

BARRIERS AND OPPORTUNITIES FOR NATURAL RISK INSURANCE

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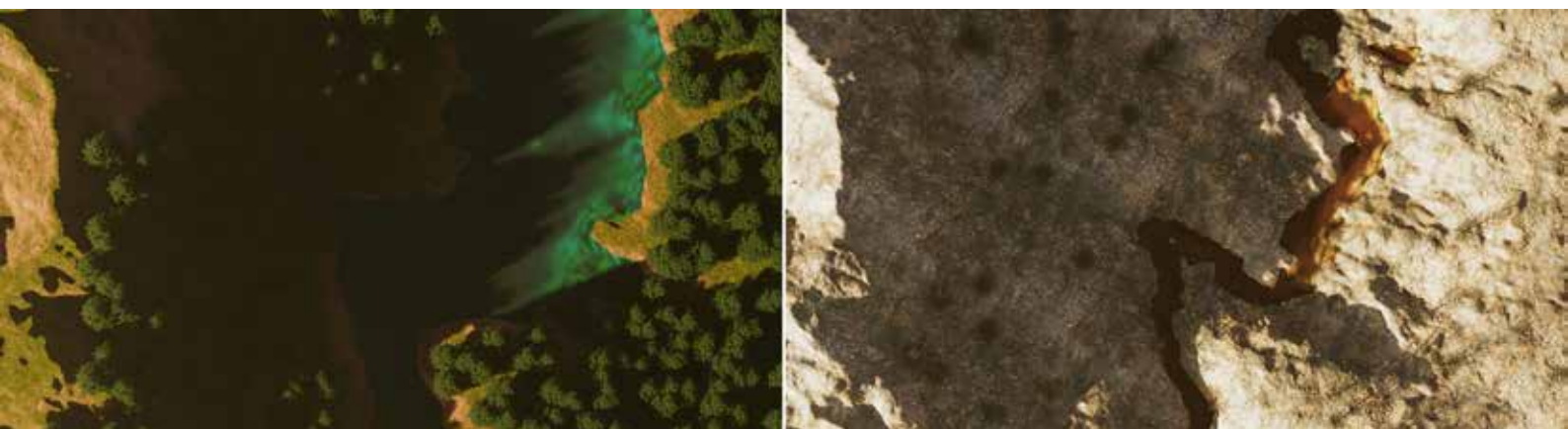
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Why insurance against natural hazards is important

Climate and natural risk insurance has the potential to align with the goal laid out by the Sendai framework for disaster risk reduction of developing resilience through measures that finance recovery while incentivising risk reduction. Firstly, by setting premiums that reflect actual risk, insurance sends a signal to agents encouraging them to modify their behavior accordingly (Botzen & Van Den Bergh, 2009; Surminski, 2014). The insurance sector can thus play a pivotal role in **incentivising risk reduction** both by potential policyholders and public administrations deciding to implement mitigation and adaptation measures.

Second, insurance **provides funds for recovery and reconstruction**, covering direct economic damage and limiting indirect damages resulting from business interruptions and negative consumption shocks (Botzen, 2013; Hoeppe, 2016; Kraehnert et al., 2021). Such funds are provided more quickly than governmental aids, ensuring a faster recovery (EIOPA, 2023; Surminski et al., 2016; Thieken et al., 2006).

Moreover, shifting the responsibility of financial compensation away from public administration has additional benefits. On one hand, it reduces the volatility of payments (Unterberger et al., 2019), as governmental aid is not only unpredictable (EIOPA, 2023; Surminski et al., 2016) but often dedicated primarily to rebuilding infrastructure rather than assisting private agents (Holzheu & Turner, 2018). On the other hand, it lowers the fiscal pressure of disasters (EIOPA, 2023; OECD, 2021) and helps achieve more financial certainty for public budgets (Unterberger et al., 2019), thereby reducing the risk of default. Well-functioning insurance systems accelerate recovery after severe natural disasters, and mitigate their negative effects on the economy, especially in countries with good institutions (Breckner et al., 2016). A more in-depth discussion can be found in the PIISA Deliverable 1.1 (Ceolotto et al., 2024).



