D4.5 White paper for the insurance sector

Authors: Kati Berninger, Adriaan Perrels, Peter Robinson, Sheetal Saklani, Laura Trentini, Hilppa Gregow

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Table of contents

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Executive summary: Climate-smart insurance for a resilient Europe

Aligning risk transfer, capital allocation and adaptation incentives to sustain insurability

This White Paper, developed under the Horizon Europe PIISA project, addresses a strategic challenge for the European insurance industry: maintaining underwriting viability and capital resilience in an era of accelerating climate risk.

Europe is locked into rising hazard levels for decades. Global temperature is rising at approximately 0.27°C per decade, with warming tracking at the upper range of earlier emission scenarios. Climate-related losses in the EU have reached €822 billion in the period 1980-2024, while substantial protection gaps persist across markets.

For insurers, climate change represents a structural shift in risk dynamics. Non-linear loss patterns, compound events and spatially correlated exposures challenge actuarial models built primarily on historical data. Continued development in high-risk areas increases accumulated exposure and capital pressure, testing affordability, solvency, and long-term portfolio stability.

Strategic directions for insurance industry leadership

The PIISA pilots provide practical evidence that climate-smart insurance is both technically feasible and commercially relevant — while also confirming that substantial work remains.

1. Forward-looking underwriting and product innovation

Across five pilot areas — climate and financial risks in agriculture, windthrow insurance for storm risk, wildfire insurance linked to nature-based solutions, green roof insurance as an adaptation response to floods and heatwaves, and drought-related building damage assessment integrated into property insurance — PIISA tested how physical hazard modelling, climate services and actuarial analytics can be combined in product design and underwriting.

These pilots demonstrate that integrating forward-looking climate projections improves risk differentiation, strengthens pricing discipline, and supports more resilient portfolio construction. Parametric and hybrid models can complement traditional indemnity insurance, enhancing transparency and capital efficiency.

2. Incentivizing prevention as a capital strategy

The pilots confirm that insurance mechanisms can actively support adaptation. Linking underwriting conditions and pricing structures to resilient land management, nature-based solutions or building-level adaptation measures reduces expected losses and moderates long-term capital strain.

Prevention is therefore not only a policy objective — it is a strategic tool for managing volatility and protecting solvency under evolving climate scenarios.

3. Strengthening risk intelligence and market dialogue

PIISA also revealed structural gaps in data integration, modelling consistency, and shared understanding of insurance's role in climate adaptation. Climate science, adaptation economics and insurance market dynamics are still insufficiently aligned. In many contexts, the industry's capacity to incentivise adaptation is not fully recognised by policymakers or financial stakeholders.

Closing these gaps requires continued dialogue between insurers, regulators, researchers, and public authorities, supported by improved data governance and transparent risk communication.

The way forward

PIISA demonstrates that climate-smart insurance solutions can be co-designed, tested, and implemented. However, scaling these approaches demands regulatory clarity, improved data frameworks, and sustained cross-sector collaboration.

For industry leaders, the imperative is clear: embed forward-looking climate risk into underwriting, pricing and capital allocation — while actively shaping the policy and market environment to sustain insurability.

By aligning risk transfer, capital deployment and adaptation incentives, the insurance industry can strengthen its own long-term competitiveness while reinforcing Europe's resilience in an era of accelerating climate risk.

1 Introduction

This White Paper highlights how the insurance industry can lead the way in closing the climate change protection gap through innovation and strategic collaboration with a close connection to adaptation planning. It is built on the findings and outcomes of the Horizon Europe project PIISA (2023-2026). The PIISA project has developed climate risk monitoring, risk prediction and risk alert methods as well and tools and climate services to facilitate this work. The project included also several pilots in which these elements were explored with the prospect of new insurance products. PIISA has also mapped citizens' views and the understanding of insurance as an adaptation measure.

This paper aims at summarizing the lessons learned from the perspective of insurance companies and the insurance industry. It provides background, research results and links to further information on climate adaptation and insurances. It also provides a way forward with recommendations targeted to insurance companies and their trade associations. We hope this paper provides guidance on the path towards climate-wise insurance sector.

