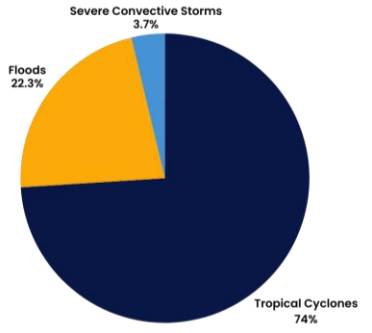
DESCARTES

# PARAMETRIC INSURANCE: A COMPREHENSIVE GUIDEBOOK FOR BROKERS AND RISK MANAGERS

## 1 THE IMPACT OF PARAMETRICS

In 2024 alone, the global protection gap stood at 60%, with $368 billion in total economic losses but only $145 billion covered by insurance—a shortfall driven largely by tropical cyclones, severe convective storms, and floods. The parametric insurance market, valued at approximately $12 billion in gross written premiums, is on a strong growth trajectory, with a projected 12% compound annual growth rate through 2030 following a decade of 22% annual growth.

**Top Global Economic Loss Events in 2024:**
**Featuring Tropical Cyclone, Flood, & Severe Convective Storm**




*Data shown for three perils selected from the top 10 global economic loss events in 2024. Source: Aon (2025)*

This momentum reflects both the intensifying impact of extreme weather and growing recognition that conventional insurance models cannot always deliver timely, flexible recovery funding. Parametric insurance, by contrast, is increasingly seen as a critical complement to traditional covers, supporting modern resilience strategies from municipal debris removal to keeping businesses afloat after a hurricane.

As disaster risks grow in frequency, severity, and cost, organizations face mounting pressure to secure coverage that responds quickly and adapts to a wide range of impacts. This is where parametric insurance stands out—offering transparent, data-driven payouts that can be deployed rapidly, helping stabilize operations, protect communities, and accelerate recovery efforts without the bottlenecks of traditional claims processes.

## 2 WHAT IS PARAMETRIC INSURANCE?

Parametric insurance, also known as index-based insurance, indemnifies clients within days based on pre-defined payout structures when a specific triggering event occurs. Unlike conventional indemnity insurance, which requires lengthy on-the-ground loss assessments to determine the exact loss value, parametric insurance speeds up the process by linking the severity of an event to the financial losses of the client upfront, along with eliminating the need for on-site visits or audits. As a powerful tool, corporate insurance brokers and risk managers may use it to fill coverage gaps left in traditional programs or may even substitute parts of their placement altogether with parametric insurance.

Pre-defined payments are triggered by the occurrence of loss events, as measured by objective data such as wind speed, rainfall level, earthquake magnitude, or the proximity of a severe hurricane to a specific location. Once an agreed threshold or index value is met or exceeded, the policyholder automatically receives a payout (often within days) upon confirming the loss amount with a simple letter. Swift payment provides rapid liquidity to aid recovery.

Payout structures are set in advance in collaboration with the broker and the client, allowing for highly bespoke insurance solutions, in which payout amounts are scaled based on the intensity of the event. Insurance brokers take on a crucial role in this process, as it is up to them to ensure the right fit between the parametric placement and the conventional insurance placement. Descartes is proud to educate and advance the skills and knowledge of brokers in this sphere.

The parametric model offers several advantages to risk managers and brokers:

- **Transparency**: The parameters for a payout are agreed upfront and typically based on publicly available or independently verified data.
- **Speed**: Payments can be made very quickly, often within days of an event.
- **Coverage**: Since it is the event, rather than the loss, which is insured, intangible losses such as loss of attraction and non-damage business interruption are covered.
- **Efficiency**: With reduced administrative and claims-processing costs, parametric insurance can be a cost-effective solution.
- **Predictability**: Parametric insurance provides first-dollar coverage without deductibles or exclusions.

Parametric insurance is a vital tool for climate-risk management and disaster resilience. It is particularly valuable in developing economies and in hard-hit sectors, like agriculture and tourism, and countries facing severe climate perils like the United States and Australia. Furthermore, it is increasingly popular as a component of commercial insurance programs, where it serves to fill coverage gaps left by deductibles, sub-limits, exclusions, and coverage withdrawal.

## 3 HOW DOES PARAMETRIC INSURANCE WORK?

The parametric policy is based on an underlying index, which measures the severity of a natural event in a numerical manner. Specific values of the index determine threshold levels that translate the severity of an event to potential financial losses of the client. The identified points of coverage in a linear or stepped-fashion build the parametric index. Ultimately, in the insurance policy, the payout structure is derived from and linked to this parametric index to determine whether and how large a payout to the client is warranted.

