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Addressing Insurability: A Playbook for Investing in Place-Based Resilience

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Foreword



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Without insurance, global capital does not flow. Few take on major financial risks without insurance, and if you cannot access insurance, you may not be able to borrow. This makes the availability of sufficient insurance at an affordable price – “insurability” – crucial to economic activity.

This is most visible in the housing market, where the increasing frequency and severity of extreme weather have made properties in some areas more difficult to insure. In California, research suggests homeowners’ insurance premiums are up 84% since 2020, partly driven by wildfire risk. In Australia, 1.3 million properties are projected to be uninsurable by 2100, while in Canada, 10% of homes are already uninsurable due to extreme weather. The consequences extend beyond homeowners: declining insurability can reduce asset values and increase risks for businesses, investors and financial institutions.

These pressures ultimately point to a wider risk management challenge. Much can be done to mitigate risk from perils such as floods, storms or wildfires at the level of an individual asset, and the investment case for such measures is strengthening – but an asset is only as resilient

as the place around it. A fortified building may still be exposed if the surrounding drainage fails, vegetation is poorly managed or critical infrastructure is disrupted. Place-based resilience therefore extends the focus of risk management beyond individual assets to the shared systems and conditions that determine the resilience of a community or location as a whole.

Investing at this level, however, creates a collective-action challenge. Measures such as storm drainage, natural flood defences and wildfire buffers benefit many stakeholders, while their costs may fall to only a few. No single actor therefore has sufficient incentive or capacity to act alone. Traditional public–private infrastructure models do not always solve this problem because resilience often creates value through avoided losses and wider benefits rather than a direct revenue stream.

This playbook identifies four areas where coalitions can act to strengthen place-based resilience and, in turn, improve insurability. Drawing on emerging examples from around the world, it provides a blueprint for stakeholders to assess their readiness, join existing coalitions and build new ones where gaps remain.

Executive summary

This playbook explores how coalitions of local government, businesses, investors, insurers and communities can manage physical risk to improve their resilience and insurability in the face of increasing extreme weather events.

The playbook is built on a core premise: “insurability”, or the availability of adequate insurance coverage at an affordable price, is increasingly determined not merely by individual asset resilience but by the resilience of the places where those assets are located. While asset-level resilience is often measured, financed and rewarded, place-based resilience remains systemically underinvested in and under-recognized.

The urgency of this topic is underscored by the data – global insured natural catastrophe losses are estimated to reach \$148 billion, as per Swiss Re, with annual insured losses exceeding \$100 billion in every year since 2020.¹ This translates into tangible impacts for households, businesses and financial actors, with decreasing property values and greater individual financial exposure posing a global macroeconomic and political risk. This is ultimately an economic, humanitarian and social issue, affecting lives and livelihoods. It should therefore capture the attention of leaders across the public and private sectors.

The failure to manage risk is an issue that no single actor can solve alone. This requires coordination among property value chain stakeholders (including engineers, architects, developers, resilience service providers), businesses, local governments, asset owners and managers, infrastructure owners and operators (for instance, utilities), investors and banks, insurers, data providers, civil society organizations and regulators and policy-makers (for example, supranational, national). With an understanding of the key challenges these actors face, this report identifies four priority interventions:

- 1 Mapping what matters:** Better risk-decision data builds a shared, decision-ready view of place-based risk. *Key actions include enhancing models to reflect place-based resilience, improving data sharing among actors and making operational impacts on businesses and households more visible.*
- 2 Paying for resilience:** Innovative financing mechanisms are needed to make the business case for place-based investments compelling. *Key actions include quantifying the return on investment of resilience interventions, crowding in private capital and using insurance as a mechanism to pool disaster risk finance.*
- 3 Making resilience count:** Insurers, lenders and investors need recognized metrics they can trust when translating resilience into underwriting, financing and investment decisions. *Key actions include implementing a common language for resilience value, recognizing place-based resilience via common metrics and linking this to insurance outcomes.*
- 4 Realizing co-benefits:** The business case for resilience can be strengthened by aligning incentives and capturing co-benefits. *Key actions include recognizing shared co-benefits to strengthen the business case, strengthening governance structures, especially for transboundary risks, and translating co-benefits into revenue streams.*

This playbook presents more than guidance; it is a call to action. The four interventions and accompanying actions are ready to be tested, scaled and owned by coalitions. By assessing readiness across asset and place-based risks, joining existing initiatives and building new coalitions, leaders across sectors can relieve insurability pressures while strengthening place-based resilience. The work starts now.

Introduction

The playbook is built on a simple premise: as extreme weather events are increasing in frequency and severity, places need more adaptive capacity to respond to these risks.



While asset-level resilience is often measured, financed and rewarded, place-based resilience remains underinvested and under-recognized. Addressing this gap requires new forms of collaboration among governments, businesses,

investors, insurers and communities to address the collective-action challenge. This playbook explores how such coalitions can manage risk in ways that improve both resilience and the insurability of places over time.

Insurability, a signal of risk management

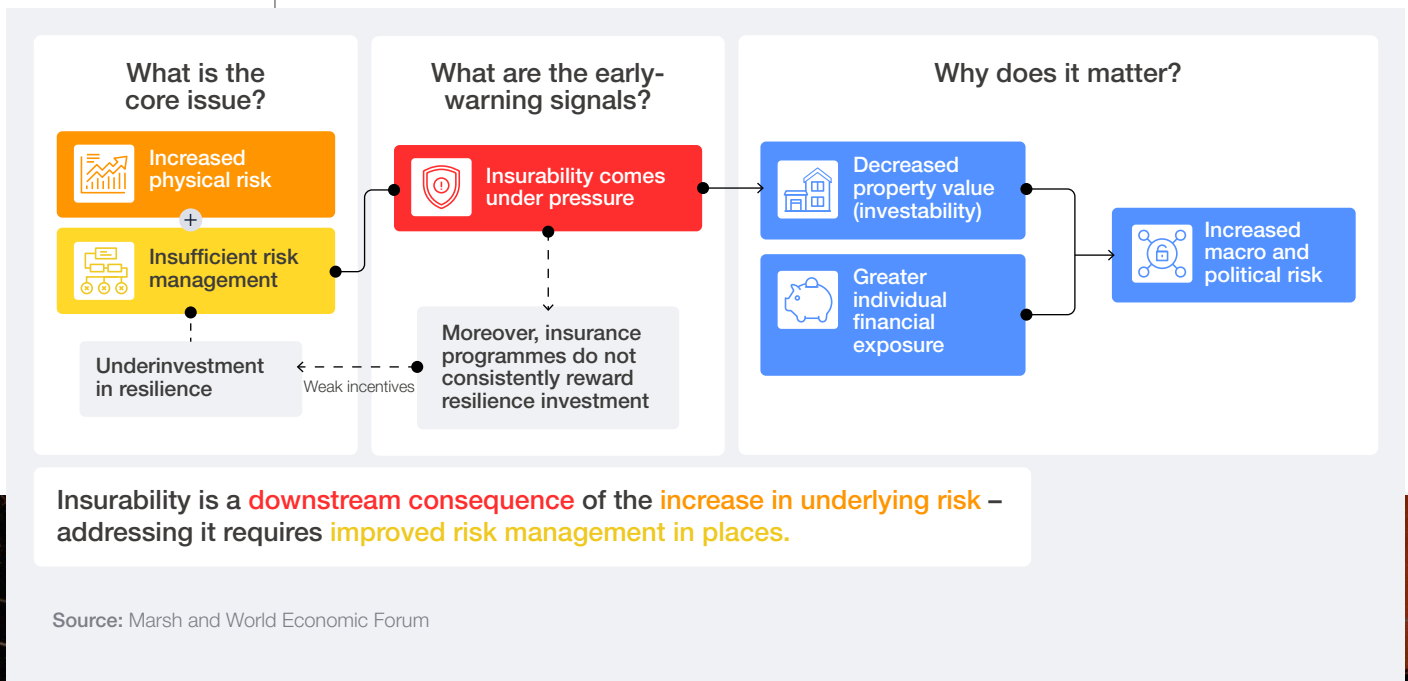
\$107
billion

Global insured losses from natural catastrophes in 2025.

Insurability – the availability of adequate insurance coverage at an affordable price – has captured headlines in recent years.^{2,3,4} Global insured losses from natural catastrophes reached \$107 billion in 2025. Annual insured losses continue to rise by 5–7% annually on average in real terms, with 2026 trend losses estimated at \$148 billion, as per Swiss Re.⁵ In some residential property markets, such as Californian wildfire zones, this is showing up as higher premiums, deductibles, restrictive terms, reduced capacity or non-renewals. In the United States, average property insurance payments made by homeowners nationally have increased by ~70% over the past five years, and in Australia, average premiums have risen by ~14% in 2025 alone.^{6,7} While the dynamics are much more nuanced in commercial property insurance markets,⁸ the reality remains that there is greater awareness of the importance of the availability of affordable insurance.

As a recent World Economic Forum briefing paper argued,⁹ this is not a crisis of insurance so much as a crisis of risk management that is relevant to those beyond the insurance industry. Insurance prices are driven by market and cyclical drivers as well as by the risk itself or “structural drivers”.¹⁰ Insurability is “a canary in the coal mine” – a financial signal that the way the global economy is managing physical risk is insufficient. Insurability affects investment outcomes via channels such as decreasing property values and greater individual financial exposure, posing a global macro and political risk, as explained in Figure 1. Crucially, it is also an important social issue – individual exposures ultimately impact lives and livelihoods. It should therefore capture the attention of leaders and investors across industries and the public sector.