1.1 Changing climate increases risk for extreme weather events and their impacts

Because of climate change, Europe will be subject to increasing drought, heat stress, sea level rise, variability in precipitation, coastal, fluvial and pluvial flood risks, and wildfire risks, with follow-up effects on biotic risks in forests and agriculture, ecosystem changes, and cascading effects (Bednar-Friedl et al., 2022). We can expect more severe and/or more frequent extreme events, which eventually translate into - often non-linear – increased risk of damages in the built environment, agricultural areas, forests, and nature areas, with follow-up effects for public health and the economy.

Weather and climate-related hazards caused overall economic losses of assets estimated at €822 billion during 1980 - 2024 in the EU, with over €1208 billion (25%) in the last four years (2021 - 2024). (EEA, 2025) This is tied to the fact that recent years have seen many long-standing climate records broken in Europe. Europe has already faced more and stronger climate hazards than earlier, and most climate hazards in Europe are projected to further increase during the 21st century, even under optimistic scenarios. A pessimistic scenario suggests that economic damages related to coastal floods alone might exceed €1 trillion per year by the end of the century in the EU (EEA, 2024). These challenges present an urgent need for adaptive strategies to foster sectoral resilience and safeguard food security across the EU.

The extent of these impacts will depend on how efficiently and quickly global greenhouse gas emissions are reduced. Given the realized and planned emission reduction efforts, the most optimist scenarios with only 1.5 degrees global warming are getting highly unlikely. Currently, the trends indicate that the world would be heading for 2.1 ~ 2.6 degrees global warming depending on the extent that targets are achieved and new pledges fulfilled (Climate Action Tracker, 2025).

Given this outlook, including a continued shortfall in climate change adaptation investments (UNEP, 2025; Monteleone et al., 2026), insurance companies should expect that climate change enhanced

risks will continue to grow quickly in the next few decades. When zooming in on specific types of hazards for specific regions in Europe, the paces of change are expected to vary significantly. For example, forest fire risks in Portugal, where rising temperatures exacerbate existing aridity and seasonal droughts, will increase much faster than in Finland with higher moisture levels (JRC, 2020). However, southern Europe is already more prepared to these events, whereas the Nordic countries are not. An example is from the extremely warm and dry summer 2018, when the Nordic countries needed help from more experienced countries. Proactive development of resilience against wildfires in the North is equally important as it is for the south.

Vulnerability and resilience need also to be considered when assessing climate risk. Among others, it is important to assess areas with ageing populations that are vulnerable to heat waves or ailing economies with low adaptation capacity. These areas/regions may be subject to even stronger increase in social or economic impacts due to more severe extreme weather impacts in the future.

1.2 Protection gap persists despite growing damages

Extreme weather events and their impacts need to be addressed through a variety of adaptation measures. They can also be managed by strengthening risk-sharing instruments and increasing their uptake. Concrete examples are investments to e.g., flood protection structures using NBS or other means, or improving land-use planning strategies and monitoring and reporting on their implementation and effectiveness. In many regions and sectors, however, current levels of risk prevention and risk sharing are inadequate (UNEP 2025). As a result, both the adaptation gap and the insurance protection gap are widening, even though European authorities are up-to-date informed about trends in damage from climate-related events (EEA, 2025). One issue is that we lack a systematic monitoring process of the changing risk landscape, as climate change is occurring in non-linear ways. Closing these gaps requires coordinated action across both domains.

The protection gap related to extreme weather events is demonstrated by maps on the coverage of natural catastrophe insurance in European countries shown in figure 1. The differences are a result of historical, geographical, political and cultural backgrounds, which in turn has led to differing national insurance regimes. Coverage is more widespread in countries with a greater state involvement, or where insurance is linked to other financial products (e.g. mortgage). Nordic countries have generally higher penetration rates for all hazards and sectors. In addition, the commercial sector presents higher insurance take-up compared to the residential sector in all countries. (See Ceolotto et al., 2024, chapter 3.3)

