

HOW A HOLISTIC RISK APPROACH INCREASES RESILIENCE IN THE FACE OF A CHANGING CLIMATE

FOSTERING GROWTH AND BUILDING
RESILIENCE IN A CHANGING WORLD





Contents

Key takeaways	3
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The urgency of adopting a holistic approach to climate risks	4
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The components of a holistic approach	6
Risk assessment	7
Risk financing	8
Resilience and adaptation	9
Realizing the holistic approach to risk	11

A holistic view of risk supports the optimal combination of risk finance and adaptation	13
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Endnotes	14
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Key takeaways

- Climate change is putting pressure on existing risk and protection strategies, with current approaches to manage risk often inadequate to put society on a path to resilience.
- Catastrophe losses continue to increase across the world. This is in part due to climate change, with other factors also influencing the evolution of natural catastrophe losses, including population growth, urbanization, and aging infrastructure and building stock, along with inflation.
- Global climate change is at risk of exacerbating the already significant protection gap, leaving many communities across the world unprotected against worsening extreme weather events.
- The total costs of risks will continue to increase, unless significant action is taken to address existing vulnerabilities and to optimize resilience strategies.
- A holistic approach to risk management presents a viable path forward by quantifying, financing and reducing the risks in a coordinated way, thereby increasing resilience levels and ensuring the continued viability and profitability of the insurance industry.



The urgency of adopting a holistic approach to climate risks



A changing climate is already impacting communities, economies and countries, revealing the severe consequences of a warming world.

[From July 2023 to June 2024, the global average temperature reached a record high of 1.64°C above the pre-industrial average, with June 2024 being the warmest June recorded.](#)

The effects of climate change are evident worldwide. Hurricane Beryl became the earliest Atlantic Category 5 hurricane on record, causing significant damage in the Caribbean and making landfall in Texas as a Category 1 hurricane, leading to widespread flooding. Hurricanes Helene and Milton followed, with Milton intensifying rapidly and both hurricanes causing heavy rainfall and flooding, exacerbated by climate change.¹

The years 2023 and 2024 have also seen an increase in convective storms globally, with significant insured losses from events like the Italian hailstorms. Severe flooding in Brazil, the United Arab Emirates and Spain has also been linked to climate change. Other factors, such as population growth and urbanization, also contribute to the rising costs of natural disasters.^{2,3}

