience in East African Cities* and organized by LDE-East Africa Research Network (LEARN), this brief recommends a pathway centered on localized AI innovation, robust data infrastructure, inclusive policy frameworks, and targeted capacity building. The goal is to ensure AI acts as an equitable enabler of resilience, empowering East African cities to not just withstand shocks but to thrive in an uncertain climate future.

Introduction: AI as an Imperative for Urban Resilience

Climate impacts are intensifying within East Africa's urban centers. The 2024 floods, for instance, caused widespread displacement and devastation, highlighting the vulnerability of urban systems. In this context, resilience (the capacity to anticipate, withstand, and recover from shocks) has become a paramount objective for urban governance. Concurrently, Artificial Intelligence (AI) has emerged as a critical tool in global resilience. AI's core capability lies in processing vast datasets to identify patterns, predict outcomes, and optimize complex systems. For cities, this translates to applications like forecasting flood paths, identifying heat-vulnerable neighborhoods, projecting disruptions in urban systems, and managing emergency responses. East Africa cannot afford to be a passive observer in this technological evolution. The choice is clear: actively shape and adopt AI to address local resilience challenges or risk falling further behind in adaptive capacity. This brief explores how to catalyze AI's potential ethically and effectively for East African urban contexts.



AI and Urban Resilience

Artificial Intelligence (AI) is fundamentally a system of data, algorithms, and computational models designed to perform tasks typically requiring human intelligence, such as pattern recognition, prediction, and decision-making. AI is therefore not merely robots or hardware, but as this integrated “brain” or *soft system* that can be embedded into various urban functions.

Urban Resilience, in the face of climate change, refers to the ability of a city’s social, economic, and technical systems to survive, adapt, and grow despite chronic stresses and acute shocks like floods, droughts, or infrastructure failure.

When combined, AI becomes a powerful enabler of resilience. AI-driven models can simulate climate impacts on urban infrastructure, allowing for more robust design (anticipation). During a crisis, AI can analyze satellite imagery in real-time to assess damage and direct resources efficiently (rapid response). Furthermore, by optimizing traffic flow or energy grids, AI enhances the day-to-day robustness of city systems. This synergy frames AI not as a standalone technology, but as a cross-cutting tool to bolster all phases of urban resilience planning and action.

The AI and Resilience Outlook in East Africa: Opportunities and Gaps

The landscape is nascent but promising. Local innovators and researchers are increasingly applying AI to urban challenges, demonstrating homegrown potential. For example, AI applications are being explored for flood early warning systems targeting informal settlements in Nairobi and Dar es Salaam. However, significant structural gaps threaten to limit the scale, equity, and sustainability of these efforts.

Key Opportunities

- i. **Shaping AI to Local Needs:** There is a growing imperative and ability to develop AI solutions trained on local data and calibrated for regional challenges, moving beyond dependence on foreign models.
- ii. **Integrated Planning:** AI can be integrated into new infrastructure projects from the outset, designing “smart resilience” into water, transport, and energy systems.
- iii. **Enhancing Proactive Resilience:** Beyond shock response, AI can be used for continuous monitoring, predicting infrastructure maintenance needs, managing watersheds, and simulating urban growth to avoid creating new vulnerabilities.

Critical Gaps

- i. **Data Fragmentation and Access:** As noted, Africa’s internet connectivity remains low, and data is often siloed in private or unconnected systems. AI’s efficacy depends on abundant, high-quality data, creating a risk that AI solutions will only serve the digitally connected, thereby exacerbating inequality.
- ii. **Infrastructure and Policy Deficits:** While governments are investing in broadband (e.g., Kenya’s ICT Authority plans), consistent electricity and affordable internet are prerequisite “*hard infrastructures*” still lacking in many areas. On the policy front, AI governance often lags, focusing on digital entertainment rather than guiding its application for critical public goods like resilience.

- iii. **Narrow Focus and Equity Risks:** Current AI-for-resilience pilots, such as those focusing solely on flood risks in informal settlements, while valuable, may overlook the systemic nature of urban infrastructure networks. A flood disrupts housing, transport, commerce, and health. A holistic, people-centered AI resilience strategy is needed to avoid creating isolated pockets of resilience while systemic risks grow.

Insights and Strategic Directions

The expert webinar emphasized that responsible adoption is as important as technological adoption. Key insights include:



Ethical and Inclusive Design is Non-Negotiable: AI systems must be developed and governed to avoid bias, protect privacy, and ensure benefits are shared widely. The concept of “*anthropomorphic AI*” reminds us that human-AI interaction must be carefully considered.



Local Capacity is the Foundation: Resilience is built by communities and facilitated by governments. AI tools must be augmented, not replace, local knowledge and agency. This requires investing in local AI expertise like data scientists, urban planners, and ethicists.



Global Lessons, Local Application: Proven applications like Barcelona’s heatwave vulnerability mapping or Houston’s flood warning systems provide valuable templates, but their success depends on adaptation to East African data realities, institutional contexts, and climate profiles.



Recommendations

To catalyze AI for urban resilience, East African governments and stakeholders should:

- **Develop a Comprehensive National AI for Resilience Strategy:** Move beyond ad-hoc projects. Policymakers should create cross-sectoral strategies that align AI development with national climate adaptation and urban development plans. This strategy must focus on equity, inclusion, and ethical guidelines.
- **Invest in Foundational Data Infrastructure:** Prioritize public investment in consolidated, open-access urban data platforms and regional data centers. Support the digitization of community-held “informal data” and establish standards for data sharing between government, academia, and the private sector to fuel locally relevant AI models.
- **Foster Local Innovation Ecosystems:** Direct funding and support to universities, tech hubs, and civic-tech organizations developing AI solutions for urban challenges. Create innovation grants and sandboxes for testing AI applications in resilience planning.
- **Build Multidisciplinary Capacity:** Launch capacity-building programs that blend technical AI skills with urban planning, climate science, and social justice. Equip city officials with the literacy to commission, manage, and regulate AI projects effectively.
- **Promote Inclusive Pilots and Partnerships:** Initiate public-private-community partnerships to pilot AI solutions that address compound risks (e.g., linking flood prediction with transport disruption models). Ensure these pilots are designed with and for marginalized urban communities to build equitable resilience.

Conclusion

The integration of AI into urban resilience planning is an urgent and complex endeavor for East African cities. The technology offers unprecedented capabilities to manage climate risks, but its benefits are not automatic. By taking a strategic and locally grounded approach, focusing on data sovereignty, ethical governance, and homegrown capacity, East Africa can ensure that AI becomes a true catalyst for building cities that are not only smarter but also more resilient for all their inhabitants. The time to act and shape this technological frontier is now.

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