



SOlutions **TE**sting for **RE**gions through Insurance for Climate **AD**aptation

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Nº	ORGANISATION	Short name	Country	Role
1	Basque Centre for Climate Change	BC3	ES	Coordinator
2	I-Catalist SL	ICA	ES	Beneficiary
3	Climate Risk Advisory Ltd	CRA	NO	Beneficiary
4	Helmholtz Centre for Environmental Research	UFZ	DE	Beneficiary
5	SINTEF AS	SINTEF	NO	Beneficiary
6	Mitigrate AS	MITI	NO	Beneficiary
7	AQUATEC	AQUA	ES	Beneficiary
8	Genillard & Co GmbH	G&Co	DE	Beneficiary
9	National Center for Scientific Research Demokritos	DEMO	GR	Beneficiary
10	Hochschule Weihenstephan-Triesdorf	HSWT	DE	Beneficiary
11	Association for the Development of West Athens	ASDA	GR	Beneficiary
12	Behavior SMART OOD	BES	BG	Beneficiary
13	Generalitat Valenciana	GVA-A	ES	Beneficiary
14	Municipality of Gabrovo	MoG	BG	Beneficiary
15	Empower Insight	EI	FR	Beneficiary
16	Stiftung Global Infrastructure Basel	GIB	CH	Associated Partner
17	Verbraucherzentrale Sachsen e.V.	VZS	DE	Associated Partner
18	Landesamt für Umweltschutz (Regional Env. Protection Agency)	LAU	DE	Associated Partner
19	KLP Skadeforsikring AS (insurance)	KLP-S	NO	Associated Partner
20	Gjensidige Forsikring ASA (insurance)	GJE	NO	Associated Partner
21	Allianz Agrar (insurance)	AZA	DE	Associated Partner
22	Croatia Osiguranje (insurance)	CO	HR	Associated Partner
23	German Insurance Association	GDV	DE	Associated Partner
24	DIMOS EGALEO (insurance)	EGL	GR	Associated Partner
25	Bavarian Farmers Association	BBV	DE	Associated Partner
26	Zadar County, Croatia	ZDC	HR	Associated Partner
27	The County Governor in Trøndelag	CGT	NO	Associated Partner
28	DZI at KBC Group (insurance)	DZI	BG	Associated Partner
29	Caisse de Reassurance (insurance)	CCR	FR	Associated Partner
30	Hellenic Association of Insurance Companies	HAIC	GR	Associated Partner

Executive Summary

This deliverable presents a series of four policy briefs which explore how insurance can more effectively support climate change adaptation in Europe by addressing the insurance loss data-sharing, the development of Innovative Insurance Solutions (IIS) and the enabling regulatory framework and governance conditions that shape insurance availability, affordability and impact.

Across Europe, climate change is increasing the frequency and severity of extreme events, while a large share of climate-related losses remains uninsured. This growing insurance protection gap places increasing pressure on households, businesses and public budgets, and limits the ability of insurance to contribute to long-term resilience. SOTERIA responds to this challenge by examining how insurance can move beyond post-disaster compensation and play a more proactive role in prevention, risk reduction and adaptation governance.

The policy brief series is structured around four complementary perspectives. The first policy brief focuses on climate risk and loss data sharing, highlighting the need for interoperable data systems, trusted governance arrangements and local capacities to turn data into actionable insights. The second examines Innovative Insurance Solutions, showing how new products, business models and behavioural approaches can help expand coverage, reduce risk and address both supply- and demand-side barriers. The third policy brief analyses enabling legal and institutional frameworks, emphasising that the main challenge is not the absence of regulation, but the need for better integration, coordination and alignment across policy domains. The fourth policy brief reflects on SOTERIA's legacy and future perspectives, drawing together lessons from the project's case studies to outline how insurance can contribute to shared climate resilience when data, incentives and governance are addressed together.

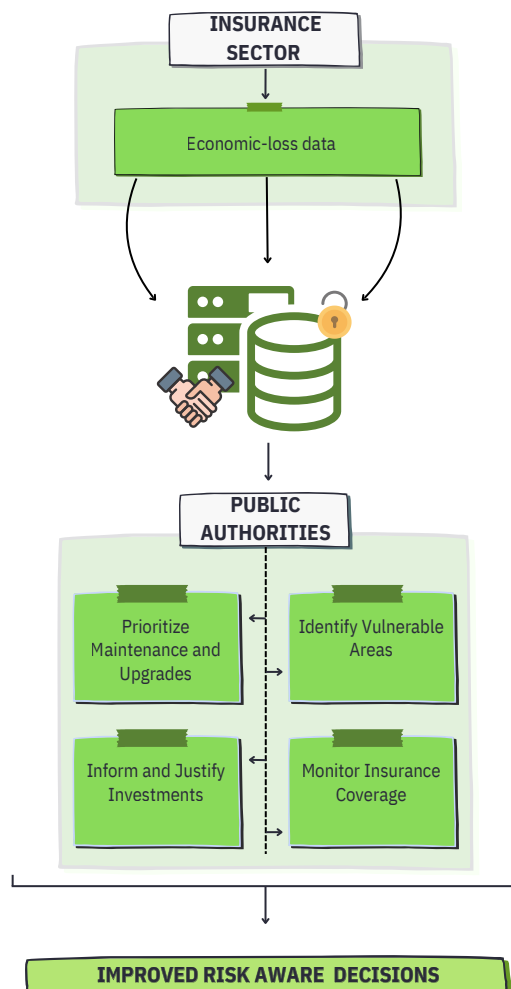
In this regard, the policy briefs show that effective climate adaptation insurance depends less on creating new tools and more on connecting existing data, insurance products and governance structures in a coherent and inclusive way. SOTERIA demonstrates that when insurance is embedded in adaptation policies, supported by shared data and aligned incentives, it can help anticipate risks, encourage prevention, stabilise recovery and reduce long-term vulnerability.

This deliverable aims to support policymakers, regulators and practitioners by translating SOTERIA's research and case study experiences into clear, actionable insights.

Building Resilient Regions Through Better Climate Risk Data

Shared Data, Shared Understanding, Shared Resilience

Climate risks are rising across Europe, yet most regions still lack access to the granular, reliable and interoperable data needed to understand where damages occur, who is most exposed, and which adaptation measures should be prioritised. Insurance loss data, especially at the asset level, is one of the richest and most precise sources of information for identifying risk hotspots and validating hazards models, but it remains underused due to legal, institutional and technical barriers. Building on evidence from SOTERIA, this policy brief explains why sharing hazard–exposure–vulnerability–loss data between insurers and public authorities is essential for accurate Risk and Vulnerability Assessments (RVA) and Climate Risk Assessments (CRA). It outlines the main barriers that hinder access and use of this information and highlights how Regional Risk Data Hubs can provide a scalable, secure and interoperable solution. The brief concludes with recommendations to support trusted, standardised and privacy-compliant data ecosystems that enable municipalities, regions and insurers to collaborate, invest wisely and reduce future climate-related losses.



KEY MESSAGES

- **Loss and damage data is essential for accurate RVA and CRA** because it shows where impacts actually occur, who is most affected, and which areas require urgent intervention, helping regions prioritise adaptation investments and avoid climate-blind decisions.
- **Insurance loss data provides the most precise and asset-level picture of climate impacts**, enabling authorities to identify risk hotspots, validate hazard models and plan cost-effective adaptation measures. However, access to this data remains limited across many regions.
- **Fragmented datasets, low insurance penetration and unclear legal frameworks** continue to hinder effective data sharing between insurers and public authorities, weakening evidence-based climate adaptation planning.
- **Experiences from SOTERIA show that governance, legal clarity, shared standards and trust** are more important than technology alone when it comes to enabling cross-sector data sharing.
- **Regional Risk Data Hubs offer a practical solution to connect insurance and public data**, providing municipalities with harmonised, interoperable and decision-ready information for planning, budgeting and resilience investment.



1. INTRODUCTION: THE ADAPTATION GAP IS A DATA GAP

Across Europe, climate change is increasing the frequency and severity of extreme events, from floods and storms to heatwaves and droughts. As a result, municipalities and regions are under growing pressure to assess their climate risks accurately and prioritise adaptation measures that protect people, infrastructure and public budgets. Yet most authorities still lack access to the granular, reliable and interoperable data needed to understand where damages occur, which assets are most exposed, and what measures would deliver the greatest impact.

Although many institutions collect climate-related information (meteorological agencies, civil protection, insurers, national, regional and municipal authorities), the data remains fragmented, inconsistent and often aggregated at spatial scales that are too broad to support local decision-making. This limits the quality of Risk and Vulnerability Assessments (RVA) and Climate Risk Assessments (CRA), which increasingly require asset-level information to evaluate exposure and vulnerability in a changing climate.

