

Global Risk and Resilience Fellowship

Shared risk, shared future

How cities and the insurance sector
can manage climate risk together

HOWDEN



Sustainable
Markets
Initiative

Contents

Shared incentives for collaboration 06

Executive summary: Four lessons for cities from four years of the Fellowship..... 10

Part 1: Understanding risk better 12

Looking beyond historical risk: How cities can use insurance risk methodologies to sharpen urban risk assessment..... 14

Building a more complete picture of risk 18

Part 2: Understanding the cost of risk 22

Looking beyond direct losses: Quantifying the full cost of risk 24

Using insurance sector statistical metrics to support decision making 28

Prioritising risk in data-constrained environments..... 30

Part 3: Insurance markets as risk intelligence 32

Using insurance market signals to identify resilience priorities 34

Keeping communities insurable 35

Identifying and reducing protection gaps 38

Part 4: Conclusion and recommendations 40

Annex 1: Overview of Fellowship projects across 13 cities 44

Acknowledgements 49

About the Fellowship coordinators 50

Lessons from the Global Risk and Resilience Fellowship





David Howden

CEO, Howden

The Global Risk and Resilience Fellowship was built on a simple idea: cities and the insurance industry are stronger when they work together. Over the past four years, our Howden Fellows have brought that idea to life across 13 cities, helping city leaders better understand risk, build resilience, and unlock investment. In doing so, they have helped communities better protect themselves against the risks posed by hurricanes, earthquakes and flooding. Having laid the foundations, we now have an opportunity to build on them, bringing together cities, the insurance industry and the wider private sector to turn the lessons of 13 cities into a lasting legacy of safer, more resilient urban communities around the world.



Lina Liakou

Co-Managing Director, Resilient Cities Network

This report marks an important milestone for R-Cities, bringing together four years of the Global Risk and Resilience Fellowship and lessons from 13 cities that embedded insurance expertise within their governments. Our network has long helped cities understand their risks, but turning that understanding into investment remains a persistent challenge: many frameworks look to past events, while cities need to anticipate changing risks, grasp their financial consequences and make the case for resilience.

Our partnership with Howden has been central to closing the gap between understanding their risk and turning that understanding into investment, giving cities tools and expertise that were previously hard to access and connecting individual hazards to their wider consequences for urban systems, public finances and communities. The result is a shared language between two sectors with a common interest in managing risk, and lessons that will shape our resilience finance work in the years ahead. Through this programme, we have advanced a more collaborative approach to financing urban resilience by working with Howden, the Sustainable Markets Initiative, and every participating city and Fellow.



Jennifer Jordan-Saifi

CEO, Sustainable Markets Initiative

The Sustainable Markets Initiative (SMI) harnesses its unique convening power to bring together business leaders, policymakers and private sector stakeholders to accelerate the transition to a more sustainable and resilient future. The Global Risk and Resilience Fellowship has demonstrated how collaboration across the public and private sectors can generate innovative approaches to the resilience challenges facing cities in an increasingly uncertain climate. The partnerships created through the programme are a powerful example of how effective convening can translate shared ambition into practical action. The challenge now is to build on this momentum, scaling successful approaches and deepening collaboration to advance inclusive city-level resilience and enable more prosperous urban communities.

Shared incentives for collaboration

The worsening impacts of climate change are raising the stakes for cities and insurers alike. Between 1995 and 2024, floods, storms, heatwaves and other extreme climate events caused an estimated USD 4.5 trillion in direct economic losses worldwide.⁰¹ In 2025 alone, global insured losses surpassed USD 100 billion, against total losses of more than USD 224 billion.

As communities, assets and economic activity become increasingly concentrated in cities, a growing share of the financial cost of climate events falls on municipal budgets already struggling to keep pace with disaster planning and recovery. At the same time, insurers face rising claims from public and private customers, challenging the long-term sustainability of coverage and contributing to market withdrawal in geographies where risk is concentrated.

4.5trn

USD in direct economic losses from extreme climate events (1995-2024)

100bn+

USD in global insured losses in 2025 alone



In 2022, Howden, the Resilient Cities Network and the Sustainable Markets Initiative launched the Global Risk and Resilience Fellowship (the Fellowship), a first-of-its-kind partnership that embeds insurance expertise within municipal governments and strengthens public-private collaboration to build climate resilience. Over four years and across 13 cities, Howden connected insurance professionals with city Chief Resilience Officers (CROs) and municipal finance leads. The joint goal was to explore how insurance methodologies, data and products could support a more robust understanding of risk and, in turn, a more holistic approach to resilience.⁰² From Melaka, Malaysia to Norfolk, United States to Cape Town, South Africa, Fellowship teams examined the wide range of roles that insurance and private sector expertise can play in risk reduction and post-disaster recovery across diverse contexts and hazard types.

The Fellowship demonstrated how collaboration between the public and private sectors strengthens risk understanding and management. Cities gained access to specialist expertise, while insurers developed a deeper understanding of the communities and risks within the geographies they underwrite. The lesson across the four years of the programme has been consistent: the methodologies that insurers use to identify, quantify and understand risk are tools that can credibly strengthen cities' approaches to building urban resilience.

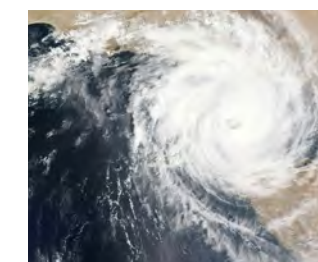
This report draws on the documented experiences of 13 Fellowship projects, alongside insights from other city members of the Resilient Cities Network, to show how closer collaboration between municipal governments and the insurance sector strengthens the assessment, prioritisation and management of climate-related risks. Fellowship case studies and reflections from participating city officials and Fellows – the insurance professionals embedded within city project teams through the programme – highlight how deploying insurance sector expertise in cities can guide better informed resilience investment decisions.

The aim is to inform future collaboration between cities, the insurance sector and private sector partners, as well as demonstrate how the Fellowship model can be scaled, creating more intentional partnerships and stronger resilience outcomes.

The methodologies that insurers use to identify, quantify and understand risk are tools that can credibly strengthen cities' approaches to building urban resilience.

⁰¹ Germanwatch Climate Risk Index 2026

⁰² See annex 1 for an overview of the work delivered with cities during the Fellowship, and key outcomes from these projects.



Matthew Simons

Deputy Resilience Officer, Norfolk Virginia

Through our experience with the Global Risk and Resilience Fellowship, we have a better understanding of the parametric tools we have available to target the residual risk associated with building resilience infrastructure.

Sharon Miller

Senior Policy Advisor, Greater Manchester Resilience Unit

The Fellowship showed that improving collaboration across public and private sectors is fundamental to developing a more accurate understanding of risk and building resilience at scale.

Sean Jukes

Associate Director, Howden Private Capital

The intended outcome of a more collaborative model between cities and the insurance sector would be mutually beneficial: cities would gain access to insurance solutions that more effectively support urban resilience, while the insurance sector would become a more relevant strategic partner to cities and create new, sustainable sources of revenue from solutions developed around previously unmet needs.



Four learnings for cities from four years of the Fellowship

1. Talk to your insurers

Insurers are not only providers of financial protection, but strategic partners. Ongoing dialogue helps to ensure decisions, investments and insurance policies are suited to evolving risks.

