

# What the market thinks:

## How global insurers are responding to rising physical risk

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# Introduction

**What do the largest insurance firms globally say about the rising cost of physical risk? That they're prepared to navigate it but doubt whether the industry as a whole is ready.**

That tension is central in this report. Drawing on a structured survey and in-depth interviews with more than 50 insurers and reinsurers across Europe, North America and the Asia-Pacific region, the findings show an industry in transition: one whose members recognize the scale of the coming challenge but remain uneven in their operational response.

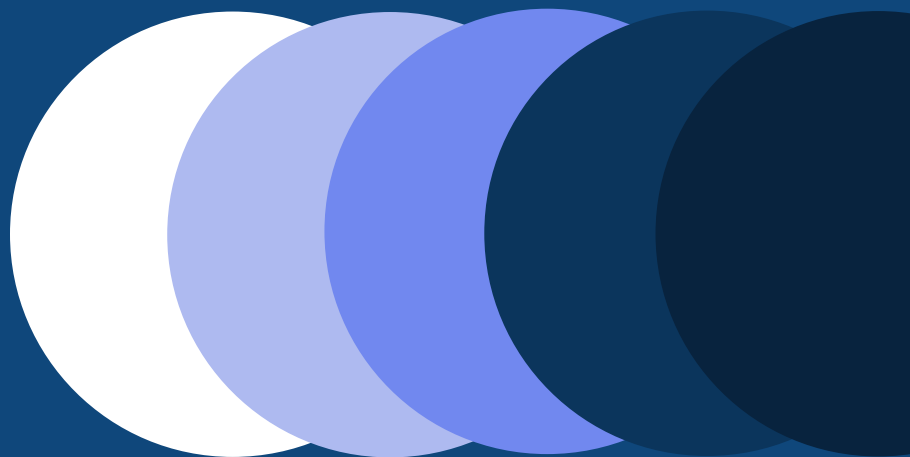
As extreme weather events intensify, insurers face interconnected pressures, including how to price physical risk more accurately, manage growing volatility and capture emerging demand for resilience-related services. Complicating this further, regulators and insurance supervisors worldwide are increasingly focused on the systemic vulnerabilities physical risk poses to financial stability.

To help insurers translate awareness into action, the report offers a maturity framework, mapping progression from initial governance structures and risk identification through to full integration of physical risk in underwriting, pricing, capital allocation and resilience planning.

The overarching message is clear: Insurers are keenly focused on the rise in physical risk, yet remain in the early stages of embedding it into the decisions that matter most.



**Linda-Eling Lee**  
Founding Director, MSCI Institute



# Forewords

## Alex Koukoudis

Senior Executive, Finance & Risk, Lloyd's Market Association

For decades, the insurance industry has functioned as the world's rearview mirror, using data from the past to price the risks of the present. But as this report by the MSCI Institute so clearly demonstrates, extreme weather events and other physical risks have shattered that mirror. Historical patterns no longer serve as a reliable map for future hazards.

The report provides a critical reality check on an industry in transition. The findings reveal a "readiness paradox," in which firms express high confidence in their own capabilities but harbor concerns about the industry's systemic resilience. This gap – between individual preparedness and collective vulnerability – is where our greatest risk lies but also where the most urgent opportunity for innovation is born.

Responding to the impacts of a warming world on our economies and societies is among the greatest challenges of our century. This report reminds us that resilience is not a static destination, but a continuous process of adaptation. The findings challenge us to move beyond high-level governance and to integrate climate accountability into the very core of executive performance and pricing models.

For those of us committed to a stable and sustainable financial system, the message is clear: The tools for resilience exist and, if they don't, we have the technological means to develop them. The question is no longer whether we have the data, but whether we have the collective will to operationalize it, to ensure that insurance remains not just a safety net, but an affordable cornerstone of a resilient society.

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## Butch Bacani

Head of Insurance, United Nations Environment Programme (UNEP)

The insurance industry has long been in the vanguard of understanding and managing risk; and has served as an important early warning system for society by amplifying risk signals.

Today, amid the climate and nature crises and deepening inequalities, insurance has become the frontline of a systemic risk to financial stability and economic security. Insurance is increasingly becoming unaffordable and, in some areas, already unavailable. Last year, UNEP's work with the insurance industry warned of a looming global insurability crisis that could lead to other financial services becoming unavailable, impacting various economic sectors. Indeed, what is not insurable is not bankable, and not investable.

This is why this report is timely. Drawing on a global survey and structured interviews, insurers are communicating strong risk signals stemming from climate-related risks. The report shows that the physical risk landscape is rapidly evolving, undermining insurability, financial stability and economic security. It shows how insurers are adapting to escalating physical risks, more frequent and severe weather events, and climate-driven losses, highlighting that the past is no longer a reliable indicator of the future.

By better understanding and managing the risks of today, insurers can enhance their long-term business resilience, help build more resilient, inclusive, safer and more prosperous communities and economies, and help society navigate the risk landscape of tomorrow. By doing so, insurers can also reap the opportunities of a more insurable world along the way.