### What is an Index?

For parametric insurance against natural events, a typical parameter is a quantifiable environmental condition such as rainfall exceeding 150 mm in 24 hours, 1-minute sustained wind speeds above 120 km/h, or wildfires at an insured location.
Consider a client who insures a 100-meter radius around their facility against wildfire risk. If satellite data confirms that a wildfire has entered this 100-meter zone, the policy has been triggered. Upon a simple confirmation of the loss by the policyholder, the policyholder immediately becomes entitled to the relevant claim. This removes ambiguity to accelerate recovery.

### From Event to Payout: A Typical Process Flow

1. **Policy Design**:
   The insurer, broker and client define the index (e.g., rainfall intensity, earthquake magnitude) and the payout structure. These are tailored to the client's exposure, risk appetite and budget.
2. **Monitoring**:
   Once the policy is active, the insurer or a verification agent monitors the selected indices through trusted data feeds on a continuous basis, ensuring a high level of data consistency and objectivity.
3. **Trigger Event Occurs**:
   Data confirms that an event has occurred and the predefined threshold for a payout has been met or exceeded. The exact claim procedure is defined ahead in each policy, thereby informing the client with a high level of certainty.
4. **Payout Issued**:
   Upon the loss confirmation of the client, the insurer initiates payment according to the agreed terms, usually within days of the event, without requiring any further input from the client. This approach enhances transparency, reduces friction in claims settlement, and ensures rapid liquidity for policyholders in the aftermath of a disaster.

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## 4 THE INFLUENCE OF TECHNOLOGY ON PARAMETRICS

Technology is integral to the effectiveness and scalability of parametric insurance. From the initial structuring of a policy to real-time monitoring and rapid payout execution, digital systems and advanced analytics support every component of the parametric insurance lifecycle.

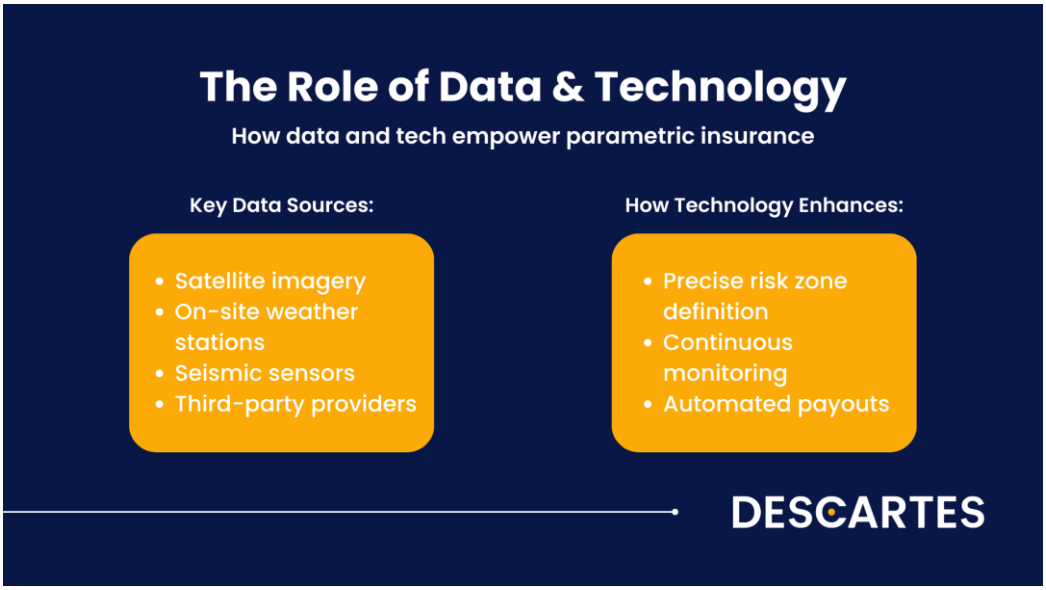
**Data-Driven Product Structuring**
The development of a parametric insurance policy begins with risk assessment and product design. Technology enables insurers to structure and price solutions that align with a client's specific exposures, historical loss data, and budget. This involves the use of sophisticated catastrophe modeling, machine learning, and scenario-based stochastic simulations. These tools help quantify risk in a transparent and reproducible way, ensuring indices accurately reflect the underlying hazards.

Customized policy design would not be possible at scale without digital platforms capable of handling complex datasets and modeling perils across geographic regions and time horizons. These capabilities are especially important for addressing emerging risks, including those driven by climate change.