Insurance loss data is one of the most accurate sources of information on climate impacts, providing detailed insights into the causes, locations and economic consequences of past events. In some countries where insurers or public compensation schemes hold historical loss databases, this information has proven essential for identifying risk hotspots, validating models and supporting cost-benefit assessments. However, access to these datasets is limited by legal uncertainty, institutional silos, low insurance penetration in many regions, and the absence of shared standards for recording and integrating loss data with hazard and exposure layers.

The SOTERIA project has explored how these challenges can be addressed through trusted governance frameworks, clear legal foundations, common data standards and technologies that ensure semantic and technical interoperability. Evidence from the project shows that improving how hazard–exposure–vulnerability–loss data is recorded, shared and used can significantly strengthen local and regional resilience planning.

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A key goal in SOTERIA is to explore how insurance loss data can support better risk awareness and evidence-based climate adaptation

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This policy brief draws on these findings to explain why granular loss and damage data matters for climate adaptation, what barriers prevent authorities and insurers from sharing it, and how emerging models, particularly Regional Risk Data Hubs, can provide a practical, scalable solution. It also outlines policy actions needed to support secure, standardised and privacy-compliant data ecosystems that empower decision-makers across Europe. The aim is to support European regions and municipalities in accessing the decision-ready insights needed to reduce climate risks and plan for a more resilient future.

WHY CLIMATE RISK DATA MATTERS AND WHY IT NEEDS TO BE SHARED

Understanding climate risk requires more than knowing that hazards are increasing, it requires knowing **where** impacts happen, **to whom**, and with **what** consequences. This level of insight is only possible when authorities can access granular, reliable and interoperable data on hazards, exposure, vulnerability and actual losses. Without it, risk assessments remain generic, modelling cannot be validated, and adaptation plans lack the precision needed to prioritise investments or protect the most vulnerable.

Insurance loss data is especially valuable because it captures real damages, such as the cause, location and cost of past events. When this asset-level information is shared in a secure and privacy-compliant way, and combined with public datasets, it provides a uniquely accurate picture of risk hotspots and reveals where preventive measures would deliver the greatest impact. Sharing data also ensures that insurers and public authorities work with a common evidence base, reducing uncertainty, improving planning and enabling decisions grounded in observed losses, not assumptions.

Ultimately, climate resilience depends on shared understanding. When data remains siloed, fragmented or inaccessible, decisions become reactive, investments are misaligned and risks continue to accumulate. **When data flows across institutions through trusted, standardised mechanisms, it strengthens collaboration, enables anticipatory action and supports smarter, fairer adaptation strategies for regions and their communities.** Think of it as equipping communities with the right tools and information to navigate the complexities of a changing climate.





2. MAIN BARRIERS: WHY REGIONS STILL STRUGGLE TO ACCESS AND USE CLIMATE RISK AND LOSS DATA?

Evidence from SOTERIA shows that the challenge **is not the absence of data, but the difficulty of accessing, combining and using information that already exists**. Across Europe, hazard, exposure, vulnerability and loss **data** remain **fragmented** across insurers, national agencies, regions and municipalities, each using different formats, definitions and tools. This fragmentation prevents regions from producing comparable risk assessments and limits their ability to prioritise adaptation investments.

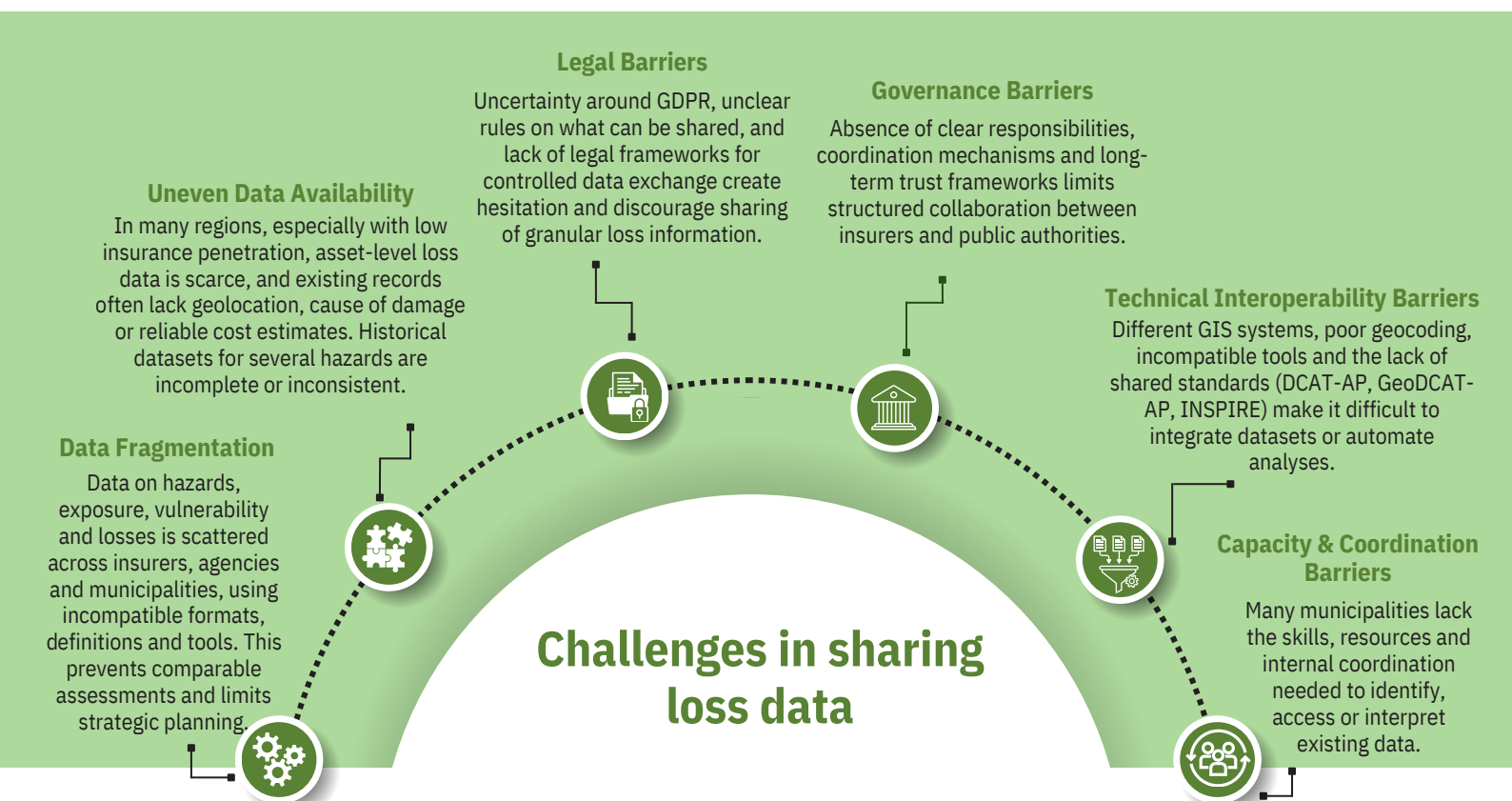
Uneven data availability is another major obstacle. In regions with low insurance penetration, asset-level loss data are scarce, and existing records often lack geolocation, cause of damage or reliable cost estimates. For many hazards, historical datasets are incomplete or inconsistent, making it difficult to calibrate models or anticipate future trends.

Legal and governance barriers also play a central role. Uncertainty around the General Data Protection Regulation (GDPR), unclear responsibilities over who may share which data, and the absence of dedicated frameworks for controlled data exchange create hesitation among insurers and authorities. The Norwegian Knowledge Bank shows that sharing granular loss data requires trust, and clear rules and defined responsibilities.

Technical barriers further complicate the picture. Lack of interoperability, incompatible GIS systems, poor geocoding and the absence of common standards, such as DCAT-AP, GeoDCAT-AP, or INSPIRE for metadata, make it difficult to merge datasets or automate analyses. Integrating data from multiple sources often requires skills and resources that many municipalities do not have.

Finally, **limited capacity and weak coordination**, both within municipalities and between administrative levels, mean that available data often do not reach the people who need them. In many cases, authorities are unaware of what data already exist, how to access them, or how to interpret them, which undermines their ability to produce evidence-based plans and investments.