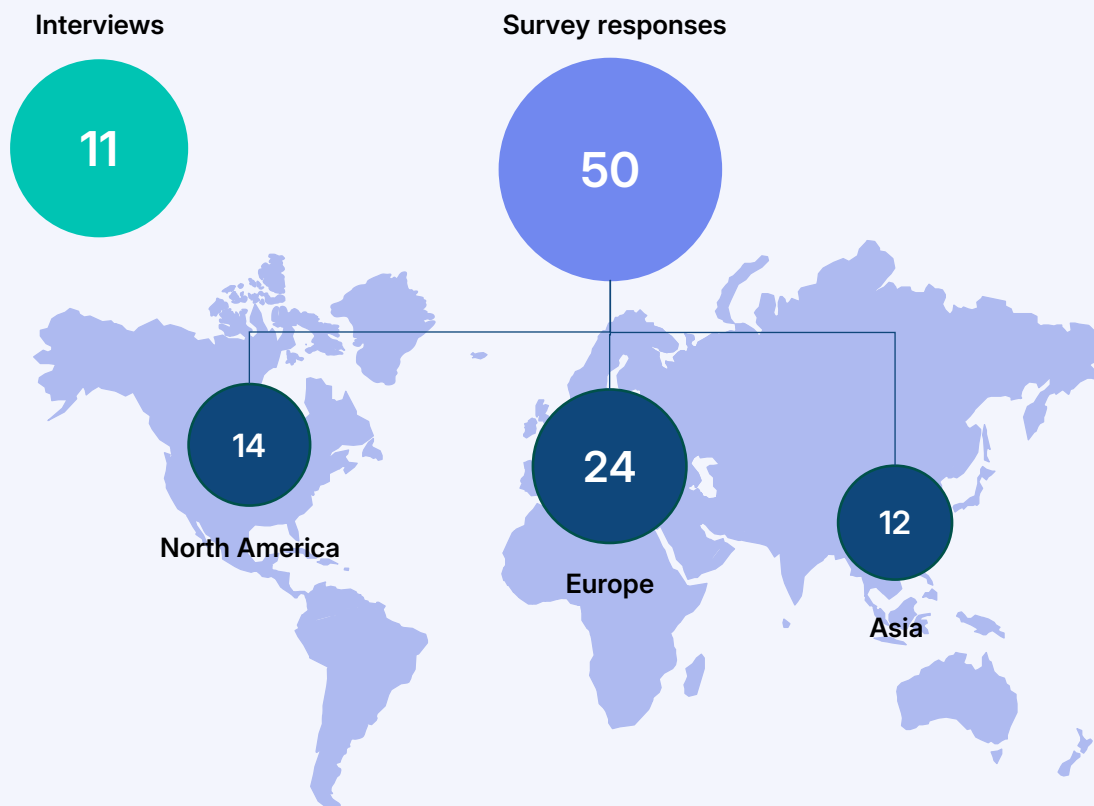
# Research approach

This report is informed by survey responses from 50 insurers and reinsurers with property and casualty activities, complemented by structured interviews with 11 insurers and reinsurers across multiple regions. Respondents include global multinationals, major regional carriers, reinsurers and Lloyd's market specialists across North America, Europe and Asia. They represent diverse business models, from full-service composite insurers to specialty carriers. Survey participants were distributed across Europe (24 insurers, 48%), North America (14 insurers, 28%), and Asia (12 insurers, 24%). The distribution reflects the geographic concentration of major global insurers while ensuring meaningful representation across all three regions.

The research focuses on how insurers assess and manage physical risks in underwriting today, the practical challenges they face in integrating evolving hazard conditions into decision-making, and where they identify opportunities for innovation and new products and services that support resilience.

Survey results and themes from discussions were synthesized to identify areas of convergence as well as meaningful points of divergence across regions. While not intended to be exhaustive, this combined qualitative and survey-based approach aims to provide a structured view of how the insurance industry is currently approaching physical risks and highlight the issues that are increasingly shaping underwriting decisions and strategic priorities across the industry.

## Insurers surveyed by region



# Key findings

- **Individual insurers rate their own preparedness above the industry's.** Across all regions, insurers consistently assessed their own preparedness more favorably than the sector's collective readiness. 62% of insurers in North America, 50% in APAC and 46% in Europe say that the industry is unprepared overall, suggesting that firms see system-wide vulnerabilities that individual actions alone cannot address.
- **Concern about systemic risk is nearly universal, but operational integration lags.** Globally, 88% of insurers expressed moderate-to-very high concern about physical risk creating systemic financial risk, and 96% flagged high concerns about infrastructure insurability in vulnerable regions. Most insurers in North America and APAC are at early stages of incorporating these systemic risks into management frameworks.
- **Advisory services present the clearest opportunity.** Most insurers (91%) see opportunities in climate risk management and resilience advisory services, while 58% cite parametric products as a key opportunity that they are actively pursuing. By contrast, only 11% view insuring nature-based resilience as a significant opportunity.
- **Layered intelligence is gaining traction.** While catastrophe models remain central to underwriting, nearly all insurers noted that models calibrated on historical data are becoming less reliable as hazards intensify. In response, insurers are adopting a layered approach by supplementing vendor models with geospatial analytics, high-resolution terrain data, and localized hazard information from universities and public agencies. But translating these qualitative adjustments into quantitative pricing decisions within annual underwriting cycles presents a challenge.
- **Near-term scenarios matter more for underwriting.** Globally, 43% of insurers report that their underwriting strategy is meaningfully informed by analysis of physical-risk scenarios. Nearly all insurers surveyed say scenarios through 2030 would be more actionable for underwriting decisions than those that look out decades. Model providers and data vendors are responding with shorter-horizon products, but the test will be how well they can inform pricing decisions.
- **Physical risk is rising on the regulatory agenda.** The impact of physical risk on rising insurance costs, claims and availability is spurring supervisors in many regions to focus on insurers' governance and risk management. There are growing requirements to include analysis of hazard-related scenarios and climate-related risks in insurers' assessments of risk, solvency, capital planning and disclosure.

*For an overview of the regulatory landscape, see page 18.*
- **The maturity of physical-risk integration varies regionally.** A majority (68%) of insurers surveyed in Europe, for example, say they have integrated physical risk into overall risk management. That compares with 36% of those surveyed in APAC and a third in North America. A majority (79%) of insurers in Europe also say their underwriting business is well prepared for rising physical risk, compared with 23% of their counterparts in North America and APAC, respectively.
- **Governance oversight exists but accountability remains weak.** While board engagement on climate risks varies, the accountability gap is clear: 69% of insurers globally reported that climate considerations were not integrated into executive performance or incentive structures. This pattern holds across Europe (63%), North America (85%) and APAC (67%).

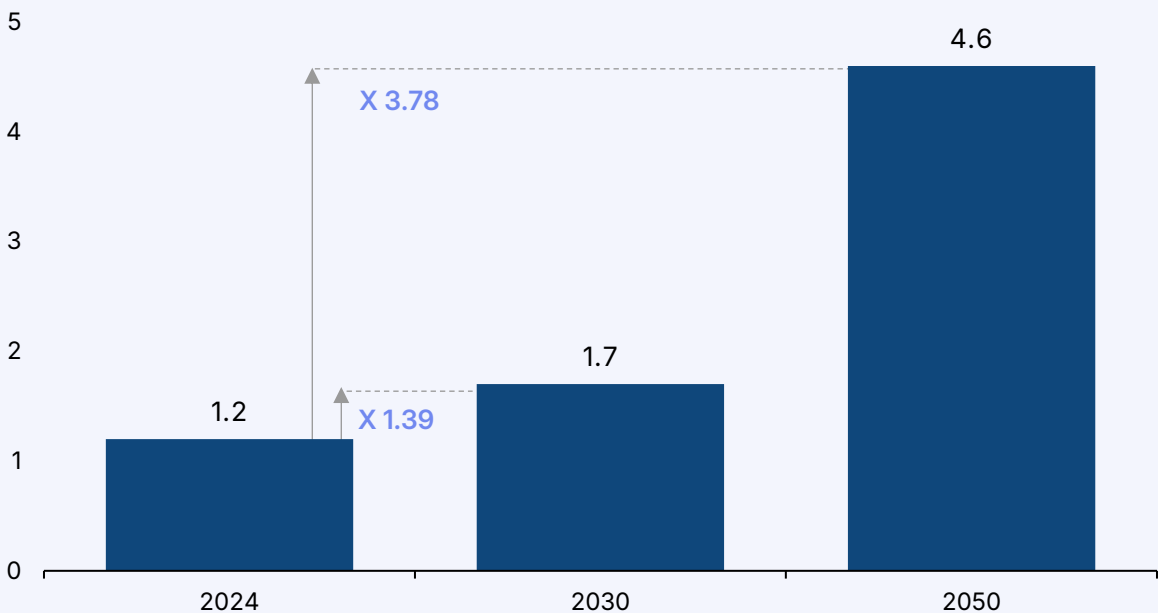
# Why now: The resilience imperative for insurers

Losses from extreme weather events are rising across nearly every geography. In several of the past few years, insured losses from natural catastrophes have exceeded USD 100 billion, underscoring the growing financial materiality of physical hazards for the insurance industry.