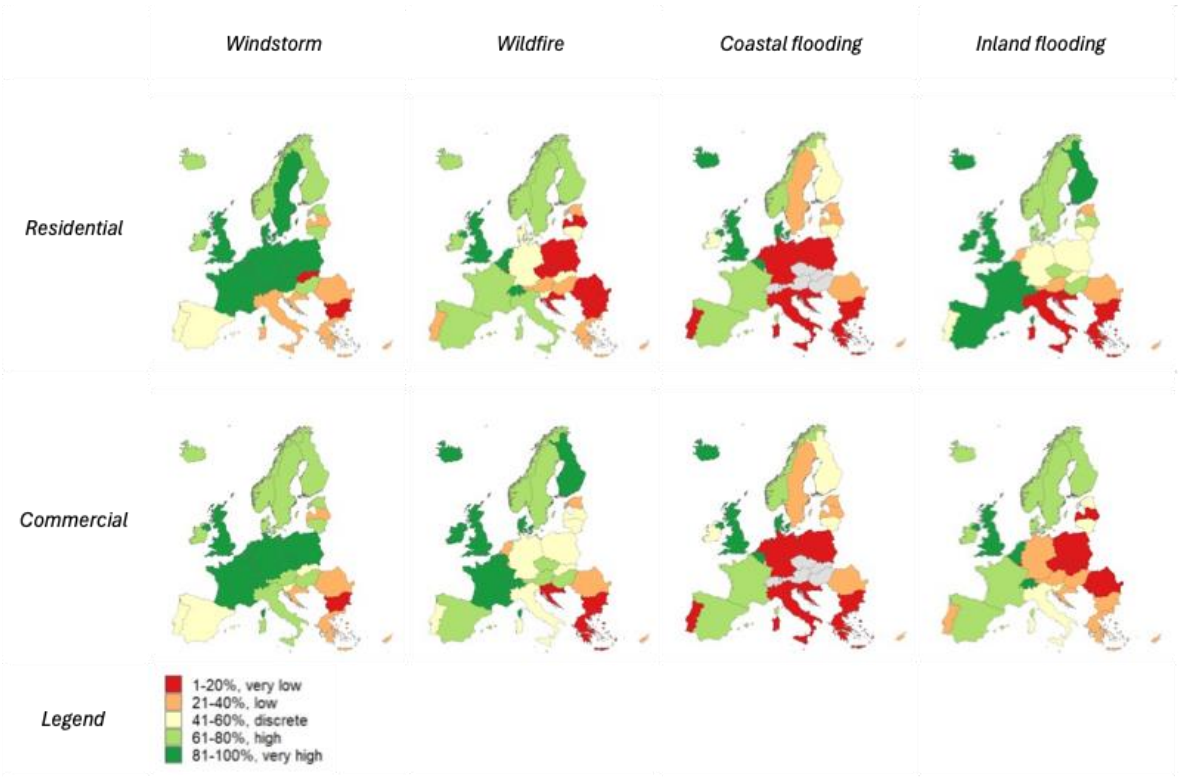

Figure 1. Residential and commercial insurance penetration rates in European countries covering different natural disasters. Source: Ceolotto et al., 2024

A survey conducted by the PIISA project with 951 participants from six countries – Finland, France, Germany, Italy, Netherland and Spain – further demonstrates the existence of such a protection gap. 76% of respondents had experienced at least one natural hazard during the last five years and 26% had suffered economic losses because of the natural hazard (Lameh et al., 2024). Despite this significant level of risk exposure, almost 60% of the respondents reported not being insured against any natural hazard. Moreover, about half of the respondents reported not receiving any economic compensation for the damages suffered. Of those who did receive compensation, 84% received it through insurance and 11,5% as government aid. Another survey focusing on the agriculture sector in Southern Spain shows that only about half of the farmers reported using climate insurance, while nearly 87% of the farmers reported moderate to severe weather impact on crops in the last 5 years, and more than 81% of the farmers reported historical losses from drought alone (Saklani et al., 2025).