FIGURE 1 Insurability is the entry point to a wider risk management issue



Addressing the root cause of the issue – inadequate risk management – necessitates moving beyond the insurance community. There are many factors that influence the building of adequate dwellings in high-risk areas, such as planning and zoning regulations, lending and investment decisions and construction choices. Further, insurance cannot substitute for risk reduction. This reduction is most effective when adaptation reduces loss potential and insurance transfers the residual risk. There

are also choices that society has locked into. Approximately 80% of buildings that will be here in 2050 already exist and much of the infrastructure was built based on outdated weather data.¹¹ So, while insurance must play a role, a broader approach is required. The focus needs to extend upstream to include the wider set of decision-makers who determine whether communities, buildings and places become genuinely resilient over time.

Place-based resilience: The entry point for action

70%

Revenue decline over five months when the coastal highway closure cut Malibu businesses off from customers after the 2025 Palisades fires in California.

The place in which an asset is located affects the overall risk. Place-based dependencies refer to the surrounding conditions that shape an asset's physical risk, operational continuity and recovery but sit outside the sole control of the asset owner. These can include surrounding infrastructure, natural systems and land use conditions. For some assets, there is only so much that can be done at the site level. The asset is dependent on its surroundings to help mitigate the risk. This means that a well-fortified building may still be at risk if off-site conditions such as storm drainage fail or if nearby vegetation is inadequately managed. Such place-based exposures are becoming increasingly critical to risk assessment, particularly in site selection for high-value, long-lived assets. Data centres exemplify this: given their scale of investment, complexity and multi-decade operational horizons, embedding place-based resilience into site selection and development from the outset is essential. The importance of place-based resilience extends beyond physical damage to business

interruption (BI) costs, which often exceed direct losses. The 2025 Palisades Fire in California illustrated this: Malibu businesses that escaped the flames still experienced an average 70% revenue decline over five months when the coastal highway closure cut them off from customers.¹²

Together, off-site (place) conditions, which are specific to an asset's location, and on-site (asset) conditions determine vulnerability and therefore insurance outcomes. Insurance may cover an asset, but losses are often determined by the place. Table 1 highlights the distinction between asset-level and place-based resilience. Although markets today quantify the resilience value of place-based measures, this remains static while the risk is dynamic.^{13,14} Moreover, while there are various coalitions focused on improving asset-level resilience, place-level resilience coalitions often require a greater number of actors and more coordination, and so these are the focus of this playbook.

TABLE 1 **Asset-level vs. place-based resilience – illustrative measures**

Example of extreme weather event	Asset-level resilience	Place-based resilience
Excessive rain	 Building elevation	 Urban drainage systems
Wildfire	 Fire-resistant materials	 Adjacent vegetation management
River flooding	 Flood barriers at the property	 Watershed and flood-plain management
Coastal storm surge	 Sealed windows and storm shutters	 Coastal defences and natural buffers



How do place-based risks affect insurance and non-insurance outcomes?

Where place-based conditions fail, the consequences extend well beyond physical damage and related business interruption to wider economic outcomes. Workers may be unable to commute, homeowners may be unable to access clean water and supply chains may be disrupted. Conversely, when the place is strengthened it can have significant disaster risk reduction benefits. For example, Singapore has been building towards being a “sponge city” since the 1970s, absorbing and channelling water through decades of drainage investment and nature-based design: the result – flood-prone land has been cut from roughly 3,200 hectares to less than 25 hectares, a 99% reduction achieved at the place level.^{15,16,17}

Investment in place-based resilience generates benefits well beyond insurance. Singapore’s sponge

city is also a water security strategy. Battery Park City’s coastal defences in New York, projected to return about \$2.16 for every \$1 invested, also protects jobs, businesses and property values across Lower Manhattan.¹⁸ In the Severn Valley, United Kingdom, natural flood management restores rivers and biodiversity in a catchment area while reducing flood risk.¹⁹ For municipalities, in particular, this makes place-based resilience one of the most effective investments that can be made. Yet this value is not consistently recognized or rewarded by the market. Data on place-based risk remains fragmented, the benefits of resilience investment are distributed across multiple actors and the costs are often concentrated upfront. The result is a market failure: resilience is under-financed and under-incentivized even where the long-term economic case is strong.

How the rest of this playbook is structured

This playbook is written for coalitions – groups typically composed of diverse stakeholders – who are willing to invest in place-based resilience and improve insurability outcomes. Section 1 introduces

key stakeholders and their challenges, Section 2 outlines four key interventions they can take and Section 3 summarizes actions by stakeholder type, ending with a call to action in Section 4.



This playbook is designed to be modular. Feel free to jump to the section that is most relevant to you. Within each subsection of Section 2, you can find relevant interventions alongside case studies. In Section 3, you can find recommendations presented by stakeholder type.

1

The challenges stakeholders face

This section introduces key stakeholders who need to act and the challenges they face, making the case for cross-actor collaboration.



Stakeholders involved in coalitions face a range of challenges in building place-based resilience. Table 2 presents the stakeholders' main roles and challenges, as identified through discussions and a workshop at London Climate Action Week 2026. They are interconnected, reflecting a broader collective-action problem: no single actor has clear

ownership or can act effectively alone. Marsh's Climate Adaptation Survey 2026 reinforces this interdependence: businesses identified governments and regulators (31%) followed by investors (24%) as the key parties needing to act.²⁰ Addressing these challenges therefore requires cross-stakeholder collaboration (as explored further in Section 3).

TABLE 2 **Stakeholders, their roles and the challenges they face**

Stakeholder		Role	Key challenges
Insureds (businesses, homeowners)		Hold assets and operations directly exposed to place-based physical risk	– Assessing current vulnerabilities – Building trust with insurers, investors and lenders
Property value chain stakeholders (e.g. engineers, architects, developers, resilience service providers)		Shape where assets are built, how they are financed and how risk information flows through property transactions	– Embedding resilience specifications in project briefs – Standardizing risk metrics into site assessment
Local governments		Manage drainage, land use, infrastructure, emergency response and systems that determine place risk	– Strengthening public-private data sharing and co-financing – Coordinating transboundary action
Asset owners and managers		Allocate capital, shape asset values and influence long-term resilience of portfolios and places	– Requiring resilience in lending and acquisition decisions – Participating in financing mechanisms such as resilience improvement districts
Infrastructure owners and operators (e.g. utilities)		Own/operate networks the condition of which directly determines place-based risk for surrounding assets	– Integrating place-based risk assessment into decisions – Aligning with community priorities
Investors and banks		Provide long-term financing that shapes where and how assets are built and maintained	– Pricing place-based risk and adjusting credit analysis – Designing resilience financing and verifying co-benefits
Insurers		Price risk, provide cover and signal where risk is rising	– Using risk score products to make location-level comparisons – Testing resilience standards to inform pricing decisions
Data providers		Generate hazard, exposure and vulnerability data that underpins risk assessment	– Filling hyperlocal and real-time data gaps – Developing standard metrics and interoperable formats
Civil society organizations		Represent communities, build trust, support local delivery and surface social vulnerabilities and co-benefits	– Building community awareness – Convening groups to implement measures locally
Regulators and policy-makers		Set regulatory frameworks and incentives that shape resilience investment; establish disclosure and risk management expectations	– Encouraging risk disclosure and mandating standards – Developing regulatory sandboxes and working groups to test place-based interventions

2

Interventions to build place-based resilience

From gathering better risk-decision data to stronger alignment of incentives, this section presents four priority interventions to improve place-based resilience.



The report team has identified four priority interventions (see Table 3):

1. Gather better risk-decision data to build a shared and decision-ready view of place-based risk
2. Introduce financing structures that make place-based resilience investment viable
3. Identify recognition such as metrics on which insurers, lenders and investors can rely when translating resilience into underwriting, financing and investment decisions
4. Achieve a stronger alignment of incentives so that the case for resilience can be strengthened by realizing actors' co-benefits

For each intervention, this section sets out examples of emerging solutions and where further innovation is needed.

This playbook primarily covers case studies in flooding (river, coastal, excessive rain) and wildfires. There are three main reasons for this. First, these insurable perils are generating substantial insured losses and driving pressures on property insurance in specific regions. Second, each is strongly shaped by place-based conditions: upstream land use, local drainage, coastal defences and surrounding vegetation all sit beyond the boundary of any individual property. Third, each can be materially addressed through resilience planning, which is the focus of this playbook.

TABLE 3 Relevant interventions and action areas

Relevant interventions	Action areas
1 Mapping what matters risk-decision data for resilient places 	1a. Models that reflect place-based resilience: Models insurers use need to be calibrated to quantify place-based resilience under dynamic forward-looking scenarios. Insurers and insureds can collaborate with data providers and model vendors to ensure that the impact of place-based conditions on property and community-level resilience is reflected accurately. 1b. Shared data platforms: Improved data-sharing arrangements enable place-level dependencies to be better understood across stakeholders. 1c. Operational impacts made visible: Businesses can assess how surrounding place conditions affect not just property damage but also downtime and business interruption. Homeowners can collaborate with local government and civil society to ensure the impact on lives and livelihoods (e.g. disruption to worker commutes, access to emergency services) are understood and mitigated.
2 Paying for resilience financing structures that make investment viable 	2a. Making the case investable: Quantifying the return on investment of resilience can help make the business case for place-based investments, which often require innovative financing mechanisms. 2b. Crowding in private capital: Completing the private capital stack with a range of beneficiaries – such as lenders and investors. 2c. Insurance designed for the community: Using insurance as a means to pool disaster risk finance at the place level in cities and communities.
3 Making resilience count recognition that insurers, lenders and investors trust 	3a. A common language for the value of resilience: A common insurability language can ensure that resilience work is documented, using metrics that all parties recognize. 3b. Recognition at the place level: The logic of place-level recognition is simple – shared metrics, certifications or standards, which can be recognized throughout the value chain. 3c. From recognition to insurance outcomes: Links between place-based resilience and insurance outcomes are beginning to emerge, and these can take various forms such as improved terms.
4 Realizing co-benefits aligning incentives across the risk ecosystem 	4a. Recognizing co-benefits to strengthen the business case for resilience: Where return on investment from resilience alone may not be a sufficiently compelling case, recognizing shared co-benefits can address this gap. 4b. Strengthen governance around transboundary risks: Strong governance structures are required to realize co-benefits across borders. 4c. Translating co-benefits into revenue streams: Co-benefits need to be translated and captured in tangible revenue streams.