2. Use insurance tools to build a fuller picture of risk

Insurance sector data, products and approaches can help cities move beyond reliance on historical risk assessments to better understand future risks, uncertainties and their potential human, social, economic and financial impacts.

3. Quantify the full cost of risk

Insurance sector methodologies can help cities assess, quantify and cost the direct, indirect and cascading impacts of climate-related disruption.

4. Build resilience through shared action

Long-term partnerships between cities and insurers create mutual benefit by improving risk understanding, resilience planning and reducing climate-related losses.

Taken together, these actions can help cities deliver benefits for communities, local economies and the environment, supported by a tailored insurance programme that evolves alongside changing risk profiles.



Part 1

Understanding risk better

Cities cannot effectively reduce risk if they do not fully understand where it exists, how it is evolving and its potential to cascade across communities, business, infrastructure and public services. By drawing on insurance sector tools, such as catastrophe modelling, exposure analysis, loss assessment and probabilistic risk modelling, cities can develop a more forward-looking understanding of risk and make better informed resilience and investment decisions. While catastrophe models typically provide a near-present view of risk, applying climate modifiers and future climate scenarios can provide a fuller picture of how physical risks may evolve over time.

Looking beyond historical risk

How cities can use risk methodologies to sharpen urban risk assessment

Urban risks such as flooding, earthquakes and extreme heat rarely occur in isolation. Understanding how they compound and cascade requires sophisticated approaches to risk mapping and modelling. However, these systems often depend on specialised expertise, data and analytical tools that many municipalities cannot easily access due to resource and capacity constraints.

Cities may be limited in their ability to account fully for this complexity. Risk assessments are either too broad, such as city-wide hazard profiles, or too granular, focusing on a single project or private asset. Many organisations, including the Resilient Cities Network, have supported cities to develop frameworks for risk assessment and identification. Yet these frameworks are often limited in their ability to analyse, quantify and understand future risk, as they rely heavily on the analysis of historical events.

This can leave cities with an incomplete understanding of their most significant risks, increasing vulnerability and making it harder to deploy resources in the most effective way. As a result, investment is often directed towards addressing the risks that are most visible, rather than those likely to have the greatest impact on reducing risk in the long term.

The insurance sector has long recognised the limitations of relying solely on historical data. As losses from large-scale events increasingly exceeded what past records alone would have predicted, insurers developed advanced risk assessment tools to better understand potential future impacts. These methodologies, including catastrophe models that can incorporate climate modifiers and future climate scenarios, offer cities a practical way to develop a more nuanced understanding of future risk across vulnerable locations, critical assets and interconnected urban systems.

Catastrophe modelling, for example, (often referred to as 'cat modelling') is the use of probabilistic computer simulations to estimate the likelihood and potential impacts of natural hazard events. Models take a forward-looking approach, incorporating a wide range of hazard, exposure and vulnerability data to generate probabilistic risk estimates that can be refined as new information becomes available. This approach provides a more comprehensive understanding of risk than historical analysis alone, helping to capture the potential impacts of low-probability, high-consequence events.

Access to model outputs can give cities a clearer picture of potential exposures and predicted losses, in turn supporting more informed planning for extreme events. By understanding the factors that drive the model's risk assessment, cities can identify opportunities to target investments and actions that reduce vulnerability over time.

Investment is often directed towards addressing the risks that are most visible, rather than those likely to have the greatest impact.

Sharon Miller

Senior Policy Advisor,
Greater Manchester Resilience Unit

The most significant shift for me has been moving from thinking about risk primarily as a hazard or emergency management issue to viewing it as a systems issue with interconnected consequences. The Fellowship highlighted how risks cascade across infrastructure, services, businesses, communities and the wider economy. It also reinforced the importance of understanding the exposure, vulnerability, financial consequences and interdependencies associated with an event occurring. Most importantly, it demonstrated that risk can be quantified in ways that help support investment decisions and build stronger resilience business cases.

Adebayo Olukayode Ade-Ojo

Manager, Environment & Ecology,
Lagos State Resilience Office

The Global Risk and Resilience Fellowship has supported a shift from a hazard-based to a systems-based approach to risk management. This enables Lagos to consider the interconnections between risks such as flooding, fire and extreme heat, as well as their impact on communities, infrastructure and the State's finances. Flooding is therefore viewed not only as an environmental and infrastructure concern, but also as a significant economic and fiscal risk. With rising sea levels, increasing temperatures and more frequent and intense flooding, the potential cost of inaction could run into billions of dollars. These risks should therefore be reflected in investment decision, capital planning and long-term development priorities.

Marc Lehmann

Executive Director,
Head of Nat Cat & Climate Change Advisory, Howden Specialty

Pricing risk and driving resilience investment requires a deep, quantitative understanding of the urban risk landscape and where we can bring insurance expertise to the table to help tackle this.

New York USA



By bringing together cities and insurers, the Fellowship proved the value of combining shared data and modelling expertise: cities were able to better identify risks and produce loss figures they could use to plan and to justify investment.

When the City of New York joined the third Fellowship cohort in 2025, the focus was on one of their largest and most ambitious adaptation efforts to date: the East Side Coastal Resilience (ESCR) project. This project involves the installation of a 2.4-mile flood protection system across the areas that faced some of the most intense flooding after Hurricane Sandy and aims to protect over 110,000 residents and local businesses from the impacts of storm surge.

Fellows developed a bespoke exposure database for the target area from open-source data and used it to run analyses within Moody's North America Hurricane Model, generating estimates of potential hurricane-related risks and losses.

Modelling expected losses with and without ESCR, Fellows were able to calculate an expected 97% reduction in potential losses from severe hurricanes as a result of the infrastructure that is being installed. This analysis not only strengthens the evidence base for the city's planned investment but can also support discussions about the potential financial benefits of resilience measures, including their implications for insurance costs and risk financing.

Cities were able to better identify risks and produce loss figures they could use to plan and to justify investment.

Building a more complete picture of risk

Quantifying the adaptation and resilience benefits of projects strengthens the case for investment decisions. However, estimating the potential value or avoided loss of specific interventions often requires technical expertise and analytical capacity that many municipalities do not possess. Insurance sector and actuarial approaches can help address this gap by comparing expected losses with and without resilience measures in place. This enables cities to assess investments against the losses they are expected to prevent, providing a clearer view of their value.

While cities take some responsibility for protecting businesses and communities from risk, they often lack the granular exposure analysis that insurers use to model, price and underwrite these risks. Building a precise view of urban risk means bringing the two systems together.

Many insurers maintain detailed exposure databases that include information at the building or plot level, drawing on data from a wide range of public and private sources. Because insurers assess risk across public and private assets, they can develop a highly nuanced understanding of exposure and vulnerability that complements municipal datasets. When shared appropriately, these insights can help cities build a more detailed picture of risk across their jurisdictions.

By integrating this level of analysis into their resilience agenda, cities can better identify highly exposed populations and prioritise appropriate adaptation or mitigation interventions, as well as critical infrastructure assets and system dependencies that could drive wider disruption if impacted.

While few municipalities possess the resources or access to build databases of comparable scale and sophistication, partnerships and data-sharing arrangements with insurance sector stakeholders can help overcome these limitations and support more informed decision making.