Types of insurance

The traditional type of insurance contract, **indemnity insurance**, pays compensation to policyholders based on the quantified extent of damage incurred. This quantification is typically performed through an on-site inspection after the event. Therefore, while indemnity insurance should provide exact compensation for the damage, there is a (sometimes considerable) lag between damage occurrence and compensation receipt, since the inspection and quantification procedures take time. In addition, this type of contract often involves clauses such as deductibles (i.e., an amount of damage which is always borne by the policyholder before insurer payout) and indemnity limits (i.e., the maximum compensation that can be paid) to limit asymmetric information and moral hazard effects. But note that such contract design can also generate a discrepancy between damage and compensation.

Since the 1990s, the insurance sector has started to develop a new type of contract, called **parametric insurance**. The objective was to create an insurance product capable of enhancing transparency and streamlining the claim process. Given its nature, parametric insurance is particularly suitable for coping with changing natural hazards and overcoming some of the “limitations” connected to indemnity products. In parametric or index-based insurance, payouts are triggered by predefined parameters or indices rather than being linked to actual losses. Thus, the method provides coverage on the basis of pre-established weather indices, such as temperature, precipitation or wind speed.

The reimbursement is activated when the predefined index reaches a specified threshold, and increases proportionally with the severity of the event, revealing that catastrophic conditions represent serious issues for insurance clients. Since payments are triggered by objective weather conditions, often measured by independent third parties, this type of product is particularly effective at reducing moral hazard and adverse selection problems (Goodwin, 2001)⁽¹⁾. It also does not require on-site inspections or damage quantifications, so compensation can be provided much more rapidly than with indemnity insurance, and at a lower cost for the insurance company. Parametric insurance, however, introduces the issue of basis risk, namely the difference between actual loss and compensation. Well-performing parametric products aim to minimise basis risk using sophisticated statistical and modelling techniques to select the appropriate triggers and integrate them into a pricing scheme. As a result, they are more technically and computationally demanding than traditional indemnity products.



Factors hindering insurance diffusion

Several factors can limit both the demand and supply of insurance coverage against climate- and nature-related risk (see Ceolotto et al., 2024 for a more detailed discussion).

Studies suggest that people tend to have a **low perception of climatic and natural risks**, despite living in risk-prone areas, and this low perceived risk results in limited insurance demand. In addition, people with higher **risk tolerance** tend to have a lower demand for insurance. Studies also suggest that today's practice of climate coverage being an opt-in component in insurance products fosters the protection gap as a result of a **status quo bias**⁽²⁾. Likewise, the **herding heuristic**⁽³⁾ can hinder the uptake of insurance, especially when people from one's social network are uninsured. A **limited financial literacy** or a **lack of understanding of insurance products** also results in low insurance demand, as does a **lack of trust** in insurance companies. Both income and prices are significant determinants of insurance demand, and affordability issues are expected to become more relevant under a

changing climate, especially for risk-based premiums that are expected to rise. When individuals are expecting post-disaster governmental relief, they tend to reduce their demand for climate insurance, a phenomenon known as charity hazard.

Supply-side factors relate to frictions connected to the **nature of risk** – e.g. extreme climatic events having a “fat-tailed” distribution – or **uncertainty** – e.g. climate change increasing the severity and variability of events – which generate problems in terms of insurability of climate- and nature-related risk. These lead insurers to undertake measures – such as **holding larger capital reserves** for solvency or **limiting the offer of coverage** in certain areas – or introducing policy clauses – **deductibles, higher premiums, indemnity limits** – that reduce attractiveness of insurance coverage for consumers. Moreover, insurance companies still rarely incorporate risk-reduction measures (such as flood-proofing buildings or nature-based solutions) into premium schemes, because of a lack of standardised metrics to quantify their risk reduction performance.

(1) In the case of insurance, moral hazard implies that having insurance reduces the incentives of individuals to avoid the insured event, whereas adverse selection increases the likelihood of insuring clients with a worse risk profile.

(2) The status quo bias refers to a reluctance to change and a tendency to stick to the current situation, even in situations in which changing would lead to a better situation.

(3) The herding heuristic refers to the tendency of people to be influenced in their choices by other people's behavior.