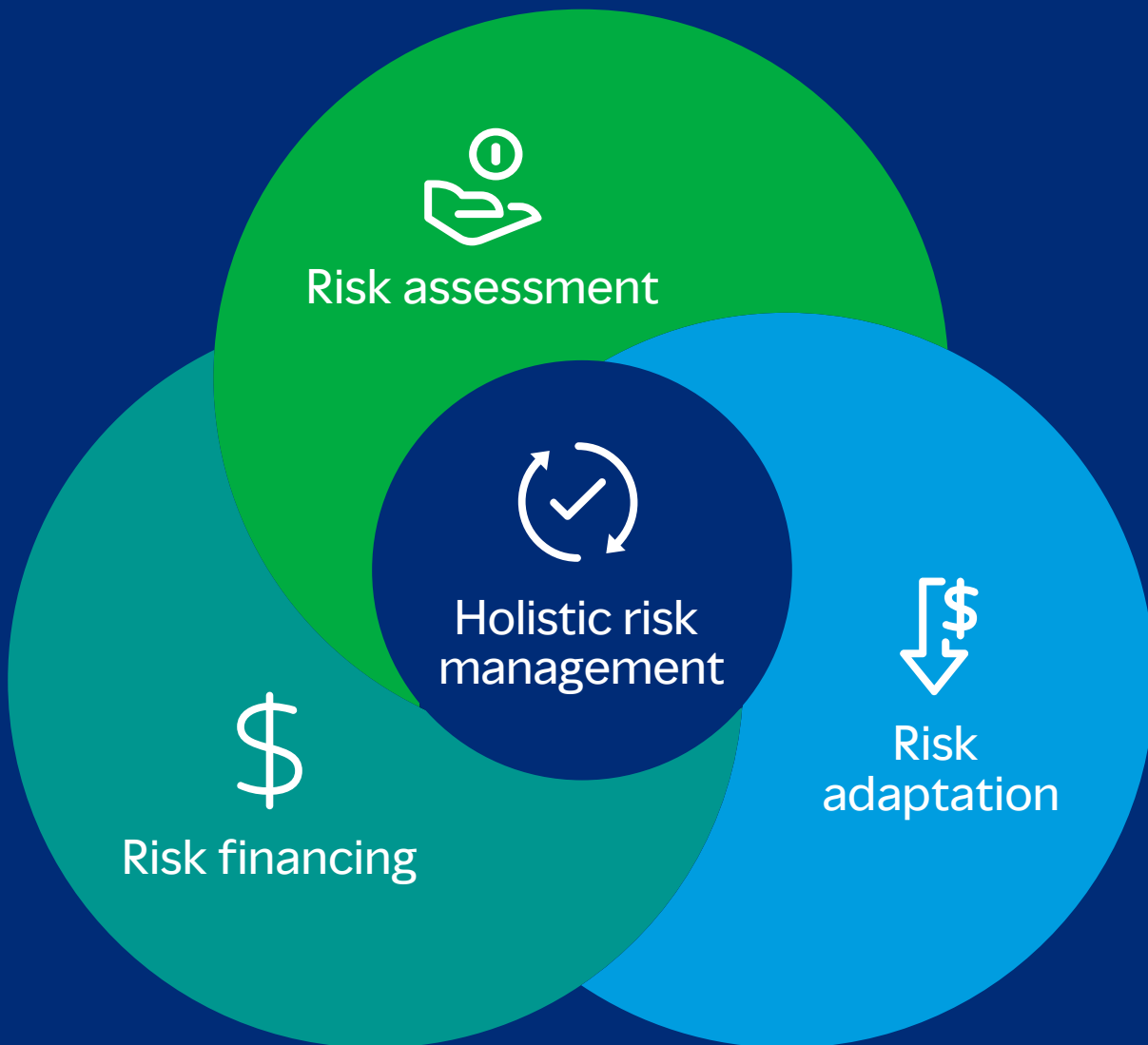
These developments raise critical questions about infrastructure resilience and climate risk management. Many communities and critical infrastructures are ill-equipped to handle extreme weather events, which are expected to increase as the climate warms. Insurance can provide financial protection, but a significant protection gap exists, particularly in developing countries and even in developed nations [like the US, where the gap exceeds 40%. In the UAE, the insurance penetration rate \(all lines of business\) is only 2.75%](#). Climate change is likely to worsen this gap unless proactive measures are taken. Concerns about insurance affordability and availability are growing as climate change introduces new uncertainties.

Currently, there is capacity in the industry to create new protection schemes, but regulatory and demand-side challenges hinder the development of innovative risk finance solutions, which are expected to become more challenging as risks increase.

The components of a holistic approach

A holistic approach to risk management is essential, focusing on financially viable solutions that provide protection for individuals and entities. This involves three integrated components: risk assessment, risk adaptation and risk financing.

This approach emphasizes a “total cost of risk” perspective, combining risk finance and climate adaptation to create effective pathways for resilience, which will vary by region and risk characteristics.