Erin Owain

Associate Director,
Howden Climate Risk & Resilience

Improving the quality and availability of municipal risk and loss data would help cities develop a clearer understanding of their exposure and vulnerabilities across interconnected infrastructure systems and, in turn, enable more meaningful conversations between cities and insurers. This creates opportunities to develop more tailored solutions that are better aligned with the risks organisations actually face. For example, a blanket insurance policy covering a diverse portfolio of assets is not always the most effective derisking approach. In some cases, organisations may be over-insuring certain risks while remaining under-protected against others.

Marc Lehmann

Executive Director,
Head of Nat Cat & Climate Change Advisory, Howden Specialty

A recurring Fellowship lesson has been that cities and insurers often view the same risks through different lenses and that establishing a shared risk framework is essential to effective collaboration. We see that significant value comes from combining city-level exposure, infrastructure and planning data (but also their approaches) with the modelling, claims and risk engineering capabilities of the insurance sector.

Greater Manchester United Kingdom



Greater Manchester's water supply is operated by United Utilities, a private company outside the Greater Manchester Combined Authority's (GMCA) direct purview. Its assets are nonetheless critical to water access and the broader resilience of the city region. In the event that flooding affects a key water facility, the impacts would not be confined to the water infrastructure itself, but could extend across the wider urban system that depends on it. In 2024, United Utilities and the GMCA teamed up with the Global Risk and Resilience Fellowship to assess how far the impacts on water assets reach.

Drawing on insurance loss models, the Fellowship project team developed a bespoke methodology to assess flood risk at the most critical facilities in United Utilities' network, costing expected damage and related losses from flood under present and future climate conditions. Additionally, the analysis considered the implications of damage to key water infrastructure for water supply across the region, including its implications for affected communities and businesses.

For United Utilities, flood profiles at facility level demonstrated how unevenly risk sits across its portfolio of assets. This brought into view the potential value of structuring insurance coverage in relation to the specific risk profile of each asset, rather than treating the portfolio as uniform.

The benefit of the analysis for the GMCA is an enhanced understanding of how communities and facilities across the city-region would be affected by flood-related disruptions to water supply. The outcome – a costed view of what United Utilities failing to adapt would mean – established an evidence base for increased climate action and investment.

Understanding the costs and consequences of risk is essential for effective prioritisation and preparedness for all stakeholders. Insurance sector methodologies enable cities and their partners to assess risk in greater detail, considering a range of potential outcomes rather than a single loss estimate. This can support more informed decisions on resilience investment, risk management and risk transfer.

Perhaps most importantly, the project highlighted that flood risk in Greater Manchester is distributed across regional authorities, public bodies, businesses, infrastructure providers and property owners, while the interdependencies between them remain only partially understood.

The impacts of flooding often cascade across these actors, creating consequences that extend well beyond those directly exposed. As a result, effective flood risk management requires coordinated action across sectors rather than interventions by any single organisation alone.

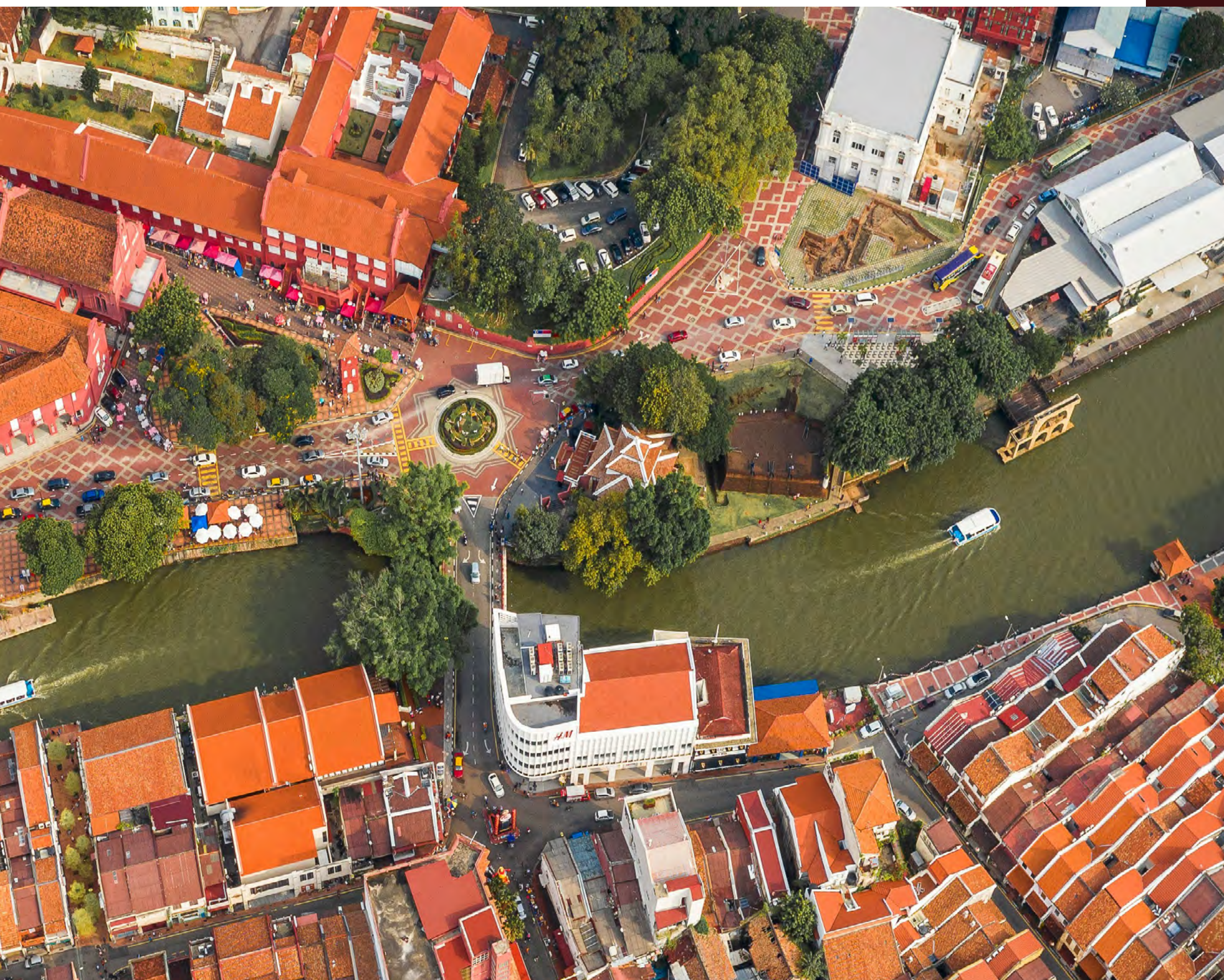




Part 2

Understanding the cost of risk

Resilience investments often compete with other pressing priorities for cities, making it difficult to justify action before a disaster occurs. Insurance sector loss assessment methodologies can help cities quantify the full costs of risk. These may include indirect and long-term impacts, such as business interruption, reduced economic activity and adverse social outcomes. Quantification enables cities to build strong economic cases for resilience and adaptation investment.

