

RISK AWARENESS AND INNOVATIVE INSURANCE SOLUTIONS ARE KEY TO IMPROVING CLIMATE RESILIENCE

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PIISA

POLICY BRIEF

Climate change intensifies extreme weather-related events and associated risks. Timely risk reduction and adaptation measures are needed to mitigate climate risks and improve society's resilience. Despite all measures, significant residual risk remains. Insurance products allow climate risks and the economic losses from weather-related events to be shared between many actors. This limits adverse impacts when such residual risk materialises, promoting economic stability and facilitating post-disaster recovery. Beyond financial protection and risk transfer, insurance companies can incentivize and promote risk reduction.

The share of extreme weather-related catastrophe losses covered by insurance is low in Europe. To address this European climate insurance protection gap, actions are needed to both enhance the supply and demand of insurance products that cover climate risks. Improving the penetration rate requires awareness raising of the economic risks created by natural hazards.

At the same time, insurance companies need to develop new and affordable products that can increase the current low penetration rates. This requires a regulatory environment that allows products like parametric insurance, and better access to damage and vulnerability data. Also, the way disaster relief is organised influences the penetration rates. Disaster relief through ad hoc measures with no budget limit disincentivises insurance. With parametric insurance, compensation is paid when a pre-defined parameter or index, such as wind speed, reaches a specific threshold. The advantage is quick compensation with no need for on-site inspections or damage quantification.

Based on the results of PIISA, we make the following key recommendations:

1

National governments should launch information campaigns to increase public awareness of climate risks.

2

National governments should provide disaster relief through dedicated public funds and not ad hoc interventions.

3

All EU countries should develop and harmonise regulation of parametric insurance products to enable their effective use.

4

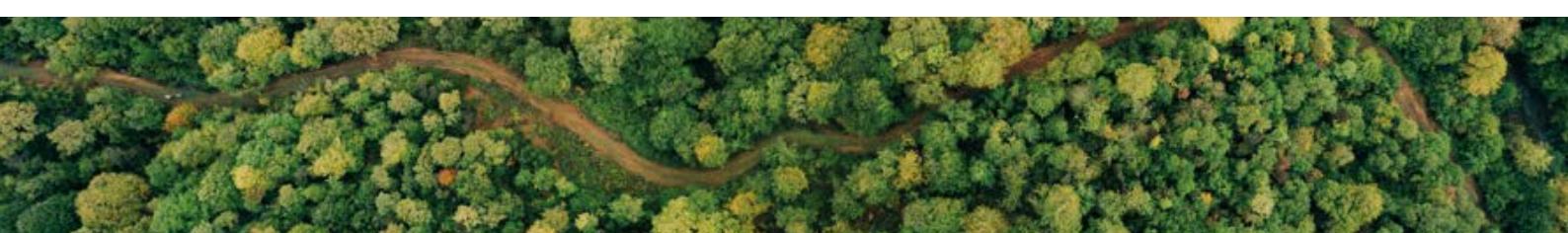
National governments should launch projects to collect damage and vulnerability data in a standardized format and make it publicly available.

5

National governments and the EU should provide R&D support to develop PPP models for innovative insurance solutions to address climate risks.

6

National governments should make climate risk insurance more affordable by a subsidy targeted to low-income households and other groups vulnerable to climate risks.



Climate risk insurance protects against residual risks

Climate change increases extreme weather events and related climate risks. The total losses in Europe due to natural hazards are expected to double by 2050 and triple by 2100 (Gagliardi et al., 2022). Well planned and implemented adaptation measures can greatly reduce climate risks and improve society's resilience. However, significant residual risk remains despite taken adaptation measures.

Insurance that covers climate risks shares these residual risks and distributes the financial impact of climate-related disasters between many actors. Shared risk means greater economic stability and faster recovery after a loss event. However, this requires that the society is able to manage climate risks to a level that ensures insurability.

Improving the coverage of climate risk insurance requires increased awareness and affordable pricing

Insurance against climate risks is offered in all European countries, although insurance markets differ greatly across countries. However, this does not mean that all natural hazard risks are well-covered by insurances. For example, in some countries commercial insurance is restricted to a limited number of hazards, while other hazards are excluded and left to the state with post-disaster relief. On the other hand, the penetration rate of insurance among households or sometimes also businesses can be low because of both demand and supply side factors. For further details see Ceolotto et al. (2024) and Lameh et al. (2024).