Evidence From Europe

Extensive surveys and analysis further investigate topics related to underinsurance with a sample of 951 respondents from six European countries (see PIISA Deliverable 1.4, Lameh et al., 2024 for further details). The primary barrier, cited by 56.3% of respondents, is the perception that natural hazards do not pose a significant enough risk to require purchasing insurance coverage, despite generally high levels of perceived risk in the sample (Figure 1a). Other important barriers are lack of awareness about the availability of natural risk insurance (18.5%), high costs (16.7%) and trust issues (14.0%). However, when focusing on people who are aware of the availability of natural risk insurance and believe the risk is severe enough to justify insurance coverage, cost and trust issues account for more than 30% of the stated barriers each. Of the respondents who would consider purchasing insurance against natural hazards, more than 60% report not doing so because it's too expensive or they don't trust insurance services and providers.

While some people do not seem to consider the possibility of purchasing insurance (35.3% of respondents), the majority is open to it and several factors could incentivize them to do so (Figure 1b). More affordable premiums appear as a key motivator for many European citizens (40.7%), indicating that the decision to (not) insure against natural risk is often a matter of financial viability. Governance assurance, for example offering a guarantee of compensation, could also play an important role, since it would help to overcome trust issues, as would a broader risk coverage of such products. More information about the availability of insurance coverage and its benefits, as well as a simplification of the process and increased guidance could also incentivise purchasing natural risk insurance.

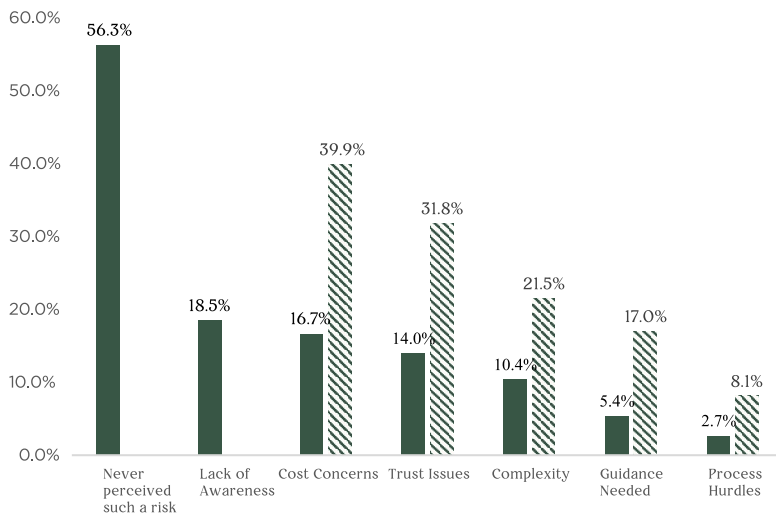


Figure 1a: Barriers to insurance adoption (N=815)

The surveys also included questions on parametric insurance. Less than 20% of respondents know what parametric insurance is (Figure 2 a). However, this result should be interpreted with caution. Parametric insurance is still not common in Europe, for example due to legal constraints as in Finland, and relatively few insurance companies offering parametric products. Moreover, for the most part, parametric insurance is not designed for households, but rather for larger policyholders. However, additional research on a sample of 626 farmers (see PIISA D3.8, Saklani et al., 2025) shows that of the surveyed farmers, who are among the primary targets of parametric policies, only 14% are familiar with parametric insurance and approximately half of them (47%) have never heard about it.

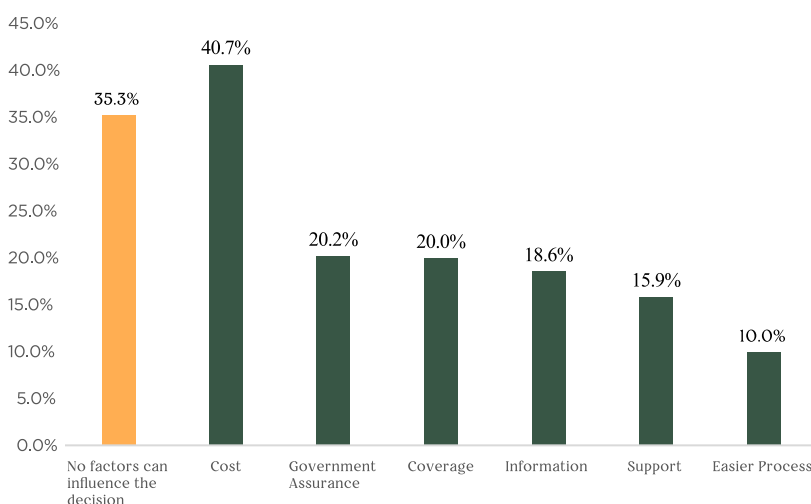


Figure 1b: Incentives to insurance adoption (N = 951)

