



Multidimensional Resilience

Building Resilience across the Physical, Economic, and Social Domains

Rebecca Marx and Diane K. Levy

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Many variables affect a city's ability to bounce back or move forward from disruptions or tensions. Cities often think about resilience in the sense of physical disruptions, such as floods or heat waves, and frequently tie the concept to growing risks of climate change–fueled disasters. But scholars and practitioners of resilience have identified other multifaceted threats requiring communities' collective attention. In particular, the Rockefeller Foundation's 100 Resilient Cities (100RC) program aimed to prepare cities to think beyond the individual shocks and stressors that make cities vulnerable and pushed for a holistic approach to resilience building. Accordingly, many cities participating in the program emphasized multiple dimensions of resilience—namely physical, economic, and social—in the resilience strategies they authored. But not every city was able to move from theory—discussing and understanding how these three domains intersect—to practice. Overall, the cities that successfully implemented holistic resilience-building projects benefited from a broader conception of resilience, clear articulation of intersections across sectors and projects, engaged stakeholders across government and the community, and strong commitments backed by ample funding.

This brief uses data collected during the Urban Institute's five-year monitoring and evaluation of urban resilience-building activities, including document reviews and extensive interviews with a variety of stakeholders across 21 100RC participant cities. It draws on the analysis completed for the final evaluation report on the 100RC program (McTarnaghan et al. 2022). The brief focuses primarily on

cities that entered the program in 2013 and 2014, given the time it takes to plan and implement projects.

Using this 21-city sample tracked over time, we examined if cities are approaching resilience as a multidimensional problem. After introducing 100RC's framing of the three domains of resilience, we highlight a sample of resilience-building projects in Wellington, New Zealand; Rotterdam, Netherlands; Norfolk, Virginia; Boston, Massachusetts; Paris, France; and Semarang, Indonesia, that address multiple dimensions of resilience.

The Multiple Dimensions of Resilience

Cities across the globe are pursuing urban resilience-building initiatives, recognizing the need to recover from a range of downturns in ways that build flexibility and accommodate uncertainty. Resilience can work within complex systems (Brunetta, Faggian, and Caldarice 2021), and there is a growing body of literature reinforcing the idea that governments should consider urban resilience along infrastructural, ecological, social and community, economic, and other dimensions (Sharifi 2020; Torabi, Dedekorkut-Howes, and Howes 2021). Although definitions of resilience domains vary, by and large, they tend to fall into the broad buckets of physical, economic, and social resilience.

The 100RC program attempted to help cities build resilience against both acute disruptions or emergencies (referred to as “shocks”) and pernicious or pervasive physical, economic, and social challenges (referred to as “stressors”). It defined resilience as “the ability of a system, entity, community, or person to withstand shocks while still maintaining its essential functions and to recover quickly and effectively.” Today, and certainly before the pandemic, the term resilience is often used in conjunction with climate change and disasters. But 100RC launched to help cities understand resilience as a lens through which to consider climate change and more general risks, such as financial shocks, as well as chronic social stressors such as poverty and inequity.

BOX 1

The 100 Resilient Cities Program

The Rockefeller Foundation launched the 100 Resilient Cities Program in 2013 to support the transformation of public institutions, functions, and operations in 100 global cities with the goal of enabling them to “survive, adapt, and grow in the face of chronic stresses and shocks.”

Core features of the program included:

- two years of financial assistance to cities to hire a chief resilience officer (CRO);
- support in the form of a strategy partner to develop a resilience strategy;
- access to a global network of CROs to share best practices;
- and access to technical support for strategy implementation.

The Rockefeller Foundation terminated funding for the 100RC program in July 2019, and 100RC’s offices closed two months later. The Urban Institute tracked progress through 2021 in 21 of the 104 cities that participated in three cohorts launched in 2013, 2014, and 2015. See appendix A for the complete list of participating cities and cities tracked by Urban.

Participating cities defined their own resilience priorities, guided by 100RC staff and frameworks. The cities referred to the City Resilience Index, developed by Arup International Development and funded by the Rockefeller Foundation, as they developed citywide resilience strategies (Arup 2014). The framework was designed to help cities measure and monitor factors that contribute to a city’s level of resilience. In addition to capturing the physical, economic, and social domains, the index emphasizes the importance of strengthening leadership and institutions to be more resilient—or nimble and coordinated enough to respond to challenges—and effectively planning and implementing resilience-building projects across multiple sectors and domains. While this process gave cities considerable flexibility in defining priorities, some critics argued that having such a broad set of goals might limit the program’s effectiveness (Lambrou and Loukaitou-Sideris 2021). We found this to be true, in that not all 100RC cities ultimately implemented a holistic resilience strategy.

BOX 2

The City Resilience Index

Arup structured the City Resilience Index around four key dimensions:

- **Health and well-being:** promotion of the health and well-being of everyone living and working in a city
 - **Economy and society:** the social and financial systems that enable urban populations to live peacefully and act collectively
 - **Infrastructure and environment:** man-made and natural systems within a city that provide critical services and protect and connect urban citizens
 - **Leadership and strategy:** the need for informed, inclusive, integrated, and iterative decisionmaking
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Physical Resilience

Interventions to improve the physical environment—built or natural—are the most common priority in resilience-building strategies in an era of intensifying climate-related natural hazards and growing clashes between development and urbanization and nature. Physical resilience building can be mitigating or adaptive in nature—in other words, these measures focus on changing the environment in order to better prepare for anticipated threats. Building physical resilience can mean reducing the fragility of systems or infrastructure, reducing exposures to disruptions, or implementing projects to ensure the continuous provision of critical services (Arup 2014).

Physical resilience is often inseparable from economic and social resilience given the importance of physical infrastructure to protecting essential services such as utilities, communication systems, transportation, and health care. Without access to basic services—including electricity, water, and wastewater treatment; reliable transportation infrastructure for people to reach their workplaces; or dependable ways to communicate—economies cannot function or grow. These services are also intimately connected to residents' well-being, a tenet that highlights the importance of minimizing human vulnerabilities and having effective safeguards in place to protect human health and life (Arup 2014). Furthermore, decisions related to land use and the built environment—which includes buildings, roads and highways, floodgates, parks and trees, and renewable energy installations—can have substantial equity implications depending on where physical amenities are placed, who they serve or protect, and their quality (Larson et al. 2016; Brugge et al. 2015; Carley and Konisky 2020).