Severe floods, wildfires, and storms continue to drive substantial losses, while shifting hazard patterns and continued exposure growth are adding uncertainty to underwriting, pricing and capital planning. Against this backdrop, MSCI's data estimates that losses from physical hazards could rise almost fourfold by 2050 compared with 2024 (see Exhibit 1).

At the same time, a large share of total economic losses remains uninsured. Persistent protection gaps are placing greater strain on households, businesses, and public institutions, particularly in regions exposed to repeated climate shocks. These dynamics have led to physical risk considerations are gaining prominence not only in underwriting but also in broader discussions around financial resilience, market stability, and the long-term availability of insurance.

**Exhibit 1: Estimated average annual physical risk-related losses (USD billion)**



Source: MSCI Sustainability & Climate. The analysis uses MSCI's Physical Risk Metrics - Issuer Level data, which spans the 9,409 companies in the MSCI Climate Change Metrics universe as of Jan. 12, 2026. Losses from physical climate hazards are based on estimates of asset damage and lost-revenue opportunities under the Network for Greening the Financial System (NGFS) "Current Policies" (3°C) scenario. Average annual loss (AAL) estimates do not reflect tail risk and extreme losses. The NGFS 3°C scenario aligns broadly with scenarios used by the MSCI Institute in reports on views toward physical risk among companies and investors. For more information, see [msci-institute.com](https://www.msci-institute.com).

# Systemic implications for the insurance industry and the financial system

Physical risks have implications that extend beyond individual insurance portfolios. As hazards intensify and exposures concentrate, physical risk can influence the functioning of insurance markets and generate spillovers into the wider financial system.

- Insurance industry risks:** Larger tail events and the clustering of secondary perils can reduce predictability and place pressure on risk selection, pricing adequacy, and exposure management. These pressures can be compounded by developments in reinsurance markets, where higher attachment points, rising prices, and more restrictive terms require primary carriers to retain a greater share of losses. If these trends persist, they may influence long-term insurability in certain geographies or lines of business. The combination of rising hazard activity and exposure growth can make it more difficult to maintain pricing stability and coverage availability, particularly in areas where the gap between economic and insured losses is widening.

- Financial system risk:** Physical risks can affect the stability of the broader financial system by altering how risk is priced, financed, and borne. As exposure to climate hazards increases in certain regions, insurance can become less available, increasing uncertainty around the protection of underlying assets. This can weigh on property values and collateral quality, with knock-on effects for mortgage markets, banks' balance sheets, and how investors allocate capital. These dynamics can also spill over into public finances. As insurance coverage declines, governments may be required to absorb a greater share of losses or finance recovery and adaptation through public balance sheets. Recurrent climate-related shocks can therefore increase fiscal strain, raise contingent liabilities, and affect long-term public investment. As a result, assessing physical risks is increasingly relevant not only for insurers, but also for other market participants, central banks, and financial regulators concerned with system-wide resilience (see "Evolving supervisory expectations" section).

How concerned are you about the impact of increasing climate-driven physical risks on systemic risk for the financial sector (including insurance, banking and capital markets)?

	Europe	North America	APAC	Global
Not concerned at all				
Slightly concerned		33%		10%
Moderately concerned	42%	17%	36%	33%
Very concerned	53%	50%	64%	55%
Extremely concerned	5%			2%

Where would you place your organization in its approach to managing the systemic impacts of physical risks?

	Europe	North America	APAC	Global
No formal approach				
Initial awareness			18%	5%
Some processes in place	21%	67%	45%	40%
Integrated into risk management	68%	33%	36%	50%
Fully embedded across the organization	11%			5%

Source: MSCI Institute

Results from our survey across 50 insurers globally indicated that concern about systemic risk is nearly universal, yet integration of physical risk into insurers' overall risk management varies widely. Globally 88% of insurers expressed moderate-to-very high concern, however insurers differed significantly in how far they have progressed in managing the broader implications.

European insurers reported the most widespread concern, with 95% indicating moderate-to-high levels of concern about systemic financial impacts. This is matched by relatively strong integration into risk management practices: 68% reported integrating physical risk into their systemic risk-management frameworks, suggesting closer alignment between awareness and action than in other regions.

North American insurers reported lower and more dispersed levels of concern, with a third expressing only slight concern. This is reflected in risk management practices, where two thirds of insurers (67%) reported having “some processes in place” rather than full integration of climate-related systemic risks.

APAC insurers showed the widest gap between awareness of systemic vulnerability and risk management integration. While 64% of insurers expressed high levels of concern, a similar share (63%) reported being at early or intermediate stages of incorporating these systemic risks into broader risk management frameworks.

## Infrastructure insurability as a channel of systemic risk

Infrastructure assets are long-lived, capital-intensive, and geographically fixed, making their insurability particularly sensitive to rising physical risks. Where insurance becomes unavailable or unaffordable, risks may be retained on corporate or public balance sheets, affect asset valuation, or constrain financing and investment. Reduced infrastructure insurability can therefore act as a transmission channel through which physical risks spill over from the insurance industry into banks, capital markets, and public finances.

Consistent with these dynamics, survey results show near-unanimous concern among insurers about the long-term insurability of infrastructure projects in regions exposed to physical climate risks. Globally, 96% of respondents reported being very to extremely concerned, with similarly elevated concern across Europe, North America, and APAC. This consensus holds despite differences in insurers’ climate-related systemic risk management maturity. Understanding these differences into how insurers are operationalizing physical-risk management and where gaps persist between awareness and action examining their practices at a more granular level

**How concerned are you that physical risks will undermine the long-term insurability of infrastructure projects in vulnerable regions (e.g., coastal zones, flood-prone areas, heat-exposed urban centers)?**

	Europe	North America	APAC	Global
Not concerned at all				
Slightly concerned				
Moderately concerned	11%			5%
Very concerned	79%	100%	82%	86%
Extremely concerned	11%		18%	10%

Source: MSCI Institute

# Integrating physical risks

## Practices, perspectives and challenges

Integrating physical climate risk into underwriting decisions presents practical challenges that go beyond risk identification. Insurers must translate evolving hazard conditions into pricing, coverage, and risk appetite within existing tools, processes, and time

horizons. In doing so, firms often assess their own preparedness differently from that of the industry as a whole. This section explores how insurers are navigating these challenges in practice, where approaches are converging, and where gaps remain.

### Self-assessment vs. industry assessment

Survey results point to a clear distinction in how insurers assess their own preparedness versus the resilience of the insurance industry overall in the face of rising physical risks. Across all regions, insurers consistently rate their own preparedness more favorably than the insurance industry's collective readiness.