**Real-Time Monitoring of Trigger Events**
A defining feature of parametric insurance is the reliance on independently verifiable data to determine whether a loss event has occurred. This is made possible by a wide array of data sources and technologies, including:

- Satellite imagery and remote sensing
- Internet of Things (IoT) devices and environmental sensors
- Radar, sonar, and telemetry systems
- Meteorological and seismic data from global and local networks

These systems continuously monitor for event conditions—such as wind speeds, rainfall totals, wildfire proximity, or earthquake magnitude—enabling near real-time detection of triggers. High-frequency data feeds and reliable measurement networks help to ensure consistency, precision, and objectivity in policy activation.



**Parametric Claims Assessment**
While the client and insurance broker file a first notice of event and complete a declaration of loss, an event report is created, evaluating the parameters and modeled loss based on data received from the certification agent or data provider. Then, within a matter of days or weeks, the claims payment is made—either to the policyholder directly or to a sub-party defined in the policy.

**Technology-Supported Renewals and Portfolio Management**
After a policy period ends, technology continues to play a role in renewal and risk analysis. Digital platforms allow insurers to adjust pricing based on updated data and incorporate emerging trends such as changing weather patterns or regional hazard shifts. Portfolio-level analysis enables insurers to manage diversification, ensuring resilience across multiple geographic and peril exposures.

Automated tools also improve the renewal experience, allowing for clear documentation of past performance, event history, and future risk modeling—all of which support more informed decision-making. For brokers, parametric insurance fosters long-term stability, strengthens partnerships with insurers, and supports consistent commission retention.

**Agnostic Modeling and Data Integration**
A core strength of parametric insurance lies in its use of agnostic modeling frameworks. These systems remain neutral and adaptive, drawing on a wide spectrum of data sources such as sensor networks, satellite imagery, third-party hazard models, and environmental datasets.

Machine learning, image recognition, and probabilistic simulations help refine risk assessments, enabling the creation of hazard-specific products across different industries and geographies. Importantly, these methods maintain transparency and consistency in how risks are measured.

For brokers, this independence from traditional market cycles and recent loss events provide a valuable complement to classic placements, offering clients innovative options without being bound by the constraints of conventional insurance market dynamics.

## 5 PARAMETRIC INSURANCE IN ACTION

Parametric insurance has been applied across a growing number of risks and industries, offering tailored solutions where speed, transparency, and accessibility are critical. Below are selected examples of parametric insurance products and the types of claims they cover.

## 1 Wildfire Coverage for Residential Communities

A homeowners association (HOA) in California, located in a high-risk wildfire zone, struggled with rising premiums year-on-year and subsequent coverage deductions. After a destructive wildfire event in 2025, the HOA turned to parametric coverage.

**Trigger**: A wildfire breaching a 100-meter radius around insured property, as verified by satellite imagery.

**Outcome**: If a fire crossed into the covered area, a full payout would be issued after a declaration of loss, providing immediate liquidity without the need for on-site damage inspection. This would enable the HOA to meet its financial obligations and avoid additional fundraising from homeowners.

## 2 Earthquake Coverage for Corporate Assets

A corporate entity in Turkey, situated in one of the world's most seismically active regions, experienced heavy financial losses from a magnitude 7.8 earthquake in 2023. Their traditional policy did not offer sufficient protection.

**Trigger**: Peak Ground Acceleration (PGA) reaching 20%g at the insured location.

**Outcome**: Under a parametric structure, a similar earthquake reaching 100%g on the PGA scale would trigger a payout. This form of coverage bypasses the delays and uncertainty of traditional claims adjustment and empowers operational continuity in disaster scenarios.

## 3 Cyclone Protection for the Hospitality Sector

In Queensland, Australia, a hotel previously affected by Tropical Cyclone Debbie struggled to recover due to long claims processing and reduced insurance availability in subsequent years. A parametric policy was introduced to fill this protection gap.

**Trigger**: A cyclone of Category 3 or higher within a defined distance, with minimum wind speeds starting at 118 km/h.

**Outcome**: If a qualifying cyclone passed within the predefined area, the policy would issue a payout based on wind speed and proximity—up to 100% of the insured limit. This structure would provide rapid access to funds, helping the business remain operational through future events.

These examples illustrate the adaptability of parametric insurance to different perils and industries. By relying on objective, third-party data and customized payout structures, parametric products provide certainty and speed—particularly where traditional insurance may fall short.