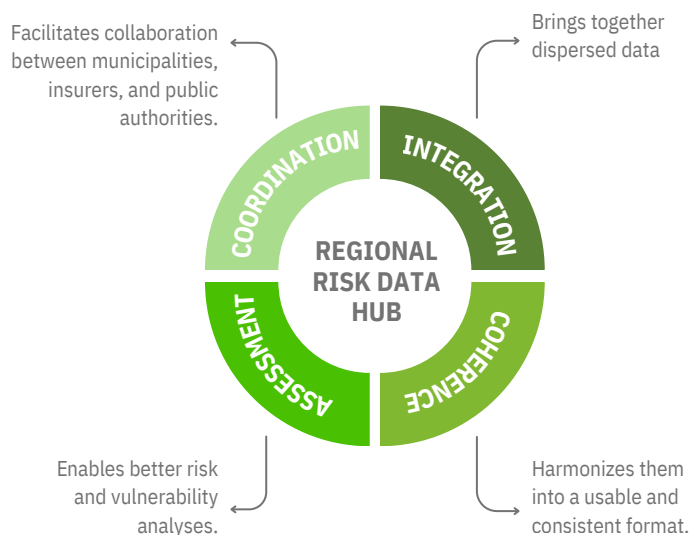
Taken together, these barriers leave public authorities without the information they need to understand where risks concentrate, how damages evolve and which adaptation measures would deliver the greatest impact. The issue is not the lack of data, but the lack of access, interoperability and governance structures that would allow this data to be used safely and effectively. As a result, municipalities struggle to produce robust RVAs and CRAs, justify investments or plan strategically, even though insurers, public bodies and technical operators often hold the data required to do so.



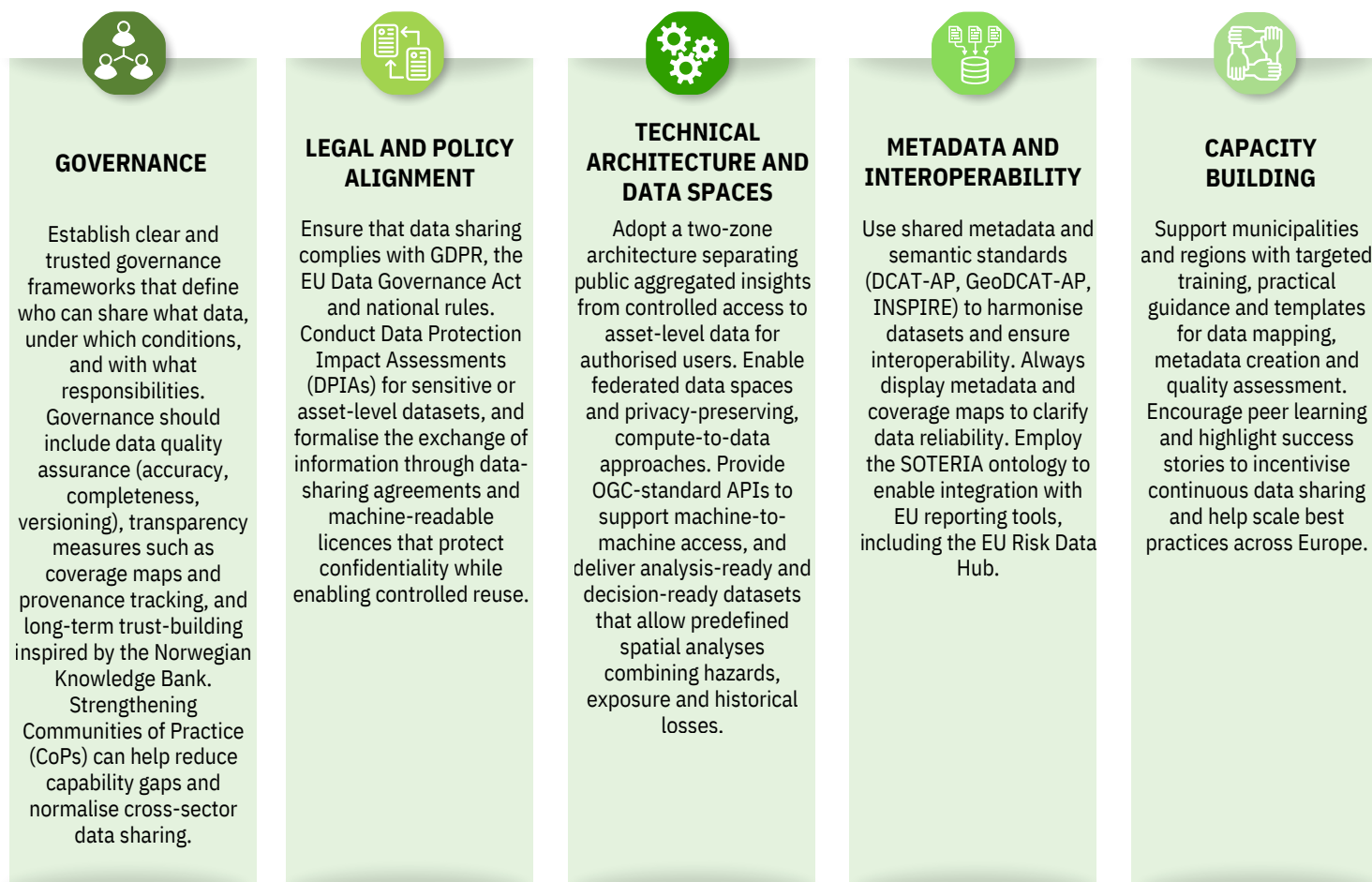


3. THE ROLE OF REGIONAL RISK DATA HUBS: A POSSIBLE SOLUTION?

Regional Risk Data Hubs (RRDHs) offer a practical way to overcome the fragmentation, inconsistency and limited accessibility of climate risk and loss data. They integrate hazard, exposure, vulnerability and loss information, including granular insurance data where available, into a single, harmonised and legally compliant system that local and regional authorities can actually use. By integrating data from both public institutions and insurers, RDHs provide municipalities with a coherent picture of where risks concentrate, how damages evolve over time and which areas or infrastructures require priority investment. This enables better risk and vulnerability assessments, more targeted adaptation planning, and stronger cases for funding. Importantly, RDHs also support cross-department coordination, reduce reliance on fragmented or isolated data, and create a trusted environment for ongoing data sharing.



4. RECOMMENDATIONS - WHAT EUROPE NEEDS TO DO NEXT?





5. CONCLUSION: DATA AS THE BACKBONE OF CLIMATE RESILIENCE

By operationalizing these recommendations, regions or countries can deliver a trusted data ecosystem that accelerates evidence-based climate adaptation, disaster risk reduction, and cross-sector collaboration. Enhanced RVA and CRA will enable municipalities and regions to prioritize investments, conduct cost-benefit analyses, and align with EU reporting frameworks such as the JRC Risk Data Hub. The establishment of national or Regional Data Hubs (RRDHs) is not only a technical platform but also a governance mechanism that strengthens coherence between Climate Change Adaptation and Disaster Risk Reduction, unlocks cost-benefit insights, and fosters systemic behavioral change. This approach strengthens resilience planning and supports compliance with European and national regulations, ultimately contributing to a climate-resilient Europe.

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The information and findings presented in this policy brief are based on key findings from SOTERIA Deliverables 2.2 "*Tech Briefing on Data, Drivers and Barriers*", 3.1 "*Recommendations for Developing Regional Data Hubs*", and 2.3 "*Guidelines on Loss Data*".

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Europe's Climate-Insurance Protection Gap: Innovative Solutions For Shared Resilience

New products, new models, shared data, shared resilience

Climate change is driving more frequent and severe extreme events across Europe, while the current insurance landscape struggles to keep pace, leaving a widening protection gap that threatens economic stability and long-term resilience. Traditional insurance models are no longer sufficient to address these fast-evolving risks, and both insurers and public authorities face barriers that limit coverage, affordability and access. This policy brief outlines the innovative insurance solutions, ranging from new products and risk-based pricing to novel business models, next-generation data-sharing approaches and shared-resilience mechanisms, that can help close Europe's climate protection gap. It highlights why change is needed and provides clear actions to make climate insurance more affordable, accessible, and resilient for people, businesses and regions.

KEY MESSAGES

- Europe's climate-insurance protection gap is widening because households, businesses and local authorities face rising climate losses but limited access to affordable and adequate insurance.
- Traditional insurance models struggle to cope with increasing risks, slow loss assessment processes and insufficient incentives for risk reduction.
- Innovative insurance solutions, parametric products, risk-based pricing, new distribution models and digital loss-data tools, can expand coverage, reduce costs and speed up payouts.
- Adoption remains limited due to barriers on both the demand side (low awareness, affordability, complexity) and the supply side (data gaps, regulatory uncertainty, limited scalability).
- These innovations can only deliver impact at scale if insurers, public bodies and European institutions work together to expand access, affordability and resilience.