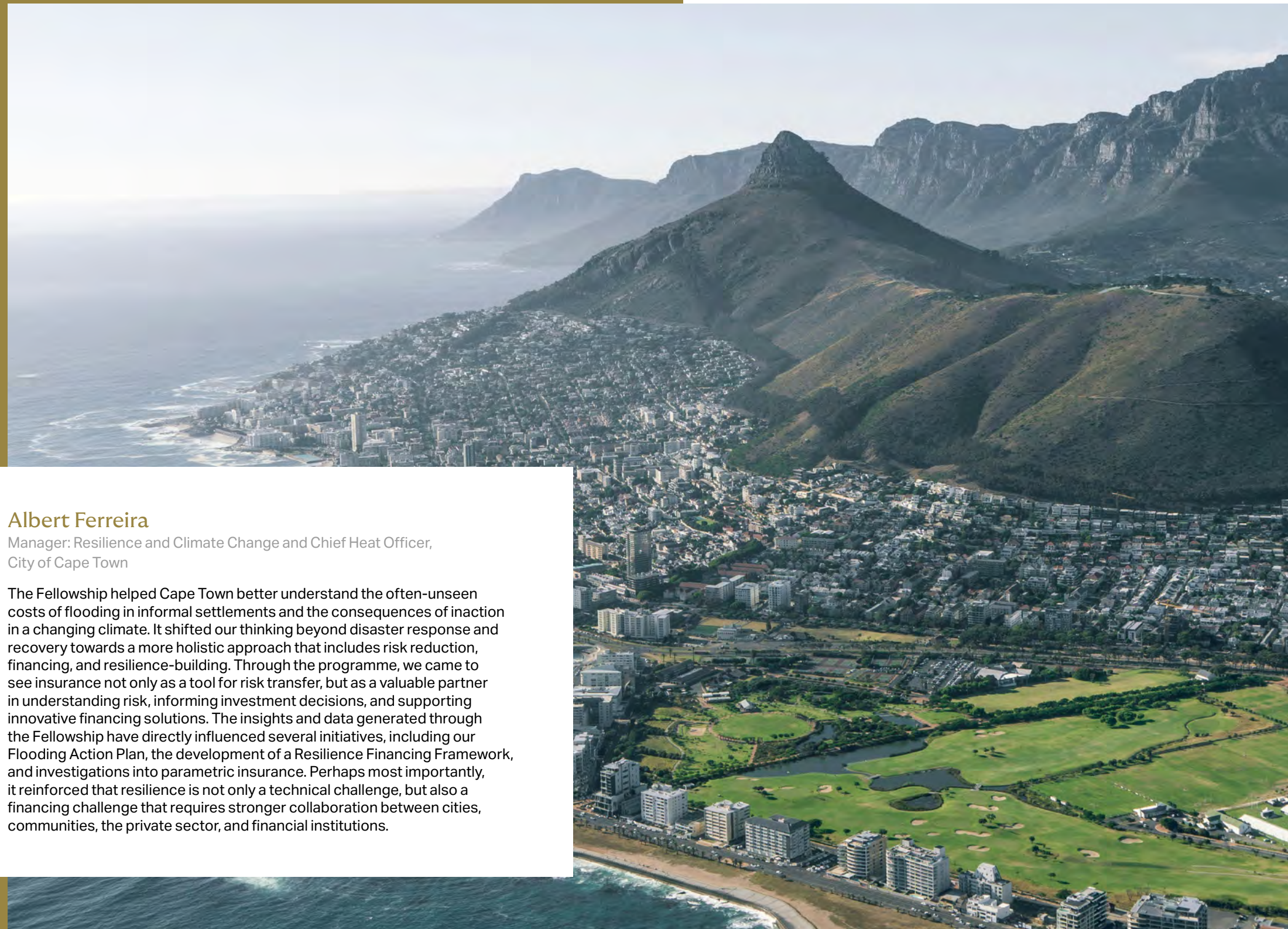


Looking beyond direct losses

Quantifying the full cost

A further challenge is accounting for the indirect costs of an event, which are often overlooked in municipal assessments. While these impacts may be borne initially by households, businesses or communities, they can ultimately affect the city through reduced economic activity, pressure on public services, and weaker social and economic resilience. Understanding these wider costs can help cities build a more complete picture of risk and the benefits of investing in adaptation and resilience.

Cape Town South Africa



Albert Ferreira

Manager: Resilience and Climate Change and Chief Heat Officer,
City of Cape Town

The Fellowship helped Cape Town better understand the often-unseen costs of flooding in informal settlements and the consequences of inaction in a changing climate. It shifted our thinking beyond disaster response and recovery towards a more holistic approach that includes risk reduction, financing, and resilience-building. Through the programme, we came to see insurance not only as a tool for risk transfer, but as a valuable partner in understanding risk, informing investment decisions, and supporting innovative financing solutions. The insights and data generated through the Fellowship have directly influenced several initiatives, including our Flooding Action Plan, the development of a Resilience Financing Framework, and investigations into parametric insurance. Perhaps most importantly, it reinforced that resilience is not only a technical challenge, but also a financing challenge that requires stronger collaboration between cities, communities, the private sector, and financial institutions.

According to the 2022 Census, 11.7% of Cape Town households live in informal dwellings, either in informal settlements or in informal backyard structures.⁰³ When the city joined the second cohort of the Fellowship, the project focused on understanding: (i) the true cost of flooding in these communities, which are data scarce and hard to analyse, and (ii) how those impacts trickle down onto the rest of the city. The aim was to generate a fuller picture of what flooding costs in order to allow the city to make more informed decisions and identify the risks that are not immediately evident.

Drawing on insurance sector approaches to exposure analysis and loss assessment, the Fellowship team developed a framework to identify and quantify a wider range of flood impacts than are typically captured in conventional assessments. Costs were classified into three categories:

- (1) Direct costs to government, relief agencies and business, traditionally reported but with gaps;**
- (2) Direct costs to informal communities, not typically assessed; and**
- (3) Indirect impacts on all of society, also not traditionally assessed.**

For those costs not traditionally assessed, the team identified proxy indicators. These included an estimated direct fiscal impact on informal households, based on categories such as damage to personal belongings, loss of structure, cost of replacement and lost business revenue, tied to the results of recent reports in certain informal communities.

The indirect impacts identified included increases in gender-based violence, delayed early childhood development, degraded ecosystem services, long-term physical and mental health impacts, and the entrenchment of underdevelopment and delayed economic growth.

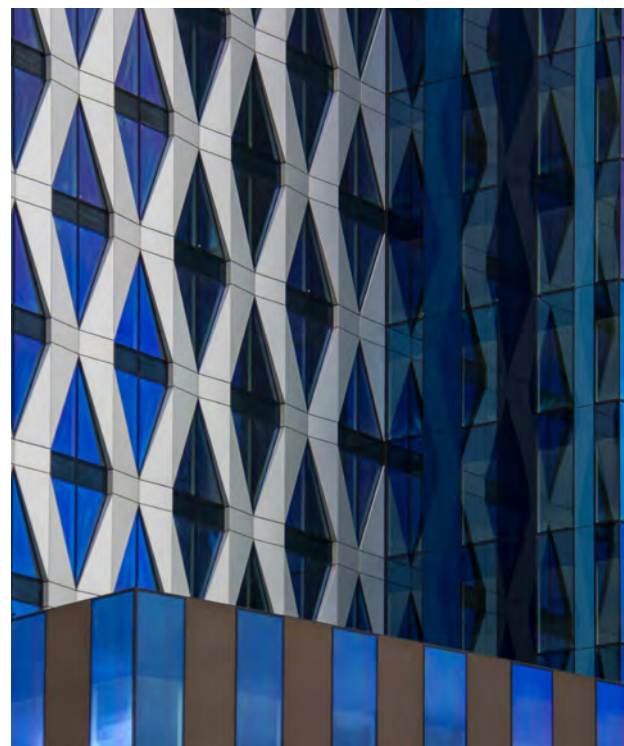
For each flood event, costs could then be estimated across the three categories, with the third producing qualitative metrics whose broader impact could be inferred.