The most important demand-side factor limiting insurance uptake is that people often perceive climate risks to be low, even if they live in high-risk areas (Figure 1). Consumers may also have a limited financial literacy, lack an appropriate understanding of insurance products, or may not trust the insurance companies. Insurance pricing and its affordability has a large effect on the take-up of insurance.

BARRIERS TO INSURANCE ADOPTION

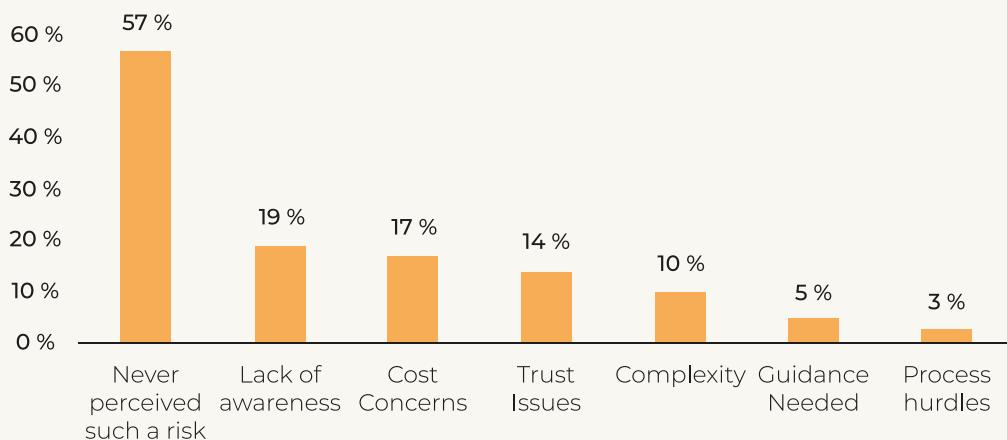


Figure 1. Barriers to insurance adoption, percentage of answers (data from six European countries, n=815, Lameh et al., 2024)

Insurance supply is affected by issues related to the nature and uncertainty of future climate risks. Climate change reduces the ability to estimate damage probabilities and expected losses from past events, as the occurrence and severity of future extreme events will no longer reflect past trends. Insurance companies find it very difficult to provide insurance products for risks that cannot be empirically estimated. In addition to increasing in time, climate-related losses tend to be spatially correlated, with plenty of events and claims concentrated in certain areas. These factors challenge insurability of climate risks and may lead to a limited offer of coverage in certain areas or the introduction of policy clauses like deductibles, higher premiums or indemnity limits, which in turn reduce the attractiveness of insurance for customers (see Ceolotto et al. 2024, chapter 4.2.).

INCREASING PENETRATION RATE OF CLIMATE RISK INSURANCES

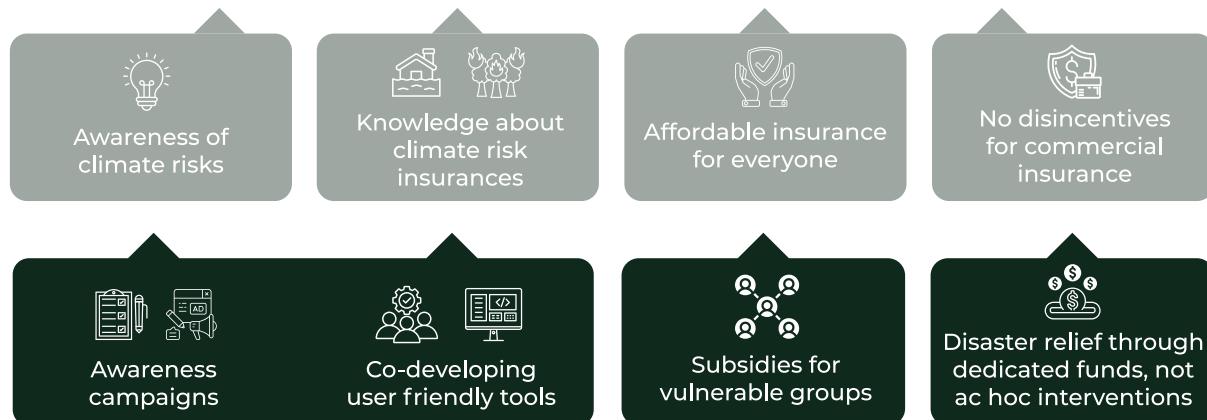


Figure 2. How to increase the penetration rate of climate risk insurances.