(4) A “fat-tailed” distribution is characterised by a higher probability mass in the tails of the distribution. This means that there is a greater chance of extreme, catastrophic events occurring.

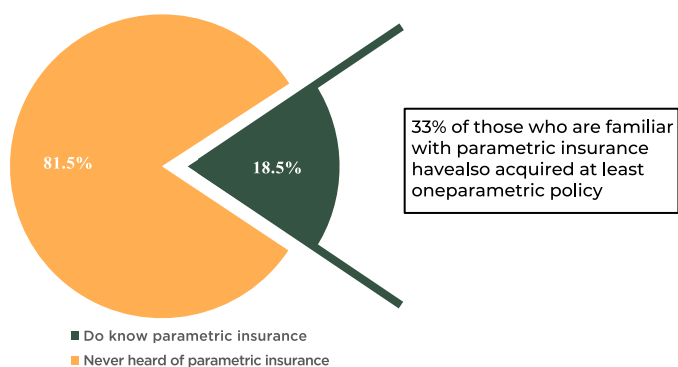


Figure 2a: Knowledge about parametric insurance (N = 951)

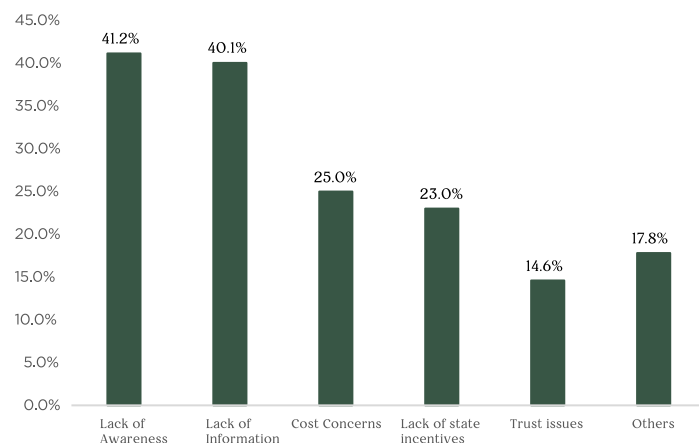


Figure 2b: Barriers to parametric insurance adoption (N = 951)

Lack of awareness and information about parametric insurance are reported as the main factors hindering adoption (Figure 2b). Coherent with the limited parametric insurance offer, respondents were unaware that specific parametric products existed and they didn't know which insurance providers offer them. Moreover, similar to traditional insurance products, cost concerns and trust issues still represent relevant challenges. Another barrier is the complexity of parametric products, as revealed by the analysis among European farmers.

The analysis also reveals reasons for optimism. The majority of farmers surveyed (78%) indicate that certain factors could influence their decision to purchase a parametric insurance policy for managing climate risks (Figure 3). The primary incentives include an additional government guarantee to back the instrument, more comprehensive information regarding the functioning and benefits of parametric policies, and cost discounts. In fact, 47% of farmers state that they would only purchase such a policy if it were supported by a government guarantee of compensation. Moreover, 40% say they would buy these policies only after gaining a clear understanding of how they work by attending dedicated informational sessions on the characteristics, benefits and procedures to activate a parametric policy, and 34% would be attracted by a reduction in costs. A smaller group (12%) would be influenced to purchase a parametric policy if they could access personalized support or if the acquisition process were simplified and expedited.