⁰³ City of Cape Town, Census 2022: Cape Town Profile (Cape Town: Research Analytics, Policy and Strategy Department, 18 December 2023)

Using insurance sector statistical metrics to support decision making

Insurance sector models often capture not only direct physical losses, but also broader economic impacts such as business interruption and supply chain disruption. These effects are not always reflected in municipal assessments, despite their significance for urban economies and recovery.

Probabilistic models that the insurance sector has deep expertise in developing provide a more nuanced view of risk than a single loss estimate. Rather than generating one projected cost, they produce a range of metrics that can inform different planning decisions. Two commonly used measures are average annual loss (AAL), which estimates the expected annual cost of a hazard over the long term, and probable maximum loss (PML), which estimates losses from severe but possible events. Together, these metrics can help cities plan for both recurring costs and the financial impacts of extreme events, supporting informed budgeting, investment and resilience planning.



The Hague Netherlands

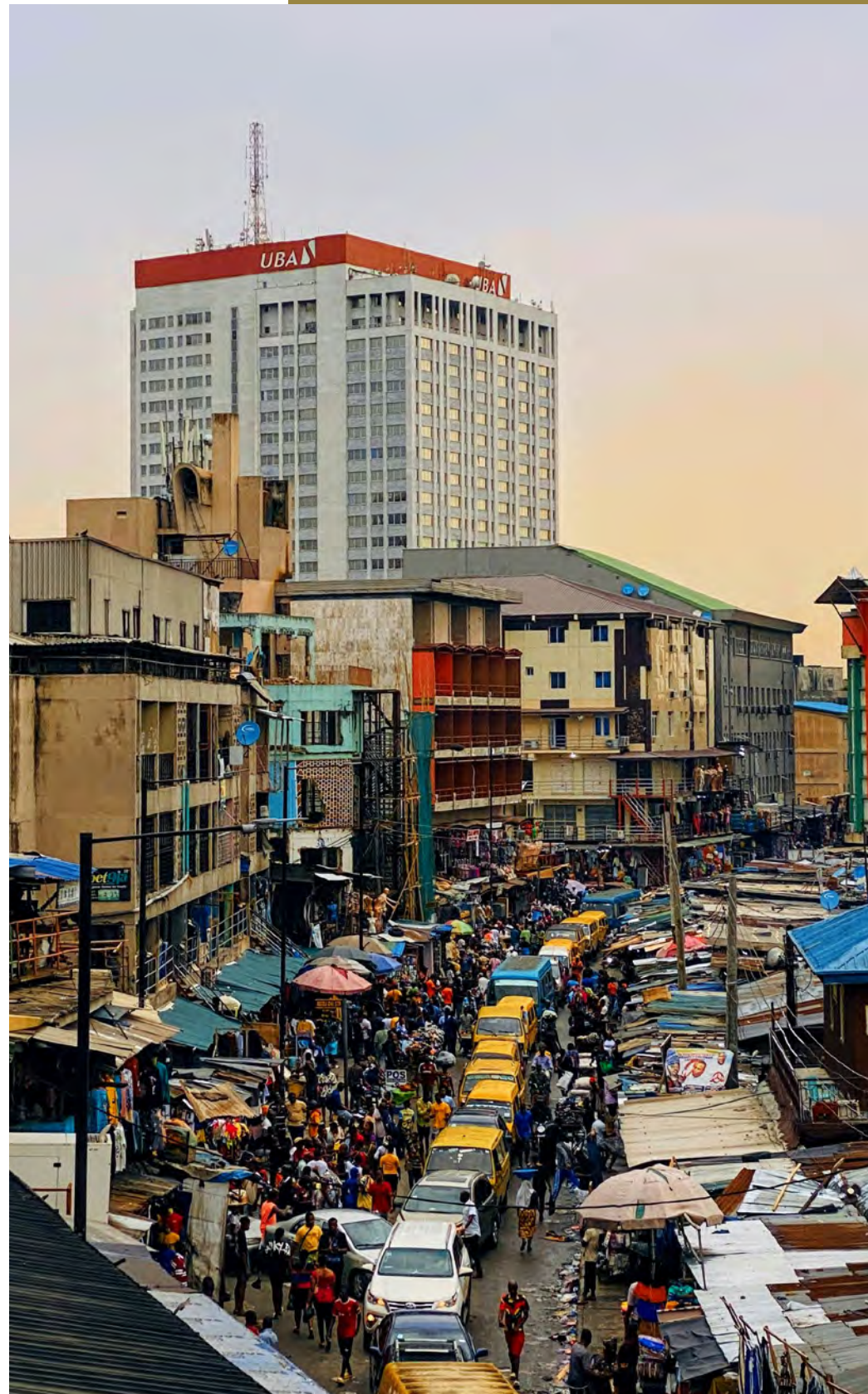


For the Hague, participating in the Fellowship in 2023 was an opportunity to receive guidance on establishing an insurance sector informed framework that could help monitor and predict potential crises, and identify priority risks. Given its data-rich environment, the city sought to create a methodology for utilising this data consistently to assess the impact and probability of potential crises.

The framework focused on PML, giving the city access to two critical data points for each risk mapped: severity and frequency. The Fellowship helped the city develop a methodology for creating simplified PML curves independently, allowing it to compare different risks. Severity was mapped on a scale of 1–6, while frequency was assessed across three return periods: 1-in-10, 1-in-50 and 1-in-200-year events. The city could then use these results to prioritise investment and align priorities.

Prioritising risk in data constrained environments

Prioritising risk in a city depends on available data, coordination across departments, long-term objectives and political will. Sophisticated modelling based on complete and comprehensive data sets can enhance decision making; however, effective risk prioritisation does not depend on perfect data. By adopting transparent and consistent methodologies, cities can make more evidence based decisions, build stronger cases for investment and allocate limited resources to the risks that matter most.



Lagos Nigeria

Only around 10% of Lagos residents have access to the public water supply. Installed production capacity is roughly 210 million gallons per day, less than a third of the estimated daily demand of 720 million gallons.⁰⁴ As part of the 2024 Lagos Fellowship, Fellows facilitated a workshop to help the city develop a practical and proportionate approach to risk prioritisation, recognising the constraints posed by limited and sometimes outdated water-related data spread across multiple municipal departments.