## 6 PARAMETRIC INSURANCE VS. TRADITIONAL INSURANCE

Parametric insurance differs fundamentally from traditional indemnity-based insurance in both design and execution. These differences are especially apparent in how payouts are triggered, how quickly claims are settled, and how risks are covered.

**Payout Structure**
In traditional insurance, payouts are based on the loss suffered by the policyholder. After a loss event, claims auditors typically conduct an on-site damage assessment to determine the value of the claim. This process can be time-consuming, subjective, and resource-intensive—often resulting in lower-than-expected payouts due to deductibles, sub-limits, or a lack of comprehensive coverage in place.

By contrast, parametric insurance is based on the severity measured by the parameter, and when triggered, results in the corresponding pre-determined payout. Hence, the amount is determined by a pre-agreed payout formula rather than assessed loss on-site. For example, a policy might pay out a fixed amount if wind speeds exceed 120 km/h within a specific area, clearly indicating the eligible payout amount to the policyholder, thus increasing certainty and reliability.

**Speed of Payout**
One of the most significant advantages of parametric insurance is speed. Because there is no need for physical loss adjustment, payouts can be made within days of the event based on data from trusted third-party sources.

Traditional insurance, on the other hand, may require several weeks or months to process claims, especially in disaster-affected areas where access is limited and assessors are in short supply. This delay can slow recovery and increase economic hardship.

**Risk Coverage**
Traditional insurance typically covers specific assets and requires clear proof of direct damage. It often excludes emerging or systemic risks, such as those related to climate variability, due to difficulties in quantifying and pricing them. Conventional covers are subject to market cycles, vulnerable to capacity shortages, and frequently structured with complex wordings and deductions. These complexities can introduce basis risk—often without the client's full knowledge.

Parametric insurance can be structured to cover a broader range of event-driven risks, including those that are traditionally considered uninsurable. It is particularly well-suited to:
- Catastrophic or systemic risks
- Hard-to-reach geographies
- Situations where rapid liquidity is critical

Moreover, because it relies on objective triggers rather than claims investigation, parametric insurance can be deployed in low-infrastructure environments or developing economies, offering financial resilience where traditional coverage may be unavailable or unaffordable.

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## 7 WHO BENEFITS FROM PARAMETRIC SOLUTIONS?

Parametric insurance is applicable to all industries but is particularly well-suited to organizations and sectors that face measurable, high-impact risks. Its flexible design allows for solutions tailored to the needs of both large corporations and smaller businesses.

Parametric insurance can be adapted for a wide range of business profiles:
- **Small businesses** benefit from predictable costs and fast payouts that help ensure continuity after a disruption. This is particularly useful where cash flow is limited, and immediate recovery funds are essential.
- **Mid-sized and large enterprises** often use parametric policies to complement or "top up" excess layers or traditional insurance programs or "buy back" their deductibles in critical regions, ultimately filling coverage gaps for significant natural perils.

Because payouts are based on pre-agreed triggers, rather than actual damage, there are fewer administrative burdens, making parametric policies accessible even to companies with limited resources or infrastructure.

At the same time, **insurance brokers** benefit by earning commissions, securing renewals, expanding business opportunities, and enhancing their value proposition with innovative solutions. The parametric nature of these policies also provides brokers with a reliable source of capacity and stability.

## Key Industries That Benefit

**Agriculture**
Farmers and agribusinesses face weather-dependent risks such as drought, flood, and heatwaves. Parametric insurance helps stabilize income and investment by providing quick payouts after adverse weather events.

**Hospitality and Tourism**
Hotels and resorts in storm-prone or wildfire-affected areas can suffer severe business interruption. Parametric coverage ensures they receive fast liquidity, even if physical damage is minimal or access to the property is temporarily lost.

**Energy and Utilities**
Operators of wind farms, solar plants, hydro power plants, and other critical infrastructure rely on weather conditions and system uptime. Parametric policies can mitigate revenue loss from weather-dependent or seasonally abnormal underperformance or shutdown due to extreme weather.

**Public Sector and Municipalities**
Governments and agencies can use parametric products to fund disaster relief, infrastructure repair, or emergency services following natural catastrophes, reducing reliance on delayed external aid.

**Construction and Real Estate**
Developers and asset managers use parametric insurance to manage risks during construction phases or for high-value properties in hazard-prone regions, ensuring timely recovery and uninterrupted project timelines.