Taking an example from a vital sector, agriculture shows that about 60% of the world's insurable crop value lacked climate-risk coverage in 2022, leaving a global crop insurance protection gap of roughly $113 billion (up from $88 billion in 2016). This gap has grown by about 4.2% per year since 2016. According to the Swiss Re Institute's Crop Insurance Resilience Index, resilience in advanced EMEA fell over 2016–2022 as crop values outpaced sums insured in markets like Spain and Italy, and France faced repeated poor yields. The regional protection gap doubled from $10 billion to $21 billion over the same period (SRI, 2023).

2 Climate-driven pressures on insurance markets

As climate warming intensifies, the insurance sector faces a fundamental shift in its operational landscape. This section examines the direct pressure of increasing claims from frequent extreme weather events across Europe. It further explores the critical issue of insurability, specifically how high-impact disasters and spatial risk correlation threaten the availability and affordability of coverage. Finally, the discussion addresses the need for higher capital reserves as asset exposure grows, particularly in high-risk zones.

2.1 Rising claims under a changing climate

As highlighted in section 1.1., losses caused by natural hazards have increased in the recent decades and are projected to rise further as the climate continues to warm. These growing losses translate directly into higher insurance claim volumes and costs across Europe. Recent examples illustrate this trend:

- **United Kingdom:**
  In 2024, British insurers recorded the highest-ever annual payouts to homeowners for weather-related damage, reflecting an escalation in storm and flood events (Association of British Insurers, 2024).
- **Spain:**
  Severe heat and prolonged drought have driven annual agricultural losses beyond **€550 million**, with more than **75% of the national territory** facing desertification risk. Water scarcity has severely impacted grain and olive harvests (COAG, 2022; Ministerio para la Transición Ecológica y el Reto Demográfico, 2015).
- **Portugal:**
  Wildfires have grown more frequent and extreme, causing widespread damage and fatalities. Between 2009 and 2023, the average annual burned area exceeded **93,731 hectares**, illustrating the scale of the challenge (OECD, 2023; Statista, 2026).
- **Netherlands:**
  The Dutch Association of Insurers' Climate Damage Monitor shows a steady increase in building damage from rainfall since 2007 (Klimaatschademonitor, 2025).
- **PIISA Interviews (Netherlands and Boreal Region):**
  Insurers in both regions report mounting urban claims driven by heavy rainfall and storms, with a gradual rise in the frequency of homeowner claims (Kroes et al., 2025).

Together, these examples underscore a clear trend: **climate-driven hazards are translating into growing annual claims**, challenging the financial stability and risk management strategies of insurance providers.

2.2 Climate change and the question of insurability

Climate change is reshaping the boundaries of insurability (see Ceolotto et al., 2024, chapter 4.2.1.). While the risks of frequently occurring events such as windstorms and wildfires can be estimated with relative confidence, low-probability/high-impact hazards—particularly floods—carry substantial uncertainty due to limited historical data.

Uncertainty and actuarial challenges

To address growing uncertainty, some actuarial consultants have introduced an "ambiguity wedge" into pricing to account for unknown shifts in climate patterns (Jensen, 2016). This challenge is especially pronounced in the reinsurance market, where imperfect competition and proprietary risk models often result in significant pricing markups (Jensen, 2016).

Reliance on historical data further complicates risk assessment. As global warming accelerates, its non-linear impacts—such as increased weather variability, amplified extremes, and tipping point risks (Merikanto et al., 2024)—reduce the relevance of the trends of the past climate records. Using historical data alone may lead to systematic underestimation of future losses and, consequently, mispriced premiums (Krauss, 2021).

Risk correlation and adverse selection

Climate-related losses are often spatially and temporally clustered (Friedl et al., 2014). For example:

- High-risk flood zones experience repeat losses, concentrating claims.
- Households in high-risk areas are more likely to seek insurance, while those outside do not—creating adverse selection.
- Hazards are increasingly interconnected (e.g., storms triggering floods and landslides), creating compound impacts that exceed the sum of individual events (Ward et al., 2022).

These dynamics increase the likelihood that certain risks become uninsurable or only insurable at unaffordable premium levels. Insurers manage these risks in many ways as part of their risk management. They also raise the probability of insurer insolvency under correlated, extreme-loss scenarios (Botzen & Robinson, 2024).