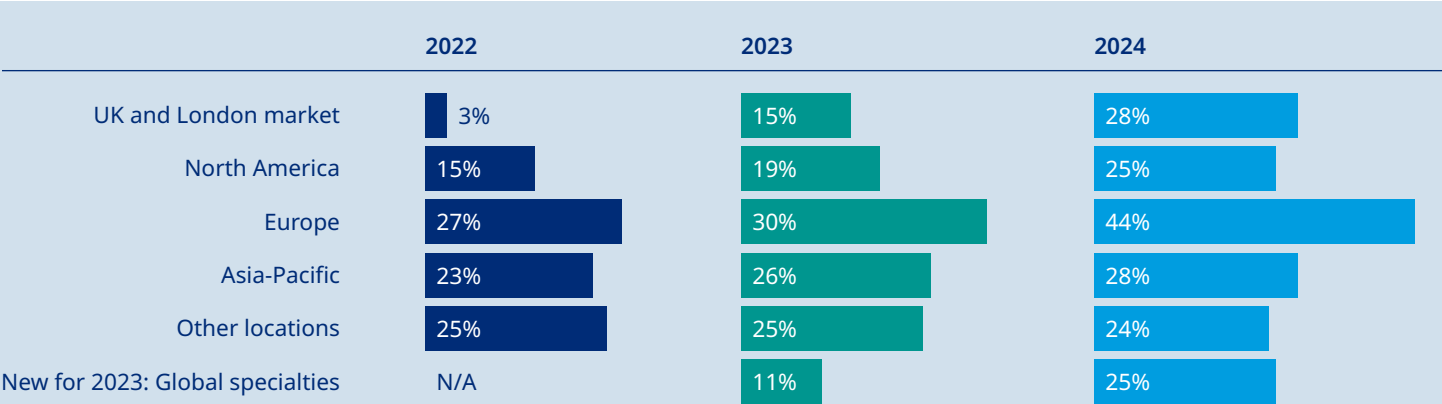




Risk assessment

The risk management process should begin with understanding and quantifying climate-related risks, including insurance gaps and vulnerabilities. Tools such as strategic risk assessments and climate surveys are available, but their application remains limited, with many organizations not fully quantifying their risks. [The Marsh Corporate Adaptation Survey](#) revealed that 48% of corporate risk managers only assess climate risks qualitatively and lag in the quantification of current and future impacts. Similarly, a survey carried out by Guy Carpenter following January 2024 reinsurance renewals shows that although climate change is considered an important topic, fewer than half of global respondents are quantifying their climate risk, as shown in Figure 1.

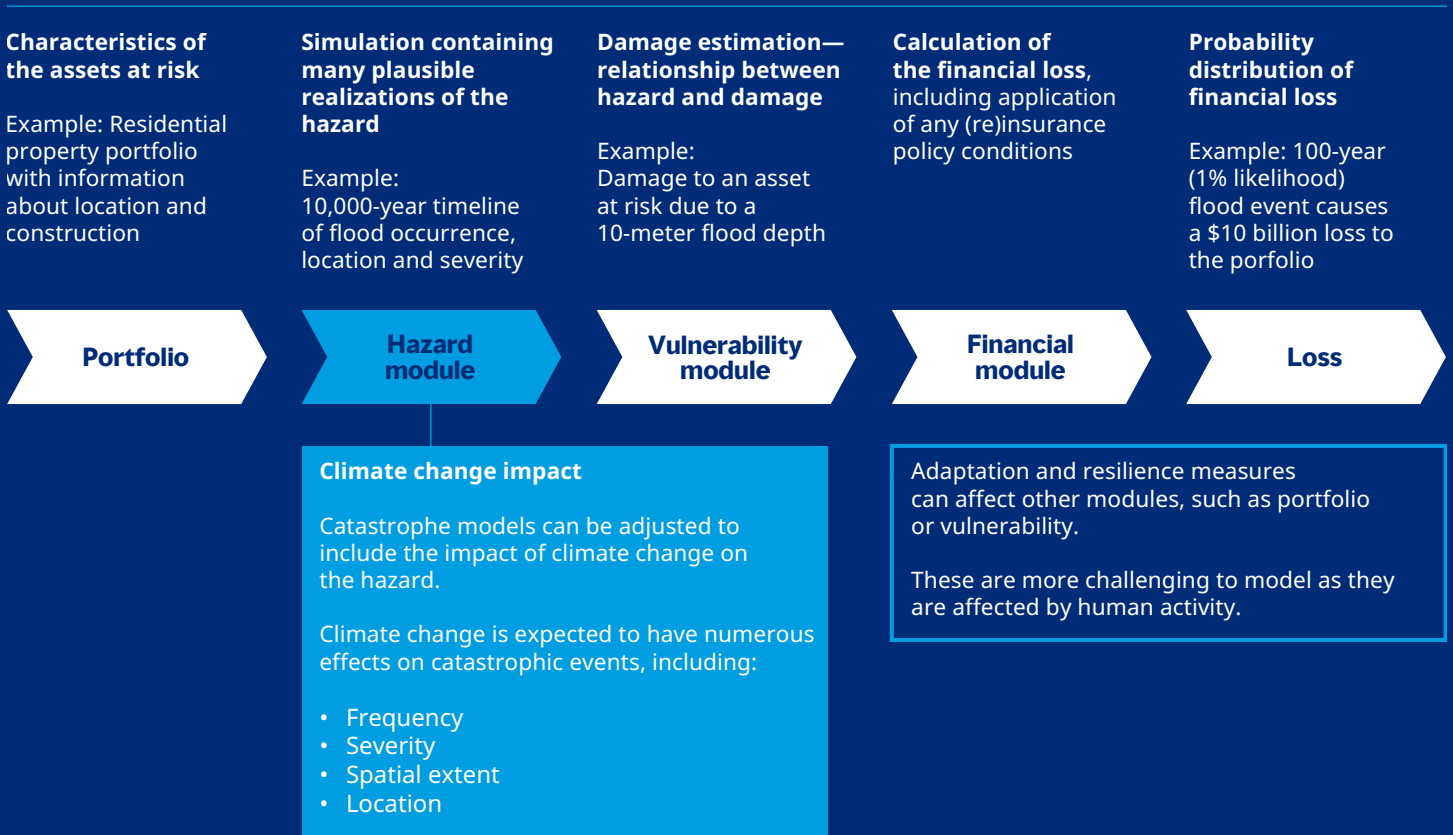
Figure 1. Percentage of clients quantifying their climate risk