1. INTRODUCTION: EUROPE'S CLIMATE PROTECTION GAP AND THE URGENT NEED TO RETHINK INSURANCE

Climate change is intensifying the frequency and severity of natural hazards across Europe and globally. These events are already inflicting profound economic, social, and environmental impacts. Between 1980 and 2023, extreme weather and climate-related events caused over 199€ billion in economic losses in the EU-27 alone, with the vast majority of those losses remaining uninsured (EEA, 2024). This growing disparity between actual damages and insured losses, known as the climate insurance protection gap, has emerged as one of the most pressing challenges for public authorities, private insurers, and vulnerable communities.

Despite Europe's relatively advanced insurance markets, the region is far from uniformly protected. In some countries, such as Norway, more than 70% of climate-related losses are covered by insurance, whereas in others, such as Bulgaria or Croatia, coverage falls below 2% (with an increasing trend) (EEA, 2024). This variation highlights not only geographic disparities but also systemic issues in the availability, affordability, and design of risk-transfer mechanisms.

In this context, it is increasingly evident that traditional insurance models alone built for a more stable and predictable climate are insufficient to meet the demands of a rapidly changing climate. At the same time, many households and small businesses face affordability constraints, limited awareness of their exposure or low trust in existing products. Together, these combined supply- and demand-side challenges prevent insurance from fulfilling its essential role in climate adaptation by spreading risk, enabling rapid recovery and incentivising preventive action.





Therefore, closing this gap therefore requires more than incremental adjustments. It calls for a shift toward insurance solutions that actively promote risk reduction and resilience, making innovation both an opportunity and a necessity. Across Europe, insurers, public authorities and research institutions are testing new tools, technologies and institutional arrangements aimed at expanding coverage, reducing costs and better reflecting current and future risks. Innovations such as parametric schemes, eco-insurance solutions, risk-based pricing tools, flood-risk certification models, enhanced data-sharing mechanisms and public-private partnerships show strong potential to reach vulnerable groups and hard-to-insure areas. Yet their deployment remains uneven, often constrained by regulatory uncertainty, fragmented markets, limited data and low user awareness.

This policy brief shows some of the innovative insurance solutions that can help close Europe's protection gap by addressing barriers on both the supply and demand sides. It presents the main areas of innovation identified in SOTERIA and gives examples from its case studies on how they can enhance affordability, accessibility and climate resilience across European regions. Finally, it lays the foundation for practical recommendations to support their wider adoption, ensuring that insurance can play its full role in Europe's climate adaptation strategy.

2. BARRIERS – WHY EUROPE STRUGGLES TO EXPAND CLIMATE INSURANCE?

Before presenting the innovative insurance solutions that can help close Europe's climate-insurance protection gap, it is essential to understand the barriers that currently limit the expansion of climate insurance. These obstacles arise on both the supply and demand sides, shaping what insurers can provide and what households, SMEs and public authorities can realistically access or are willing to purchase. Together, these barriers explain why promising innovations struggle to scale and why new approaches are urgently needed.

SUPPLY-SIDE BARRIERS: WHAT LIMITS INSURERS' ABILITY TO EXPAND COVERAGE?

Information asymmetry and lack of high-quality local data: Across several case studies, insurers face gaps in hazard, exposure and historical loss data at the resolution needed for accurate modelling. These data limitations increase basis risk, hinder pricing, and restrict the development of parametric products.

Legal and regulatory constraints: In multiple regions, outdated or unclear regulatory frameworks limit the introduction of innovative climate insurance solutions. Ambiguity around approval procedures, data use, and the role of public authorities reduces insurers' ability to test or scale new products.

Limits of insurability: In some highly exposed regions, the frequency and severity of climate-related losses challenge the actuarial feasibility of insurance. When expected losses exceed affordable premium levels, insurers face structural barriers to offering or expanding coverage.

Capacity constraints within the insurance sector: In a few case studies, the insurance sector lacks sufficient technical resources or financial capacity to design, price or distribute climate-risk products at scale. This constrains innovation and slows the expansion of dedicated climate insurance schemes.

The combined effect: A system unable to scale innovative solutions

Because supply-side barriers limit what insurers can offer, and demand-side barriers limit public uptake, innovative solutions struggle to reach scale. The result is a persistent and widening protection gap that leaves vulnerable groups underinsured, increases fiscal pressure on governments and weakens Europe's climate-adaptation capacity.

DEMAND-SIDE BARRIERS: WHY DO HOUSEHOLDS, SMES AND AUTHORITIES REMAIN UNDERINSURED?

Low risk awareness and limited understanding of insurance: In several regions, households, farmers, SMEs, and local authorities underestimate climate risks or have misunderstandings about insurance mechanisms. This reduces perceived value and lowers uptake.

Reliance on government support: Some communities expect post-disaster assistance to cover losses, decreasing incentives to purchase insurance. This over-reliance on public compensation creates a behavioural barrier to market-based risk transfer.

Lack of awareness and limited information on risks: Beyond general risk perception, many end users have insufficient access to clear, localised information about their specific risk exposure, insurance options, and product functioning.

Cultural factors influencing decision-making: In certain contexts, historical norms, collective behaviours or local attitudes toward insurance influence willingness to insure. Social learning and peer effects can either hinder or enable adoption.

Complexity of insurance products: Where insurance offerings are perceived as difficult to understand, especially parametric or multi-peril products, potential users may avoid them even when they address real risks.

Unaffordability of premiums: In several case studies, premiums remain too high relative to income levels or perceived value. Without targeted subsidies, many vulnerable groups are unable or unwilling to pay.

Mistrust toward the insurance sector: Past experiences, miscommunication or limited transparency contribute to scepticism toward insurers, particularly regarding parametric solutions where triggers may not be intuitive. This reduces uptake despite product soundness.



3. INNOVATIVE INSURANCE SOLUTIONS – EXPANDING COVERAGE, REDUCING RISK, STRENGTHENING RESILIENCE

Countries across Europe are experimenting with new ways to make climate insurance more affordable, accessible and aligned with today's rapidly evolving risks. These innovations respond directly to the supply- and demand-side barriers outlined above, offering practical pathways to expand protection while strengthening incentives for risk reduction. Within SOTERIA, nearly 80 existing or emerging solutions were analysed, with four groups standing out for their relevance, potential for scale and demonstrated impact. This section introduces these four types of innovative insurance solutions, shows how they can contribute to closing Europe's climate-insurance protection gap, and highlights proven examples drawn from SOTERIA's case studies.

1

NEW PRODUCTS AND PRICING



New products and pricing refer to insurance solutions that link premiums, coverage and payouts to measurable risk factors, such as hazard indicators, exposure levels or the implementation of mitigation measures. Instead of relying only on traditional loss-based assessments, these innovations use risk-based pricing and parametric triggers to offer faster payouts, greater transparency and incentives for prevention. By adjusting premiums according to property-level risk and rewarding households or businesses that invest in protective measures, these solutions help reduce vulnerability while keeping insurance accessible in high-risk areas. They represent a shift from compensating losses to actively supporting climate resilience.

BUT FIRST... WHAT DO WE MEAN BY INNOVATIVE INSURANCE SOLUTIONS?



Innovative insurance solutions build on the principles of sustainable insurance, which call for integrating environmental, social and governance considerations into every stage of the insurance value chain. They cover both existing and new solutions, combining adapted or improved products, processes and technologies with approaches that promote risk reduction, transparency and long-term resilience. Instead of simply compensating losses, these solutions aim to prevent them by better aligning insurance with climate-risk realities and societal needs.

They emphasise responsible decision-making, collaboration with clients and public authorities, awareness-raising, and clear accountability. In the context of climate adaptation, innovative insurance solutions represent a shift from traditional protection toward models that actively support resilience, sustainability and equitable access to coverage.

Flood Certificates in Germany: A Practical Example

In Germany, SparkassenVersicherung uses tools such as the Flood Risk Pass, which checks the real flood risk of a property and gives clear advice on how to reduce it. If homeowners follow these recommendations, even houses in high-risk areas can become insurable again. Sparkasse banks also offer low-interest public loans from KfW to help families afford these protective measures, creating a system where prevention, insurance, and financing support each other. In Saxony, a similar certificate exists but is run as a public program where the state covers much of the cost to help people understand their risk and improve their homes, although it is not directly linked to insurance. Both approaches show a simple idea: when people receive the right information and support to protect their homes, properties that once seemed too risky can become safer, easier to insure, and better prepared for future climate impacts.

Public-Private Models and Parametric Multi-Peril Insurance for Farmers: Lessons from Bavaria and Lower Saxony

Bavaria has introduced a large-scale public-private partnership where farmers receive subsidised parametric multi-peril insurance for drought, hail, storms and other weather risks. The scheme is mandatory (with few exceptions), heavily funded through the Common Agricultural Policy, and gives farmers bundled coverage that would otherwise be unaffordable. Digital tools such as remote sensing, IoT sensors or blockchain could further improve data quality and reduce basis risk.