The penetration rate of climate risk insurances can be increased to some extent by increasing the awareness of climate risks and by informing citizens of available insurance products. It can also be increased by avoiding public systems that disincentivise commercial insurance like seemingly unlimited ad hoc disaster relief, which has been reported to disincentivise insurance for example in Germany and Italy (Ceolotto et al., 2024).

These factors can be advanced through the following policy measures:



NATIONAL GOVERNMENTS SHOULD

- launch campaigns to increase awareness of climate risks and risk reduction measures among citizens and companies as well as local and regional authorities using popular media like TV and social media
- provide disaster relief through dedicated public funds and not ad hoc interventions
- build public-private partnerships to promote development of climate risk insurance

EUROPEAN UNION SHOULD

- provide R&D support to develop public private partnership models for innovative insurance solutions to address climate risks
- redesign the EU Solidarity Fund and convert it to a reinsurer of last resort
- include climate risk insurance literacy as an integral part of its European Financial Literacy Strategy



Making insurances more affordable especially for vulnerable groups is one way to increase the penetration rate (please see the section on justice).

Enabling parametric insurance helps to compensate for extreme weather events

In traditional indemnity insurance, compensation is paid according to actual losses which often need to be checked on site. It may take a long time before the payout is made. With parametric insurance, conversely, compensation is paid when a pre-defined parameter or index, such as wind speed or precipitation, reaches a specific threshold. The advantage of parametric insurance is that the compensation can be paid much more quickly than with indemnity insurance, and at a lower cost for the insurance company. However, it should be noted that parametric insurance is not applicable to cover all risks.

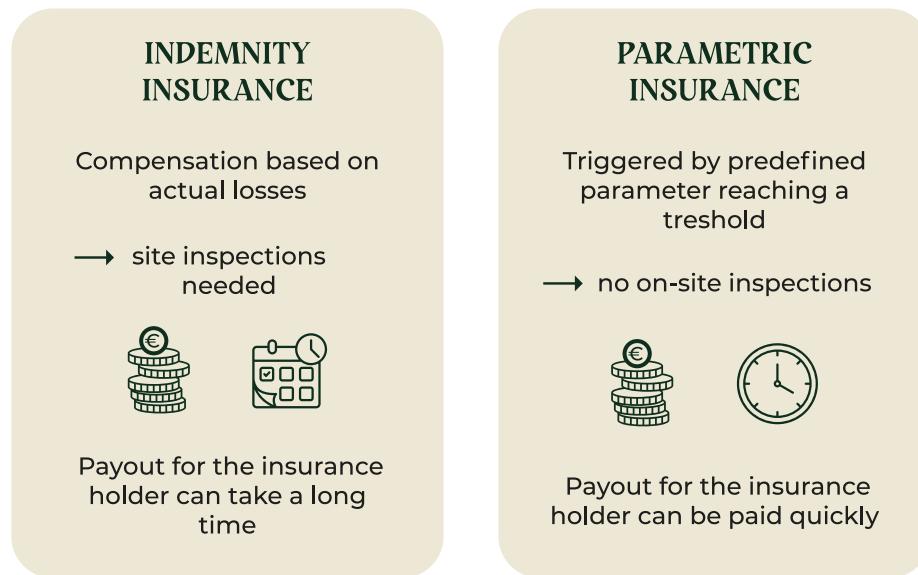


Figure 3. The benefits of parametric insurance over indemnity insurance.

A challenge with parametric insurance is that there may be a difference between compensation provided and the actual loss incurred (basis risk). This can be partially mitigated by modelling, which requires good quality weather and climate data as well as sophisticated statistical and modelling techniques. Thus, parametric products are technically and computationally more demanding than traditional indemnity products, and it may not be feasible for the insurance companies to offer them for small clients.