Source: Guy Carpenter, 2024.

The (re)insurers who conduct these quantifications commonly use catastrophe models, which simulate potential losses from catastrophic events by integrating data from various fields, as illustrated in Figure 2.

Figure 2. Climate change impact assessment



Source: Guy Carpenter, 2024.

Catastrophe models can be adjusted to reflect current and future climate impacts, aiding decisions on underwriting, pricing and regulatory compliance. This analysis can also be extended to model adaptation measures and reduce vulnerabilities. By providing detailed insights into potential disaster impacts, catastrophe models can assist in formulating policies and planning for infrastructure development and emergency response. This is crucial for minimizing the socioeconomic impacts of disasters.

Governments can also use catastrophe models to inform decisions on public insurance schemes and financial reserves needed to cover potential losses. This helps to ensure that adequate financial resources are available to support recovery efforts and maintain economic stability in the aftermath of natural disaster shocks. Catastrophe models can also be leveraged to guide investment in infrastructure and community development projects, ensuring that these investments are resilient to future catastrophic events.

Risk financing

Risk financing solutions can be tailored to meet the needs of governments, businesses and communities by freeing up capital for investment and growth while managing volatility and costs. These solutions may include traditional (re)insurance, retained loss, captives and insurance-linked securities.

The (re)insurance market is generally resilient, with carriers required to hold substantial capital to mitigate insolvency risks. However, recent loss increases, partly due to climate change affecting non-peak perils like flooding and thunderstorms, have impacted (re)insurance coverage and profitability. Insurers are now retaining more losses, which is particularly challenging for those unable to raise policyholder prices in line with costs. For the insurance industry, an enhanced understanding of current and projected physical risks is important to inform underwriting and risk management decisions. Although traditional insurance products play a role, alternative solutions like parametric insurance are increasingly being mobilized to provide capital against rising risks. Parametric solutions are very versatile—in principle, any financial loss can be insured under this design as long as there are available datasets that reliably

describe financial exposures to physical hazards or any other risk driver. They can extend coverage to high-risk assets and supply chains and help contain the risk of uninsurability. This can be particularly valuable in situations where traditional markets are becoming more expensive or where underwriters are unable or unwilling to provide coverage.