Lower Saxony offers a smaller, voluntary program that supports both parametric and traditional insurance and prioritizes farmers using climate-adapted practices. It is more flexible but limited by budget.

Both models show how subsidies, innovation, and risk-reduction incentives can expand access to affordable climate insurance.

NEW BUSINESS MODELS

New business models reshape how insurance is delivered, financed and shared across public and private actors. Their goal is to make climate insurance more affordable and transparent while rewarding proactive risk reduction. These models often combine subsidies, parametric insurance, bundled coverage or public-private partnerships to expand access for vulnerable groups—particularly farmers facing rising climate volatility. By redesigning incentives and distribution channels, they help overcome affordability barriers, reduce uncertainty and ensure that climate risks are managed collectively rather than left solely to individuals or insurers.



2



3

NEW TOOLS AND METHODS FOR LOSS DATA SHARING

Advances in digital technology are reshaping how climate risks are monitored, modelled and shared. Tools such as remote sensing, IoT sensors, satellite imagery and AI-based damage assessment provide faster and more accurate information on hazards, exposure and losses. When combined with trusted data-sharing arrangements between insurers and public authorities, they help reduce basis risk, improve pricing, speed up claims processes and make climate insurance more viable in high-risk areas. At the same time, emerging knowledge-sharing platforms at global, national and regional levels are creating common standards and spreading best practices, enabling more coordinated and evidence-based climate-risk management.

Loss Data Platforms in Practice: From Global Tools to Local Action

Two contrasts show how data sharing boosts climate insurance effectiveness. At the global level, the Resilience Planet Data Hub (COP28) provides open-access risk indicators, standardized metrics and best-practice cases to help governments, investors and insurers understand climate risks and design better insurance solutions.

At the national level, Norway shows how targeted data sharing can support local climate adaptation. Insurance companies share anonymized claims data with selected municipalities through the Knowledge Bank, helping them analyze risks, plan investments, and evaluate preventive measures. Strong safeguards and trust-building were key to long-term cooperation.

Together, these models illustrate how data-sharing systems, from global hubs to local platforms, can strengthen climate resilience and support more effective climate insurance solutions.



Examples of Shared Resilience in SOTERIA case studies

Norway shares anonymised insurance loss data with municipalities through a national “Knowledge Bank”, allowing local authorities to improve flood models, evaluate preventive investments and strengthen adaptation planning.

Valencia (Spain) co-developed a set of 34 resilience indicators with local institutions, linking climate adaptation, nature-based solutions and ESG metrics into a common governance framework.

Zadar (Croatia) applies behavioural insights to increase insurance uptake among farmers, using trusted intermediaries, simplified messages and faster payouts to address low awareness, cultural barriers and lack of trust.

Across these examples, common metrics, cross-sector cooperation, and inclusive processes help create a shared language of resilience, supporting better adaptation decisions, stronger institutions, and wider use of climate-risk insurance.

SHARED RESILIENCE

Shared resilience refers to approaches where public authorities, insurers, financial actors, and communities work together to manage climate risks, share responsibilities, and strengthen society’s capacity to prepare for and recover from extreme events. Instead of acting in isolation, stakeholders use common metrics, coordinated planning and joint incentives to reduce vulnerability and support long-term resilience. This involves integrating ESG principles into insurance and public decision-making, aligning adaptation efforts across sectors, and ensuring that actions are transparent, accountable and based on shared evidence. By creating a common results-based framework, shared resilience helps translate climate risks into coordinated strategies that guide investments, support behavioural change and enhance collective protection across territories.

4



TAKEN TOGETHER,

these four areas of innovation show that climate insurance can evolve from a reactive compensation tool into a proactive resilience mechanism. New products, new business models, improved data sharing and shared-resilience frameworks each tackle different parts of the protection gap, but their impact grows when combined. **They demonstrate that it is possible to have affordable, accessible insurance that improves resilience, provided that the solutions are aligned with local needs, supported by reliable partnerships and integrated into broader adaptation strategies.**



4. RECOMMENDATIONS

Building on the barriers identified and the innovative insurance solutions tested across SOTERIA, this section sets out targeted recommendations for the key actors involved in closing Europe's climate-insurance protection gap. Because no single stakeholder can address the challenge alone, the actions proposed here are tailored to policy makers, insurance companies, the financial and corporate sector, and local communities and territories. Together, they outline how data, regulation, products, finance and local engagement can be aligned to scale up effective solutions, improve affordability and accessibility, and strengthen climate resilience across European regions.



FOR POLICYMAKERS

- **Build the Data Foundations for a Fair and Resilient Insurance Market:** Enable secure and standardised access to high-quality hazard, exposure and loss data so insurers and public authorities can better model climate risks and design affordable, risk-based insurance. This requires public-private data-sharing agreements, interoperable platforms and more granular drought, flood and heat-risk indicators, as shown in several SOTERIA case studies. Importantly, data frameworks should also go beyond economic losses to capture environmental, social and governance impacts, supporting more resilience-oriented decisions.
- **Incentivise Affordable and Risk-Reducing Insurance:** Use targeted subsidies, co-financing schemes, micro-grants and tax incentives to help households, farmers and SMEs access insurance that rewards preventive action, such as risk-reduction measures verified through flood certificates (Saxony), MITIGRATE assessments (Gabrovo), or conditional subsidies for agriculture (Bavaria/Saxony-Anhalt). Where relevant, align these incentives with CAP Pillar II and national climate-adaptation programmes.



FOR THE INSURANCE SECTOR

- **Mainstream Innovative and Inclusive Products:** Expand the offer of risk-based and parametric products, integrate verified risk-reduction actions into pricing, apply transparent trigger metrics, adopt tiered incentive models (e.g., basic-intermediate-advanced discounts in Gabrovo) and develop nature-based or ecosystem-linked insurance where relevant (Valencia).
- **Strengthen Trust Through Transparency and Engagement:** Use behaviourally informed communication, simplified product descriptions, visual explanations of parametric triggers, and trusted messengers (e.g., banks, farmer associations in Zadar). At the same time, participate in joint awareness campaigns with municipalities, brokers and civil society to address misinformation and clarify limits of state compensation (Saxony).



FOR THE FINANCIAL AND CORPORATE SECTOR

- **Align Finance with Resilience and Prevention:** Integrate climate-risk assessments, flood certificates, resilience indicators and adaptation measures into lending and investment policies. Where possible, link loan conditions or preferential financing rates to verified household, business or municipal risk-reduction investments, ensuring that prevention efforts are directly rewarded through improved access to finance (as seen in Germany and proposed in Gabrovo)
- **Support Scalable Digital and Data Innovations:** Invest in satellite-based hazard mapping, AI-driven risk modelling, remote sensing and secure digital tools that support real-time monitoring and shared-resilience frameworks (Valencia, Trøndelag, Gabrovo). In parallel, fund digital infrastructure that improves data availability, strengthens evidence on losses and helps reduce basis risk in innovative insurance products.



FOR COMMUNITIES AND TERRITORIES

- **Build Shared Resilience Through Local Partnerships:** Foster collaboration between insurers, municipalities, utilities, farmers, civil society organisations and banks to develop shared resilience indicators, co-created governance frameworks and joint communication strategies (Valencia, Trøndelag, Saxony). Integrate insurance and prevention measures into local climate adaptation plans, emergency preparedness and land-use decisions to ensure that risk reduction and coverage evolve together. Support the use of environmental, social and governance KPI aligned with international standards, such as ISO 37125, to track progress and ensure accountability.
- **Empower Citizens With Clear Risk Information:** Strengthen risk awareness and insurance literacy through trusted local intermediaries such as farmer associations, consumer organisations, municipalities, cooperatives and community groups. Use clear, behaviourally tested communication materials to simplify insurance concepts, improve understanding of parametric products and address misconceptions around public compensation and state aid (Zadar, Saxony).



5. CONCLUSIONS

Overall, the SOTERIA project shows that Europe's climate insurance protection gap is driven by both supply-side barriers and demand-side challenges. Notably, although these barriers differ across regions and sectors, recurring patterns emerge across the case studies. In particular, insufficient data for risk modelling, limited awareness among households and farmers, reliance on government compensation and affordability issues stand out.