Many 100RC participating cities prioritized physical resilience in their resilience strategies to strengthen infrastructure against climate-driven shocks and stresses. Cities proposed projects to prepare for flooding or sea level rise, which included building green infrastructure such as parks, green corridors, or gardens; making improvements to canals, as in Chennai, India; or installing additional water drainage infrastructure, as in Semarang. Many of the participating cities, including those in Europe, the

Middle East, Africa, Asia, and North America, planned to improve transportation infrastructure for mass transit, electric vehicles, walking, or cycling. Some cities also planned to make buildings stronger or more energy efficient; Wellington, for example, prioritized strengthening its earthquake-prone buildings in addition to building more efficient buildings and reducing construction waste.

Economic Resilience

Strengthening economic resilience can take several forms, such as emphasizing environmental sustainability or bolstering economic growth and redundancy of services—defined as the intentional, cost-effective spare capacity to accommodate disruptions. It often means building a diversified economy that is not overly reliant on one sector and provides ample livelihood and employment opportunities. It can also involve providing support and resources to businesses, often to small and medium enterprises (SMEs) or entrepreneurs. Economic resilience hinges on reliable mobility and communications systems and the effective provision of essential services. A growing concept under this domain is digital resilience, or efforts to digitize access to information, finances, or goods and services.

As previously noted, physical resilience projects that protect critical infrastructure and services support economic resilience. In addition, economic resilience initiatives overlap with social resilience concerns, especially in relation to concentrated poverty and its drivers, such as unequal access to well-paying jobs and inadequate education or workforce training. For example, studies have linked school quality to higher earnings later in life and shown that improving school quality in a disadvantaged area can reduce income inequality (Chetty et al. 2011). Economic, physical, and social resilience also overlap in relation to energy and other climate-related infrastructure transitions; without efforts to support workers on the front lines of transitions aimed at bolstering physical resilience, people who work in legacy fossil fuel industries may be adversely affected (Carley and Konisky 2020).

Cities noted that protecting critical infrastructure was important from an economic perspective to ensure the continuity of business operations during or following a disaster. In addition, several participating 100RC cities prioritized support for businesses as a resilience-building action. In Norfolk, for example, the nonprofit RISE Resilience Innovations supports innovators who are developing and testing ideas for businesses that will address climate-related risks.¹ Support for SMEs in Melaka, Paris, and Semarang became a priority following the pandemic. In Semarang, interviewees noted that support for entrepreneurship and environmentally and socially oriented business grew to address the rising unemployment rate in the city (McTarnaghan et al. 2022). Some cities aimed to support new markets to provide more economic opportunities, address unemployment, and avoid overdependence on a single industry. The government in Medellín, Colombia, for example, supported the development of the creative economy, which emphasized promoting innovative practices and cultural expression through industry.² And several other cities, including Belfast, Medellín, and Rotterdam, prioritized digital resilience.

Social Resilience

Social resilience focuses on issues of inequality, equity, inclusion, and justice, which includes empowering stakeholders from historically underserved populations and ensuring that cities are meeting the needs of vulnerable populations. It emphasizes resolving inequities based on race, class, gender, and other social statuses or characteristics; focuses on strengthening networks, building social connectedness, and increasing social capital so that disparate groups in society are better able to work together to address shocks and stressors; and can also involve expanding social infrastructure, such as educational and training centers, or access to health care.

The social domain overlaps with the physical and economic domains in that socially excluded and burdened populations—such as people of color or populations with low incomes—also tend to face greater risk of harm from natural disasters and are the least likely to have resources to recover from an economic or physical shock (Fothergill and Peek 2004). Furthermore, past studies have found that strong social networks and a sense of solidarity can make emergency responses more inclusive and effective, and building physical infrastructure alone is insufficient to avoid the most negative impacts of disasters (Aldrich 2017). In fact, the literature supports the idea that inclusion must be part of any resilience governance agenda, because inequality and social exclusion undermine actions that promote resilience (Adger et al. 2020).

Several cities that participated in the 100RC program treated inequity as a stressor and emphasized the social domain of resilience. In Boston, racial equity was the overarching driver of the city’s resilience planning. However, equity was not always made explicit in other cities’ strategies. The Norfolk strategy, for example, does not use the term “equity.” The city framed social issues in terms of improving conditions and services in education, workforce training, housing, health care, and other areas for vulnerable populations. Other cities also recognized the need to expand social infrastructure such as schools (as in Lagos) and to create more opportunities for skills building to support social mobility (as in Rotterdam). In some cases, the pandemic—which began after most cities released their strategies—elevated the topic of inequity in resilience-related discussions and highlighted the stark disparities between access to services and exposure to COVID-19 across racial and economic classes. Cities in the United States, meanwhile, also saw rising concern around racial inequities during this period in response to the police murder of George Floyd.

Multidimensional Resilience in Theory and Practice

Resilience building can differ in practice from theory. Although the 100RC planning process encouraged cities to think about multiple domains of resilience and how they interconnect, only some cities implemented projects that holistically addressed an issue across the physical, economic, and social dimensions. This section explores how cities portrayed the holistic concept of resilience in their program applications and resilience strategies compared with the projects they implemented.

Multidimensional Needs

In their applications to the 100RC program, cities in the first cohort identified needs with minimal guidance whereas cities in the second cohort were required to select their top four priority shocks and stressors from a prefilled list (table 1). While none of the options were exclusively physical, economic, or social problems, the vast majority of priority shocks and more than half of the priority stressors selected by the cohort 2 cities fell into the physical threats domain, many of which are exacerbated by climate change. This category includes environmental issues such as heat waves, which are affected by physical factors such as building or road materials, amount of green space, housing quality, and access to air conditioning.

TABLE 1

Stated Resilience Needs of 100RC Cohort 2 Sample Cities, 2014

Cohort 2 Sample Cities	Priority Shocks				Priority Stressors			
Athens	Earthquake	Heat wave	Civil unrest	Infrastructure failure	High unemployment	Shifting macro trends	Poor air quality/pollution	Aging infrastructure
Boston	Flooding (coastal)	Infrastructure failure	Terrorism	Blizzard	Pronounced poverty/inequality	Lack of affordable housing	High unemployment	Rising sea level
Chennai	Flooding	Hurricane	Heat wave	Tsunami	Overpopulation	Significant environmental degradation	Aging infrastructure	Rising sea level
Montreal	Hazardous material accident	Infrastructure failure	Heat wave	Flooding	Aging Infrastructure	Declining/aging population	Unreliable transportation system	Poor air quality/pollution
Paris	Flooding	Disease outbreak	Heat wave		Lack of affordable housing	Intractable homelessness	Poor air quality/pollution	
Santiago	Earthquake	Landslide	Flooding	Wildfire	Pronounced poverty/inequality	Significant environmental degradation	Drought and water shortage	Lack of affordable housing
Wellington	Earthquake	Tsunami	Flooding	Landslide	Shifting macroeconomic trends	Rising sea level and coastal erosion	Aging infrastructure	Invasive species

Note: Orange text indicates that the city ranked physical threats first; magenta text indicates economic first; and blue text indicates social first.