Parametric insurance is not well known by many clients, either because they are not aware of their existence/availability or because they lack an appropriate understanding of their functioning. Moreover, in some countries parametric insurance is still not recognised as a valid type of insurance (e.g., Finland).

To enable parametric insurances, the following policy actions are needed:



All EU countries should develop and harmonise regulation of parametric insurance products to enable their effective use.



To reduce the basis risk, national governments should ensure that good quality in-situ weather and climate data is available in an open format



Increasing awareness of parametric insurance products by including them in the awareness campaigns (see previous section).

How can insurances better incentivise adaptation measures?

Innovative insurance products can encourage people, businesses and the public sector to implement adaptation measures thus reducing their exposure and vulnerability to risks. For example, insurance premium discounts for home insurance can incentivise house owners to implement fire breaks to protect against wildfires. Similarly, implementation of a regional wildfire risk reduction plan including designed, extensive firebreaks, may enable reduction of home and forest insurance premiums over a larger district. However, PIISA results on green roofs in the Netherlands indicate that the incentives provided by insurance products may not be sufficient to encourage action (Kroes et al., 2025), and other incentives like investment support may be needed, e.g. via low interest loans for risk reduction measures.

Insurance companies need to develop innovative insurances that reduce climate risks. Standardized practices and metrics that incorporate risk reduction measures and practices into pricing schemes is one way of achieving this.

The following policy actions are needed:



National governments and the EU should facilitate the definition of standardised practices and metrics to quantify the risk reduction potential of adaptation measures and favour their integration in insurance price schemes. This can be achieved either via their own initiative, or with the creation of enabling regulations.

Insurance forms just a small part of the incentives needed to encourage adaptation action. National governments and the EU should also provide support or incentives for banks to provide more affordable loans to facilitate investments in adaptation measures.

Better availability of damage and vulnerability data supports insurance development

There is a vast and rapidly expanding array of basic and tailored data on changing climatic conditions and associated hazards, often organised and formatted according to common standards. A lot of these data are publicly available.

Conversely, economically and socially oriented damage and vulnerability data are much more scattered, with incomplete coverage, much less standardised, and often with limited public availability. Some regions have limited capacity to collect and analyse data, which further complicates data availability. Insurance pricing will be challenging with incomplete vulnerability data. Poor understanding of damage risks and their causes makes it harder to plan adaptation measures.

To make damage and vulnerability data more available for insurance companies and research, the following policy actions are needed:



National governments should launch projects to collect damage and vulnerability data in a standardized format and make it publicly available. Data could be collected in one place as in the Dutch Climate Risk Portal. Eventually it could be developed into an EU wide climate service observatory.



As damage data is sensitive information with economic value, national governments and the EU should introduce data sharing regulations and/or incentives for the private sector to support more open data. Incentives could be in the form of more affordable access to other databases.

Justice issues related to adaptation insurance need to be addressed

The impacts of climate change do not hit everybody equally. Certain groups of people, locations and regions are more vulnerable than others. For example, in the Arctic region, climate change is advancing more rapidly than elsewhere. Indigenous groups like the Saami people, whose livelihood depends on nature, are suffering from climate change both economically and culturally (Berninger 2025).

Insurance premiums may not be affordable to the most vulnerable groups. High risk areas like flood prone areas may be uninsurable in the future. These areas are often also places where the poorer and more vulnerable households live, as the lack of financial resources and social networks leaves them as the only available option to find a house or precludes relocation.