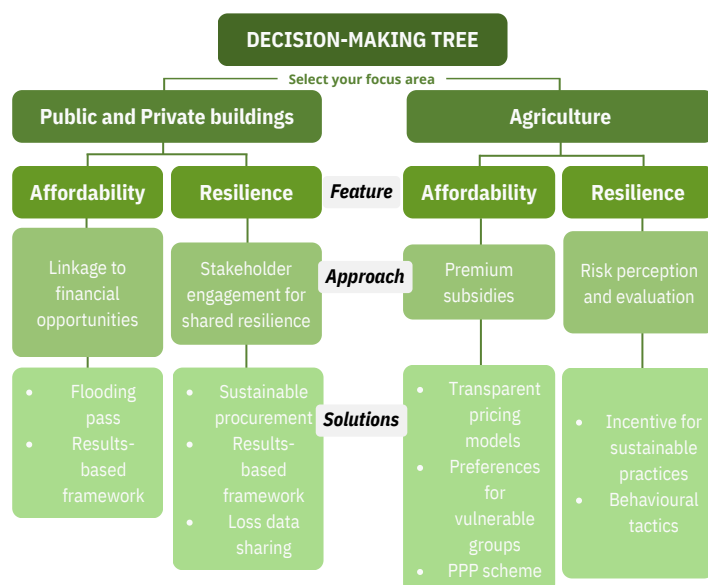
To address these challenges, SOTERIA's decision-making tree provides a practical framework to identify where innovation can deliver the greatest impact. For example, shared-resilience approaches can help overcome fragmented governance, while financial linkages can address affordability constraints. Moreover, behavioural interventions improve risk perception, and pricing innovations support climate-aligned investment. Importantly, the analysis demonstrates that the most effective solutions combine technical innovation with behavioural insights and governance reforms rather than relying on isolated measures.

Furthermore, the four innovation pathways identified by SOTERIA offer a clear roadmap for transforming climate insurance from a reactive compensation instrument into a core pillar of Europe's climate adaptation strategy. As shown in the case studies, when insurance is combined with risk-reduction incentives, behaviourally informed communication and collaborative governance models, uptake improves and resilience increases.

However, achieving scale requires coordinated action across multiple stakeholder groups. Therefore, policymakers must strengthen data infrastructures, modernise regulatory frameworks and introduce targeted incentives for risk-reducing insurance. At the same time, insurance companies need to mainstream innovative products, enhance transparency and build trust through user-

centred communication. In parallel, financial and corporate actors should align lending and investment practices with resilience objectives and support digital data innovations, while communities and territories must foster shared-resilience partnerships and empower citizens with clear and accessible risk information.

Ultimately, closing Europe's protection gap will not result from a single solution but from a coherent, multi-stakeholder effort grounded in innovation, prevention and shared responsibility. By integrating the lessons from SOTERIA, its identified barriers, decision-making framework, innovation types and targeted recommendations, Europe can move toward climate-insurance systems that are inclusive, affordable and resilient.



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Enabling Climate Resilience: Legal Frameworks to Empower Climate Adaptation Insurance

Insuring the world of tomorrow

Climate change is showing its claws across Europe, exposing people, economies, and ecosystems to growing losses that existing responses can no longer contain. The insurance sector, traditionally seen as a payer of damages, can play a far greater role by helping to anticipate and reduce risks, support recovery, and finance preventive action. Yet its potential is limited by fragmented regulation, weak cooperation between and within public and private actors, and major data gaps that leave many communities unprotected. This paper shows which existing EU and national legal frameworks are currently starting to shape the conditions for the insurance sector to contribute to climate adaptation, and what is still needed to make these frameworks truly enabling. By comparing European and Member State contexts, it highlights where progress is taking place, where barriers remain, and what reforms could help unlock the sector's full potential for resilience.

KEY MESSAGES

- The insurance sector can move beyond compensating losses to become a key driver of climate adaptation, helping to anticipate and reduce risks, encourage prevention, and channel investment into resilient solutions.
- The European regulatory framework is starting to provide important support for this role, but implementation still remains uneven and fragmented across countries and governance levels.
- Persistent barriers continue to hinder progress. Climate-related insurance loss data remain largely underused, with no effective mechanisms to integrate them into national risk systems. Strict data protection regulations make it difficult to share and use loss data, while public-private cooperation remains weak. These gaps limit innovation and the development of innovative insurance solutions that promote prevention, resilience, and nature-based adaptation.
- Moving forward requires stronger collaboration between the public and private actors, built on solid institutional capacity, mutual trust, and effective data-sharing systems. Equally important is to ensure inclusive insurance mechanisms that protect vulnerable people and regions, and to integrate the insurance sector more fully into adaptation policies and regulations. These steps will be essential to strengthen Europe's capacity to adapt to climate change and to empower the insurance sector as a key driver of resilience and innovation.

1. INTRODUCTION: A CRITICAL MOMENT FOR ACTION

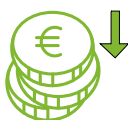
Europe is already experiencing the accelerating impacts of climate change. The continent is warming twice as fast as the global average, and extreme weather events such as floods, droughts, and storms are becoming increasingly frequent and severe. Between 1980 and 2023, these events caused more than €738 billion in economic losses, with over €162 billion recorded in just the past three years. Beyond the numbers, these losses are disrupting lives, damaging infrastructure, and placing mounting pressure on public budgets. The growing scale of these challenges underlines the urgency of strengthening Europe's capacity to adapt and build resilience.

Within this context, the insurance sector can play a much greater role than it currently does. Insurance is uniquely positioned to help people, businesses, and governments anticipate and manage climate risks before disasters occur, while also supporting recovery and reconstruction afterwards. It can direct investment towards safer, more sustainable assets and generate valuable data to inform public decision-making. Yet, despite this potential, the sector's contribution to climate adaptation remains limited. Across Europe, only about 35% of climate-related losses are insured, and in some regions this figure falls below 5%, leaving many households and communities highly exposed to climate risks.



The limited role of insurance in supporting adaptation reflects a combination of regulatory, institutional, behavioral and technical barriers. Fragmented responsibilities across governance levels often hinder coordinated action, while cooperation between public authorities and insurers remains inconsistent. In many cases, the exchange and use of climate risk data are still too weak to guide effective prevention or risk reduction efforts, making it harder to anticipate threats and plan adaptation measures in advance. As a result, insurance is often used only after disasters, rather than as part of a wider effort to reduce risks and support long-term adaptation.

This situation has important consequences for Europe's social and economic stability. When climate-related losses are not insured, the financial burden shifts to individuals and public authorities, amplifying inequalities and increasing fiscal vulnerability. Strengthening partnerships between public and private actors, improving access to reliable climate risk information, and expanding insurance coverage are therefore essential steps to close the protection gap. Empowering the insurance sector to contribute more actively to adaptation would enhance the continent's overall resilience and support a fairer, more sustainable response to the growing risks of climate change.



Between 1980 and 2023, extreme weather events caused more than €738 billion in economic losses in Europe.

35%

35% of climate-related losses are uninsured, leaving more than 50% of households and communities vulnerable and unprotected against climate risks.

Therefore, this policy brief explores which existing European and national legal frameworks are starting to shape the conditions for the insurance sector to contribute to climate change adaptation, and what is still needed to make these frameworks truly enabling. It analyses how EU regulations are interpreted and implemented across different Member States, considering the diversity of insurance systems and governance contexts. By comparing European and national approaches, it identifies common barriers and provides policy recommendations to strengthen the regulatory and institutional foundations that can empower the insurance sector to drive innovation, prevention, and resilience in a changing climate.

2. POLICY LANDSCAPE

2.1. The EU's Enabling Legal Framework for Climate-Resilient Insurance

The European Union is progressively developing a comprehensive and interconnected legal framework that defines how the insurance sector can contribute to climate adaptation. This framework covers multiple areas, including climate and adaptation policy, sustainable finance, data governance, environmental protection, and disaster risk reduction. Together, these elements shape the conditions under which insurers can assess, manage, and transfer climate risks, invest in resilience, and align with public adaptation goals.

At the heart of this landscape lies the **European Climate Law**, which makes climate neutrality by 2050 a legally binding objective and establishes the need to strengthen adaptive capacity and climate resilience across the Union. Complementing it, the **EU Strategy on Adaptation to Climate Change** sets a roadmap for smarter, more systemic, and faster adaptation by promoting stronger coordination across governance levels and sectors. It explicitly recognises the role of insurance in closing protection gaps, improving climate risk data, and supporting prevention, calling for deeper collaboration with the EIOPA and the creation of a European climate risk data hub. Together, these instruments provide the political and institutional foundation for integrating insurance into Europe's wider adaptation agenda.



The Sustainable Finance Framework provides a second, complementary pillar of this enabling environment. Through the **EU Taxonomy Regulation**, the **Corporate Sustainability Reporting Directive (CSRD)**, and the **Sustainable Finance Disclosure Regulation (SFDR)**, insurers are encouraged to align investments and products with climate adaptation and resilience goals. The Taxonomy defines what constitutes sustainable economic activity, the CSRD ensures transparent and comparable reporting of climate-related risks and opportunities, and the SFDR enhances disclosure and accountability across financial markets. In parallel, the **Solvency II Directive** and its recent amendments require insurers to explicitly consider climate and environmental risks within governance, solvency, and investment frameworks. Together, these measures strengthen the financial sector's capacity to anticipate long-term climate impacts and channel capital toward resilience-enhancing projects.