2.1 Intervention 1: Mapping what matters – risk-decision data for resilient places

This intervention is placed first because the ecosystem depends on it. The challenge is not that place-based risk cannot be quantified but that it is not assessed consistently. Data is fragmented: hazard maps sit with national agencies, drainage records with municipalities, claims experience with insurers and operational exposure with businesses. While some place-based data is incorporated into catastrophe models, the accuracy and granularity with which resilience measures are reflected varies considerably. The result is no shared view of risk: the same asset can be rated low risk by its lender, high risk by its insurer and unrated by its investor. Without a common view of risk, stakeholders cannot align on the resilience measures required or their value. If an underwriter cannot see that a natural flood management scheme protects a property, for example, the investment may go unrecognized in insurance outcomes.

Addressing this requires progress in three connected areas: developing models that can quantify place-based resilience, improved data-sharing across stakeholders and better visibility of not just property damage but also the operational impacts that may follow – because quantifying these can support the business case for action. For each, the report sets out examples of where action is already emerging and where innovation is required.

Action area 1a: Models that reflect place-based resilience

Catastrophe models are the lens through which insurers view a place. However, there are two main challenges. First, while most models capture large-scale defences such as river dykes and coastal flood-wall systems, very few capture community-scale interventions or nature-based solutions effectively. Second, although these place-based resilience measures are static, climate risk is dynamic, and this distinction is not yet applied consistently in risk assessment or pricing. Until that happens, investment in the resilience of a place cannot be fully recognized in the price of insurance.

What is emerging?

In Paradise, California, a coalition set out to address the first challenge by expressing the value of a nature-based intervention in the metrics insurers use to make decisions: average annual losses.

CASE STUDY 1

Incorporating wildfire buffers into models' insurers use

 United States  Wildfire  Suburban semi-rural areas, residential properties

The 2018 Camp Fire killed 85 people and destroyed 90–95% of the structures in Paradise, California, including 11,000 homes, causing \$16.5 billion in total losses and \$12.5 billion in insured losses,²¹ the costliest disaster globally that year. Insurers responded by withdrawing, with non-renewals in California rising 31% in 2019 alone. The withdrawal that followed was not just a pricing failure, it was a signal that the market lacked the tools to assess which properties could be made resilient and which could not.

The Nature Conservancy, working with Marsh Re, a reinsurance broker, gathered granular data about Paradise: which houses were destroyed, property boundaries from public records and how much homes cost to rebuild. They fed this into the insurance pricing model, then tested what happened if they added green spaces and parks around the town's edge designed to slow fire spread. The results:

- These green buffers alone reduced the modelled losses by 27%.
- When combined with modern building codes, which independently reduce losses by a further 20%, the two measures together produced a compounded reduction of around 42%, cutting total modelled losses from over \$10 billion to around \$6 billion.
- That shift could materially improve the risk profile and support more viable insurance outcomes, subject to pricing, market capacity and regulatory conditions.

This analysis demonstrates that incorporating place-based resilience measures into insurers' models can quantify their risk reduction benefits and establish a quantifiable return on resilience investment.



The capability to reflect place-based resilience in modelling therefore exists. What limits its use is not technical capacity but the consistency of demand and the maturity of the evidence base across different contexts. This points to a role for market innovation alongside data vendors as well as public policy. For example, Colorado's HB 1182 regulation, passed in 2025, requires insurers to account for property, community and landscape-scale mitigation in both pricing and coverage decisions, and offers a model other jurisdictions could adopt to incentivize this behaviour.²²

Where innovation is required

Methodologies fit for the decision being made:

Similar to the improvements in catastrophe (CAT) models, place-based risk assessment methodologies can be improved across the property value chain. This includes robust place-based risk assessment for asset managers, with insurability as one indicator of underlying risk, and resilience-adjusted credit analysis for banks. Close collaboration among these actors is required to ensure consistency throughout the property value chain (Intervention 2).

Clarity on what models can be used for and what they cannot: Actors need guidance on the appropriate models and methodologies for specific decisions. Climate and catastrophe models serve

complementary but distinct purposes: portfolio-level hazard screening and financial impact assessment across return periods and pricing or underwriting decisions. However, these models are not designed for site-level or place-based resilience decisions. Engineering analysis is required for that. Using CAT and climate models for site-level resilience produces confident but incorrect answers. Users need clear guidance on which tools fit which decisions: models for portfolio hazard and financial screening; engineering for resilience options analysis.

Action area 1b: **Shared data platforms**

Even where models can accommodate place-based resilience, they depend on data that no single party holds. Hazard maps, claims experience, infrastructure records, planning codes, building design details and exposure data sit with different institutions, and each sees only part of the picture.

What is emerging?

Where insurers, government and the wider value chain share hazard, claims, infrastructure and exposure data, all stakeholders can better understand the risk. Ireland shows both why this is needed and how to design it.

CASE STUDY 2

Designing a national flood-risk data platform

 Ireland  Flooding  High flood-risk zones, all property types

Flooding is Ireland's costliest peril, with recent events causing more than €800 million (\$934 million) in damage. Household insurance penetration is high (about 98% of homes have cover),²³ but flood cover is the exception. Insurers classified entire neighbourhoods as uninsurable based on crude location data. As one parliamentary committee put it: "it is impossible to get flood insurance for a dwelling within 100 metres of a river even if it is an apartment 100 feet off the ground".²⁴ The government built flood defences, but insurers had no reliable means of verifying the standard or effectiveness of those defences, and so did not reflect them in pricing data. A 2014 agreement between the government and the insurance industry was meant to fix this but had little practical effect. The result: the state was investing in protection, and homeowners were not seeing the benefit.

The London School of Economics and Political Science (LSE)'s Grantham Research Institute proposed a national flood-risk data platform for Ireland where all parties contribute what they know and access what they need:

- Government agencies would provide data on flood defences and hazard maps.
- Insurers would provide claims data showing where losses actually occur.
- Lenders, utilities and developers would both use the platform and feed it, because their decisions shape future risk.

Similar platforms already work elsewhere: Austria, Germany, Australia and France all run national flood-data systems that insurers use in pricing. Ireland's version would go further by connecting the entire property value chain in one place.

While the proposal has emerging institutional support, further incentives are needed to operationalize the platform. It has also spurred related innovation. In 2026, Lloyd's Lab partnered with Ireland's Department of Finance on a dedicated flood-resilience programme, with several start-ups developing improved flood-resilience data. The next step is to start sharing it.²⁵

Where innovation is required

Data sharing needs shared infrastructure and standardized formats: Hyperlocal data sharing is needed across the property value chain. Two complementary routes to alignment are emerging: open platforms that give all stakeholders the same baseline data, and consistent standards that make proprietary data comparable even where it cannot be shared. For example, open platforms such as ResilienceArc are beginning to close this gap, giving businesses a free, transparent way to assess their exposure and model operational impacts across perils and regions, so that non-damage losses enter business decisions. Collaboration with organizations such as the Carbon Disclosure Project (CDP), which is expanding its disclosure frameworks to include extreme weather risk and resilience metrics, allows for broader standard alignment over definitions and formats.^{26,27}

Clear governance, updates and common standards for critical datasets: Policy-makers and regulators can provide oversight over who owns, updates, validates and can access critical datasets, alongside guidance on their appropriate use. For example, government hazard maps are often designed to identify danger to life, not estimate property damage; using them for insurance pricing can therefore produce misleading outputs. These maps may also be outdated, reinforcing the need for forward-looking hazard data. A structural tension remains: actors holding the most granular claims and loss data have built their competitive advantage on it, and sharing it carries genuine commercial and legal risk. Without their participation, shared platforms may remain reliant on less precise and current public datasets. Progress requires engagement with reinsurers and catastrophe model vendors to agree on common standards for how place-based resilience is reflected across key datasets.

Action area 1c:

Operational impacts made visible through better business interruption modelling

Physical damage is only part of any loss; the operational disruption that follows is often larger and far less well understood. This is especially true for small and medium-sized enterprises (SMEs), for whom operational impacts can be severe. While organizations are expanding the sophistication of asset-level risk and risk management, they are still under-examining business interruption. Marsh's 2025 Adaptation Survey found that 74%

of businesses experienced physical asset losses or disruptions from extreme weather – yet only 45% are assessing future extreme weather impacts on critical infrastructure dependencies. The gap between experiencing disruption and planning for it remains significant.²⁸

+ What is emerging?

While assessment of business interruption is still not systematic across businesses, one asset class where it is increasingly being considered is data centres. As data centre construction expands to meet growing digital demand, there is an opportunity to build place-based assessment into site selection as well as into business interruption analysis.

CASE STUDY 3

Quantifying business interruption for data centres

 United States  Hurricanes and flooding  Peri-urban areas, commercial data centres

Data centres operate under a critical constraint: uninterrupted service. Assessing physical damage to the facility captures only part of the risk. Business interruption losses can far exceed the cost of repairs – and when the cause of disruption lies outside the facility itself, standard damage assessments may not register a loss at all. A data centre can be engineered to the highest standards and still depend on the place around it: grid power, water for cooling, transport access and network connectivity, which all sit beyond the facility's boundary.²⁹

A technology company with a portfolio of more than \$100 billion in the US engaged an advisory firm to assess extreme

weather risk across its global assets, with a particular focus on data centres, both for climate reporting and to inform future investment decisions. The findings identified flooding as the principal driver of increased value at risk and informed mitigation priorities as well as construction criteria for future facilities.