Current gap in forward-looking modelling

Despite mounting evidence, most actuarial models currently remain backward-looking. From the review conducted by Ingel et al. (2024) as part of the PIISA project, it emerged that most actuarial risk models are still backward-looking. Backward looking meaning for instance using historical data on a period of 1970-2020. The stochastic models used are reproducing data on thousands of events to detect a trend. Climate change impact on the trend is visible and integrated. However, the acceleration regarding future economic impacts of climate change and hazards might be under evaluated. As of today, insurance today is mainly covering risks for short term (next 3-5 years max). Nonetheless,

integrating forward-looking climate data would help reduce mispricing risks and better align premiums with emerging hazard patterns.

2.3 Capital requirements and growing exposure

Extreme climate change induced events may generate very large losses. This, in turn, requires substantial capital reserves to cover them, and the cost is passed on to consumers in the form of higher premiums (Ceolotto, et al., 2024, chapter 4.2.2). Alternatively, the companies seek reinsurance which also typically place a high uncertainty wedge, and their actuarial calculations have a proprietary nature.

Exposure growth in high-risk areas

A key driver of increasing capital needs is the continuing development in risk-prone areas:

- In the **Netherlands**, the value of properties located in flood-prone zones rose from under **20% of total property value in 1960** to more than **25% in 2012**, with the increase especially pronounced in residential sectors—where flood insurance uptake is typically lower (Jongman et al., 2014).
- Similar trends occur globally. Development in areas like coastal zones is often viewed as economically attractive for e.g. tourism despite a high risk of natural disasters, and often inadequate government measures to limit risk and poor spatial planning policies (Aerts et al., 2018).

Migration trends further exacerbate exposure. In many countries, population growth has been strongest in high-risk coastal and flood-prone areas. An example in the U.S. shows that even though destructive storm events continue to affect their coastline at an increasing rate, the U.S. Census Bureau estimates that between 2000 and 2016, population levels along this coastline increased by 24.5 percent, compared to 14.8 percent for the U.S. as a whole (Cohen, 2018).

These patterns reflect historical development choices made when climate risks were lower, but they now contribute to heightened vulnerability, greater exposure, and increased pressure on insurance systems.

3 Insurance sector and climate adaptation

To address growing climate risks and close the insurance gap, the climate service providers and insurance sector should focus on three priorities:

1. Understanding of changing risks and pricing insurance correctly

Insurance companies need a better, systematic way to analyse how climate risks and vulnerabilities change over time, in different regions and for different customer groups. They should use forward looking data, consider which adaptation measures clients are using, and their contribution to risk (and premium) reduction, and then check whether insurance products can be priced profitably *and* remain affordable.

2. Collaborating with the public sector

Effective climate adaptation requires coordinated action. Public authorities must assess and be prepared for climate risks, while the insurance industry should work with them to balance adaptation measures, investments, and insurance solutions.

3. Co-developing innovative insurance solutions

With a clear understanding of changing risks, insurers can adjust portfolios and develop new products that complement traditional models and provide broader protection.

These topics are dealt with in the following sections.

3.1 Collaboration to link adaptation and insurance

Insurance companies can contribute to risk reduction in several collaborative ways. They can help to raise awareness of risks among their customers and in the society. At the same time, information on risk prevention measures can be shared. Broader risk awareness work can be carried out in collaboration with public actors or NGOs, for example housing associations.

Insurers can also provide information or data about weather-related damages. The Climate Damage Monitor published by the Dutch Association of Insurers (Klimaatschademonitor, 2025) is a good example that should be broadly replicated in other countries. It provides information to experts, residents and businesses on annual insured damages caused by extreme weather in the Netherlands, with options to filter by specific hazards or insurance types.

Adaptation measures that reduce potential exposure and vulnerability thus reducing the climate risk are essential in maintaining insurability. Thus, it is important for the insurance sector that solid steps are taken to plan and implement effective adaptation measures. Insurers can incentivise and inform individual policy holders to take more preventive measures. Insurers can also co-operate with national, regional and local governments to help developing and implementing effective adaptation measures. They can provide their expertise, develop innovative insurance products, and in some cases, finance critical adaptation measures, while accounting for the effects of other measures on the remaining risks to be insured.