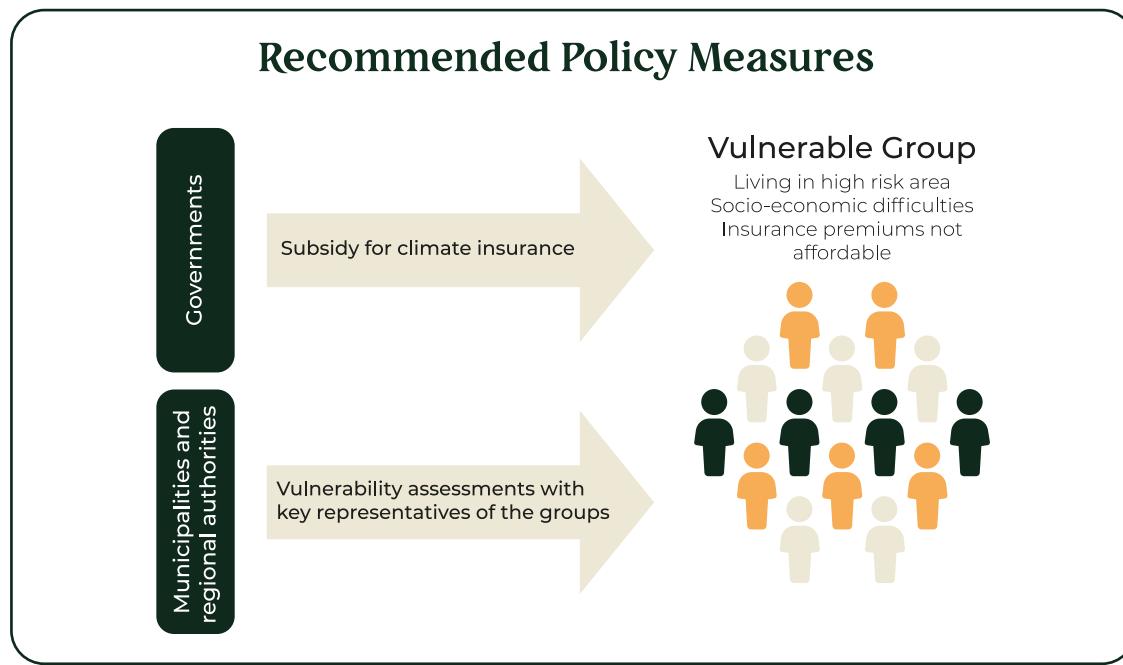


Figure 4. Recommended policy measures to support vulnerable groups and take them into account in adaptation planning.

To address justice issues in climate risk insurance, the following policy measures are recommended:



National governments should make climate risk insurances more affordable for the most vulnerable groups by a subsidy to low-income households and other vulnerable groups. The subsidy should not be embedded in insurance prices to avoid distorting the price signal of risk. The subsidy can take various forms, such as vouchers.



Local and regional authorities are encouraged to make vulnerability assessments and plan how to reduce risk including participatory processes making sure that also vulnerable groups are heard.

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REFERENCES

Berninger, K. 2025. Round table discussion with policy makers on adaptation finance and justice. A session held in the 7th Nordic Conference on Climate Change Adaptation on May 14th in Rovaniemi Finland.

Ceolotto, S., Colucci, M., Taddeo, S., & Mysiak, J. (2024). Role and potential of insurance in accelerating climate adaptation in Europe. PIISA Deliverable 1.1. Retrieved from: https://piisa-project.eu/assets/deliverables/D1.1_Insurance%20in%20climate%20adaptation_31.5.2024.pdf.

Gagliardi, N., Arévalo, P., & Pamies, S. (2022). The fiscal impact of extreme weather and climate events: Evidence for EU countries. (Discussion Paper 168; DISCUSSION PAPER, p. 40). European Commission, Directorate General for Economic and Financial Affairs. Publications Office. Retrieved from: <https://data.europa.eu/doi/10.2765/867213>.

Kroes, S., Klok, L., & van de Kerkhof, A. (2025). Enablers and Barriers of Nature-based Solutions for insurers in the Netherlands and the Boreal region. Retrieved from: <https://piisa-project.eu/assets/deliverables/publications/PIISA%20-%20Enablers%20and%20Barriers%20of%20Nature-based%20Solutions%20-%20Final.pdf>

Lameh, G., Groen, H.S., Grassi, L. & Carrai, L. (2024). Focused market reviews in WP3 pilot sectors/areas. PIISA deliverable 1.4. Retrieved from: https://piisa-project.eu/assets/deliverables/D1.4_Focused%20market%20reviews%20in%20WP3%20pilot%20sectors%20areas.pdf



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