The analysis illustrates the value of business interruption assessments at the site selection stage, when place-based conditions can still shape the construction decision rather than simply qualify it.



Where innovation is required

Monitoring that keeps pace with conditions:

Risk monitoring needs to become more dynamic. Early signs of what this could look like are emerging from a range of start-ups. For example, one start-up uses existing footage from dashcams, CCTV and drones to build a continuously updated view of roads, drainage and utility conditions – giving insurers a near real-time signal of deteriorating infrastructure that correlates with loss risk. Plain Site, another early-stage example, seeks to embed nature-based flood interventions such as sustainable drainage into the property insurance process, with adaptation plans reflected in the quote. These examples are still at an early stage, but they point to a broader direction of travel.³⁰

Tools that non-specialists can use: Equally important are decision tools that translate technical outputs into practical actions for non-technical users, such as SMEs. This requires collaboration with local governments and civil society organizations, which can provide open access tools most relevant to specific geographies. One example is a platform that provides transparent municipal and government data on place-based resilience,

currently in pilot stage with a place-based risk data provider and the Urban Land Institute. Government-led initiatives such as the United States Federal Emergency Management Agency (FEMA)'s Resilience Analysis and Planning Tool similarly provide high-level publicly available data.³¹

Making non-damage losses visible: Current frameworks focus on physical damage and business interruption, but the wider economic impact often runs deeper and goes uninsured. Research on the 2021 Belgium floods found that while 3,000 firms were directly damaged around 11,000 upstream buyers suffered persistent sales declines lasting for up to three financial quarters, losses that never appeared in an insurance claim. Developing tools that model supply chain dependencies, linear assets disruption (for example, sewage pipes, electricity grids) and financing cost impacts alongside physical risk is essential to make the full business case for place-based resilience visible.³²

Better data does not reduce risk on its own, but it enables what follows: prioritizing investment, building trusted assessments and rewarding resilience through risk transfer. The next intervention builds on this foundation.

2.2 Intervention 2: Paying for resilience – financing structures that make investment viable

This section addresses the crux of the free-rider problem: financing and how the investment case is made.

The value of a resilience investment extends well beyond avoided property damage. It includes wider economic losses that do not materialize – such as prevented healthcare costs or averted costs from transport disruptions affecting workers and residents. From property values that are protected to the co-benefits described in Section 2.4, like biodiversity to national security, the economic case for resilience is well documented: studies indicate that each \$1 invested in adaptation and resilience yields between \$2 and \$10 in benefits, with a recent analysis of 320 investments across 12 countries estimating returns of more than \$10 over a 10-year period. Notably, a substantial share of this value arises whether or not a disaster occurs.^{33,34}

The free-rider challenge, however, is not the return itself but its capture. The benefits are distributed among homeowners, businesses, insurers, lenders and governments, and accrue over decades, while the costs are concentrated and immediate. Those who pay are rarely able to capture the majority of the value they create. Financing structures are needed to address this by bringing the beneficiaries of an investment together into instruments that fund it.

Action area 2a:

Making the case investable

The first obstacle is that resilience does not present itself as an investable proposition. Its value is real, but it is spread across many parties and arrives over many years.

What is emerging?

Before capital moves, the diffused value of resilience has to be captured. Mechanisms for this are multiplying. Resilience improvement districts, emerging in US states such as Connecticut, ringfence a defined area so that the uplift in property values and tax base created by resilience investment helps pay for it. OneShoreline, the San Mateo County resilience district in California, plays a similar gathering role for coastal protection, connecting municipalities with private capital for engineered and nature-based flood reduction.³⁵ And the Milken Institute's 2026 Financial Innovations Lab has mapped the blended structures that make residential resilience financeable, including state revolving loan funds and resilience lending through community development financial institutions, which reach households but are often overlooked by conventional lenders.³⁶ Lenders themselves are also beginning to build climate risk and resilience into credit decisions.



Where innovation is required

Bringing lenders into resilience finance:

Mortgage lenders and retail banks have the longest financial relationship with any property, often 25 years or more, yet they play a limited role in funding resilience today. Examples show what is

possible where climate risk enters credit evaluation directly, but these remain exceptions rather than standard practice. There is an opportunity to explore loan terms that recognize documented resilience measures and closer data sharing between lenders and insurers so that both view the same risk in the same way.

CASE STUDY 4

Embedding physical climate risk and resilience into corporate lending



Egypt



Multiple perils



Multiple geographies, commercial properties and critical infrastructure

When climate risks remain unpriced in lending decisions, corporate borrowers cannot justify adaptation investments that protect cash flows and operations. Commercial International Bank (CIB), Egypt's largest private-sector bank, is embedding physical climate risk into credit evaluation through an integrated environmental and social risk management (ESRM) system paired with blended climate finance. Key elements include:

- Translating climate risk into credit metrics using heatmap-based methodologies that capture sector vulnerabilities and geographic exposure in ESG risk scoring.
- Identifying and financing targeted resilience investments validated against climate scenarios.
- Structuring blended finance through the Climate Finance Program, with support from PROPARCO, a development

finance institution owned by the French Development Agency, and the Green Climate Fund, a United Nations organization based in South Korea, for interventions including greenhouse systems with drip irrigation (\$5.2 million), port wave-breakers (\$25.5 million) and wastewater treatment manufacturing (\$4 million).³⁷

- Establishing a “brain trust” governance mechanism, including the CIB, clients, development finance institutions and technical partners, to validate project designs and risk assessments.

To scale beyond pilots, the approach requires access to blended and development finance, granular physical risk data infrastructure capturing client asset locations of the kind described in Section 1.1 and continued investment in translating climate risk into standardized credit metrics.

Resilience districts as a vehicle for asset

owners: The resilience district concept introduced earlier in this section also offers a route for private actors. Asset owners and managers could engage with business improvement districts and similar structures to explore how resilience measures might

be funded collectively at district level, allowing the owners who benefit from a safer place to contribute to creating it. The California Forward Resilience District Incubator, launched in 2025, offers an early model for how this can be structured.

CASE STUDY 5

Building the template for resilience districts

 United States  Multiple perils  Municipalities and local governments, California and Connecticut

California's Senate Bill 852 (2022) authorized the creation of resilience districts, giving communities a legal mechanism to pool funding across beneficiaries and invest collectively in long-term risk reduction. To translate that into practice, California Forward and Resilient Cities Catalyst launched the Resilience District Incubator in 2025, selecting five pilot communities in California and Connecticut, including the City of San Rafael, the County of Los Angeles and the City of Bridgeport.³⁸

The incubator provides each community with technical assistance, peer learning and expert input from advisers spanning finance, insurance and risk modelling. The funding mechanisms available to districts include tax increment financing, benefit assessments, resilience bonds and grants, with the right combination determined by local fiscal context and institutional relationships.

The following key design features make it work:

- A defined geographical boundary that captures the beneficiaries of resilience investment.
- Multiple funding levers pooled into a single vehicle, reducing reliance on one-off grants.
- Technical and governance support to move communities from concept to being investment-ready.
- An advisory group spanning insurers, lenders and risk specialists to validate project design.

The model is still in its pilot stage, but it provides a replicable template for how communities can move beyond one-time funding towards stable, long-term financing for place-based resilience. The next step is demonstrating that private asset owners within district boundaries can be active contributors, not just beneficiaries.

Action area 2b:

Crowding in private capital

Public funding alone cannot meet the scale of investment that place-based resilience requires. Private capital is available, but it requires what any investor needs: a defined return, a measurable outcome and a credible counterparty. The challenge is structuring resilience interventions so that they offer all three.

What is emerging?

Not all resilience projects generate an obvious revenue stream, and structuring the investment case is a challenge. The Southeast Asia Partnership for Adaptation through Water (SEAPAW) examined how to scale private finance for climate adaptation in South-East Asia, and identified six approaches to address this: creating a direct revenue stream where possible; capturing land value uplift; strengthening core business operations; aggregating projects into investable portfolios; matching risk-return profiles to different forms of capital; and unlocking performance-based financing through robust impact measurement frameworks. In practice, several of these approaches are beginning to take shape.³⁹

The Flood Action Coalition in the UK is exploring this area, in collaboration with an anchor partner that has a direct attributable return on investment (ROI)

which can be attached to resilience investments. In this case, a water company that benefits from flood resilience can fund a percentage of the initial investment, thereby crowding further external funding. A similar structure was used in financing the Stormwater Management and Road Tunnel (SMART) in Kuala Lumpur, Malaysia, a dual-purpose tunnel that under normal conditions functions as a motorway but during heavy rainfall diverts storm-water away from the city centre. The tunnel was financed via a public-private partnership (PPP), with the federal government funding approximately \$342 million (the storm-water component) and a corporate joint venture financing the remaining \$163 million (the highway component) via equity and debt financing.⁴⁰ These examples illustrate how the investment case can be structured around direct beneficiaries, but much work remains, and even when PPPs successfully finance upfront capital, the associated operational expenditure is often not built into business models.

Another approach is risk-pooling: aggregating the exposures of many communities or cities creates portfolios large and diversified enough to attract private insurance and reinsurance capacity, often supported by public funds that cover what the market alone will not.