Working collaboratively with city stakeholders, the Fellowship team developed a risk register designed to provide a consistent basis for comparing and prioritising risks. The methodology assessed risks against six criteria: impact, probability, cascade effect (the likelihood that one crisis triggers another), trend (whether a risk is increasing, stable or declining), citizen concern and political support. Each criterion was scored quantitatively and weighted according to its relative importance, producing an overall score that enabled risks to be ranked and prioritised in a transparent and systematic way.

⁰⁴ F.H. Ayeni and M.A. Okonkwo, Water, Sanitation and Hygiene (WASH) Situation in Lagos State, Nigeria, Position Paper (Abeokuta: Environmental and Economic Resource Centre, December 2023), 1–2, https://eerce.org/wp-content/uploads/2024/03/WASH_Publication_EERC-2023.pdf, 1–2, https://eerce.org/wp-content/uploads/2024/03/WASH_Publication_EERC-2023.pdf.



Part 3

Insurance markets as risk intelligence

Insurance markets provide valuable signals about how risk is changing, where vulnerabilities are increasing and which risks may become more difficult to finance or transfer over time. Cities that understand and respond to these signals can better target resilience investments, support long-term insurability and reduce the financial burden of future disasters on households, businesses and public budgets.

Using insurance market signals to identify resilience priorities

Sean Jukes

Associate Director,
Howden Private Capital

From an insurance perspective, resilient cities are more insurable because investments in risk reduction, preparedness, building standards and critical infrastructure can reduce expected losses and improve risk predictability. Conversely, where resilience does not keep pace with growing exposures, insurance affordability and availability can come under pressure, ultimately creating protection gaps. This reflects a key Fellowship finding that pricing risk and driving resilience investment requires a deep, quantitative understanding of the urban risk landscape and where we can bring insurance expertise to the table the help tackle this.

Keeping communities insurable

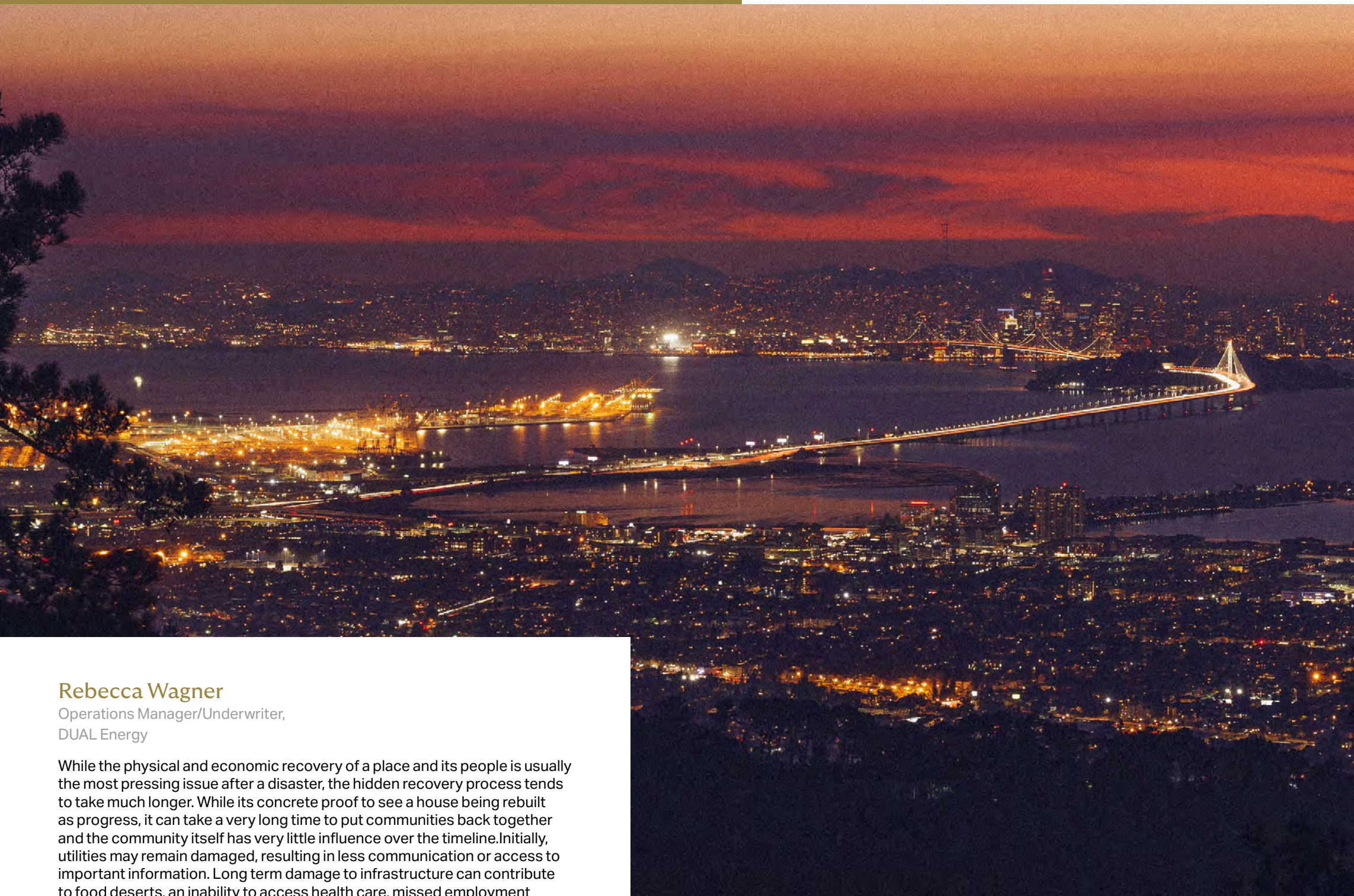
Changes in insurance sector activity (e.g., fluctuations in premium pricing or availability of coverage) can act as clear indicators of where risk lies or where risk management investments need to be made. Where risk cannot meaningfully be managed or mitigated, withdrawal of insurance coverage can be one indicator that cities should reassess the suitability of future development or rebuilding following extreme weather events.

Even in areas where the public sector compensates for insurance sector withdrawal, long-term urban development may be ill-advised as it will continue to represent a strain on public sector budgets. For those municipalities considering more drastic climate adaptation, such as managed retreat or realignment, mapping private insurance withdrawal or rising premiums can serve as a useful indicator of where to begin considering relocation.

Keeping risk within insurable limits is often, at least in part, within a city's control. Through decisions on mitigation investments, building standards and land use, public authorities can influence the level of exposure of certain assets and, by extension, the availability of insurance cover.

What cities cannot determine on their own is whether a given area can remain insurable, or what actions would be required to achieve that outcome. Working directly with insurers helps answer both questions, enabling cities to target resilience measures more effectively, while supporting the long-term ability of insurance markets to offer coverage.

Oakland USA



Rebecca Wagner

Operations Manager/Underwriter,
DUAL Energy

While the physical and economic recovery of a place and its people is usually the most pressing issue after a disaster, the hidden recovery process tends to take much longer. While its concrete proof to see a house being rebuilt as progress, it can take a very long time to put communities back together and the community itself has very little influence over the timeline. Initially, utilities may remain damaged, resulting in less communication or access to important information. Long term damage to infrastructure can contribute to food deserts, an inability to access health care, missed employment opportunities and fewer social interactions.