European insurers demonstrated the most confidence in their own capabilities, with 79% rating their underwriting business as well-prepared. However, this confidence diminishes when assessing the broader industry - only 50% believed the insurance industry overall is well-prepared, with 46% rating industry preparedness at only moderate levels. This gap suggests European insurers feel equipped to handle challenges within their own organizations but recognize significant vulnerabilities exist across the broader industry.

North American insurers showed the widest divergence between self-assessment and industry assessment. While responses about their own preparedness were evenly split across unprepared, minimally prepared, and somewhat prepared categories, their view of the industry was even more cautious, with 62% rating industry preparedness as minimal or inadequate. APAC insurers reported the lowest confidence overall, with over half rating both their own operations and the broader industry as unprepared or minimally prepared, though they were slightly more critical of industry-wide readiness than their own capabilities.

The patterns suggests firms believe they are managing physical climate risks better than their peers, or that vulnerabilities in the broader market, such as uneven adoption of climate tools, fragmented data quality, or varying risk appetite, create system-wide exposures that individual firm actions cannot fully address. One potential explanation for this preparedness gap lies in how insurers are building and deploying their technical capabilities for climate risk analysis.

**Overall risk readiness**  
Our underwriting business is well prepared for rising physical risks

	Europe	North America	APAC	Global
Not at all		8%	23%	8%
Somewhat	21%	69%	54%	42%
Very much so	46%	23%	15%	32%
	33%		8%	18%

**Overall risk readiness**  
The insurance sector overall is well prepared for rising physical risks

	Europe	North America	APAC	Global
Not at all	8%	31%	38%	22%
Somewhat	38%	31%	15%	30%
Very much so	42%	38%	31%	38%
	8%		15%	8%
	4%			2%

Source: MSCI Institute

## Growing reliance on internal expertise to interpret physical risk and model outputs

Insurers described dedicating more internal resources to analyzing climate and hazard information and reviewing catastrophe model outputs used in underwriting. Several emphasized the importance of developing sufficient internal expertise to challenge vendor model assumptions and interpret results critically, noting that building and maintaining this capability remains an ongoing effort. Some organizations also referenced initiatives to improve climate fluency among underwriters and risk teams.

Survey results highlight uneven perceived capabilities across regions in relation to assessing and managing physical risk. Globally, most insurers indicated that their teams have the necessary skills and tools, while a fifth reported being fully equipped for climate analysis. European insurers reported stronger perceived technical capabilities, whereas 50% of APAC insurers

indicated limited skills and tools. Most North American insurers (77%) rated their capabilities at a high level, but none indicated being fully equipped. These capabilities are being applied to a fundamental challenge: the tools that have historically anchored underwriting are showing their limitations.

### In their words

*"You have to really upskill your colleagues on the importance of these longer-term views of climate... and how they can benefit the business."*

**North American insurer**

### Risk management

**Our team has the necessary skills and tools for climate-related risk analysis and management**

	Europe	North America	APAC	Global
Not at all				
Somewhat	4%	23%	50%	24%
	67%	77%	42%	74%
Very much so	29%		8%	19%

Source: MSCI Institute

## Catastrophe models remain central to underwriting, but insurers increasingly recognize historical calibrations are becoming less reliable for future risk

Catastrophe models, which are largely calibrated using historical hazard and loss data, remain the backbone of underwriting and risk management for most insurers. Vendor models are widely used as primary analytical tools, with organizations applying internal review and validation processes to support underwriting decisions.

In response to recent rises in hazard frequency and severity, some insurers are drawing on climate-related insights to contextualize and challenge historical model outputs. Insurers described using these insights to assess whether model assumptions remain appropriate given recent experience, to compare alternative model views, and to apply expert judgment when interpreting loss estimates, particularly for perils where historical data is limited or evolving.

Still, translating these qualitative adjustments into quantitative pricing or decisions about risk selection remains difficult within annual underwriting cycles. In response to these limitations, insurers are expanding beyond traditional catastrophe models to incorporate additional data sources.

### In their words

*"Our modelling is kept very heavily refreshed with the latest science... we additionally have a team of meteorologists and cat scientists internally who do validation and trends analysis."*

**European insurer**

## Insurers are adopting a 'layered intelligence' approach, combining catastrophe models with granular geospatial and terrain data

Insurers are broadening the set of data sources used to support physical risk assessment. Geospatial analytics, high-resolution mapping, and hazard-specific datasets are increasingly integrated alongside catastrophe model outputs. These datasets allow insurers to assess exposure at a more granular level, moving beyond broad regional averages.

Some insurers also described incorporating additional hazard and terrain data tailored to specific geographies, particularly for flood and other location-sensitive perils. In a number of cases, this involves drawing on data from local research institutions, universities, or public agencies to improve the relevance of inputs for regional risk assessment. The combination of model outputs with supplementary datasets reflects a wider practice of layering information to support underwriting judgment.

### In their words

*"We use advanced analytics, we use advanced mapping tools. We have a GIS team that supports a lot of that work... to address two primary drivers of risk, exposure and vulnerability."*

**North American insurer**

# Underwriting adjustments remain the first response, but rising physical risk can ultimately constrain market participation

As physical risks evolve, insurers are adjusting underwriting criteria and coverage terms, including deductibles, sub-limits, and more granular distinctions by peril and geography where hazard activity has changed.

Several indicated that scaling back or exiting specific segments or perils may be considered where higher hazard activity coincides with other constraints, including limited modeling confidence, regulatory limits on risk-based pricing, reduced reinsurance availability or affordability, and diminished risk-adjusted returns on capital. This suggests that withdrawing from a market is typically a last resort after adjustment strategies have been exhausted.

These underwriting decisions are increasingly supported by structured measurement frameworks. Survey responses indicate that 84% of insurers globally have established climate-related metrics to monitor risk exposure and performance, with European insurers showing the most advanced adoption, where

54% reported being at the most mature stage of developing and monitoring such metrics. The widespread use of these metrics suggests that physical risk is no longer managed on an ad-hoc basis but is embedded within formal portfolio management and risk appetite frameworks. However, the effectiveness of these operational measures depends significantly on governance structures and accountability mechanisms, areas where gaps remain.

### In their words

*"Higher deductibles, lower sub limits for different coverages...all those things were adjusted to account for the additional increased risk."*

**North American insurer**

### Metrics & Targets

We have established climate-related metrics to monitor risk exposure and performance.

		Europe	North America	APAC	Global
1	Not at all				
2					
3	Somewhat	8%	23%	25%	16%
4		38%	46%	58%	45%
5	Very much so	54%	31%	17%	39%

Source: MSCI Institute

# Board-level awareness exists, but physical risk is not yet tied to executive accountability

Board-level awareness of climate risks appears to be developing unevenly, and yet to be translated into accountability mechanisms at the executive level.

The absence of performance incentives suggests physical risk remains largely a strategic or reputational consideration rather than one tied to individual or business unit accountability.