Source: Authors' analysis based on the second cohort cities' 100RC applications.

Cities tended to have more nuanced discussions of their priorities, which fell less squarely into a single domain. For example, Wellington’s application rated “earthquake” as the city’s number one shock; it additionally noted that the risk of earthquakes coupled with Wellington’s economic reliance on government and professional services located along a major fault line shed doubt on their ability to withstand a large earthquake. Boston cited its primary resilience challenge as a lack of integration because of the “historical problem of institutional racism and classism that keeps communities from engaging in meaning collaboration and dialogue.”

Multidimensional Strategies

Developing a resilience strategy was a core tenet of the 100RC program and a major milestone for participating cities. The semi-structured process, beginning with a public agenda-setting workshop, involved prioritizing specific, implementable initiatives for resilience building that could inspire city stakeholders to act. The program encouraged an inclusive and collaborative approach to strategy development with the expectation that local community members in the public, private, and civic sectors would engage in the process. 100RC also encouraged co-learning and co-creation across the program’s network cities.

Guided by 100RC’s Resilience Strategy Guidance Manual and the City Resilience Index, and with the support of various strategy partners, most cities produced resilience strategies that touched on each of the physical, economic, and social domains. However, cities did not equally focus on each domain. Most strategies emphasized physical issues, frequently related to climate change and disaster risks, which aligned with their applications. Some prioritized economic or social issues, although previous evaluations of 100RC strategy content found that specific actions focused on inequality, justice, or equity were more piecemeal (Fitzgibbons and Mitchell 2019; Meerow, Pajouhesh, and Miller 2019). We found in our sample that while cities might mention these social concerns in their strategies once or twice (with the exception of Boston), they were rarely the central framing for cities’ resilience strategies. The strategies also seldom identified the specific populations expected to benefit from the projects.

Most of the cities’ resilience strategies were ambitious in the areas addressed. Cities typically structured these strategies around three to five overarching themes—often referred to as pillars or goals—with 10 to 15 underlying goals or strategies and 30 to 50 actions or initiatives (though one city’s strategy outlined 92 actions). In Semarang, for example, one of the city’s five pillars was “new economic opportunity”; one of the goals underlying this pillar was “promoting entrepreneurship to increase the competitiveness of trade and services”; and a specific initiative targeting those goals was “enhance the capacity of SME and creative economy.” Most cities’ strategies included a mix of specific and broad actions. The Washington, DC, strategy, for example, included “[creating] an economic mobility lab by 2023” and “[designing] climate-ready neighborhoods and developments.”

Almost all the pillars, most of the underlying goals, and many of the actions cut across multiple domains. In the DC strategy, each proposed project included the combination of shocks and stressors it meant to address. The city’s objective to make transportation more people-centered notes that the

action would simultaneously address inequality, strained transportation, traffic injuries, carbon pollution, and gentrification stresses. The Rotterdam strategy, which contained 44 headline goals, included an elaborate Venn diagram showing where each action falls in relation to the seven goals identified in the strategy. And the Wellington strategy articulated each action's resilience co-benefits—the ways the project would result in positive outcomes outside the central intent of the project—and how they actively contribute to other planned projects.

In addition to identifying potential benefits of each action, some strategies provided clarity around an implementation plan. For example, beyond identifying related resilience goals for each action, the Rotterdam strategy indicated the expected level of impact (individual, district, city), owners, partners, and potential financing sources; the Paris strategy similarly identified owners and main partners as well as first steps for implementation; and each of the actions described in the Norfolk strategy stipulated an expected timeline for the action.

Multidimensional Implementation

While all cities had ambitious plans to build resilience across the physical, economic, and social domains and do so in an integrated manner, they did not all exhibit progress in implementing their multidimensional plans. Common challenges included lack of resources, such as staff capacity or funding; lack of public support for projects; or unclear ownership of projects. In some instances, this outcome could be attributed to the unexpected closure of the 100RC program in 2019. However, some cities made substantive progress in urban resilience building across domains, either through specific projects or a collection of projects. This section examines a sample of cities that were able to translate their holistic thinking into action. Details on select plans and actions from the cities are provided in appendix B.

In Wellington, a multistakeholder project to develop an integrated transport system will include new mass rapid transit through the central city and improvements to walking and cycling connections.³ The city expects the project to reduce emissions and economic disruptions and improve public transportation access and options for vulnerable populations. Planning for the massive project is well underway, and the initiative has the public support of New Zealand's transportation minister.

Rotterdam is implementing a multifunctional roof project to simultaneously address climate change and demands on space in a city that is facing issues related to the availability of affordable housing and recreational spaces. Converted flat roofs provide greening, biodiversity, water storage, and drainage benefits in the physical realm; provide a sustainable energy source from solar or wind in the physical and economic realms; and serve as gathering spaces to build social cohesion in the social realm (Gemeente Rotterdam 2018). City leaders envisioned this project before the start of 100RC; it is well funded with financial support from the European Union has progressed independent of Rotterdam's resilience office. The city is also in the early stages of exploring the development of rooftop villages of tiny homes.

Finally, in Norfolk, the Ohio Creek Watershed project—a neighborhood redevelopment project involving gray and green infrastructure—provides physical protections against flooding, creates community spaces for recreation and gatherings, and aims to improve the economic growth potential of the neighborhood (Junod et al. 2021). Both the overarching goals stated in Norfolk’s resilience strategy and the objectives of the Ohio Creek Watershed project fall squarely into the three resilience domains to 1) physically protect the coast; 2) build economic opportunities; and 3) strengthen social connections. The project is designed to reduce flooding (physical) and to enhance public amenities in a low-income, economically isolated, and historically underserved neighborhood (social and economic). New transportation and flood protection infrastructure are expected to improve resident mobility, especially during extreme rainfall events, and to encourage business and economic development in the neighborhood. In addition, the city expects the flood protection measures to improve property values for the area, which is primarily occupied by residents with low and moderate incomes and people of color. The project has city and external funding, and construction is well underway.

More often, projects target direct progress in two domains, such as the Oasis Schoolyards project in Paris. This initiative aims to transform 50 schoolyards each year from heat-trapping asphalt surfaces to educational gardens. The schoolyard transformations address the physical threat posed by heat waves as well as social resilience by turning them into publicly accessible spaces for learning about nature. The physical and social outcomes of this project are clear, although any potential economic impacts are less direct. The city’s mayor strongly supports the project, having pledged €1 billion per year for the maintenance and beautification of streets, squares, and gardens (including Oasis Schoolyards). Since the start of the project, oversight passed from the Paris resilience office to the school affairs department.