The Fellowship project in Oakland, California focused on wildfire risk, which has increased significantly in recent years and contributed to rising insurance costs and reduced insurance availability across parts of the state. Due to the increased frequency and severity of wildfires, insurers are being forced to pull out of areas they can no longer sustainably underwrite wildfire risks.

Oakland's objective in participating in the Fellowship project was to understand what role the city could realistically play in improving the insurability of communities exposed to wildfire risk.

The Fellowship project team developed a profile of wildfire risk and insurance around Oakland and engaged key players from the insurance sector to understand the conditions required to maintain the availability and affordability of cover. The project team also provided the city with a list of strategic areas in which the city could work to reduce risk for homeowners, including specific types of mitigation efforts. The project increased awareness among consumers and insurers of relevant policies and mitigation measures, while identifying opportunities to strengthen building codes and improve transparency between government, consumers and insurers.

Identifying and reducing protection gaps

The protection gap is defined as the uninsured portion of losses resulting from an event, namely the difference between total economic and insured losses.⁰⁵ It is a critical indicator that cities should pay attention to as they assess and plan for what risks can be transferred to the insurance market as part of a broader set of risk management, response and recovery activities.

In those areas where the protection gap is larger, businesses and individuals will face longer recovery times with impacts on the local economy and tax base. A large protection gap can be considered a proxy indicator of high vulnerability and this should be integrated into urban risk prioritisation frameworks as cities consider where to invest for community protection.

In areas where the protection gap is large, the public sector is likely to become a payer of last resort, for example through the disbursement of emergency relief funds or needing to make extraordinary budget allocations.⁰⁶ Mapping and estimating where these costs are likely to occur can help cities create more accurate recovery budgets by anticipating these expenses ahead of time.

The protection gap is not a static number. Therefore, cities should consider how it is continually evolving, and how they can help proactively reduce it. This may involve investing in mitigating infrastructure in key areas, enhancing insurance awareness and literacy in high exposure communities, or considering purchasing community focused risk transfer mechanisms on behalf of populations with high exposure.

⁰⁵ The Natural Catastrophe Protection Gap: Measurement, root causes and ways of addressing underinsurance for extreme events, International Insurance Society, 1.

⁰⁶ Government of Pakistan, Asian Development Bank, European Union, United Nations Development Programme and World Bank, Pakistan Floods 2022: Post-Disaster Needs Assessment (Islamabad: Ministry of Planning, Development & Special Initiatives, October 2022)

⁰⁶ <https://www.undp.org/pakistan/publications/pakistan-floods-2022-post-disaster-needs-assessment-pdna>.



Greater Miami and The Beaches USA

In 2023, Greater Miami and the beaches participated in the first cohort of the Global Risk and Resilience Fellowship and provided a pivotal case study for how cities can use protection gap analysis and insurance mechanisms to protect the communities that are most vulnerable to climate risks. In line with the broader Miami305 Resilience Strategy,⁰⁷ the Fellowship project focused on identifying neighbourhoods across Miami Dade County, City of Miami and City of Miami Beach that faced significant protection gaps based on criteria such as low average income and low recorded savings, high proportions of renters (who are less likely to have insurance) and/or areas where engineered solutions would be considered impractical or infeasible.

The Fellowship project team then worked together to create indicative parametric insurance policy options that practically demonstrated how insurance could be used to protect these communities and support rapid post-hurricane recovery. These simplified, community-scale policies did not require individual residents to purchase insurance or act as the policy holder. Instead, the Fellowship project team recommended that either the city, or an external party pay for and hold the policy. In the event that the policies were triggered, the policy holding entity would then provide precise, pre-agreed payouts to affected community members.

Following the Fellowship project, a local philanthropic organisation, the Miami Foundation, chose to further develop one of the indicative policies designed through the programme and subsequently purchased the policy. The policy provided comprehensive protection for a low-income community vulnerable to hurricanes and at risk of prolonged recovery following a major storm.

⁰⁷ Greater Miami & the Beaches 2019 <https://resilient305.com/>



Part 4

Conclusion and recommendations

Across four years and 13 cities, the Fellowship has shown the value of bringing city knowledge and insurance sector expertise together. Cities bring a detailed understanding of their communities, infrastructure and priorities, while the insurance sector brings methodologies, data and expertise that can help quantify risk and inform decisions about where resilience investment can have the greatest impact.

The projects also demonstrate that these approaches can be applied across very different contexts.

Catastrophe modelling and probable maximum loss (PML) analysis in New York and The Hague show what is possible in data-rich environments, while Lagos's risk register and Cape Town's analysis of informal settlements demonstrate how the same principles can support decision making where data is more limited.

Recommendations for cities

1. Establish structured and sustained engagement with the insurance sector
2. Integrate insurance sector capabilities into resilience, adaptation and investment decision making
3. Incorporate risk financing and protection gap analysis into resilience planning

Recommendations for the insurance sector

1. Invest in ongoing dialogue with cities to better understand local priorities, governance structures and resilience challenges
2. Share expertise, data and analytical tools where possible
3. Collaborate to develop products that address municipal and community level resilience needs

Realising these opportunities will require sustained collaboration between cities and the insurance sector, reflecting an overarching recommendation from the Fellowship that resilience is strengthened through shared action.

The Fellowship provides a model for bringing these capabilities together, creating shared value by reducing risk for communities while supporting the long-term availability of insurance.

The Fellowship has highlighted a clear pathway for cities to strengthen how they assess, manage and transfer risk through collaboration with the insurance sector and with other cities. This starts with identifying risk at both a local and systemic level, before understanding its full cost, including direct and indirect impacts. Cities can then use insurance market signals alongside other evidence to identify where risks and vulnerabilities are increasing and target resilience investment accordingly. The tools and approaches used will differ between cities depending on their needs, capacity and available data.

The next step is to make collaboration between cities and the insurance sector more systematic. Cities need ways to engage insurers earlier in resilience and investment planning, while the insurance sector can continue to share its expertise, data and analytical capabilities to support better informed decisions. A sustained commitment to collaboration models between city officials and private sector stakeholders that create a shared language around risk, resilience and investment will be key to aligning priorities and strengthening partnerships.

As climate related losses grow in frequency, severity and cost, this collaboration will become increasingly important. A shared understanding of risk can help cities direct resilience investment more effectively and support the continued availability of insurance for businesses and households. Ultimately, the greatest value lies in reducing risk before disasters occur and helping communities and businesses withstand and recover from the shocks that do.