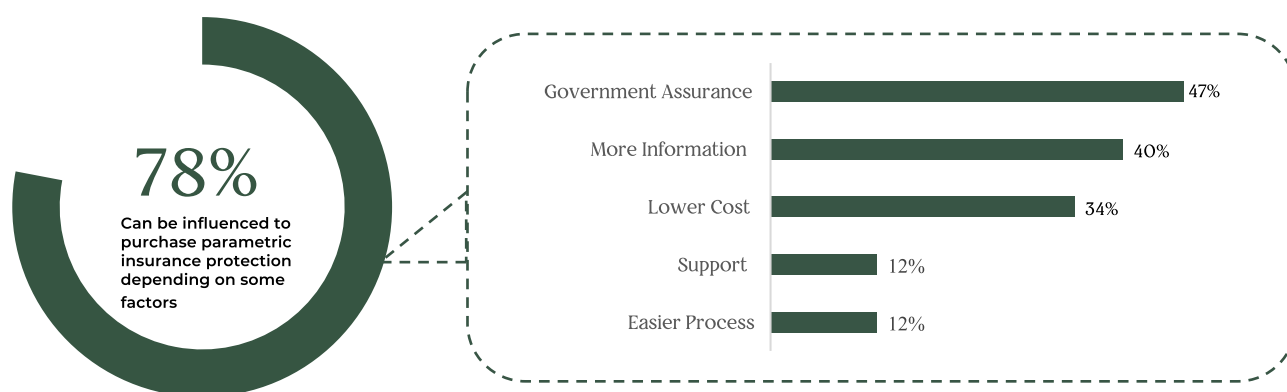


Figure 3: Incentives to parametric insurance adoption (farmers sample)

Opportunities to foster the adoption of natural risk insurance

The work conducted in PIISA highlights numerous promising avenues to achieve a wider diffusion of both traditional and parametric coverage against natural hazards and enhance the role of the insurance sector in supporting climate adaptation.

Promote public awareness and education

The review and survey results underscore the need for better public education about the economic consequences of natural hazards and the availability of insurance solutions. Citizens need clearer information not only about the risks but also about how insurance can help protect against the financial impacts of these events. Developing and expanding information, such as a dedicated section on an insurer's website, tips and blogs focused on, e.g., climate adaptation or parametric insurance, may close the information gap and encourage people to uptake insurance.

Strategies to address the cost of insurance policies and improve the overall appeal of insurance policies

The analysis highlights that excessive cost and limited trust in insurance services and providers hold off many people from purchasing natural risk insurance, both worldwide and in Europe. Pro-active strategies by governments and the insurance sector to alleviate these issues – for example, ensuring a guarantee of compensation, recognising premium discounts for the adoption of risk-reduction measures, enhancing support to (prospective) policyholders – could all support insurance diffusion.

Encourage insurance innovations

Pilot parametric insurance products in regions experiencing repetitive climate events, demonstrating effectiveness in providing rapid, objective payouts that enhance resilience for farmers, urban developers, and forestry stakeholders, well-tailored to client's needs. The adoption of blockchain technology and the use of artificial intelligence could further support this effort, as they allow for product personalisation and streamlining insurance processes.

Data sharing

To improve the dissemination of household-level data, broader collaboration and data sharing may be needed among insurers, while ensuring compliance with competition laws. This effort could be supported through the establishment of a centralized knowledge platform or data hub that systematically collects and shares evidence on climate hazards, impacts as well as risk-reduction effectiveness of adaptation interventions.



Support public-private partnerships

Expand funding and policy support for climate risk insurance, enabling co-investment in climate-resilient infrastructure and green initiatives. For instance, insurers in the Boreal region have stressed the need to collaborate with local governments and the construction sector to support the uptake of adaptation solutions. This includes co-funding via subsidies and helping customers find reliable contractors. Additionally, insurers can collaborate with regulators and contractors to establish clear standards and support cross-sector initiatives that promote climate-adaptive (re)building practices. The implementation of these solutions should be reflected into pricing schemes, both society-wise (reducing the risks and premiums for all policyholders following the implementation of public climate-resilience interventions) and for individual policyholders (when they adopt risk-reduction measures on their properties).

Long-term strategy

In collaboration with a sector association (e.g. Dutch Association of Insurers), insurers can develop a long-term, shared vision for climate adaptation. This may include the incorporation of Key Performance Indicators (KPIs) to help monitor progress and drive continued improvements in climate resilience.



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