A survey carried out by Guy Carpenter following January 2024 reinsurance renewals shows the range of actions being taken by (re)insurance markets in response to climate change (Figure 3).

Climate change may lead some insurers to exit certain markets, increasing protection gaps. For example, Marsh McLennan's [Staying Above Water: A Systemic Response to Rising Flood Risk](#) highlights how increasing levels of accumulation and volatility are already discouraging insurers from covering flood risk in some parts of the world, including Florida. However, new risk pooling mechanisms, such as the UK Flood Re scheme and catastrophe pools in various regions, are emerging to provide coverage for previously uninsurable risks.

Another example is the use of parametric solutions to help expand flood coverage to low-income communities. Marsh McLennan's [community-based catastrophe insurance \(CBCI\) pilot](#) in New York City uses parametric triggers to provide flood coverage to lower-income residents. Under the model, homeowners benefit from a CBCI program for all or a portion of a stated climate peril by a group insurance policy, typically purchased by a local government agency or community organization. The community-based underwriting approach reduces administrative, risk-financing and distribution costs, opening up both risk reduction and risk transfer options for a large group of homeowners.

Figure 3. How (re)insurers are responding to climate change



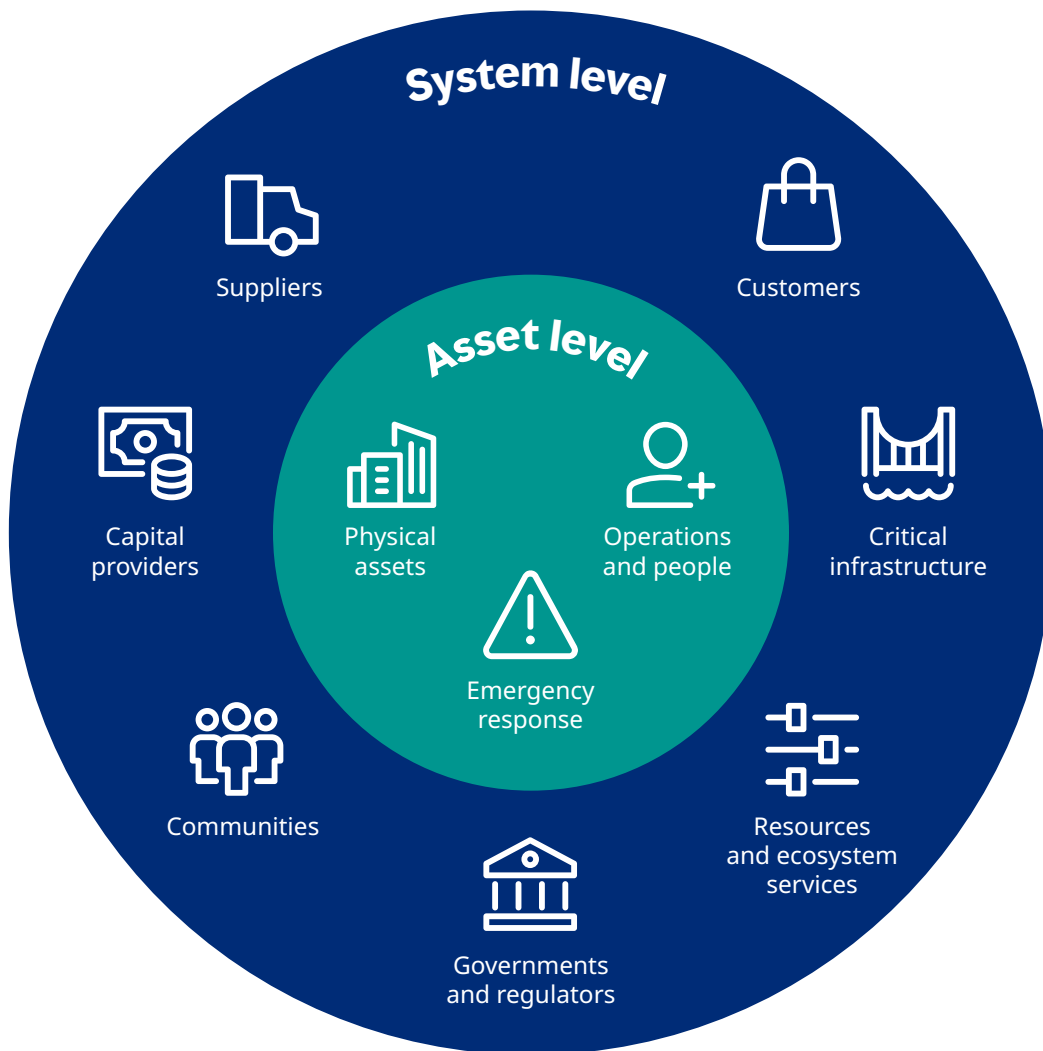
■ Advocating for price increases
■ Reducing exposure to a region ■ Exiting a line of business
■ Requiring disclosure from primary carriers ■ None