**Financial Institutions and Investors**
Parametric products are increasingly used as portfolio covers to cover in a transparent manner loan defaults, portfolio climate risks, and severe economic consequences or as stand-alone covers to hedge the risk of investment projects in particular exposed regions. , where objective triggers support transparency and portfolio protection.

## Where Parametric Insurance Works Best

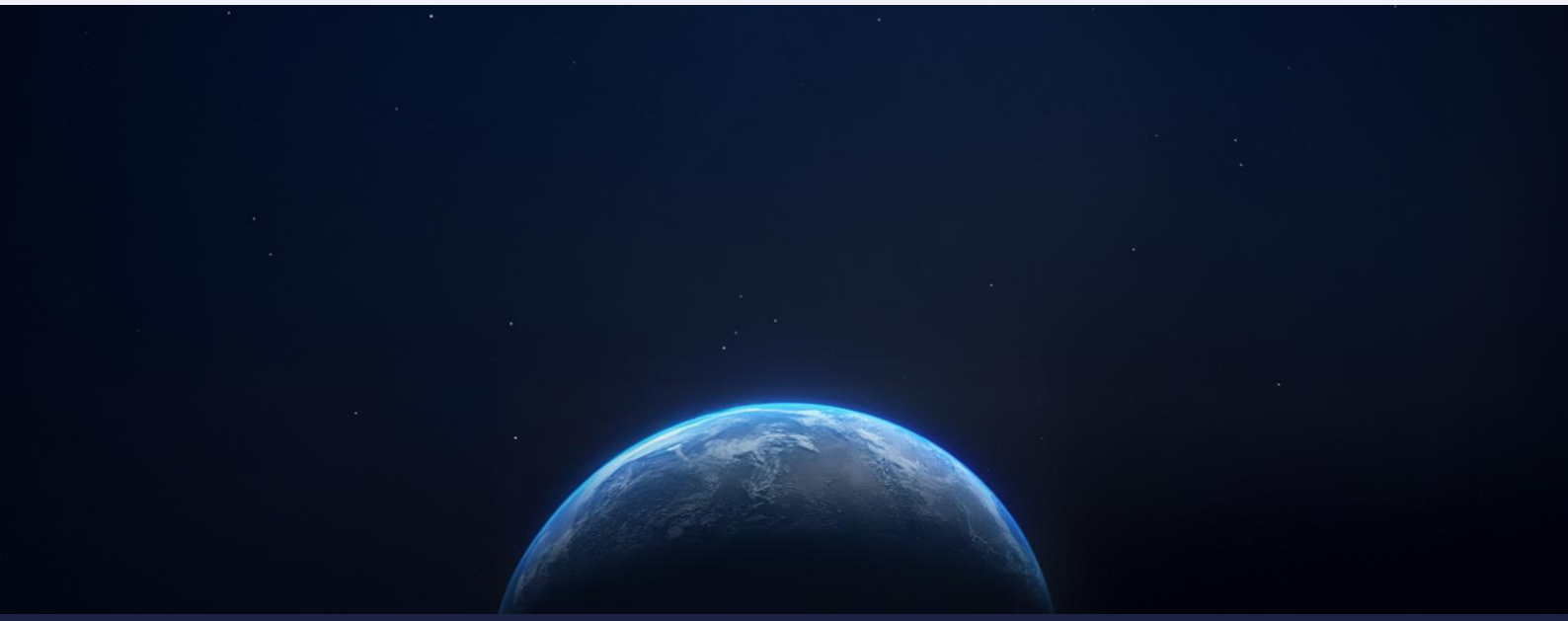
Parametric insurance is most effective when:

- **The risk is well-defined and measurable** (e.g., earthquake magnitude, rainfall totals, wind speed).
- **The need for fast recovery funding is critical** (e.g., businesses in disaster-prone areas).
- **Infrastructure or data access is limited**, making traditional claims adjustment difficult.
- **Coverage gaps exist in the traditional market**, such as exclusions, high deductibles, or non-renewals.

This includes not only high-risk regions, such as coastal zones, wildfire corridors, or seismic hotspots, but also emerging markets where insurance penetration is low and climate vulnerability is rising.

## Why It Matters Today

The coverage gap is widening due to factors like climate change and urbanization. Although more businesses are finding protection, the economic loss is still growing faster than the insured loss. Therefore, the need for comprehensive coverage proves that alternative risk transfer solutions are vital—and parametric insurance is set to play a central role in closing protection gaps worldwide. By combining speed, clarity, and adaptability, it enables organizations and communities to respond immediately and invest in future resilience—making it not just an alternative, but an essential part of modern risk management.



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