Insurance companies and other actors in insurance sector do engage in cooperation with research and expert organisations as well as public organisations with respect to adaptation to climate change, but the depth and scope of the cooperation vary enormously, while it is rarely long-term. There are some examples of lasting structural cooperation. For example, in Norway insurers agreed jointly with municipalities to provide damage data to support effective municipal adaptation policies (see section 1.3). Another example is the Dutch Climate Impact Atlas, entailing structural cooperation of research and expert organisations, and public organisations.

Co-operation between experts in climate change and its impacts and insurance companies benefits both. For example, in a forest fire pilot of the PIISA project run by AXA Climate, a regional authority, AGIF, researchers and an insurance company are cooperating, resulting in a prototype of an insurance product.

3.2 Collaboration to improve data access and facilitate product development

Insurers will need a larger variety of data, including hazard and damage data, and a broader range of expertise to be able to provide effective adaptation aware insurances and related services to different customer groups. Furthermore, there will be a steady need to update insurance products and monitor changes in risk factors, including adaptation measures affecting residual risk to be covered by insurances. A part of these data may not be freely obtainable, whereas there may be lack in standardisation of the concerned data, making it hard to combine them for analysis and product development.

Under those circumstances collaboration between actors is called for to develop shared practices and standards and indeed also share data as much as possible to avoid duplication of work and attain higher quality. Efficient and effective handling of data and information is essential for the viability of insurances. Yet, at the same time a part of the economic viability is based on knowledge differentials, that insurances obviously are not very willing share. So, collaboration should be carefully designed, while a lot can be learned from existing collaborations, often public-private partnerships based on regional and/or sector cooperation.

Despite these challenges there is a growing number of examples of far-reaching cooperation, such as the Norwegian Hazard Damage Knowledge Bank (Thomassen & Hauge, 2022) and the Open Insurance Network. From interviews conducted with various representatives from insurances and (local) public authorities arises also the message that more and deeper collaboration is welcomed and possible, but not easy to establish on a more permanent basis. Collaboration can also open completely new ways of data collection, e.g. by using remote sensing and data filtering techniques, and thereby enable cost and time savings in case of claims, while also enabling cheaper monitoring of risk levels in certain areas.

Stepping up collaboration calls for a better understanding of information markets, which tend to behave differently than conventional market forms, involving features such as multisided markets and non-linear economies of scope (Coyle et al., 2020).

Furthermore, public authorities, in cooperation with private actors, should take care about consistent policies on open data and data sharing, including the security and privacy aspects and risks involved, and promote the sharing of best practices regarding such collaborations. Harrison et al. (2022) argue that natural hazard data management has evolved significantly in technical terms but often lacks a governance layer which takes care of strategic coordination and development, and assignment of *data stewardship*. The need for better overall governance of data collection, processing and dispatch equally applies climate change adaptation related risk data.

3.3 Developing insurance products

Insurance products can be adapted or redesigned to become *climate-aware*, providing incentives for policyholders to implement adaptation measures that reduce the likelihood or severity of weather-related damage. Incentives often take the form of premium discounts for risk-reduction

actions. These discounts require modelling to estimate the expected impact of the measure on residual risk. One of the few documented success cases is the US National Flood Insurance Program, where premium discounts have effectively encouraged flood mitigation for new buildings (Paudel, 2012). However, incentive effectiveness depends on the type of information that policyholders must share, as different data-sharing requirements influence willingness to participate (Grassi, 2024).

Insights from PIISA pilots

The PIISA pilots provide practical evidence of how incentives work in real contexts:

- **Green roof pilot (Boreal region and the Netherlands):**
  Premium discounts alone were not sufficient to motivate green-roof construction. More impactful approaches include offering green roofs as bundled products or providing free roof inspections. Some insurers already provide climate-adaptation advice, with one offering a free property "health check" every four years to help homeowners reduce climate-related losses (Kroes et al., 2025).
- **Wildfire pilot (Portugal):**
  AXA Climate and AGIF modelled how different types and intensities of fuel breaks reduce wildfire damages and associated premium levels. Using this information, new insurance products can be developed with premium reductions provided for preventive measures such as fire reducing forest management.