Annex 1

Overview of Fellowship projects across 13 cities

City	Challenge	Insurance sector contribution	Key outcome
Glasgow, UK (2023 and 2026)	Mobilising finance and private sector engagement to support Glasgow's delivery of its net-zero targets and Greenprint for Investment.	• Climate finance advisory • Relationship building between Glasgow and investors (e.g. pension funds) • Introductions to other private sector partners	Supported stronger climate finance governance at Glasgow City Council and enhanced the City's engagement with private sector partners for its climate and resilience ambitions.
The Hague, Netherlands (2023)	Using insurance risk assessment methodologies to establish a consistent approach to identifying, assessing and prioritising investment toward diverse and emerging urban risks.	• Risk quantification • Probable maximum loss modelling • Risk transfer and management advisory	Created a risk assessment framework that improved risk prioritisation, strengthened cross-departmental collaboration and informed future resilience planning.
Melaka, Malaysia (2023)	Strengthening understanding of current and future flood risk across most exposed areas in the city, including UNESCO World Heritage assets.	• Flood modelling and analytics • Risk transfer and management advisory	Improved the City's understanding of flood risk and provided a roadmap for a data-driven flood risk management strategy incorporating adaptation and insurance solutions.
Surat, India (2023)	Incorporating future climate risks into waste management planning and infrastructure investment decisions.	• Applied climate hazard analysis • Risk modelling • Adaptation and risk-transfer advisory	Improved the City's understanding of long-term climate risks to waste sector infrastructure and informed plans for resilient waste management expansion and investment.
Greater Miami and the Beaches, USA (2023)	Exploring insurance solutions to strengthen financial protection for low-income hurricane exposed communities.	• Risk assessment and modelling • Hazard mapping • Parametric insurance structuring and pricing	Demonstrated how community-scale insurance could support vulnerable communities and informed the structuring of a policy placed in the market and purchased by the Miami Foundation.

City	Challenge	Insurance sector contribution	Key outcome
Greater Manchester, UK (2024)	Assessing the cost of failing to adapt to the impacts of flood risk on critical water infrastructure to inform the economic case for adaptation investment.	• Flood risk modelling • Loss assessment	Improved understanding of flood risk exposure, system interdependencies and the costs of inaction, helping inform investment in adaptation measures.
Lagos, Nigeria (2024)	Exploring approaches to better manage water-related risks and support resilience investment.	• Risk assessment and prioritisation • Data sharing • Exploration of derisking investment in water infrastructure	Improved understanding of water risks, investment barriers and opportunities to use insurance and financing mechanisms to support water resilience objectives.
Norfolk, USA (2024)	Identifying opportunities for insurance solutions to optimise coastal resilience investments.	• Risk assessment and modelling • Hazard mapping • Parametric insurance structuring and pricing	Improved understanding of how innovative insurance solutions can support flood resilience, encourage insurance retention and complement infrastructure financing strategies.
Oakland, USA (2024)	Exploring how to make homeowners more insurable to wildfire.	• Access to insurance market expertise, underwriter perspectives • Analysis of the regulatory, market and risk factors affecting insurance availability and affordability • Risk reduction and transfer advisory	Improved understanding of the drivers of insurance inaccessibility and identified practical action to reduce wildfire risk to potentially support improved insurability over time.

City	Challenge	Insurance sector contribution	Key outcome
Cape Town, South Africa (2024)	Understanding the direct, indirect and longer-term impacts of flooding in informal settlements.	• Applied insurance-sector loss assessment • Risk analysis • Quantification of economic and social costs of flooding	Improved understanding of the true cost of floods in Cape Town's informal settlements, helping strengthen the case for resilience investment and more targeted adaptation measures.
New York, USA (2025)	Demonstrating the financial benefits of investment in the construction of the East Side Coastal Resiliency project.	• Applied catastrophe modelling and insurance sector risk assessment • Flood modelling • Loss modelling	Demonstrated how resilience investments can reduce expected losses and strengthen the evidence base for future resilience investment and insurance decision making.
Rio de Janeiro, Brazil (2025)	Enhancing preparedness for impacts of extreme rainfall, including flooding and landslides.	• Risk modelling • Risk management and transfer advisory • Disaster risk financing advisory	Improved understanding of rainfall-related risks and identified opportunities to complement disaster response with pre-arranged financing and parametric insurance solutions.
Mexico City, Mexico (2025)	Improving financial resilience to seismic risk for vulnerable communities.	• Parametric insurance advisory and structuring • Disaster risk financing advisory	Developed a practical roadmap and insurance concept to strengthen post-earthquake financial resilience and support faster, more equitable recovery.



Acknowledgements

This report was produced through the partnership between the Resilient Cities Network (R-Cities) and Howden as part of the Global Risk and Resilience Fellowship. It reflects the shared commitment of both organisations to strengthening cities' understanding, management and financing of climate risk, and to advance practical solutions that build urban resilience.

We extend our sincere thanks to all thirteen participating cities and to their officials, for their time and openness throughout the Fellowship. Their experience and insights were central to this work.

We would also like to extend our thanks to the many organisations that have worked on this programme over the years, including development partners, academic institutions and civil society groups. Their expertise, collaboration and shared commitment to building urban resilience have shaped our thinking and made this work possible. We are grateful for these partnerships and look forward to continuing their work together to close the protection gap and strengthen the resilience of cities and their communities.

We are grateful to the colleagues and contributors who helped shape this report through its development, review and refinement, including Ada Rustow, Allison Ahern, Annabel Wicks, Isabelle Cadignan, Polly Harlow, Sophie Sacarello and Wadeisor Rukato.

About the Fellowship organisations

About Howden

Howden is a leading global insurance intermediary group, built on employee ownership. Founded in 1994, it delivers insurance, reinsurance and underwriting services for clients ranging from private individuals to the world's largest multinationals.

The Group operates in 57 countries across Europe, the USA and Latin America, the Middle East, Asia Pacific and Africa, with 25,000 people managing over \$54 billion in premiums for clients.

Further information is available at [howdengroup.com](https://www.howdengroup.com) and [howdengroupholdings.com](https://www.howdengroupholdings.com)

About Resilient Cities Network (R-Cities)

Resilient Cities Network is the world's leading urban resilience network. It brings together global knowledge, practice, partnerships and funding to empower its members to build safe and equitable cities for all. Its unique city-led approach ensures cities drive the agenda to benefit the communities they serve. At work in over 100 cities worldwide, the Resilient Cities Network supports on-the-ground projects and solutions to build climate resilient, circular and equitable cities, while also facilitating connections and information-sharing between communities and local leaders. **For more information, please visit resilientcitiesnetwork.org**

About the Sustainable Markets Initiative

Founded by His Majesty King Charles III in 2020, as Prince of Wales, the Sustainable Markets Initiative has become the world's 'go-to' private sector organisation on transition. Launched in 2021, the Terra Carta serves as the Sustainable Markets Initiative's mandate with a focus on accelerating positive results for nature, people and planet through real economy action.

For more information, please visit: sustainable-markets.org



Let's connect

While the Global Risk & Resilience Fellowship is concluding, its legacy continues through the partnerships, knowledge and practical solutions it has helped create. We are eager to hear from you if you are interested in learning more about the Fellowship's findings and opportunities to strengthen private sector involvement in building urban resilience.

To get in touch, or get involved, please contact:

Polly Harlow

Associate, Climate Risk and Resilience, Howden
polly.harlow1@howdengroup.com

Allison Ahern

Manager, Resilience Finance & Investments, R-Cities
aahern@resilientcitiesnetwork.org



One Creechurch Place, London EC3A 5AF

+44 (0)20 7623 3806
info@howdengroup.com

Howden is a trading name of Howden Insurance Brokers Limited, part of Howden Group Holdings. Howden Insurance Brokers Limited is authorised and regulated by the Financial Conduct Authority in respect of general insurance business. Registered in England and Wales under company registration number 725875. Registered Office: One Creechurch Place, London EC3A 5AF. Calls may be monitored and recorded for quality assurance purposes. 10/26 Ref: 15123-03