Globally, board engagement on physical risk shows wide dispersion, with no clear consensus on how systematically these issues are discussed at governance level. 46% indicated their boards are informed on a regular basis, with European insurers showing the highest frequency of board engagement. North American and APAC insurers showed more

varied practices, with 38% and 17% respectively reporting only occasional board briefings. These relatively low scores may indicate that physical risks are discussed at the board level but are not systematically included in the agenda or reviewed with consistency.

Translating governance oversight into performance incentives remains limited. Globally, 69% of insurers reported that climate considerations are not integrated into executive performance or incentive structures at all. This pattern holds across all regions, with the majority of insurers globally indicating no linkage between physical risk management and executive compensation.

## Governance

The board is informed of climate-related risks and opportunities on a regular basis.

	Europe	North America	APAC	Global
Not at all		8%	8%	5%
	13%	38%	17%	24%
Somewhat	42%	23%	42%	43%
	38%	23%	25%	36%
Very much so	8%	8%	8%	10%

## Governance

Climate considerations are integrated into executive performance or incentive structures.

	Europe	North America	APAC	Global
Not at all	63%	85%	67%	69%
	25%	15%	8%	18%
Somewhat	4%		17%	6%
	4%		8%	4%
Very much so	4%			2%

Source: MSCI Institute

# Perspectives on forward-looking analytics

Nearly all insurers interviewed noted that catastrophe models, which are largely calibrated using historical hazard and loss data, are becoming less indicative of future outcomes as hazard behavior evolves. At the same time, several highlighted the difficulty of isolating a distinct climate signal in observed loss trends, given the influence of other drivers such as exposure growth, natural variability, land-use change, and shifts in vulnerability. This creates a fundamental challenge, as historical experience is no longer a stable guide to future risk, while translating evolving hazard trends into pricing and risk selection remains uncertain.

Although interest in forward-looking climate analysis is growing, **some insurers interviewed described their use of these tools as exploratory rather than operational.** Methodologies for translating outputs into near-term underwriting or pricing inputs remain under development, and the mismatch between long-term horizon of climate scenarios and annual underwriting cycles continues to be a central barrier.

**Survey results also showed dispersion in the utility of forward-looking climate scenarios,** underscoring this implementation gap. While 63% of European insurers report that forward-looking scenarios meaningfully inform pricing models for exposed business lines, North American insurers show the widest divergence - 64% rate scenario use as only "somewhat" informing pricing, with just 9% describing meaningful integration. APAC insurers also show similar hesitation. However, **insurers overwhelmingly agreed that aligning climate scenarios with shorter business horizons would increase their practical relevance.** Nearly 90% of

## In their words

*"We've had that conversation internally... historical data is not the right indicator... the trends are changing much faster because of climate change."*

**Asian insurer**

European insurers and 67% of North American insurers strongly agreed that scenarios extending only to 2030 would be more actionable for underwriting decisions such as pricing and risk selection. This suggests that the barrier is not skepticism about scenario analysis itself, but rather the temporal mismatch between 2050-2100 projections and annual underwriting cycles. Developing scenarios tailored to underwriting time horizons may be essential to closing this gap.

## In their words

*"Because of climate change we're now considering including forward-looking data in our models."*

**Asian insurer**

**Forward-looking climate scenarios meaningfully inform our pricing models for business lines exposed to physical risk.**

	Europe	North America	APAC	Global
Not at all	5%		25%	17%
Somewhat	32%	64%	33%	40%
	42%	9%	33%	31%
Very much so	21%		8%	12%

**Having climate scenarios aligned with shorter business horizons (e.g., up to 2030) would increase their relevance for underwriting decisions such as pricing and risk selection.**

	Europe	North America	APAC	Global
Not at all			8%	2%
Somewhat				
	11%	33%	42%	26%
Very much so	89%	67%	50%	72%

Source: MSCI Institute

Survey results also suggest that climate-related scenario analysis is more embedded at a strategic level than in day-to-day underwriting or pricing decisions.

Globally, 58% of insurers report that their underwriting business strategy is informed by climate scenarios, with European insurers showing the highest level of integration. Interview discussions help explain this pattern: some insurers noted that strategic planning operates over longer time horizons than annual policy cycles, making scenario analysis more relevant for informing medium to long-term positioning. While insurers work to integrate forward-looking analytics into their processes, they face several cross-cutting challenges that constrain their ability to respond effectively to rising physical risks.

### In their words

*“Each year we do our annual business plan, but within that we’re also looking at the next five years, that’s our medium-term business plan. So, five years is a relevant time horizon. Ten or fifteen years is still relevant because a lot of contracts get renewed year on year.”*

**European insurer**

#### Strategy

Our underwriting business strategy is informed by climate-related scenario analysis.

	Europe	North America	APAC	Global
Not at all		8%		2%
Somewhat	29%	46%	58%	41%
	33%	38%	17%	31%
Very much so	38%	8%	25%	27%

Source: MSCI Institute

## Cross-cutting challenges identified by insurers

While insurers surveyed identified a broadly similar set of challenges, the relevance and intensity of those challenges can vary across organizations. The issues below reflect constraints that insurers say they commonly face when seeking to embed climate considerations more deeply into underwriting.

### Data availability and quality constraints

Insurers highlighted significant variation in the availability, resolution, and consistency of hazard data across regions and perils. While high-resolution hazard and terrain datasets are widely available in parts of Europe and North America, coverage remains less consistent in some Asia-Pacific markets, with insurers noting that resolution and completeness can vary materially by location.

Data limitations also differ by hazard type. Flood risk data is generally more developed, though gaps remain at local scale where high-resolution terrain or floodplain information is unavailable. In contrast, datasets for severe convective storms and wildfire were described as more fragmented, with greater variation in data quality and modeling approaches across regions. Several insurers surveyed stressed that these limitations are most acute at an asset or postal code level, where regional averages can mask meaningful differences in exposure and vulnerability.

### Reinsurance as a structural constraint

Several insurers described reinsurance market conditions as a structural constraint on managing physical risk. Changes in reinsurance pricing, attachment points, and available capacity can increase the share of risk retained by primary insurers and limit their ability to smooth volatility across portfolios, particularly for higher-risk perils or regions. Some insurers also highlighted a timing mismatch between how quickly physical hazard conditions can change and how reinsurance protection is structured. Reinsurance programs are typically negotiated on annual cycles and informed by historical loss experience, which can slow the adjustment of protection as risk profiles evolve. In this context, higher retentions and tighter reinsurance terms can interact with capital requirements and regulatory pricing constraints, influencing underwriting appetite and capacity deployment.

### Divergent regulatory expectations across jurisdictions

Insurers described variation in regulatory expectations across jurisdictions as a practical challenge when responding to rising physical climate risks. In some markets, insurers have greater flexibility to adjust pricing or underwriting criteria as hazard conditions evolve, while in others regulatory constraints limit the extent or speed of such adjustments, particularly in higher-risk areas. For insurers operating across multiple markets, this can result in different underwriting responses to similar physical risk profiles depending on the regulatory context.