Source: Guy Carpenter, 2024.

Resilience and adaptation

Investment in resilience and adaptation at state, business, community and homeowner level can reduce the financial impact of disasters and bring down the costs of risks. In addition, risk awareness and education can improve the understanding of risk and the available response options. Marsh's adaptation framework (Figure 4) offers a comprehensive method for corporates or large organizations to address climate adaptation and resilience. It starts with identifying interventions to increase the resilience of physical assets, improve operations, protect people and enhance emergency response. Asset-level resilience measures can look like implementing flood defenses to protect a site from flood damage or controlling working conditions for workers in heat-affected regions. In addition, system-level considerations such as suppliers, customers, critical infrastructure, resources and ecosystem services, governments and regulators, capital providers, and communities are also important to understand the total costs of risks as well as direct and indirect risk drivers.

Figure 4. Marsh's climate adaptation and resilience framework



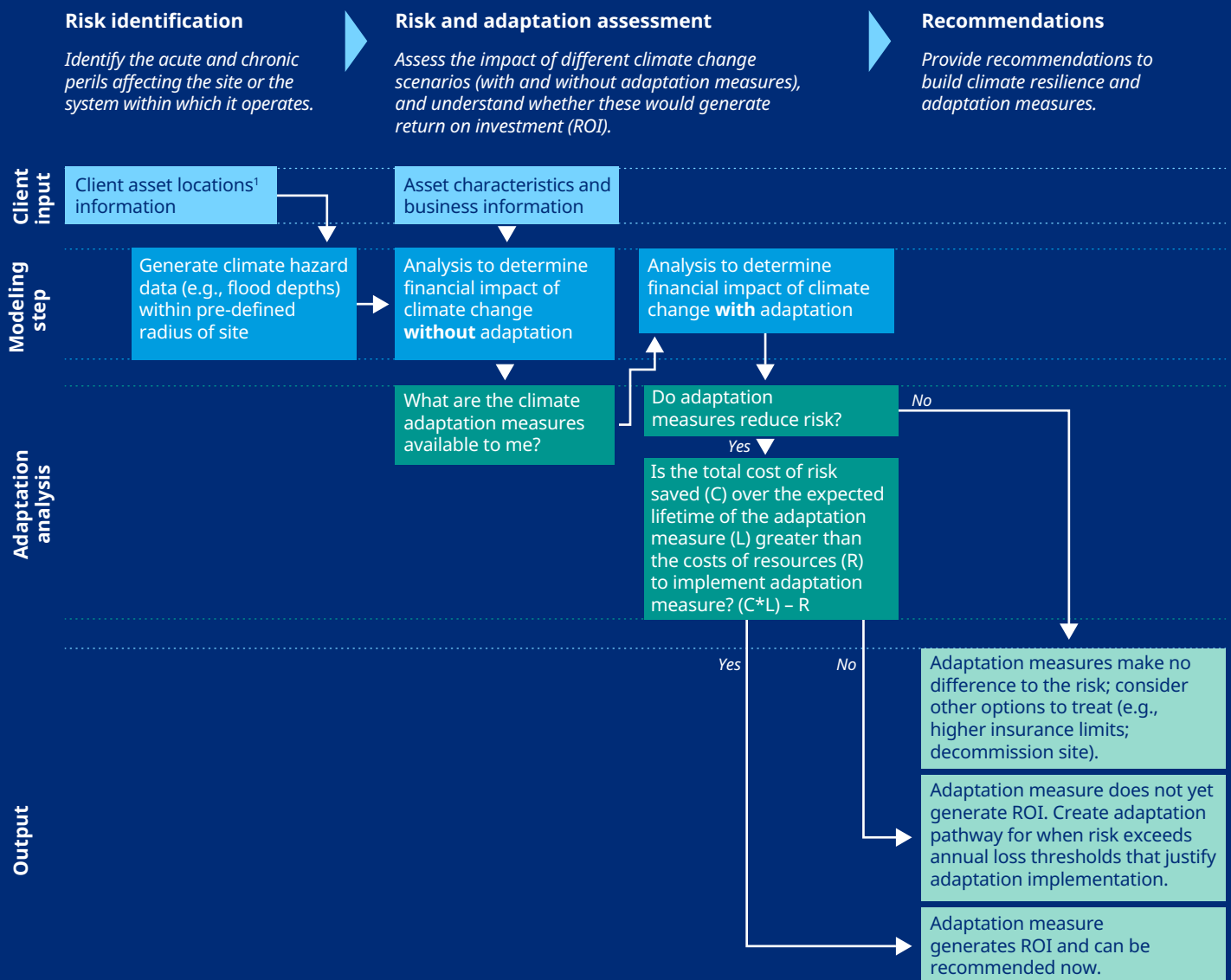
Source: [Marsh](#).