Parametric and index-based insurance

Parametric or index insurance pays compensation when a predefined parameter—such as wind speed or precipitation—exceeds a threshold (Figure 2). The key advantages include:

- faster payouts due to no site inspection
- lower administrative costs
- reduced moral hazard, since parameters cannot be influenced by the policyholder (Eerola et al., 2024)

Unlike indemnity insurance, parametric products do not require complex conditions to guide customer behaviour, because payouts are linked to independent measurements rather than observed damages.

The main disadvantage of parametric insurance is the **basis risk**, the difference between the actual losses and the compensation provided. Below are some examples from the pilots of the PIISA project.

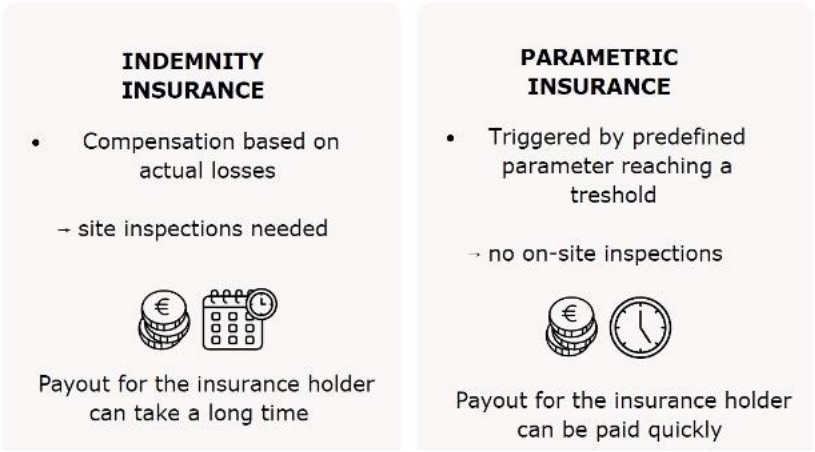

Figure 2. The benefits of parametric insurance over indemnity insurance for the policy holder.

Examples from PIISA parametric pilots

- **Forestry (Windthrow risk):**
  Amigo developed the *Standardized Windstorm Index (SWI)* to capture local windstorm intensity, the main driver of forest damage in Europe. The index is being tested with AXA Climate and AXA Germany to evaluate its use in real portfolios and its ability to support climate-resilient forest management.

- **Real estate (Subsidence risk):**
  Amigo also developed the *Climate Dryness Index (CDI)* to assess future dryness trends linked to clay shrink–swell, a major cause of structural subsidence in Europe. The CDI helps raise awareness among homeowners, informs risk dashboards, and supports the integration of climate projections into underwriting. Its structure makes it adaptable to other sectors, such as agriculture, where drought and heat stress are key risks.

- **Agriculture (Olive farming in Andalusia):**
  The PIISA project is co-developing a parametric solution supported by the CoDepi tool. CoDepi visualises historical payout triggers and compares them with farmers' self-reported "bad years," enabling participatory validation of index performance. This ensures the resulting insurance products are both feasible and accurately aligned with farmer needs (Saklani et al., 2025).

- **Basis risk assessments (Finland):**
  LocalTapiola analysed basis risk in agricultural yield insurance. Surveyed Finnish farmers expressed *very low tolerance* for basis risk, identifying it as the primary barrier to commercialising parametric insurance in agriculture (Eerola et al., 2024).

4 Conclusions and recommendations for the insurance sector

The PIISA project highlights that as climate change accelerates, the insurance sector must evolve from a passive payer of claims to an active partner in climate adaptation. Based on the research and pilots conducted, the following conclusions and recommendations are provided for insurance companies and trade associations.