CASE STUDY 6

City-scale risk-pooling through the Urban Infrastructure Insurance Facility (UIIF)

🌐 Latin America and the Caribbean 🌐 Multiple perils 🏙️ Urban areas, critical infrastructure

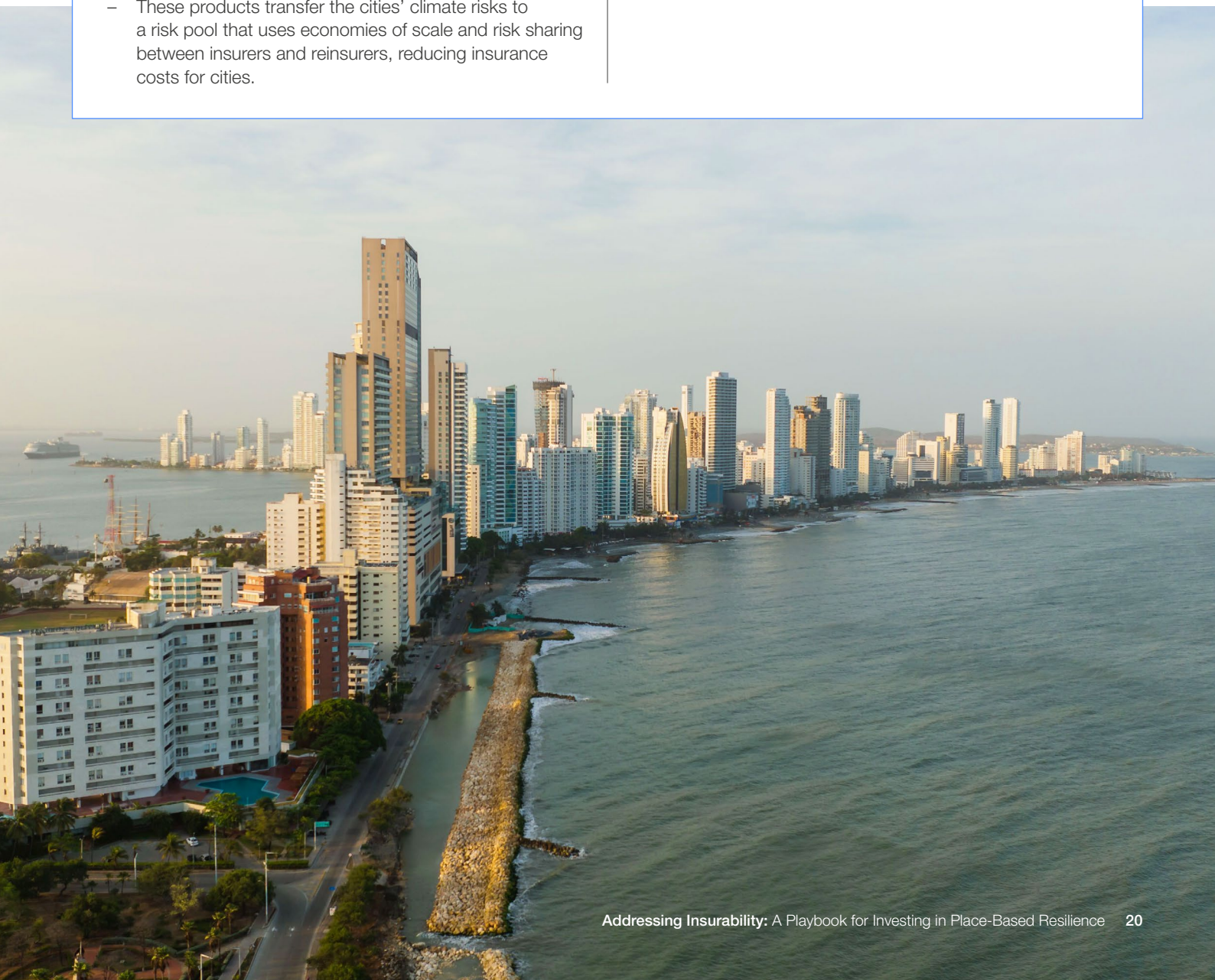
About 70% of cities in Latin America and the Caribbean face high risks from natural hazards and extreme weather events that can damage critical infrastructure and disrupt the lives of residents. Individually, many of these cities find insurance difficult to access or afford, and few have reliable funding available for recovery when a disaster strikes. The Urban Infrastructure Insurance Facility was established to address this gap. It is financed by the KfW Development Bank on behalf of the German government and implemented by the International Council for Local Environmental Initiatives (ICLEI)–Local Governments for Sustainability,^{41,42,43} as a contribution to the InsuResilience Global Partnership.⁴⁴

Ten selected cities undertook a risk assessment of their key assets and areas, which informed insurance coverage tailored to their specific needs. Cities were also provided with a detailed review of their adaptation and disaster response and recovery capabilities, alongside a set of recommendations to strengthen these areas and highlight where risk transfer gaps remain.

- These products transfer the cities' climate risks to a risk pool that uses economies of scale and risk sharing between insurers and reinsurers, reducing insurance costs for cities.

- After extreme weather events, cities benefit from rapid access to the pool's financial resources to rebuild critical infrastructure and help vulnerable residents cope with the impacts.
- Implementation follows a seven-stage roadmap covering city screening and selection, urban risk assessment and capacity development.

The facility aims to provide tailored insurance coverage worth €100 million (\$117 million), protecting at least 7.5 million people in participating cities. As implementation progresses, its experience can offer a tested template for other regions: the risk assessment methodology, the pooling structure and the seven-stage roadmap are all designed to be replicable. While the fund provides resources to rebuild, it is important that infrastructure is built back better and more resiliently. Existing and new risk pools elsewhere could draw on this model when considering how to extend coverage to critical urban infrastructure and vulnerable residents.



74%

of small businesses globally are underinsured.

Where innovation is required

Municipal financing vehicles for resilience:

Municipal resilience projects rarely pay for themselves through a single source of funding, and financing is typically assembled deal by deal, which is slow and puts such projects beyond the reach of most municipalities. There are several opportunities to strengthen how such vehicles are designed. These include pre-disaster resilience financing, where structures release capital for risk reduction before an event occurs – for example, through instruments that reward municipalities as they reach agreed resilience milestones. They also include more replicable blended vehicles, combining government grants, low-cost loans from public or development banks and private investment in standardized structures that, once developed in one municipality, can be adopted elsewhere rather than rebuilt from scratch. Other approaches are likely to emerge as this area develops.

Action area 2c:

Insurance designed for the community, not the individual

If households and businesses are uninsured or underinsured this can prolong local disruption and delay wider community recovery in the wake of an extreme weather event. Globally, there is a protection gap issue. Around 14% of US homeowners have no cover at all, a figure that rises to over 90% in low-income Asian economies, while 74% of small businesses globally are underinsured.^{45,46,47}

What is emerging?

Community-based catastrophe insurance addresses the protection gap issue. A single institution that represents the place (a community organization, municipality or homeowners' association) arranges a single policy covering many households at once. This gives the community better negotiating power, lower cost per household and the ability to link cover directly to local risk reduction. A pilot in New York City provides the most developed application of this model to date.

CASE STUDY 7

Community-based catastrophe insurance (CBCI)

 United States  Flooding  Urban areas, residential properties

Conventional insurance fails those who need it most: only ~42% of global economic damage caused by natural catastrophe events is insured.⁴⁸ Low- and moderate-income households in New York City's flood-exposed neighbourhoods are hit hardest and recover slowest: they hold few savings and are often unable to access post-disaster loans, while federal assistance arrives late or not at all. A 2021 framework developed by Marsh Re with the Wharton Risk Center set out an alternative: community-based catastrophe insurance (CBCI), in which a community institution arranges cover on behalf of its members.⁴⁹

In March 2023, the framework became reality. The Center for NYC Neighborhoods, a housing non-profit, purchased a parametric flood cover in partnership with the NYC Mayor's Office of Climate and Environmental Justice, the Environmental Defense Fund and SBP, a national disaster relief and resilience organization founded in 2006 in response to Hurricane Katrina.

- When flooding in pilot neighbourhoods exceeds a preset threshold, measured through satellite imagery, ground sensors and even social media images, the insurer pays the Center directly.
- The Center then distributes emergency grants of up to \$15,000 per household, up to \$1.1 million in total, within days rather than months.⁵⁰
- The funding for the development and implementation of this cover in year one was provided by the US National Science Foundation.

The pilot was designed as a blueprint for replication, but its success depends on trusted community institutions with established local networks. A key challenge remains sustainable funding: NGO and municipal budgets are not structured to sustain insurance programmes over time. Replication will therefore require funding mechanisms such as resilience levies, blended finance vehicles or embedding the premium cost within broader municipal resilience budgets.

Where innovation is required

Community insurance across markets:

The community-based model is relevant wherever individual insurance take-up is low. Civil society organizations play a key role as trusted intermediaries between insurers and the communities they serve.

Communities, insurers and local governments could explore adaptations suited to their own institutions and regulatory settings, and initiatives such as the Insurance for Good Solutions Catalyst – which partners with communities, non-profits and the public sector on innovation in risk transfer – offer a starting point for identifying partners and existing solutions.

2.3 **Intervention 3: Making resilience count – recognition that insurers, lenders and investors trust**

Even when resilience interventions exist, there is no single source of truth that tells an investor what a resilience investment is worth, a lender what covenant to attach or an underwriter how to price a protected asset. That translation requires recognition of metrics and frameworks to convert resilience work into something on which the market can act collectively.

Here the difference between assets and places matters. At the asset level, certifications, ratings and standards work because one owner controls the asset and can make the relevant improvements. One leading example is the Insurance Institute for Business and Home Safety (IBHS) FORTIFIED Roofs programme. This is a US-based independent, voluntary building standard for weather-resilient roofs, above and beyond local building codes, which is increasingly being linked to insurance outcomes. For example, in the United States, the North Carolina Insurance Underwriting Association has issued catastrophe bonds with an embedded resilience feature, in which a portion of the bond is set aside to fund wind-resistant roofs consistent with IBHS FORTIFIED standards, so that the capital raised to absorb losses also funds their reduction. Flood Re's Flood Performance Certificates in the United Kingdom offers another early model for what this could look like in practice at the asset level.

Implementing something similar for a surrounding area is much more complex: a place has no single owner. Place-level recognition therefore attaches not to the assets within a place, but to whoever governs it: a homeowners' association that governs a housing community, a developer that masterplans a neighbourhood, a municipality that sets codes and maintains drainage systems. A manufacturing facility cannot certify its watershed, but it benefits when the authority manages the watershed based on recognized metrics. This distinction shapes

everything in this section, and it is why the language here is deliberately one of recognition rather than of standards or certifications.