System-level measures could be analyzing and managing a business's resource availability from its surrounding ecosystem or creating community-based insurance solutions to protect entire communities from the impact of singular climate-induced perils.

Adaptation requires action at asset and system level. To identify the most relevant types of action and optimize adaptation and risk management strategies,

it is important to assess the return on investment for adaptation interventions by estimating costs and benefits of different measures. Figure 5 below outlines such a quantitative approach, allowing for a clear decision tree for a government or a company, incorporating asset or systems data, and building on risk identification and risk and adaptation assessments.

Figure 5. Quantitative approach to assess and prioritize adaptation interventions






Source: Marsh.

Realizing the holistic approach to risk

For many (re)insurers, the integration of adaptation measures into their risk models is still at an early stage. Catastrophe models can quantify the impact of resilience measures, such as improvements to building codes or flood defenses, by modifying the vulnerability part of the models. This can be used to assess the potential reduction in risk of these measures and the potential premium saving that could be available against the cost of implementation. However, the incorporation of adaptation and resilience measures that are influenced by human activity into the models tends to be challenging. It is common for some types of interventions, such as large-scale flood protection

schemes. But it is still early days for other adaptations, such as nature-based solutions like mangroves, which can significantly influence risk levels. This is an emerging area where industry and academia can collaborate to improve analytical tools and approaches. For example, the [Nature Conservancy and Guy Carpenter's 2021](#) report outlines the quantification of nature-based solutions to reduce wildfire risk, as does the [EU Naturance project](#). Catastrophe models can help explore what an optimal climate risk financing and adaptation strategy can look like today and in the future for different projected climate pathways at state, business, local government or community levels as shown in Figure 6.

Figure 6. Achieving a view of risk by analyzing the impact of investments in adaptation and resilience