Key conclusions: the evolving risk landscape

- **Growing protection gaps:** Despite escalating climate-related losses—estimated at €822 billion in the EU from 1980–2024—a significant insurance protection gap persists. In a survey of six European countries, nearly 60% of respondents reported having no insurance against natural hazards despite high exposure.
- **Threats to insurability:** Climate change challenges traditional actuarial models that rely on historical data. Factors such as "fat-tail" distributions of catastrophic events and the spatial correlation of risks (where one hazard triggers another) threaten insurer solvency and may lead to market withdrawals.
- **Risk concentration in development:** Economic trends continue to drive migration and development into high-exposure areas, such as coastal zones, increasing the total value of assets at risk and the subsequent cost of capital reserves.

Recommendations for insurance companies

1. Modernize risk assessment and pricing

- Use forward-looking climate projections in actuarial models to avoid mispricing policies.
- Account for adaptation: Systematically track the impact of physical adaptation measures (e.g., green roofs or fire-reducing forest management) to ensure products remain both profitable for the insurer and affordable for the client.

2. Innovate product offerings

- Incentivize prevention by developing climate-aware products that offer premium discounts or value-added services—such as free property health checks—to policyholders who implement risk-reduction measures.
- Explore possibilities of adopting parametric insurance (using e.g., the Standardized Windstorm Index) to provide rapid payouts without on-site inspections, reducing administrative costs and improving liquidity for policyholders after extreme events.
- Engage in developing sector-specific innovations, such as forest windthrow indices, soil dryness indicators, and co-designed agricultural insurance solutions.

3. Promote risk awareness and support policyholders

- Collaborate with municipalities, sectoral organisations, NGOs, and research institutions in awareness-building and prevention.
- Advise policyholders on how to access sector-specific alert and weather information.

4. Strengthen collaboration

- Partner with public authorities to form long-term structural cooperation to align insurance solutions with national and local land-use planning and climate change adaptation strategies.
- Enhance data sharing, working with research organizations and competitors, to develop shared standards and databases for hazard and damage data, like the Norwegian Hazard Damage Knowledge Bank.

5. Integrate climate services into underwriting and product development

- Incorporate hazard-based climate indices (e.g. windstorm and compound drought–heat indicators) into underwriting workflows.
- Use climate services to support product innovation in sectors exposed to long-term climate risks (forestry, agriculture, real estate).
- Facilitate collaboration between insurers and scientific partners to translate climate data into operational risk metrics.
- Complement claims-based historical models with seasonal forecasts and climate projections.
- Support homeowners in making more informed decisions regarding insurance coverage and adaptation measures.

Recommendations for trade associations in the insurance sector

- Lead industry-wide initiatives to raise public awareness of climate risks and available prevention measures.
- Encourage national governments and the EU to develop and harmonise regulation of parametric insurance products to enable their effective use.
- Encourage consistent policies on open data and data stewardship to resolve information market inefficiencies and the "freeloader" problem regarding innovative insurance solutions.
- Establish a Climate Insurance Observatory in partnership with public actors coordinated via an online platform. This platform could:
    - facilitate the sharing of impact and loss data to speed up the development of climate-smart insurance products,
    - have descriptions of pilots and best-practice examples,
    - provide a channel for new initiatives, promoting collaboration between experts and insurers, and providing links to successful pilots,
    - help to promote events and new reports.

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Dissemination material produced by the PIISA project

Info Cards

Info Card 1 - Nature-Based Solutions in the Center of Climate Adaptation. Available at: https://piisa-project.eu/assets/deliverables/publications/PIISA_Info%20Card%20Layout%2020240913-compressed.pdf

Info Card 2 - How do Climate Risk Insurance differ across Europe? Available at: https://piisa-project.eu/assets/deliverables/publications/PIISA_Info-Card-02.pdf

Info Card 3 - Barriers and opportunities for Natural Risk Insurance. Available at: https://piisa-project.eu/assets/deliverables/publications/PIISA_Info-Card-03.pdf

Policy Brief

Risk Awareness and Innovative Insurance Solutions are key to improving Climate Resilience. Available at: https://piisa-project.eu/assets/deliverables/publications/PIISA_Policy-Brief_Online-Version_Compressed.pdf

Blog posts

Available at: https://piisa-project.eu/blog

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