Closing that gap requires progress in three areas: a common language for the value of resilience, recognition systems that operate at the level of the place and a reliable link from recognition to insurance outcomes. For each, the report sets out what is already emerging and where innovation is required.

Action area 3a:

A common language for the value of resilience

Today, the same resilience work is described differently by different stakeholders. An engineer documents a drainage upgrade in technical specifications, a property developer sees it as part of site design and delivery, a local government may view it as part of area-level flood management, an insurer assesses it through a catastrophe model, an investor sees a line of capital expenditure (CapEx) and a lender may not see it at all. Nothing connects these views, so a single resilience investment is valued differently by everyone who looks at it and often it is not valued at all.

What is emerging?

A common language would address this: resilience work is documented once, using a framework with metrics that all parties recognize, so that an upgrade specified by an engineer becomes a risk reduction an underwriter can price, a resilience measure a local government can support, a feature a developer can evidence or a value an investor or lender can bank. There are some pilots emerging in this area.



CASE STUDY 8

Capturing the value of coastal wetlands through Blue Carbon Resilience Credits

 Caribbean  Flooding  Marine ecosystems, natural assets

Mangroves, seagrasses and salt marshes provide multiple benefits, including a protective barrier against incoming coastal storms. Yet the resilience value of these ecosystems is often not captured across financial actors. Blue Carbon Resilience Credits⁵¹ are being developed to address that gap by recognizing both the carbon and flood-reduction benefits of protecting and restoring coastal wetlands. The challenge is creating a recognized financial value for the resilience benefits of coastal wetlands that can be recognized by actors across the finance ecosystem.

The Ocean Risk and Resilience Action Alliance (ORRAA) partners with The Nature Conservancy and AXA XL, an insurance company, to create Blue Carbon Resilience Credits for mangrove ecosystems in the Caribbean. The aim is to allow corporations to offset their carbon footprint while also supporting resilience by reducing flooding in highly vulnerable coastal areas through wetland conservation and restoration.

- Based on a pre-feasibility study across two sites covering 10,000 hectares of mangroves, ORRAA estimates that restoring these sites could avoid more than \$140 million a year in property damages and reduce flood risk for more than 750 people.
- The Nature Conservancy is now working with local partners to establish a recognized baseline for the project, including updated mangrove site maps, and is examining blended finance mechanisms that bring actors together to scale additional projects.

Blue Carbon Resilience Credits now need to be adopted by additional actors to scale the initiative across additional sites.

Where innovation is required

Application to other perils: The resilience credits offer an approach that could be extended to other perils. Excessive rain may be particularly well suited to this: municipalities typically hold information on drainage capacity, which could support the development of comparable metrics for surface water resilience, thereby incentivizing further investments.

Action area 3b: Recognition at the place level

The logic of place-level recognition is simple: rate the place once and reward everyone in it. It is already working wherever someone governs the place.

What is emerging?

In the US, IBHS's Wildfire Prepared Neighborhood designation certifies risk reduction across communities, with homebuilder KB Homes' Dixon Trail development the first to earn it, extending recognition beyond individual homes to community-scale wildfire mitigation. Similarly, Australia's Bushfire Resilience Rating gives households a recognized preparedness score that insurers can reflect in pricing. The longest-established example of this model is the Community Rating System (CRS) under the US National Flood Insurance Program (NFIP), which rewards communities for coordinated flood-plain management and creates insurance benefits for residents across a municipality.

CASE STUDY 9

Community-level flood ratings through the US Community Rating System

 United States  Flooding  High flood-risk areas, residential properties

Individual homeowners cannot manage risk on a flood-plain. The choices that matter most – where to permit building, how to maintain barriers and how to warn residents – sit with the municipality. Yet for decades there was no mechanism that rewarded a town for making those choices well. FEMA created the Community Rating System (CRS)⁵² in 1990 under the National Flood Insurance Program (NFIP) to reward coordinated flood-plain risk management.

Municipalities earn points across creditable activities spanning public information, mapping, flood-damage reduction and warning systems, and are scored from Class 10 to Class 1. Around 1,500 communities participate, with key features being:

- Premium discounts linked to every step up the scale, reaching 45% at Class 1 for eligible policyholders.

- Collective incentives by design: residents benefit only when their local government acts, so residents lobby for public investments that reduce community-level risk.

Tulsa, Oklahoma, shows the system at its best: after a flood killed 14 people in 1984, the city spent four decades converting its flood-plain and upgrading storm-water systems, earning a Class 1 rating in 2022 and the maximum discount for its residents.

Thirty-five years of evidence make the CRS a good example for place-level recognition, yet no equivalent exists in most markets worldwide. There is an opportunity to develop similar models in other countries and to extend its logic to other perils.

Where innovation is required

Developing place-based recognition in other regions: The CRS demonstrates that rating a place and rewarding its residents works. There are opportunities to adapt the model for other countries and perils, and it is something both existing and new natural catastrophe risk pools could consider incorporating into their design.

Interoperability of existing rating systems:

For existing systems such as wildfire ratings, mutual recognition among national schemes – for example, the Insurance Institute for Business and Home Safety (IBHS) Wildfire Prepared and Australia's Bushfire Resilience Rating – would further support consistent assessment of portfolios that span countries, supporting global asset managers and investors.

Action area 3c: From recognition to insurance outcomes

Recognition links back to insurability only if it changes what happens at the point of risk transfer. A designation that does not move price, coverage, deductibles or availability has no insurance market value, however rigorous the assessment behind it.

What is emerging?

Recognition matters only if it changes insurance outcomes, and this link is now forming. Some insurers are offering policyholders in wildfire-prone

areas a discount on the catastrophe portion of their premium for earning the IBHS wildfire designation, while some carriers in high-risk areas are not willing to underwrite uncertified homes. Explicit guidance that encourages resilience recognition by insurers and investors are being explored by agencies such as the Federation of European Risk Management Associations (FERMA)'s Open Sesame initiative launched in May 2026 to develop a dedicated climate resilience financing framework.⁵³ Regulators can play an enabling role in formalizing recognition frameworks. Insurers are also taking the lead in some cases. For example, after flood-related losses at a vehicle storage yard in Japan, an insurer assessed the site's resilience and recommended raising ground levels. The case informed government guidance for coordinated port resilience planning.

Where innovation is required

Linking certification to commercial property insurance outcomes:

Links between recognition and insurance outcomes are beginning to emerge in the residential sector, but these remain limited on the commercial side. There may be an opportunity to connect existing certifications through commonly recognized frameworks. Examples at the asset level, such as the Marsh Carlyle Investing in Resilience Framework,⁵⁴ can provide inspiration for place-based innovation.

2.4 Intervention 4: Realizing co-benefits – aligning incentives across the risk ecosystem

Place-based resilience interventions generate co-benefits that go far beyond traditional return on investment calculations. A flood defence that reduces insured losses also recharges groundwater, supports biodiversity net gain and protects a tax base. A nature-based solution deployed as a wildfire buffer can sequester carbon, have recreational benefits and act as a biodiversity habitat alongside the loss reduction that first justified it.

These co-benefits are often the primary benefits that actors, especially public actors, are trying to solve, such as an improved tax base or meeting national security objectives. This highlights a key opportunity: aligning incentives across the risk ecosystem to capture value beyond resilience. While the return on investment of resilience alone may not provide a compelling case for any single actor (as explored in Sections 2.2 and 2.3), recognizing these wider co-benefits can help close that gap.

Doing so requires progress in three connected areas: coalitions that solve for co-benefits holistically, collaboration that can span administrative boundaries and routes to convert co-benefits into revenue streams. For each, the report sets out what is already emerging and where innovation is required.

Action area 4a: Solving for co-benefits holistically

What is emerging?

The most compelling examples of coalitions are those that start with a place rather than a peril, asking what the full value of investing in that place could be. In Shropshire, United Kingdom, a water management scheme is bringing together farmers, water utilities, local authorities and the environmental agency around a single catchment, aligning environmental stewardship payments, flood-risk reduction and water-quality improvement into a single programme. No individual participant could have funded or justified the full intervention; together, the coalition could. Singapore's approach to urban water management – designing city infrastructure as a sponge that retains, cleans and releases water – demonstrates the same principle at city scale: what began as a water security strategy has generated multiple co-benefits by reducing urban flooding, creating a biodiversity corridor and generating public health benefits simultaneously.



CASE STUDY 10

A whole-catchment approach with natural flood management benefits

 United Kingdom  Flooding  Rural areas, all property types

The Severn Valley suffers average annual losses of ~£150 million (\$205 million) from flooding, and the River Severn has recorded some of its highest levels in decades in the past seven years alone. Modelling shows that up to 100 million cubic metres of water will need to be stored during large flood events – equivalent to 11 days of the United Kingdom's water supply – to better protect more than 3,000 homes and businesses at risk. The catchment spans two nations (Wales and England) with different regulators and funding regimes, and the scheme envisages up to £1 billion (\$1.3 billion) of investment, far beyond public grant funding alone.

Jointly led by the national Environment Agency, Shropshire and Powys Councils and Oliver Wyman, the Severn Valley Water Management Scheme is the flagship project of a wider cross-border partnership treating catchment-scale resilience as a driver of regional growth.⁵⁵ The emerging design combines more than 25,000 nature-based interventions with engineered water storage, aimed at managing a one-in-100-year flood with an allowance for impacts of future climate change. Early delivery is already under way: more than 140 natural flood management measures – leaky dams, ponds and wetlands – have been installed upstream. The coalition is now working with beneficiaries of the risk reduction – from insurers and developers to farmers and government – to identify channels for funding the scheme. Once completed, the scheme is expected to support up to £5 billion (\$6.8 billion) in wider economic impact.