Other cities implemented projects that emphasize one component while creating an underlying enabling environment to implement successful projects in other domains. For example, Boston designed a racial equity training program, which would be administered to all city staff by an external consultant, citing the city’s inability to integrate and historical problems of institutional racism and classism that prevent its diverse communities from engaging in meaningful collaboration and dialogue. The city identified racial inequity as the core problem underpinning which communities are most affected by physical shocks, such as coastal and rain-related flooding and infrastructure failures, and socioeconomic stressors such as pronounced poverty, inequality, lack of affordable housing, and high unemployment. The three-part training begins with an implicit bias exercise and includes a session to help staff understand structural racism and how it plays a role in their work; it also focuses on ensuring that all residents, regardless of their backgrounds, can access resources and recover from physical, environmental, or economic threats. The former Boston mayor elevated this issue by officially declaring racism a public health crisis, and the racial equity training remains one of the city’s largest, most well-funded contracts.

In alignment with its strategy pillar to create new economic opportunities, Semarang is working toward a program with the Global Resilient Cities Network to enhance the role of SMEs as part of the city’s economic recovery from the pandemic. This response has included the digitalization of traditional markets to help link local startups to households—for example, ordering groceries for delivery helps

citizens meet their daily needs and SMEs gain business. The city expects greater support for SMEs to have impacts beyond the economic domain, such as protecting the jobs of the city's more vulnerable populations for whom SMEs are a key source of livelihood. Similarly, ongoing efforts to promote entrepreneurship and environmentally and socially oriented business will help address issues related to the rising unemployment rate in the city and the need for diversification of the local economy.

Enabling Factors for Multidimensional Resilience

Cities that successfully moved multidimensional projects from strategic planning to implementation demonstrated several commonalities. This section outlines various enabling factors across three areas: strategy development, project planning, and resources for implementation.

Strategy Development Factors

Among the sample cities, Urban identified five enabling factors related to strategy development. These included incorporating a broad view of resilience, identifying multiple project benefits, specifying implementation details, building on or connecting to other plans and existing projects, and garnering support for strategy updates.

Cities that undertook holistic projects **demonstrated broad resilience thinking** that included multiple sectors of the economy and society and connected the dots across domains and initiatives. In Semarang, for example, interviewees said that 100RC broadened the city's understanding of resilience beyond climate change to include economic and social stressors and helped them recognize new sectors as entry points for resilience building.

Most of the cities that implemented cross-cutting projects **articulated each project's place in the grand scheme of resilience building across domains**. Whether by placing projects in relation to other projects, as in Rotterdam, or by identifying co-benefits that feed into other municipal projects, as in Wellington, understanding the connections among efforts and making the case for a project in those terms was important.

While many cities simply included descriptions of actions in their strategies, several cities that are currently implementing cross-cutting projects **identified a clear vision or pathway for implementation in their strategy**. For example, in the Paris strategy, each of the 35 actions articulated first steps, project owners, and main partners; in Norfolk, a timeline accompanied each action item. Even in Semarang—which did not consistently provide detailed implementation guidance—the city's priority action of supporting SMEs included details about the target group, time period, initiative owner, and initiative supporters.

Part of the vision for implementation involves considering **how many actions the city should propose under a strategy and how to prioritize among them**. Some cities proposed more actions than what was achievable but were still successful in implementing priority actions. For example, the racial equity trainings in Boston are among the few actions moving forward from the city's list of 72 actions.

Semarang identified priority actions among the total 53 actions in its strategy. The other featured cities—Wellington, Rotterdam, Norfolk, and Paris—all had fewer than 45 proposed actions.

Cities that implemented resilience projects often **developed strategies that were connected to other plans or strategies in the city**. For example, the Paris strategy builds on the Smart and Sustainable Paris Strategy, and Paris’s climate plan includes many references to resilience. In addition, a staff member in Paris is specifically in charge of ensuring compliance between the Plan Local d’Urbanisme (local urban plan) and existing environmental and social plans, such as the climate action plan and the resilience strategy. Paris, Norfolk, Wellington, and Semarang also released topical strategic plans that explicitly referenced their resilience strategies.

Resilience offices can also contribute to multidimensional resilience building by becoming **involved in planning efforts for new related strategies**. In Boston, for example, the city consulted the CRO about new heat equity and urban forest plans, which will have important implications for the physical and social resilience realms, particularly around racial equity.

Many of the resilience strategies did not build projects from scratch but rather **included related projects that were already underway**. For example, Rotterdam already supported the implementation of green roofs when it included this action in its resilience strategy. Similarly, in Norfolk, some of the projects identified in the strategy were already underway, such as an initiative to engage diverse voices through the Norfolk Senior Pastors Roundtable.

While some cities have not referenced their resilience strategies since they were published, others **reference them on an ongoing basis and regularly update them**. For example, Rotterdam published a new resilience strategy in February 2022, and Paris and Semarang have updates planned. In addition, Paris has consistently tracked the progress of its 35 initiatives, apart from the 5 that the city is no longer pursuing.

Planning Factors

The sample cities exhibited three enabling factors related to planning efforts. First, communities tended to recognize the need for resilience building and engagement in the planning process. Second, staff were generally willing to collaborate with the CRO in departments across the government. Lastly, data were available to inform the city’s resilience planning on an ongoing basis.

A concerned and engaged community. Cities that implemented projects tended to have active civil societies. In Rotterdam, for example, the government was able to easily mobilize community groups during the pandemic to help provide essential services and care for elder residents. Paris has a charter of participation to promote civil organization and individual participation in local democracy, and Semarang usually has good participation in its annual process to involve community members in a city plan consultation.

In most of the featured cities, including Norfolk, Paris, Rotterdam, Semarang, and Wellington, resident engagement in planning improved over Urban’s five-year evaluation period. In addition to an

engaged community, cities need effective channels for engagement. Semarang has demonstrated such channels in its annual processes for city plan development at the local, subdistrict, district, and city levels, which have yielded significant community participation.

The featured cities saw especially high levels of community concerns around resilience, and therefore greater motivation to implement multidimensional projects. In Norfolk, persistent flooding in low-income and middle-income communities was a reality, not just a potential future threat. And in Wellington, earthquakes are considered inevitable. The need for resilience in multiple forms became especially apparent during the pandemic. In Rotterdam, the CRO initiated a project to look beyond the physical and social aspects of resilience in isolation, stating, “The pandemic has put a magnifying glass on the interlinkages between these themes and the need for a systems approach.” COVID-19 drove the progress of resilience initiatives in Semarang as well. The murder of George Floyd in May 2020 had similar effects across US cities, where the pandemic and national racial reckoning jointly elevated the need for social resilience and equity.