#### In their words

*"For flooding for example, we need terrain data, which is not same quality everywhere; LiDAR data is great for Europe, and Asia has improved in recent years, but resolution in some geographies still needs to improve."*

**European insurer**

#### In their words

*"We provide group-level support to legal entities... adapting the group underwriting policy to meet local requirements... and excluding the US from certain processes based on legal advice."*

**European insurer**

# Maturity ladder of physical-risk management

Overall, survey results revealed significant variation in how insurers are operationalizing physical risk considerations. To provide a structured view of this variation, we have developed a maturity ladder based on interviews, survey inputs, and observed market practices. The framework below maps progression across five operational dimensions, showing how

insurers move from taking initial steps, such as establishing governance structures or identifying key risk exposures, toward more sophisticated integration where physical risk is embedded across underwriting, pricing, capital allocation, and resilience planning

Theme	Taking initial steps	Making progress	Embedding physical risk management	Advanced
<b>Governance</b>	The insurer has outlined plans to establish governance for integrating physical climate risks relevant to underwriting and portfolio exposure	The insurer has disclosed dedicated roles, timelines, and objectives for managing physical risks within underwriting and risk functions	A board member or committee has explicit oversight of physical risk, including impacts on underwriting strategy, accumulation and capital	Physical risk governance is embedded across underwriting, pricing, and portfolio management, with senior remuneration linked to resilience, loss prevention and portfolio robustness
<b>Strategy</b>	The insurer has identified the key lines of business, geographies, and perils it plans to assess for physical climate risk	The insurer has identified material physical risks and opportunities across short, medium, and long horizons, including implications for underwriting appetite	The insurer has quantified key elements of its physical risk management, reflecting geographic differentiation, peril severity and concentration of exposure	The insurer has a clear adaptation and underwriting strategy supported by financial plans, capital allocation, reinsurance strategy and targets for portfolio resilience
<b>Climate risk management</b>	Initial qualitative assessment of physical risks to insured portfolios	The insurer uses climate hazard data and analytics to qualitatively and quantitatively assess underwriting and portfolio risks	Climate scenario analysis is applied across multiple scenarios, including tail risks and non-linear impacts on losses, pricing and capital	Climate risk analytics are fully integrated into underwriting guidelines, accumulation management, pricing and portfolio steering
<b>Metrics and targets</b>	Initial consideration of physical risk-related metrics for underwriting	The insurer produces exposure, hazard, and materiality metrics across portfolios and regions	Metrics, limits, and targets for physical risk are defined and increasingly embedded in underwriting decisions and portfolio management	Clear adaptation and portfolio resilience metrics are in place, with metrics actively steering underwriting strategy and risk appetite
<b>Reporting and disclosures</b>	Initial internal reporting on physical risks	Public disclosure of physical climate risk exposures at a high level	Public disclosure of physical risks, scenario analysis outcomes, and implications for underwriting and portfolio management	Detailed, validated climate risk reporting covering governance, underwriting strategy, risk management, and metrics aligned with supervisory expectations

Source: MSCI Institute

# Evolving supervisory expectations

As physical risks have become more material for insurance claims, costs, and availability, supervisors are treating climate risk as an increasingly important prudential issue. In many jurisdictions, climate-related prudential requirements focus on governance and risk management (pillar 2), including expectations around

scenario analyses and established prudential processes such as own risk and solvency assessment (ORSA) and capital planning (see Exhibit 2). In addition, some jurisdictions require insurers to disclose climate-related risks (pillar 3).

## Exhibit 1: Physical risk-related losses set to nearly quadruple by 2050

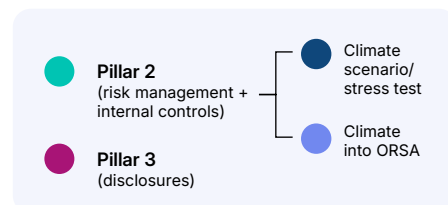
### Americas

**U.S. National Association of Insurance Commissioners:** Insurers in participating states required to comply with TCFD reporting (first participating states since 2022), which has since moved toward the ISSB standards.

**New York Dept. of Financial Services (DFS):** NYDFS requirements for NY-domestic insurers' management of financial risk due to climate change (2022).

**Bermuda Monetary Authority:** Guidance on embedding climate risk in governance and risk management, including ORSA and climate scenario analysis (2025).

**Canada – Office of the Superintendent of Financial Institutions (OSFI):** Updated guidelines on mandatory climate-related financial disclosures, risk management and scenario analysis (2025).



**Central Bank of Brazil:** Climate risk integration into governance, risk management and scenario analysis; mandatory stress testing from 2025.

### Europe

**Germany – BaFin:** First issued sustainability risk guidance in 2020. Many of these expectations became binding (2023), and a new circular explicitly embeds such risks for Solvency II insurers (2025).

**UK Prudential Regulatory Authority (PRA):** Launched a consultation proposing enhanced supervisory expectations for banks and insurers on climate-related financial risks and finalized these expectations in December 2025.

**France – Autorité de Contrôle Prudentiel et de Résolution:** Requires insurers to disclose climate-related financial risks and integrate them into governance and risk management.

**Swiss Financial Market Supervisory Authority:** Requires insurers to disclose climate-related financial risks and integrate these risks into their governance and risk management processes (2022).

**European Insurance and Occupational Pensions Authority (EIOPA):** Application guidance on integrating material climate-related financial risks in ORSA (2022). Published results of monitoring exercise (2025).

**EU Solvency II Review:** The amending Directive introduces requirements for climate-risk materiality assessments and long-term climate scenario analysis in ORSA. Member States must transpose by Jan 2027.

### Asia

**Monetary Authority of Singapore (MAS):** Guidelines for embedding climate risks in environmental risk management came into force (2022). Further transition-planning guidance expected.

**Australian Prudential Regulatory Authority:** Supervisory expectations for managing climate-related risks within governance and risk management practices (2021).

**Financial Services Agency Japan:** Supervisory guidance on climate risk management (2022). Reinforced by the FSA's 2025 insurers' climate-risk management report and second scenario analysis exercise.

**China Banking and Insurance Regulatory Commission:** Issued guidelines for insurers to enhance climate risk management and disclosure practices (effective January 2023).

### Global

**International Association of Insurance Supervisors (IAIS):** Published recommendations to support regulators integrate climate risk into the supervision of the insurance sector (2021).

Conducted a series of public consultations to propose climate-related considerations to the global framework for insurance supervision (2023/24).

Source: MSCI Sustainability & Climate Research, as of December 2025. ORSA = Own Risk and Solvency Assessment. TCFD = Task Force on Climate-Related Financial Disclosures. Note: The table is illustrative and non-exhaustive, showing selected regulatory developments in key jurisdictions across the APAC, EMEA and Americas regions as of December 2025. Jurisdictions are at varying stages of supervisory development, including differences in the scope, maturity, and implementation of climate-related supervisory approaches. No direct comparability across jurisdictions should be inferred.