The coalition is exploring several routes to close the funding gap:

- Green finance as an established starting point – carbon credit sales and Biodiversity Net Gain (BNG) units.
- Working with large infrastructure operators across rail, water, energy and highways to jointly shape the scheme around their own resilience needs, capturing the value that catchment-scale risk reduction offers assets that would otherwise be exposed to flooding.
- Wider mechanisms targeted at businesses and communities in the local economy, explored through the Marches Forward Partnership (a cross-border alliance of four councils seeking trailblazer green growth status for the Welsh Marches along the border between England and Wales) – including regulatory freedoms and investment zone status.

Together, these routes sit alongside blended public and private finance, with the mix still to be confirmed.

The priority now is turning these routes into firm commitments: resolving free-rider risk among beneficiaries, securing insurer participation and confirming which mechanisms and investors will anchor the model. Lessons from this process are intended to inform how similar catchments could be financed elsewhere.

Where innovation is required

Making the national security and productivity

case: The economic arguments for resilience investment most often cited are insured loss avoidance and property value protection. Other arguments – including supply chain protection, fiscal revenue stabilization and maintaining labour productivity – are less quantified in ways that reach central governments and treasury departments. Developing that evidence base would unlock a scale of co-investment currently absent from most coalitions. This also requires greater ownership and advocacy on behalf of the coalition from local government actors.

Action area 4b: **Governing transboundary risk**

Many of the perils most material to place-based resilience – river flooding, excessive rain, coastal storm surges, wildfires – do not respect administrative boundaries. A coalition that operates within a single municipality cannot manage a risk

that originates upstream in a neighbouring jurisdiction or across an entire catchment area.

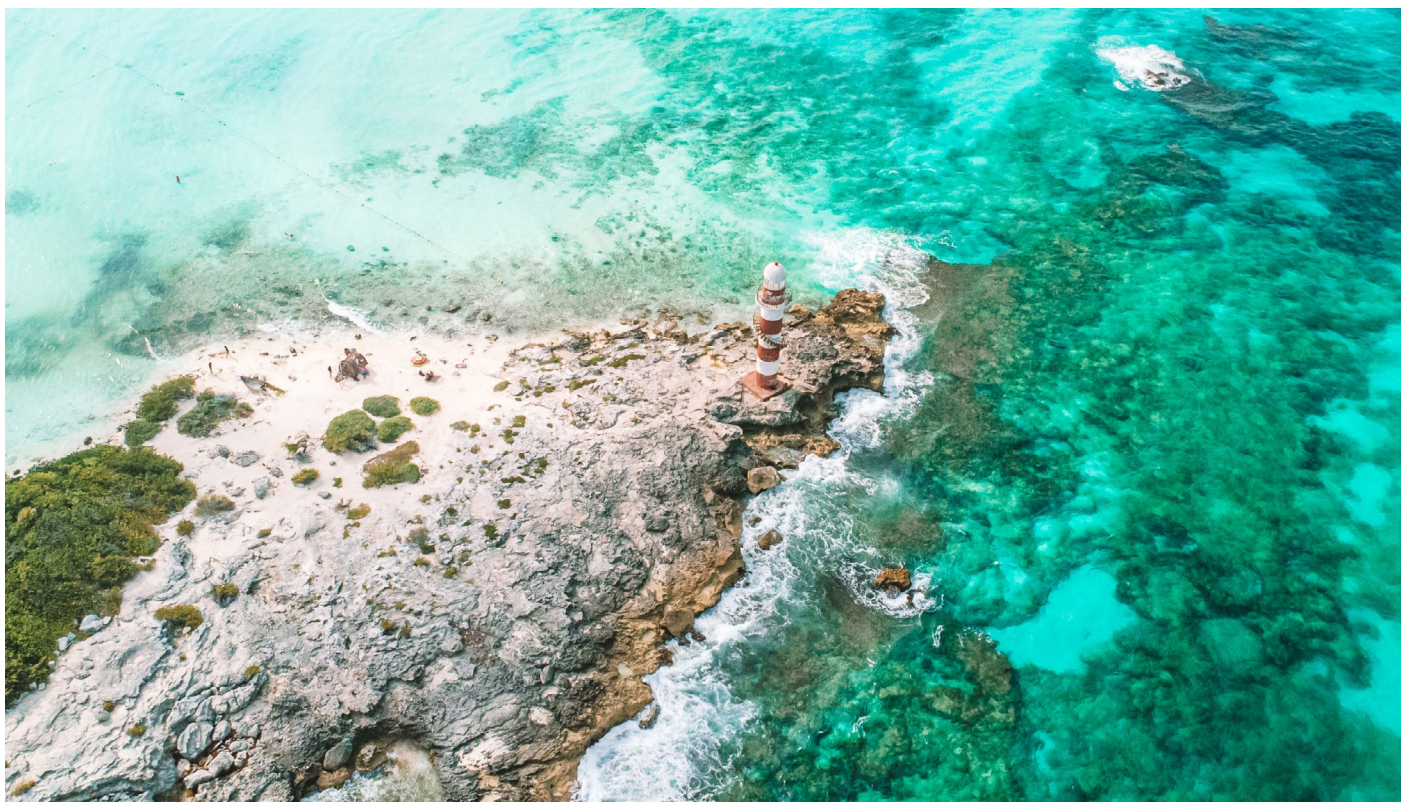
What is emerging?

Building effective coalitions for transboundary risks requires partnerships that cross those boundaries. The Mississippi River Cities and Towns Initiative – a non-partisan initiative that brings together mayors from across the river basin to coordinate on flood risk and economic resilience – illustrates both the potential and the difficulty: shared interest is visible, but shared decision-making requires sustained political will.⁵⁶

Where innovation is required

Governance frameworks for transboundary

coalitions: The hardest design question for transboundary coalitions is how costs, benefits and decision rights are to be shared across jurisdictions. The river basin and coastal coalition examples in this section have each had to solve this problem from scratch. There is an opportunity to develop replicable collaboration templates, drawing on water law, watershed management and municipal finance



precedents, and make the structure more straightforward for capital markets and insurers who might want to participate.

Action area 4c: Converting co-benefits into revenue streams

For a coalition to act on shared value, that value has to reach the parties that create it, as covered in Section 2.3. Where this becomes challenging is with benefits that are harder to quantify, such as national security or improved public health. One area ripe for innovation is the shared value of natural systems.

What is emerging?

When it comes to ecosystem resilience, a coalition that generates measurable water-quality improvement, biodiversity gain or carbon sequestration alongside risk reduction can in principle monetize those outcomes through established and fast-emerging environmental markets (for example, voluntary carbon markets, Biodiversity Net Gain credits in the United Kingdom or payments for ecosystem services). From an insurer perspective,

AXA and SCOR⁵⁷ have explored insurance products designed around nature restoration, where the insured asset is the ecosystem itself and the policy incentivizes the ongoing management that keeps it functioning as a risk buffer. The principle is replicable wherever a natural system performs a protective function that can be measured, verified and credited. Similar initiatives have been piloted, such as the Quintana Roo Reef Protection programme in Mexico, which is a parametric product financed by coastal property owners and the tourism industry, who pay fees into a trust that goes towards coral reef restoration.^{58,59}

Where innovation is required

Testing co-benefits across insurable and non-insurable perils: Addressing an extreme weather risk that directly ties back to property insurance (for example, flood, wildfire) frequently generates co-benefits for chronic extreme weather risks that are harder to insure, such as urban heat, water scarcity and air quality. As these risks become more material for stakeholders, especially asset owners in cities, there is an opportunity to structure pilots that explicitly link interventions across both acute and chronic risks, building a broader evidence base for the overall value of resilience.

3

Stakeholder engagement in different action areas

Resilient places require collaborative action across a wide range of stakeholders.



Section 1 of this playbook highlighted a clear challenge: current approaches are often constrained by fragmented data, low interoperability of metrics, underdeveloped financing structures and poor alignment of incentives and benefits across stakeholders. If place-based resilience is to shape real-world outcomes, it requires practical action across the four interventions identified in Section 2. The recommendations in this section provide a summary by role of needed actions, with Table 4 providing a more detailed look at each of the four interventions.

Insureds, businesses and homeowners need to integrate place-based physical risk into core decision-making rather than treat it as an insurance issue alone. For businesses, understanding how surrounding place conditions affect damage, downtime and business disruption can inform better decisions on site selection, capital allocation and operational resilience. For homeowners, having this information directly impacts human safety and daily activities during extreme weather, as well as having broader financial impacts such as mortgage and insurance affordability and property values.

Property value chain stakeholders (for example, engineers, architects, developers, resilience service providers) are ideally positioned to embed place-based risk into design, procurement and investment decisions. By collaborating with insurers, data providers and civil society, they can ensure that resilience interventions deliver measurable co-benefits while improving insurability and project bankability.

Local governments can convene stakeholders, strengthen public risk data, provide resilience guidelines, align planning and infrastructure decisions and create conditions to crowd in private investment. While they play a key role in resourcing, it is important to note that financing typically requires public-private partnerships, especially for large-scale resilient infrastructure projects. Clearer ownership and delivery mechanisms, improved data sharing and well-defined governance for how critical datasets are updated and accessed would give the market the certainty it needs. Moreover, building the evidence base for wider economic and social value and designing blended finance and cross-boundary governance models could unlock resilience investment at scale.

Asset owners and managers are well placed to integrate place-based resilience into acquisitions, leasing, financing and asset management decisions. They are critical players in advocating for how important place-based resilience is for the economic success of an area, which can then inform a local government's ROI thesis. In practice, collaborating with local partners and using place-based evidence in conversations with builders, lenders, insurers and tenants could help test – and ultimately demonstrate – how resilience interventions affect value, financing conditions and insurance outcomes.