Another factor in communities’ capacity to engage in resilience building is the presence or lack of major political or societal disruptions—apart from the pandemic—such as a coup or extensive civil unrest. None of the cities highlighted in this brief experienced major disruptions.

Prior research on this same subset of cities suggests that they could have been more inclusive in their planning processes and better addressed issues of inequality, equity, and justice in their strategies to ensure equitable outcomes (Fitzgibbons and Mitchell 2019; Meerow, Pajouhesh, and Miller 2019). Nevertheless, our evaluation in the full report found that community participation and access in planning in this subset of six cities was either accessible or largely accessible, and resilience-related plans were inclusive of vulnerable populations in all cities except Paris, which was modestly inclusive (McTarnaghan et al. 2022).

Willing collaborators across the government. Multidimensional resilience would be difficult to achieve without buy-in from government officials outside of the resilience office. Cities that implemented projects that spanned multiple domains tended to have broad support across the government. In Paris, city leaders embraced resilience strategy planning as an opportunity to bring stakeholders together from different parts of the city to discuss challenges and break down silos. City leaders in Norfolk were already pursuing resilience-adjacent actions across city departments, which led to early strong support and ongoing engagement with 100RC-specific efforts. CROs can play a central role in coordinating the efforts of city officials, as shown in Semarang and Wellington, where interviewees shared that establishing CROs in government contributed to greater coordination among departments and city leaders and increased coordination in strategic investments.

Data on resilience needs and performance. The cities that are implementing multidimensional projects tended to be relatively data rich. Data availability improved in Paris, Rotterdam, and Semarang during Urban’s five-year evaluation period, while Norfolk, Rotterdam, and Wellington expanded research partnerships with local universities to improve their data collection, analysis, and use of data. Several of the cities have extensive, publicly available data (for example, the “Analyze Boston” website).

Meanwhile, Semarang is improving accountability through a website that allows citizens to access planning information and track developments in city subdistricts.

Implementation Factors

The 100RC cities we examined exhibited three enabling factors related to resources for implementation. They committed financial resources to projects, were able to attract external funding, and appointed staff to oversee project implementation and maintenance. Moreover, support for the resilience office or buy-in for resilience-building projects among high-level staff with authority was critical.

City government support, ability to attract external funding, and well-resourced cities. Financial resources to support resilience strategy implementation came from various sources. Some cities had healthy budgets for their resilience offices. For example, the budget for the Paris resilience office covers its operational expenses and resilience-related studies. For project implementation, Paris tends to use resources from other departments' budgets. Office staff can review the city's budget for a resilience focus. Boston also had extensive resources for resilience building from the city government: the contract for racial equity training for all city staff was the largest in the city. In Wellington, the transportation minister continues to deliver long-term, large-scale transportation infrastructure improvements.

Other cities benefited from external funding resources. For example, in Norfolk, the major redevelopment project of the Ohio Creek watershed (which won a National Disaster Resilience Competition) was largely funded through a grant from the US Department of Housing and Urban Development; Rotterdam's multifunctional roof project received funding from the European Commission; and the World Bank funded projects in Semarang.

All the cities featured in this brief—Boston, Norfolk, Paris, Rotterdam, Semarang, and Wellington—also benefit from being relatively well-resourced cities. They are all high-income cities compared with other cities that participated in the 100RC program. However, it is not the case that all high-income cities have implemented multidimensional resilience projects.

Dedicated staff and departments to drive projects forward. The CRO can have a lead role in coordination and facilitating communication, but to drive citywide resilience building across domains, other leaders need to take responsibility for project implementation and ongoing management. Sometimes the responsibility stays with the CRO; in Boston, for example, the CRO worked directly with consultants to design a training and insulated it during a period of large-scale government turnover throughout 2021. But elsewhere, many projects no longer remain under the CRO: the Oasis Schoolyards project in Paris was moved to the school affairs department, and the multidimension roof program moving forward in Rotterdam also does not sit under the resilience office.

Public and binding support from city officials. Support from city officials lends legitimacy and can help initiatives gain traction. For example, in Norfolk, the city manager provided consistent and strong

support for resilience efforts and for the CRO position, especially at the beginning of the city's engagement with 100RC. Key city staff such as the planning department head showed strong buy-in to the resilience concept, which helped drive projects forward. Similarly, the mayor of Paris mandated the implementation of Oasis Schoolyards as one of her priorities, and the mayor of Boston declared racism a public health crisis, which helped focus resources on the issue.

Conclusion

In many cities, the initial nudge from 100RC to think holistically about resilience was an important step toward implementing resilience-building projects that cut across physical, economic, and social domains. However, cities varied in terms of how closely they adopted 100RC's broad definition of resilience. Although cities tend to place the strongest emphasis on climate and disaster-related risks and physical resilience, and many existing strategies lacked an explicit focus on the other two domains, the 100RC resilience planning process helped create more linkages across domains.

Despite the time and resources that went into developing holistic strategies, many cities did not explicitly refer to multidimensional strategies, and some interviewees worried that their city's resilience strategy would become another document that sits on a shelf. Some strategies were extremely ambitious without a concrete, achievable number of actions, while others did not articulate clear steps for implementation—namely, who will own the project, what partners are necessary, and how the project will be funded. But several of the cities highlighted in this brief that continue to use and update their strategies show that actionable strategies can help governments and leaders think through connections across projects and identify first steps. The holistic strategy development process also showed that resilience-building projects do not have to be brand new. Many cities built on what they were already trying to achieve; bringing a resilience lens to these projects helped increase communication across disparate initiatives toward developing more unified citywide goals.

Cities that implemented multidimensional urban resilience-building projects benefited not only from a clear strategy but also from more personnel and financial resources. Engagement of civil society stakeholders and staff from across government departments made project implementation possible. Direct funding through offices of resilience, budget allocations from various governmental departments, and external funders were also key enabling factors.

Addressing resilience through the 100RC framework proved a considerable challenge for cities, although most were able to produce holistic and actionable strategies and plans. Identifying how resilience domains intersect and developing plans acknowledging those intersections has been more difficult. The cities highlighted in this brief have been able to move forward plans that will benefit their residents and support greater well-being. Not all cities pursuing multidimensional resilience efforts will have each enabling factor, but the factors identified in this brief will be helpful, we hope, to cities taking up the challenge.