Reliable and accessible data are essential for effective risk assessment and innovation in insurance. The EU has made significant progress in this area through initiatives such as the **European Data Strategy**, the **GreenData4all**, the **INSPIRE Directive**, the **Open Data Directive**, the **Regulation on High Value Data Sets** and the **Data Governance Act**. These instruments collectively promote interoperability, standardisation, and greater access to environmental and geospatial information, while safeguarding data privacy. Better data governance enables insurers to improve risk modelling, design more tailored products, and cooperate more effectively with public authorities in prevention and recovery planning.

Likewise, the EU's environmental and nature protection policies have increasingly recognised the role of Nature-Based Solutions (NbS) as cost-effective measures to address climate risks. NbS reduce exposure to floods, droughts, and heatwaves, while restoring ecosystems that provide vital protective services. Key policy frameworks such as the **European Green Deal**, the **Biodiversity Strategy for 2030**, the **Nature Restoration Law**, among others, place NbS at the centre of Europe's resilience agenda. For the insurance sector, these initiatives open

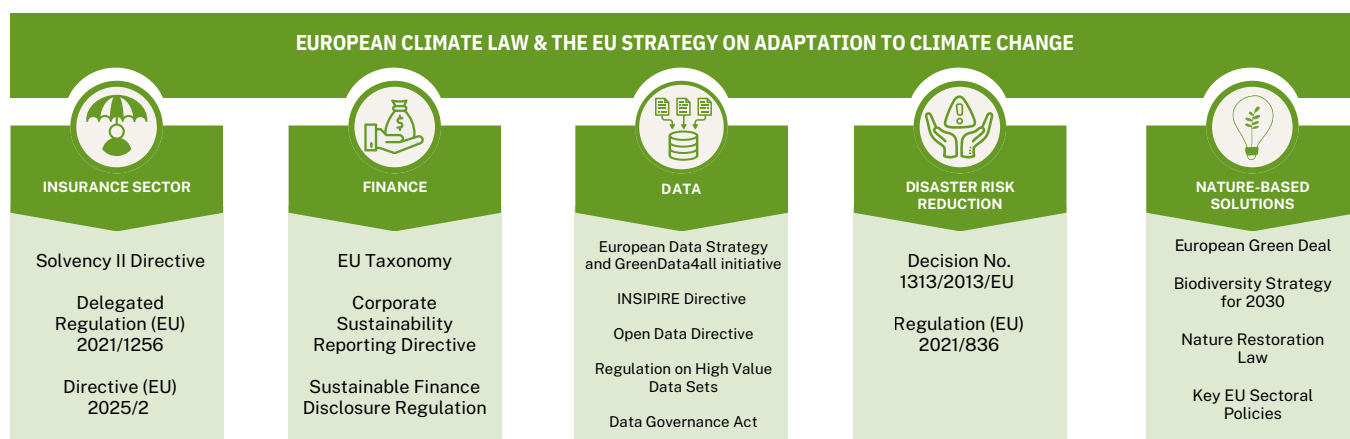


opportunities to integrate ecosystem-based approaches into risk assessment, pricing, and investment decisions, while supporting projects that combine climate adaptation with biodiversity conservation and social co-benefits.

Finally, the Disaster Risk Reduction (DRR) framework reinforces the preventive dimension of climate adaptation and provides an important bridge between public and private risk management. Guided by the Sendai Framework for Disaster Risk Reduction 2015–2030, the EU has integrated DRR principles across its policies, most notably through the **Union Civil Protection Mechanism (UCPM)** and **Decision No. 1313/2013/EU**. These instruments enhance coordination between Member States, improve access to risk and loss data, and promote early warning systems, preparedness, and resilience planning. For insurers, this

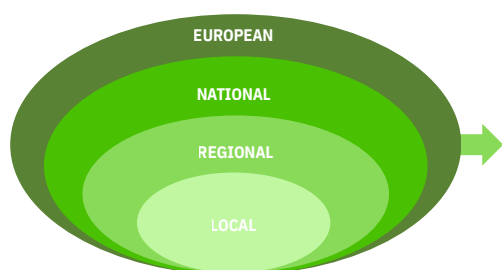
framework is highly relevant as it strengthens the information base for pricing and loss modelling, supports prevention-based investments, and creates opportunities for cooperation in risk transfer and recovery mechanisms.

Together, these policy frameworks form a coherent ecosystem that enables the insurance sector to evolve from a reactive payer of losses into a proactive partner in climate resilience. By aligning climate, financial, data, NbS and disaster risk governance, the EU is progressively creating the legal and institutional foundations for insurance to play a central role in Europe's transition toward a climate-resilient and sustainable future.

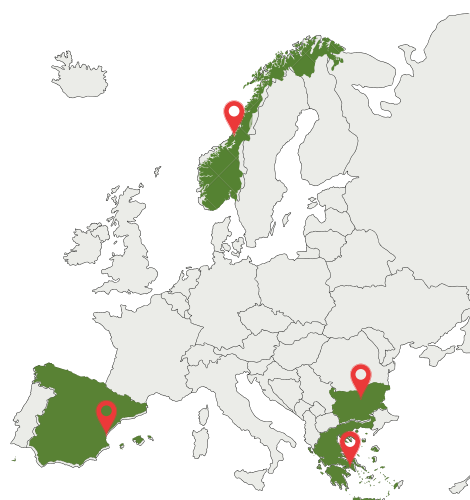


2.2. Bridging EU Adaptation Frameworks with National Laws and Insurance Schemes

Building on the European analysis, this section examines how the enabling conditions for insurance-based climate adaptation take shape at national, regional, and local levels. While EU frameworks provide overall direction, their effectiveness ultimately depends on the institutional, legal, and market contexts of each Member State.



Through the analysis of four case studies, Spain, Greece, Bulgaria, and Norway, this section describes how each country's insurance system addresses climate-related and catastrophic risks, and outlines the key features of their legal and policy frameworks for climate adaptation. By presenting both components together, the analysis offers a clear picture of how national environments differ in their maturity, structure, and capacity to support innovative insurance approaches.



The aim is not only to map these systems, but to identify the enabling conditions and common barriers that influence the insurance sector's ability to contribute to resilience and adaptation. By comparing these contrasting settings, the section helps reveal what types of legal and institutional arrangements are most conducive to developing effective, climate-resilient insurance frameworks.



SPAIN - Valencian Autonomous Community

Spain has a **well-established insurance system** for natural and climate-related catastrophes, based on **solidarity and public-private cooperation**. The **Consorcio de Compensación de Seguros (CCS)** provides **mandatory coverage** for extraordinary risks such as floods, earthquakes, or storms, ensuring **universal protection** and rapid compensation. Regarding regulation, at the national level, the Climate Change and Energy Transition Law and the National Adaptation Plan (PNACC) form a robust framework that recognises the role of insurance in managing climate risks. Regionally, the Valencian Community has adopted its own Climate Law and is preparing an adaptation plan (PVIECC) that integrates insurance into territorial risk management. Overall, the Spanish system is **highly regulated, institutionally mature, and very accessible**, with **clear governance structures** and with **strong public-private cooperation**. It provides stable protection against climate-related disasters, supports rapid compensation, and contributes to consistent and coherent adaptation efforts across territories.



GREECE - Attica Region (West Athens)

Greece is gradually **moving** from a reactive model **to a more structured system of insurance against natural and climate-related catastrophes**. Historically marked by low insurance penetration and high reliance on post-disaster state aid, the country is now introducing **reforms** that **include mandatory natural disaster coverage** for specific economic actors, fiscal incentives for households, and an Observatory for Disaster Insurance. The national Climate Law, the National Adaptation Strategy, and regional adaptation plans, such as that of Attica, strengthen governance and create a clearer framework for managing climate-related risks. Despite **ongoing challenges** related to **affordability, trust, and market fragmentation**, these **regulatory developments mark a significant shift** towards the integration of insurance into national resilience and disaster risk management efforts.



BULGARIA - North Central Region (Gabrovo Municipality)

Bulgaria has a **fragmented and underdeveloped insurance system** for natural and climate-related disasters. Insurance **coverage** remains **low**, **public awareness of prevention is limited**, and **trust in insurers is weak**, which forces the state to assume most disaster-related costs. At the national level, the Climate Change Mitigation Act and the National Adaptation Strategy provide a partial framework but contain no clear link to insurance, while **cooperation between public and private actors remains minimal**. Regionally, the Regional Development Act and Adaptation Strategies such as that of the North Central Region incorporate climate adaptation and disaster risk reduction, but **implementation is weak**. Locally, **municipalities** like Gabrovo are taking **proactive steps** to address climate risks, yet often **without adequate support from higher authorities**. Strengthening institutional capacity, coordination, and the integration of insurance into adaptation and risk management policies will be key to improving resilience and the development of insurance innovative solutions.