Infrastructure owners and operators, such as water and energy companies, are custodians of critical systems that underpin community resilience and economic productivity. By adopting place-based risk assessment, investing in redundancy and adaptive infrastructure and sharing operational data with regulators and insurers, they can reduce systemic vulnerabilities while building trust with stakeholders. Their participation in resilience coalitions directly protects communities from cascading service failures and enables better insurance and investment decisions.

Investors and banks can help scale place-based resilience by incorporating place-based dependencies into due diligence, credit analysis and valuation, while also supporting financing mechanisms that mobilize capital. Supporting verification approaches that recognize co-benefits across nature and society would also broaden the investable universe.

Insurers and the wider insurance community have a major role in translating place-based resilience into financial signals. Insurers, reinsurers, brokers and modellers can help ensure that local resilience conditions are better reflected in underwriting, pricing and new forms of risk transfer. Reinsurers typically have less granular data but may want to consider how they can incorporate resilience into pricing and risk.

Data providers can improve catastrophe models, so they capture place-based dependencies and resilience measures. Better metrics, shared methodologies and interoperable systems are needed if place-based resilience metrics are to be used consistently across actors.

Civil society organizations can unlock community engagement and be trusted local delivery partners in coalitions. They can help ensure that place-based resilience measures are practical, inclusive and credible.

Regulators and policy-makers (for example, supranational, national) including financial regulators, are critical enablers of place-based risk management at scale. By mandating standardized metrics, supporting data infrastructure and creating formal coalition frameworks, they can drive consistent adoption across the financial and property sectors while ensuring local communities benefit from resilience investments. Their role is to reduce fragmentation and create a policy environment in which place-based risk becomes standard practice. Insurance market regulators can ensure that price signals remain clear: recognition of resilience only supports availability and affordability where insurance pricing can reflect both reduced risk and remaining residual risk.

TABLE 4 | Suggested stakeholder engagement in different action areas

Stakeholders	Interventions			
	1. Mapping what matters – risk-decision data for resilient places	2. Paying for resilience – financing structures that make investment viable	3. Making resilience count – recognition that insurers, lenders and investors trust	4. Realizing co-benefits – aligning incentives across the risk ecosystem
 Insureds (businesses, homeowners)	<i>Businesses:</i> Assess how surrounding place conditions affect property damage, downtime and business disruption and participate in local coalitions and data-sharing arrangements so that place-level dependencies are better understood. ➔ See Case study 1 <i>Homeowners:</i> Access publicly available hazard maps such as flood maps to understand the future extreme weather risk your home may face.	<i>Businesses and homeowners:</i> Collaborate with local resilience partnerships, business improvement districts or resilience districts. ➔ See Case study 5	<i>Businesses:</i> Integrate place-based risk into CapEx planning, site selection and operational resilience decisions. <i>Homeowners:</i> Follow guidelines by public schemes to undertake resilience measures that are recognized by insurers. ➔ See Case study 9	<i>Businesses and homeowners:</i> Monitor and report on co-benefits realized (e.g. water-quality improvement, biodiversity gain) to attract impact investors and advocate for increased local government investment in the community.
 Property value chain stakeholders	Embed resilience specifications and whole-life cost modelling into project briefs and procurement documents, so that the investment case for resilience measures is legible to lenders, insurers and public funders from the outset of a project. Property value chain actors can leverage the insurance industry's cost-of-risk tools to do this. Participate in open data ecosystems and monitoring systems so design outcomes are informed by up-to-date risk data and resilience interventions feed back into catastrophe models.	Collaborate with communities and insurers to map co-benefits (heat, water, biodiversity, social resilience) into project design and justify government investment.	Integrate standardized place-based risk metrics into site assessment, design standards and urban planning workflows. ➔ See Case study 1	N/A
 Local governments	Strengthen data sharing with insurers, businesses and infrastructure operators. ➔ See Case study 2	Enable funding models that help public resilience investment improve place-based outcomes. Design blended finance vehicles and other co-investment structures for municipal-scale resilience projects. ➔ See Case study 5	Support shared place-based guidelines, standards and resilience baselines. Establish governance for who owns, updates, validates and can access critical risk datasets.	Develop governance frameworks for transboundary resilience coalitions. Identify clear ownership and delivery mechanisms and make the co-benefit case for place-based resilience. ➔ See Case study 10
 Asset owners and managers	Require resilience considerations in acquisitions, leases, financing and development decisions. ➔ See Case study 3	Participate in financing mechanisms such as resilience improvement districts that test how local resilience interventions affect asset value, financing conditions and insurance outcomes. ➔ See Case study 5	Use place-based evidence to engage lenders, insurers and tenants more effectively	Collaborate with neighbours, local authorities and non-governmental organizations (NGOs) to design and implement place-based interventions (watershed management and nature-based solutions) that amplify co-benefits. ➔ See Case study 10

	1. Mapping what matters – risk-decision data for resilient places	2. Paying for resilience – financing structures that make investment viable	3. Making resilience count – recognition that insurers, lenders and investors trust	4. Realizing co-benefits – aligning incentives across the risk ecosystem
 Infrastructure owners and operators	Integrate place-based risk assessment into infrastructure upgrades and new investment planning cycles. → See Case study 10	Invest in nature-based solutions and other place-based interventions that reduce exposure to multiple perils over time. → See Case study 10	Share operational and resilience data with regulators, insurers and civil society to improve dynamic risk monitoring.	Collaborate with local authorities and communities to ensure infrastructure investments align with place-based resilience priorities and deliver co-benefits.
 Investors and banks	Incorporate current and future place-based physical risk into portfolio analysis, asset valuation and asset-level due diligence. → See Case study 4	Participate in resilience financing, including resilience covenants, lender-insurer data sharing and resilience-linked lending structures. Help design blended finance vehicles and resilience bonds that can crowd in capital at municipal or community scale. → See Case study 4	Share operational and resilience data with regulators, insurers and civil society to improve dynamic risk monitoring.	Use co-benefit verification approaches that allow resilience investments to support broader nature and social objectives. → See Case study 8
 Insurers	Use risk-score products that allow aggregated quantitative comparisons between locations and perils in present and future climate. These can be used in conjunction with catastrophe models and property data providers. Collaborate with data providers and model vendors to investigate impact of place-based resilience on property modelling outcomes. → See Case study 1	Co-create financing-linked insurance mechanisms, including structures that reward proactive risk reduction rather than only post-loss recovery. An insurer might also want to think about whether that incentivization/credit could flow through to reinsurance or capital. → See Case study 7	Test how resilience standards, certifications and community-level measures can inform pricing and coverage decisions. → See Case study 9	
 Data providers	Fill data gaps, including hyperlocal business interruption and operational loss data. Expand dynamic risk monitoring using near-real-time weather, sensor and exposure data. → See Case study 1		Develop standard metrics, interoperable formats and shared methodologies for place-based risk. Build open Application Programming Interface (APIs) and other systems that allow place-based risk information to be used consistently across actors and non-technical users, including communities and SMEs. Collaborate with the rest of the ecosystem – e.g. while insurers will have the claims data, the model vendors will have the modelling expertise. → See Case study 2	Test how interventions for insurable perils such as flood and wildfire can also produce measurable co-benefits for extreme heat, water stress, biodiversity and economic and social resilience. → See Case study 8
 Civil society organizations		Build local awareness and trust around insurance, risk reduction and risk transfer options, including where protection gaps are greatest. → See Case study 1	Support monitoring and documentation of resilience interventions so their outcomes can be evidenced to insurers, investors and public authorities.	Convene community groups, local stakeholders and delivery partners to support implementation of place-based resilience measures. → See Case study 7
 Regulators and policy-makers	Encourage disclosure of place-based physical risk exposure and support the development of open, interoperable public risk data infrastructure that fills gaps no single private actor can address.		Mandate standardized place-based risk metrics and interoperable data formats across regulated financial institutions and development sectors. Create accountability mechanisms that link regulatory compliance to community-level resilience outcomes. → See Case study 9	Establish formal coalition frameworks (e.g. regulatory sandboxes, working groups) to test place-based interventions with measurable co-benefits. → See Case study 5

4

Where to now? Three immediate next steps

Three immediate steps begin the work outlined in this playbook.



Place-based resilience is becoming a precondition for maintaining insurance availability and affordability in high-risk areas. This requires coordination among a wide range of stakeholders.

Here are three immediate steps:



Assess your readiness:

Work through the four interventions, identifying areas where you can act to improve place-based resilience and where collaboration is essential. Complement this with supporting guides on how you can link asset- and place-level resilience to insurability outcomes (for example, the Marsh Carlyle Investing in Resilience Framework,⁶⁰ the Climate Resiliency Playbook⁶¹ or addressing system level gap checklists⁶²).



Join what is already working:

You do not need to start from scratch. This playbook is accompanied by a digital repository that you can use to explore live pilots and initiatives, filterable by geography, to find coalitions already building resilience in places relevant to you. Learning from and contributing to these efforts accelerates progress for everyone.



Build a coalition:

If no initiative exists in your place, step up as a leader and build one. Identify peers and local stakeholders who share your ambition. The members of the World Economic Forum's insurance community are actively looking to support coalition leaders on the ground. If you are ready to be a leader in your region, make contact – the community wants to connect you with others who are already in that position.



The insurability crisis is, at its core, a failure to manage risk – and, in many cases, no single actor can solve it alone. The path forward demands collaboration between stakeholders to build place-based resilience. Solutions include: better data to sharpen the investment case; financing structures that crowd in both public and private capital; recognized metrics to give investors, lenders and

insurers the confidence to price resilience; and an economic case anchored in co-benefits. Together, these levers can relieve the insurability pressures in the places that need them the most right across the world – coastal communities, river catchments, wildfire zones and cities. The actions and solutions in this playbook are ready to be tested, scaled and owned. The work starts now.

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Endnotes

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