Appendix A: 100RC Participating Cities, by Geography and Cohort

Cohort 1 (2013)	Cohort 2 (2014)	Cohort 3 (2015)
<i>Africa</i>		
<ul style="list-style-type: none"> Dakar, Senegal Durban, South Africa 	<ul style="list-style-type: none"> Accra, Ghana Arusha, Tanzania Enugu, Nigeria Kigali, Rwanda 	<ul style="list-style-type: none"> Addis Ababa, Ethiopia Cape Town, South Africa Lagos, Nigeria Luxor, Egypt Nairobi, Kenya Paynesville, Liberia
<i>Europe</i>		
<ul style="list-style-type: none"> Bristol, United Kingdom Glasgow, United Kingdom Rome, Italy Rotterdam, Netherlands Vejle, Denmark 	<ul style="list-style-type: none"> Athens, Greece Barcelona, Spain Belgrade, Serbia Lisboa, Portugal London, United Kingdom Milan, Italy Paris, France Thessaloniki, Greece 	<ul style="list-style-type: none"> Belfast, United Kingdom Greater Manchester, United Kingdom Tbilisi, Georgia The Hague, Netherlands
<i>Latin America and the Caribbean</i>		
<ul style="list-style-type: none"> Medellín, Colombia Mexico City, Mexico Porto Alegre, Brazil Quito, Ecuador Rio de Janeiro 	<ul style="list-style-type: none"> Cali, Colombia Juarez, Mexico San Juan, Puerto Rico Santa Fe, Argentina Santiago de los Caballeros, Dominican Republic Santiago, Metro Region, Chile 	<ul style="list-style-type: none"> Buenos Aires, Argentina Colima, Mexico Guadalajara, Mexico Montevideo, Uruguay Panama City, Republic of Panama Salvador, Brazil
<i>Middle East</i>		
<ul style="list-style-type: none"> Byblos, Lebanon Ramallah, Palestine 	<ul style="list-style-type: none"> Amman, Jordan 	
<i>North America</i>		
<ul style="list-style-type: none"> Alameda, California, United States Berkeley, California, United States Boulder, Colorado, United States El Paso, Texas, United States 	<ul style="list-style-type: none"> Boston, Massachusetts, United States Chicago, Illinois, United States Dallas, Texas, United States 	<ul style="list-style-type: none"> Atlanta, Georgia, United States Calgary, Canada Greater Miami and the Beaches, Florida, United States

Cohort 1 (2013)	Cohort 2 (2014)	Cohort 3 (2015)
<ul style="list-style-type: none"> ▪ Los Angeles, California, United States ▪ New Orleans, Louisiana, United States ▪ New York City, New York, United States ▪ Norfolk, Virginia, United States ▪ Oakland, California, United States ▪ San Francisco, California, United States 	<ul style="list-style-type: none"> ▪ Montreal, Canada ▪ Pittsburg, Pennsylvania, United States ▪ St. Louis, Missouri, United States ▪ Tulsa, Oklahoma, United States 	<ul style="list-style-type: none"> ▪ Honolulu, Hawaii, United States ▪ Louisville, Kentucky, United States ▪ Minneapolis, Minnesota, United States ▪ Nashville, Tennessee, United States ▪ Seattle, Washington, United States ▪ Toronto, Canada ▪ Vancouver, Canada ▪ Washington, DC, United States
Oceania		
<ul style="list-style-type: none"> ▪ Melbourne, Australia 	<ul style="list-style-type: none"> ▪ Sydney, Australia ▪ Wellington City, New Zealand 	
South, Southeast, and East Asia		
<ul style="list-style-type: none"> ▪ Bangkok, Thailand ▪ Christchurch, New Zealand ▪ Da Nang, Vietnam ▪ Mandalay, Myanmar ▪ Semarang, Indonesia ▪ Surat, India 	<ul style="list-style-type: none"> ▪ Bengaluru, India ▪ Chennai, India ▪ Deyang, China ▪ Huangshi, China ▪ Phnom Pehn, Cambodia ▪ Singapore, Singapore ▪ Toyama, Japan 	<ul style="list-style-type: none"> ▪ Can Tho, Vietnam ▪ Jaipu, India ▪ Jakarta, Indonesia ▪ Kyoto, Japan ▪ Melaka, Malaysia ▪ Pune, India ▪ Seoul, South Korea

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Sources: Rockefeller Foundation, “Rockefeller Foundation Announces First Cohort of Resilient Cities,” news release, December 4, 2013, <https://philanthropynewsdigest.org/news/rockefeller-foundation-announces-first-cohort-of-resilient-cities>; AIA Foundation, “35 Cities Added to Rockefeller Foundation’s 100 Resilient Cities Challenge,” Building Design and Construction, December 3, 2014, <https://www.bdcnetwork.com/35-cities-added-rockefeller-foundations-100-resilient-cities-challenge>; and 100 Resilient Cities, “100 Resilient Cities and the Rockefeller Foundation Announce 37 New Member Cities, Reaching the 100 City Milestone for Its Global Network,” news release, May 25, 2016, <https://www.prnewswire.com/news-releases/100-resilient-cities-and-the-rockefeller-foundation-announce-37-new-member-cities-reaching-100-city-milestone-for-its-global-network-300274345.html>.

Note: Sample cities are in bold.

Appendix B

Appendix B highlights a sample of resilience-building projects in Wellington, New Zealand; Rotterdam, Netherlands; Norfolk, Virginia; Boston, Massachusetts; Paris, France; and Semarang, Indonesia. We feature these cities because they address multiple dimensions of resilience. Each case study below explains the city's stated priorities in its application to the 100RC program as well as the major goals of their resilience strategies. The case studies also detail progress toward the implementation of multidimensional projects.

Case 1: Resilience-Building through Accessible Transit in Wellington

Wellington, New Zealand, joined the 100RC program in December 2014 as part of the program's second cohort.⁴

APPLICATION

The city's primary priorities when it applied were to address the physical threats of earthquakes, tsunamis, flooding, and landslides. The city also highlighted the stresses of rising sea level, coastal erosion, and aging infrastructure, referencing a storm in June 2013 that left 30,000 residences without power—some for up to two weeks—and a major rail link disabled for a week, which disrupted both commuters and freight. After this experience, the city recognized its overreliance on two major transportation routes and learned that it could not reliably reach its most vulnerable homebound populations in a disaster scenario. Wellington joined 100RC because the city wanted to reduce physical exposures and vulnerabilities and ensure the continuity of critical services.