In parallel, regulators are paying closer attention to market-wide outcomes, particularly where affordability pressures and the protection gap are widening and creating broader economic and fiscal exposure. A brief look at practices across different regions reveals these developments.

### **Europe and the UK**

In the EU, EIOPA been explicit that climate-driven catastrophe trends can become a supervisory concern through underinsurance, market retreat, and knock-on fiscal impacts. EIOPA has highlighted that only about a quarter of natural catastrophe losses are insured across the EEA, which helps explain why supervisory attention spans both firm-level risk management and the dynamics of insurability and affordability. EIOPA's work on protection gaps and related policy measures signals a more intervention-aware posture in the face of climate risk.

In the UK, the PRA's SS5/25 sets updated expectations for how banks and insurers should identify, manage, and embed climate-related risks. Supervisors are looking for climate risk to be reflected in day-to-day decision-making. This includes clearer articulation of material exposures, stronger management information, and evidence that scenario analysis is being used to inform strategy and risk appetite, including where physical risks affect underwriting, reserving, and operational resilience.

### **Asia-Pacific**

In Asia-Pacific, a growing number of supervisors are setting out expectations for insurers. Singapore has advanced rapidly with development by the MAS of Guidelines on Environmental Risk Management covering governance, strategy and disclosure. This increased focus positions environmental and climate risk an increasingly central supervisory topic.

In Australia, APRA's CPG 229 provides a prudential

framework for managing climate change financial risks. APRA has also published results from its 2024 climate risk self-assessment survey, showing that while banks' maturity improved, large insurers' average maturity remained broadly unchanged. This supervisory benchmarking signals that expectations are continuing to rise for insurers.

### **North America**

Insurance supervision in the U.S. is primarily state-based, and many large states continue to require and expect climate-related reporting and risk management evidence from insurers. The NAIC Climate Risk Disclosure Survey remains an important supervisory tool in participating jurisdictions, including California and New York, using a structure based on the Taskforce for Climate-related Financial Disclosures to collect information on governance, risk management, and strategy.

In Canada, climate risk expectations are becoming more clearly embedded within prudential supervision. OSFI's B-15 climate risk management guideline sets out requirements for insurers, covering governance, risk management, scenario analysis, and phased disclosure expectations. OSFI has also reinforced scenario analysis through climate scenario exercises to enable benchmarking and system-level assessment.

### **Globally**

Supervisors worldwide are increasing the attention put on climate-related risks in the insurance sector. Recent work by IAIS provides a practical reference point for supervisors on how to integrate climate-related risks into their oversight practices. This work reinforces expectations around governance and risk culture, risk identification and measurement, and supervisory assessment of how climate influences risk and solvency.

# Commercial opportunities and innovation

While insurers are grappling with the challenges of rising physical risks, many also see commercial opportunities emerging. Some of these opportunities build on existing products and services, while others reflect more novel approaches to managing and transferring physical risk. They expand the ways in which insurers can support clients' adaptation efforts and align insurance offerings with broader responses to physical risk.

## In their words

*"We are supporting clients in becoming more resilient... continuing to develop risk estimation tools, including advanced screening, where to provide resilience investments, and also providing mitigation advice."*

European insurer

## In their words

*"Deploying more capacity in regions with underinsurance is a key opportunity for growth and resilience over the next 5 to 10 years."*

European insurer

## Perspectives on opportunity size

Insurers showed cautious optimism about new underwriting opportunities related to climate resilience, though views differ on the scale and timing. When asked about opportunities for their own firms, insurers globally were roughly evenly split between viewing the potential as large (51% expecting 10-20% GWP growth) and moderate (43% expecting 5-10% GWP). European insurers were most optimistic, with 63% expecting large opportunities, while North American and APAC insurers were more cautious.

When asked, however, about opportunities for the insurance sector overall, sentiment shifted more positively. Globally, 71% of insurers surveyed say they view sector-wide opportunities as large (10-20% GWP), with 20% seeing transformational potential (>20% GWP).

This pattern of greater confidence in sector-wide opportunities than in individual firm opportunities suggests insurers recognize the commercial potential of physical-risk resilience underwriting but may be uncertain about their ability to capture market share or differentiate offerings in what could become a more crowded space. It also reflects the reality that many solutions related to resilience may require collective industry action, that extends beyond any single insurer's capacity.

Over the next five years, how large do you believe the opportunity is for new underwriting related to climate resilience, in terms of Gross Written Premium (GWP)?

### For your firm

	Europe	North America	APAC	Global
Negligible (<1% GWP)				
Small (1-5% GWP)	4%			2%
Moderate (5-10% GWP)	25%	62%	58%	43%
Large (10-20% GWP)	63%	38%	42%	51%
Transformational (>20% GWP)	8%			4%

### For the insurance sector overall

	Europe	North America	APAC	Global
Negligible (<1% GWP)				
Small (1-5% GWP)				
Moderate (5-10% GWP)		8%	25%	8%
Large (10-20% GWP)	67%	85%	67%	71%
Transformational (>20% GWP)	42%	8%	8%	20%

Source: MSCI Institute

## Evolution of advisory offerings and resilience services

Risk management and advisory services have long been part of insurers' offerings. Several insurers described how these activities are increasingly incorporating physical risk considerations, such as flood exposure, wildfire risk, or asset vulnerability under more extreme weather conditions.

Insurers noted that these services typically involve helping clients identify and prioritize physical risk vulnerabilities, quantify potential losses, and assess where resilience investments or mitigation measures are most effective. This support draws on insurers' existing catastrophe modeling, hazard data, and engineering expertise and is often delivered through a combination of analytical tools, risk assessments, and expert guidance, including asset-level reviews and loss prevention recommendations.

Survey results indicate strong conviction in this opportunity. Across all regions, insurers showed strong consensus that climate risk management and resilience advisory services represent a key

commercial opportunity, with over 90% of insurers globally rating this as significant or very significant. This growing focus on advisory and risk management services may also reflect a broader effort by insurers to preserve the size and viability of the insurance market as physical risk intensify. Helping clients remain insurable and keeping premiums at levels they are willing and able to pay could reduce the risk of shrinking addressable markets for insurers over the long term.

*While advisory services represent the most immediate opportunity, insurers also see potential in newer product structures that address gaps in traditional coverage →*

**Climate risk management and resilience advisory services are key commercial opportunities, and we are actively expanding offerings that help clients adapt to rising physical risk.**

	Europe	North America	APAC	Global
Not at all			8%	2%
Somewhat		8%	17%	7%
Very much so	53%	83%	42%	58%
	47%	8%	33%	33%

Source: MSCI Institute

## Parametric insurance: expanding applications and insuring new risks

Parametric and index-based insurance products were widely discussed as an area of opportunity, particularly in contexts where traditional indemnity insurance is difficult to deploy. Insurers highlighted existing applications in agriculture, weather-related risks, and catastrophe-exposed or underinsured regions, and pointed to scope for expanding parametric solutions to additional perils or markets that have historically been difficult to insure.