	Current assessment	Deeper analysis	Commentary
 View of risk	Identification of key exposure characteristics driving risk and ability to impact probable maximum loss estimates	Assessment of current insurance penetration rate, identification of protection gaps and opportunities for improved coverage	True resilience requires a holistic risk management approach, so we recommend integrating various risk assessment, risk mitigation and risk financing strategies to achieve climate resiliency goals. We collaborate with risk carriers to create a bespoke risk management plan specific to their risk profiles and financial capacity to respond to climate disasters. <ul style="list-style-type: none"> • Build consensus and clarity on risk tolerance and existing disaster-risk-financing mechanisms. • Uncover the key drivers of risk to allow for the crafting of targeted resiliency solutions. • Estimate the economic impact of identified solutions for informed decision-making regarding investment trade-offs. • Evaluate the growing impact of risk mitigation solutions over time and how that reduces the overall economic loss potential and dependence on risk financing in the long run.
 Strategy review	Scenario testing of physical risk hardening strategies and impact to economic loss potential	Granular analysis of the deployment of multiple concurrent resiliency strategies	
 Impact on resilience	Portfolio screening to uncover locations and assets most exposed to climate change for targeted mitigation efforts	High-resolution site-level modeling to evaluate the economic impact of planned resiliency strategies	

Source: Guy Carpenter.

Combining catastrophe models and risk analysis can help develop optimal climate risk financing strategies. This involves assessing current risks, insurance penetration rates and protection gaps to create tailored climate risk management plans that are specific to a country/region/city/business risk profile and take into account their financial capacity to respond to climate risks.

Key components include reviewing existing resilience measures, enhancing model outputs to estimate economic loss reductions and ensuring insurability for at-risk communities. Importantly, the benefits of investments in risk mitigation may take time to materialize, necessitating ongoing assessments of disaster relief access, alignment with other mitigation efforts and forecasting the long-term impacts of risk mitigation investments.

As well as developing these holistic risk models, there are [further measures](#) insurers can take to build and promote climate resilience. The [recent Marsh McLennan study](#) highlights some of these, which include but are not limited to:

1. Making resilience a strategic priority in underwriting
2. Engaging underserved communities through public-private partnerships
3. Encouraging “build back better” initiatives
4. Supporting public sector decision makers with data and insights



A holistic view of risk supports the optimal combination of risk finance and adaptation

A holistic view of risk is essential for effectively combining risk finance and adaptation. As physical risks increase, existing risk management techniques may fall short in addressing climate change. A comprehensive approach allows for quantifying and financing risks while promoting resilience and adaptation, ensuring the insurance industry's viability. Collaboration among the insurance sector, financial markets, governments and academia is crucial. Innovative solutions like community-based catastrophe insurance can incentivize risk mitigation and protect low-income residents.

Incorporating climate adaptation into risk management can enhance risk understanding and potentially reduce the widening insurance-protection gap. This involves a mix of qualitative and quantitative strategies, including economic cost analyses, return on investment assessments for adaptation measures and visibility into supply chain climate exposure.

Implementing these adaptation measures can strengthen system-level assets, making them more resilient to climate change and reducing disaster risks. Greater resilience leads to fewer claims and lower losses for insurers, making coverage more affordable.

Marsh McLennan offers a number of solutions to help:



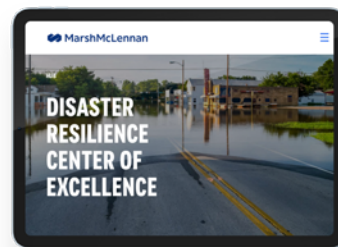
Marsh's
[Global Climate Resilience and Adaptation Hub](#)



Guy Carpenter's
[Climate Change](#)



Marsh McLennan's
[Climate Resilience](#)



Marsh McLennan's
[Disaster Resilience Center of Excellence](#)

Endnotes

- 1 Guy Carpenter. "*Climate Change*," available at <https://www.guycarp.com/solutions/risks/climate-change.html>.
- 2 Marsh McLennan. "*Flood Risk Index*," available at <https://www.marshmclennan.com/insights/publications/2021/september/marsh-mclennan-flood-risk-index.html>.
- 3 Marsh McLennan. "*Staying Above Water: A Systemic Response to Rising Flood Risk*," available at [marshmclennan.com/insights/publications/2023/february/staying-above-water-a-systemic-response-to-rising-flood-risk.html](https://www.marshmclennan.com/insights/publications/2023/february/staying-above-water-a-systemic-response-to-rising-flood-risk.html).

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