STRATEGY

Wellington published a resilience strategy in March 2017 that included three major goals: 1) connected and empowered communities; 2) integrated and informed decisionmaking; and 3) a healthy and robust home, built, and natural environment. The strategy articulates 10 interrelated programs to be implemented through a series of 30 broad actions. It relates the actions to how they will address a few central resilience challenges: a changing society, continued earthquakes, and rising sea level. Each action description contains details about the project lead, key partners, and how the project might contribute to the success of other strategy actions.

IMPLEMENTATION

Of the projects included in the strategy, one of several in progress is Let's Get Wellington Moving, a \$1 billion multistakeholder project to develop an integrated transport system. It is a series of projects that will be delivered in three phases. Another project underway, City Streets, is a three-year, \$350 million program aimed at moving more people with fewer vehicles. Construction will begin in the next three years and is expected to take 10 to 12 years. Meanwhile, investigation and planning work for larger, longer-term projects has begun, and the city expects construction to begin at the end of this decade. The long-term planned construction includes new mass rapid transit through the central city, improvements to walking and cycling connections around the Basin Reserve, and an extra Mt. Victoria Tunnel. The

implementation plan is large, complex, and time-consuming, as is the case for many resilience-building infrastructure projects. The project team has committed to exploring options to make sure Wellington residents will be happy with the results of the large public investment involved. Each project tends to go through a time-intensive five-step process: scoping, investigation, detailed investigation, design and consenting, and build. In May 2022, the transportation minister confirmed the ministry's commitment to delivering the projects. However, some stakeholders have criticized the project for spending too much time and money on consulting.

According to the strategy, the project will provide redundancy and flexibility. It is closely connected with other initiatives in the strategy, including increasing the adoption of electric vehicles and developing a climate adaptation plan—both of which have also received funding.

RESILIENCE DOMAINS

While the project primarily focuses on the threats of physical disasters made more likely by climate change, Wellington has considered benefits in other areas. For instance, the city expects the project to reduce economic disruptions and improve public transportation access and options for vulnerable populations.

Case 2: Resilience Building through Green Roofs in Rotterdam

Rotterdam, Netherlands, entered the 100RC Program in 2013 as part of cohort 1.⁵

APPLICATION

Rotterdam applied to the 100RC program with the intent of addressing water challenges and energy challenges; increasing community involvement; and preventing major disruptions to its citizens and the economy.

STRATEGY

Rotterdam released its first resilience strategy in 2016. The city organized its strategy around seven goals related to society, energy, cyber, climate resilience, infrastructure, strengthening networks, and anchoring resilience in the city. Under the seven goals are 68 actions, distinguished by two types: 24 headline or “flywheel” actions and 44 underlying related actions. Rotterdam's strategy relates the intersection of goals and headline actions through an elaborate Venn diagram that shows where each action falls under the seven enumerated goals. In addition, the city articulated related resilience goals, levels of impact (individual, district, city), project owners, partners, and potential financing for each action.

Rotterdam developed a new resilience strategy using the City Resilience Framework in the Resilient Rotterdam Strategy 2022–2027 (Gemeente Rotterdam 2022). The new strategy focuses on seven resilience themes and their planned interventions: climate resilience, ecological resilience, energy resilience, social resilience, economic resilience, digital resilience, and general resilience. The descriptions of these goals acknowledge that there are multifunctional measures that the city must take to address overlapping crises. Ecological and energy resilience interventions directly relate to climate

resilience. Social resilience focuses on growing inequality and economically vulnerable populations, in addition to health and cyber threats. Economic resilience interventions focus primarily on inequality and resource-related and pollution crises but also contribute to addressing biodiversity, climate, and health threats. Rotterdam expects digital resilience to address dependencies on digital technologies alongside the growing sophistication of cyber threats while also contributing to health, inequality, and climate solutions. And finally, general resilience interventions aim to strengthen resilience learning capacity and the power to change.

IMPLEMENTATION

Rotterdam has substantially progressed its goal to support sustainable roofscapes through its multifunctional roof program. The city implemented this program to simultaneously address climate change and demands on space related to a lack of affordable housing and recreational facilities. The government is converting flat roofs for uses across multiple domains, including water retention to delay drainage, sustainable energy generation, and gathering spaces to support social cohesion-building. The program has a budget of €800,000 each year. The resilience office staff are aware of the project's progress but are not responsible for overseeing it.

Relatedly, an €800,000 project to renovate unused roof space for multifunctional purposes on the largest social housing complex in Rotterdam focused on its low-carbon, social inclusion, and skill-building potential. It is a collaboration between the municipality and the Vestia housing association and funded through the LIFE @ Urban Roofs project of the European Commission.

RESILIENCE DOMAINS

Repurposing Rotterdam's flat roofs serves functions across resilience domains as the city attempts to address land scarcity issues without furthering development encroachment on the natural environment. In the physical realm, the roofs provide greening, biodiversity, water storage and drainage benefits. Straddling the physical and economic realms, the roofs can generate sustainable energy from solar or wind, potentially reducing energy costs and reliance on polluting energy sources. They also serve as a space for local food production. And straddling the physical and social domains, some roofs have roof bridges that serve as connections between residences to increase resident mobility. The strategy also envisioned that rooftops could house villages of tiny homes, if approved by city authorities, which could serve as an additional source of affordable housing. The roofs fall into the social resilience domain as well, serving as gathering spaces where city residents can build social cohesion.

Case 3: Resilience Building through Neighborhood Redevelopment in Norfolk

Norfolk, Virginia, joined 100RC in the program's first cohort in 2013 (Junod et al. 2021).

APPLICATION

When Norfolk applied to the 100RC program, its priorities were to build up coastal protection, utility redundancy, economic recovery capacity, transportation, and healthcare services to slow the growth in health disparities within the population.

STRATEGY

Norfolk released its resilience strategy in October 2015 and organized it around three central goals: 1) designing the coastal community of the futures; 2) creating economic opportunity by advancing efforts to grow existing and new sectors; and 3) advancing initiatives to connect communities, deconcentrate poverty, and strengthen neighborhoods. The plan includes 12 strategies and 42 actions underlying these goals. Norfolk identified resilience partners for each goal and provided a timeline for every action.

IMPLEMENTATION

One of the major projects underway in Norfolk is the Ohio Creek Watershed project, a redevelopment effort to protect the Grandy Village and Chesterfield Heights neighborhoods—both of which are majority African American—from tidal flooding during heavy rain and coastal storm events. The city is constructing gray and green infrastructure to protect the shorelines, while also enhancing gathering spaces such as parks and school playgrounds to serve the dual purpose of recreation and water storage. Other community amenities from the project include bike lanes, sidewalk connections, pedestrian walkways, and a resilience park with sports fields and community gathering space. The project faced some challenges around resistance to resident relocation and budget concerns but was overall viewed positively. Funding for this project included a \$112 million grant from the US Department of Housing and Urban Development.