Parametric solutions, which offer coverage at pre-agreed amounts based on a trigger such as flooding, can enable faster settlement, providing timely liquidity after extreme events. By relying on predefined triggers, these products can reduce administrative complexity and make insurance viable where loss

adjustment is challenging. Insurers highlighted the importance of careful product design, particularly around basis risk, data quality, and regulatory acceptance. As a result, insurers surveyed say they view parametric insurance as a complement rather than a substitute for traditional coverage. Survey results reveal strong interest but also indicate this opportunity remains in earlier stages of development compared to risk management and advisory services.

*Beyond parametric products, a smaller group of insurers is exploring even more nascent opportunities at the intersection of nature-based solutions and insurance →*

Parametric and other index-based insurance products are a key commercial opportunity to address growing physical risks, and we are actively developing or piloting such solutions.

	Europe	North America	APAC	Global
Not at all	5%			2%
			8%	2%
Somewhat	26%	58%	33%	37%
	63%	42%	58%	56%
Very much so	5%			2%

Source: MSCI Institute

# Insurance for nature-based solutions and carbon credits remains niche

A small number of insurers referenced insurance for nature-based solutions and carbon credits in interviews. For example, one insurer mentioned

insurance policies to protect the delivery of future nature-based carbon credits or existing carbon credit inventories against physical risks.

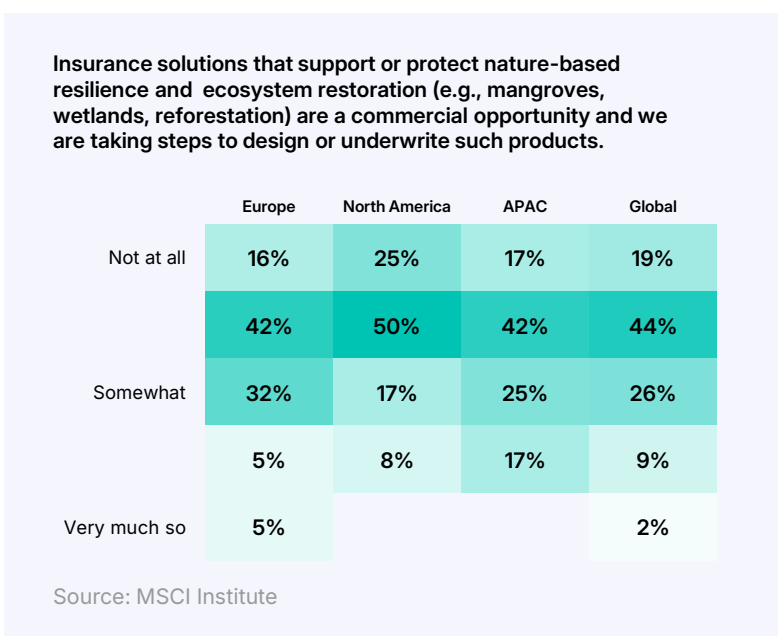
## Examples of insurance for nature-based solutions and carbon projects

Participation Type	Implementation	Insurer	Examples
Underwriting Nature-based Carbon Project Financing	Insurance coverage against carbon credit non-delivery due to physical risk impacts, protecting buyers and project stakeholders from financial losses on contracted carbon credits.	CFC	<b>Carbon Delivery Insurance</b> – coverage for buyers if contracted carbon credits are not delivered due to weather events, embedded directly into Go Balance’s carbon credit offering.
		Kita	<b>Non-Delivery Insurance</b> – coverage for partial or full non-delivery of carbon credits due to natural catastrophes, protecting buyers, investors, or project developers.
Parametric Insurance for Nature-Based Solutions	Parametric triggers based on wind speed, storm intensity to rapidly fund ecosystem restoration after natural disasters	Swiss Re	<b>Mexico’s Coral Reef Hurricane Cover</b> – parametric insurance triggered by wind speed within a predefined area, with payouts used to fund coral reef repair after storms. In 2020, Hurricane Delta triggered a USD 850’000 payout for coral reef restoration activities.
		Munich Re	<b>Hawaiian Coral Reef Tropical Storm Cover</b> – parametric insurance triggered when storm wind speeds of 50 knots or more occur in the coverage area, providing rapid funding for post-storm reef restoration.

Source: MSCI Institute.

Survey results indicate this remains the most nascent commercial opportunity among climate-related products. Globally, 63% of insurers say they see coverage for nature-based solutions as either a negligible or small opportunity, while just 11% say they view it as significant or very significant.

The results suggest that while insurers recognize the conceptual opportunity for insuring nature-based solutions, the practical challenges of product design, pricing and market demand remain substantial. Insurance for nature-based carbon credits may require further maturation of underlying carbon and biodiversity credit markets, as well as clearer policy frameworks, before it becomes a material revenue opportunity for most insurers.

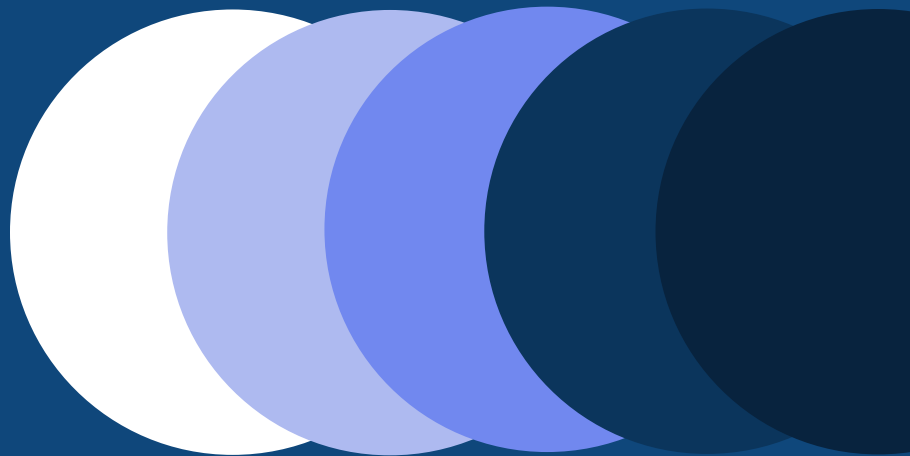


# Conclusion

**This analysis provides a baseline for understanding how the global insurance industry is responding to physical climate risk. The findings reveal significant variation across regions and operational dimensions, and an industry evolving from awareness to action. Insurers increasingly recognize the financial relevance of physical risk while working to translate that recognition into underwriting.**

Several areas warrant further exploration, including how insurers' underwriting and portfolio-management teams align on physical risk, the efficacy of supervisory policies in each region, the effectiveness of new analytical tools and products at sharpening risk assessment, and how insurers are evaluating opportunities that demand for resilience solutions may present.

The industry's response to physical risk will continue to evolve. Progress will be measured by the speed with which technical capabilities translate into operational change, the ability of the insurance sector to address challenges that individual firms cannot solve alone, and the availability of new and affordable forms of coverage that reinforce the resilience of businesses and consumers to the rising cost of extreme weather events and other mounting hazards.



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