RESILIENCE DOMAINS

Norfolk's stated goals fall squarely into the three resilience domains to 1) physically protect the coast; 2) build economic opportunities; and 3) strengthen social connections. The Ohio Creek Watershed project is designed to reduce flooding (physical) and enhance public amenities in a low-income, economically isolated, and historically underserved neighborhood (social and economic). The city expects that new transportation and flood protection infrastructure will improve resident mobility, especially during extreme rainfall events, and will encourage business and economic development in the neighborhood. In addition, the flood protection will protect community centers and residential properties as well as improve property values in areas that primarily comprise residents with low and moderate incomes and people of color.

Case 4: Resilience Building through Oasis Schoolyards in Paris

Paris, France, entered the 100RC program as part of cohort 2 in 2014.⁶

APPLICATION

At the time of its application, Paris's priority shocks to address included flooding, disease outbreaks, and heat waves, and the priority stressors included a lack of affordable housing, intractable homelessness, and poor air quality and pollution. The city's needs were based on the desire for influenza pandemic control, empowered stakeholders, minimal human vulnerability, and continuity of critical services in the face of hazards.

STRATEGY

Paris published its resilience strategy in June 2018. The resilience challenges identified in the strategy mostly reflect the needs indicated in the city's application. They include social, economic, and spatial inequities and social cohesion; terror threats and security; climate change; air pollution; the Seine and river-related risks; and territorial governance.

Paris structured its strategy around three pillars: 1) an inclusive and cohesive city that builds on the strength of its residents to become more resilient; 2) a city built and developed to meet the challenges of the 21st century; and 3) a city in transition that mobilizes collective intelligence, adapts its operations, and cooperates with its surrounding territories. There are collectively 9 objectives and 35 actions, described as a "strategy based on cross-cutting projects," which highlight how different project relate to the three pillars. Every action description includes details about first steps, project owners, and main partners.

IMPLEMENTATION

The mayor has directly supported the Oasis Schoolyards project through a mandate to transform 50 schoolyards a year from asphalt surfaces into educational gardens. The mayor has pledge €1 billion per year for the maintenance and beautification of streets, squares, and gardens, including the creation of Oasis Schoolyards. The schoolyards initiative is no longer under the directive of the resilience office but has been passed on to the city's school affairs department.

RESILIENCE DOMAINS

The project originated as an attempt to adapt urban space to high temperatures. The government identified schoolyards for intervention because they are covered in impermeable asphalt that traps heat and because these spaces are closed to the general public. The schoolyard transformation effort both addressed the physical threat posed by heat waves and supported social resilience by turning schoolyards into community-accessible spaces for learning about nature.

Case 5: Resilience Building through Racial Equity in Boston

Boston, Massachusetts, joined the 100RC program in 2014 as part of cohort 2.⁷

APPLICATION

When Boston applied to the 100RC program, it framed its resilience needs around the inability of the city to fully integrate and the historical problems of institutional racism and classism that have prevented its diverse communities from engaging in meaningful collaboration and dialogue.

STRATEGY

Boston published its resilience strategy in July 2017 and organized it around 4 visions, 13 goals, 23 initiatives, and 72 actions, with a central component of racial equity. Each action has a "what" and "why" description; a note on the resilience qualities it touches on; an indication of its resilience value in terms of resilience and racial equity building at the city, community, organization, interpersonal, and individual levels; a timeframe (short, medium, or long-term); and implementation partners.

IMPLEMENTATION

The primary initiative championed by Boston's second CRO was a racial equity training for all city staff in Boston—a product of the strategy activity to launch the Racism, Equity, and Leadership (REAL) resilience program. The training includes three parts and begins with an implicit bias exercise. The city designed a second session to help staff understand structural racism and how it plays a role in their work, and a third exercise focused on how to implement initiatives with a racial equity lens.

RESILIENCE DOMAINS

In Boston, the problem of racial inequity underpins which communities are most affected by physical shocks, such as coastal and rain-related flooding and infrastructure failures, and socioeconomic stressors such as pronounced poverty, inequality, lack of affordable housing, and high unemployment. Although Boston is not implementing the resilience strategy action by action, the city believes that addressing racial equity will contribute to achieving other goals and plans across departments.

Case 6: Resilience Building through Support for SMEs in Semarang

Semarang, Indonesia, joined the 100RC program in 2013 as part of the program's first cohort.⁸

APPLICATION

Semarang applied to the 100RC program to address the impacts of climate change across its priority sectors—including clean water, flood management, marine and fisheries, and health—as well as to build institutional capacity. Its previous resilience efforts focused on disaster and environmental damage, but not climate change.

STRATEGY

Semarang published its resilience strategy in May 2016. It includes six pillars: sustainable water and energy, new economic opportunities, readiness for disasters and diseases, integrated mobility, transparent public information and governance, and competitive human resources. Under these pillars, the plan includes 18 strategies and 53 initiatives. The level of detail for each action varied, sometimes including its resilience value, target group, target location, time period, initiative owner, and initiative supporters, or only a few of these specificities.

IMPLEMENTATION

In alignment with its new economic opportunities pillar, Semarang is working toward a program with the Global Resilient Cities Network to enhance the role of small and medium enterprises (SMEs) as part of the economic recovery from the pandemic. This response has included the digitalization of traditional markets, such as making applications for business licenses available through mobile apps. These apps link local startups to households that can, for example, order groceries for delivery—both helping citizens meet their daily needs and SMEs gain business. Relatedly, the action to enhance the capacity of SMEs and a creative economy had one of the most detailed descriptions in Semarang's resilience strategy.

RESILIENCE DOMAINS

SMEs are a key source of livelihood for Semarang's vulnerable communities. As such, supporting them can create new economic opportunities and improve conditions for populations who rely on SMEs as their main source of income. Efforts to digitize SMEs can help meet people's daily needs, such as access to resources like groceries. The city also expects promotion of entrepreneurship and environmentally and socially oriented businesses to address issues related to rising unemployment rate in Semarang and the need for diversification of the local economy.

Notes

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About the Authors

Rebecca Marx is a research analyst in the Climate and Communities practice area of the Metropolitan Housing and Communities Policy Center at the Urban Institute. She conducts research on the connection between our built and natural environments and social and economic outcomes.

Dian Levy is a principal research associate in the Metropolitan Housing and Communities Policy Center at the Urban Institute. Her work focuses on low- and moderate-income housing and neighborhoods, the effects of federal and local programs on residents and neighborhoods, implementation and viability of housing provision models, and housing discrimination.

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