NORWAY - Trøndelag

Norway has one of the **most consolidated and effective** insurance systems for natural and climate-related hazards in Europe. Through the Norwegian Natural Perils Regulation, **coverage against natural hazards is automatically included** in all property and fire insurance policies. This **solidarity-based mechanism** ensures **universal protection** regardless of location and promotes equitable cost sharing across the market. At the national level, climate **governance** is strongly **linked to land-use planning and building regulations**, integrating prevention and risk reduction into development decisions. Close cooperation between insurers and public authorities, supported by **extensive data sharing**, enhances risk assessment, early warning systems, and preventive measures. Therefore, Norway's system is **mature, highly coordinated and regulated, and very reliable**, showing how insurance can operate as an essential component of national climate adaptation and rapid disaster recovery.



WHAT THE COUNTRY COMPARISON TELL US?

The comparison of Spain, Greece, Bulgaria and Norway shows that **innovative insurance solutions for climate adaptation can only thrive within strong and coherent enabling frameworks**. Where regulation is clear, institutions have the capacity to assess risk, coordinate actors and enforce standards, data is openly shared, and public-private cooperation supports prevention, insurance becomes a strategic tool that reduces losses and accelerates recovery. **The message is clear: to narrow the protection gap and enable insurance to support adaptation, countries must strengthen governance, improve coordination and trust across levels of government, and link public support to preventive and risk-reducing measures**. Insurance can only drive resilience when the surrounding policy environment enables risk reduction, not just compensation.





3. MAIN INSTITUTIONAL AND LEGAL BARRIERS

There are three main barriers that limit the development of enabling legal and institutional frameworks for climate-resilient insurance. These challenges, related to coordination, regulation, and data governance, constrain the insurance sector's capacity to contribute proactively to prevention, adaptation, and resilience-building efforts across Europe.



POOR COORDINATION AND FRAGMENTED RESPONSIBILITIES

- **Lack of coordination across governance levels:** Limited communication and cooperation between public administration departments and levels of government lead to unclear mandates, duplicated efforts, and gaps in implementation.
- **Siloed operations:** Climate adaptation, disaster risk management, and the insurance sector function independently, without shared goals or coordination mechanisms.
- **Limited collaboration frameworks:** Few formal structures exist to promote public-private partnerships or integrate insurance data and tools into adaptation planning.
- **Capacity and resource gaps:** Local and regional authorities frequently lack the technical expertise and financial means to design and implement effective climate adaptation strategies.



NO CLEAR LEGAL LINK BETWEEN INSURANCE AND ADAPTATION

- **Regulatory focus on finance:** Insurance regulation remains primarily oriented toward solvency and consumer protection, overlooking prevention and long-term resilience.
- **Reactive approach to risk management:** The sector still intervenes mainly after disasters occur, with few incentives to support proactive risk reduction or preparedness.
- **Weak legal integration:** Adaptation strategies rarely include explicit legal provisions connecting insurance or financial instruments to resilience-building efforts.
- **Limited incentives for innovation:** Few legal or fiscal instruments exist to promote preventive or nature-based insurance products that contribute to long-term resilience.



BARRIERS TO DATA SHARING

- **Lack of binding frameworks:** No mandatory rules exist for sharing risk and loss data between public and private stakeholders.
- **Strict privacy and confidentiality rules:** EU data protection (GDPR), financial regulations, and business confidentiality concerns restrict the exchange of detailed risk and loss data between insurers and public authorities, discouraging collaboration and limiting the development of evidence-based adaptation policies.

4. POLICY RECOMMENDATIONS



01. STRENGTHEN COORDINATION AND INTEGRATE INSURANCE INTO CLIMATE ADAPTATION GOVERNANCE

Better coordination between adaptation, civil protection, and insurance authorities is key to reduce fragmentation and ensure consistent action across all levels of government. Regular dialogue and cooperation between public and private actors can build trust and align resources toward shared goals. Adaptation plans should clearly include insurance as a preventive and financial tool, not only for compensation, by assessing coverage levels, using loss data in planning, and promoting mitigation through financial and regulatory incentives.

02. IMPROVE ACCESS, USE AND SHARING OF CLIMATE RISK DATA

Reliable and accessible climate data are essential for effective adaptation and innovative insurance solutions. Public authorities should develop interoperable data platforms that bring together climate projections, exposure maps, and loss information. Clear rules are needed to ensure data sharing respects privacy while enabling collaboration between insurers, researchers, and public institutions. Better data use will support smarter risk modelling, prevention, and evidence-based decision-making.

03. CREATE LEGAL CONDITIONS THAT ENCOURAGE INNOVATION AND STABLE PUBLIC-PRIVATE COOPERATION

Governments should develop regulatory environments that make it easier for insurers and public authorities to work together on new solutions for climate risks. Clear rules, shared responsibilities, and long-term agreements can increase trust and attract private investment in prevention and recovery. Legal frameworks should also allow the testing and scaling of innovative products that help close protection gaps.



5. CONCLUSIONS

Europe can no longer afford to treat insurance as a passive payer of damages. As climate losses surge, failing to adapt our regulatory systems risks deepening inequality, slowing recovery, and placing unsustainable pressure on public budgets. Empowering insurance as a strategic partner in adaptation is not a technical detail, it is a necessity for economic stability and social protection. By strengthening legal frameworks, improving data access, and fostering genuine collaboration across institutions, Europe can unlock prevention, accelerate recovery, and steer investment toward resilience. The window for preparedness is narrowing, and the choices made now will determine whether societies can withstand the climate shocks of tomorrow.

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Leveraging Insurance For Climate Adaptation

Lessons from SOTERIA and Future Perspectives for Shared Resilience

Climate change is increasingly affecting European countries, leading to more frequent and severe extreme events that generate growing economic and non-economic losses, while large segments of society remain uninsured or underinsured, widening the climate insurance protection gap. Building on existing evidence of the role of insurance in climate adaptation, SOTERIA focuses on three key pillars through which the sector can strengthen resilience: the sharing and use of climate-related risk and loss data, the design of incentives that promote risk reduction and preventive action, and the role of insurance as a financial stabiliser and partner in adaptation governance. The project shows that improved governance, better data-sharing and stronger cooperation between public and private actors can enhance the contribution of insurance to prevention, vulnerability reduction and closing the climate insurance protection gap resilience. This policy brief synthesises the main lessons learned and outlines pathways to consolidate, replicate and scale these results across Europe.

1. INTRODUCTION: INSURANCE AND CLIMATE ADAPTATION IN EUROPE

Climate change is increasing the frequency and severity of extreme events across Europe, generating higher economic and non-economic losses and damages, exposing the limits of current risk management and insurance systems. Despite relatively advanced insurance markets, a large share of climate-related losses remains uninsured, revealing an existing protection gap. This insurance protection gap places growing pressures on households, businesses, and public budgets, while undermining long-term climate adaptation efforts.

In response to this challenge, the SOTERIA project has explored how the insurance sector can better support climate change adaptation. Throughout the project, efforts have focused on three key pillars where the insurance sector can contribute to improving the current situation: first, the provision and use of climate-related risk and loss data; second, the design of incentives to encourage risk reduction and preventive actions; and third, the possibility that insurance can play the role of a financial stabiliser within public-private adaptation governance. Together, these pillars provide a practical framework for understanding how insurance can move beyond compensating losses towards contributing more actively to shared resilience.

SOTERIA worked with different European regions and communities through several case studies examining how this role of the insurance sector can be strengthened in practice while still adapting models to different territorial contexts, needs, and capacities. By bringing together insurers, public authorities, local actors and experts, the project tested concrete approaches to data sharing, innovative insurance solutions and collaborative governance, while identifying the institutional, legal and behavioural conditions that enable or hinder their effectiveness.

KEY MESSAGES

- **Insurance can significantly strengthen climate adaptation in Europe**, but only when it is treated as part of a wider adaptation system rather than as a standalone post-disaster response.
- Many people remain uninsured because they do not fully understand their climate risk and do not see clear incentives to act, closing the **insurance protection gap therefore requires better risk information, prevention-oriented insurance and coordinated public-private cooperation**.
- Climate-risk and loss data already exist, but their **limited sharing, governance and practical use continue to constrain** prevention and informed adaptation planning.
- **Insurance delivers the greatest resilience benefits** when it actively supports prevention, risk reduction and recovery planning, rather than focusing only on compensating losses after disasters.
- Improving climate resilience across Europe depends on **effective multilevel and cross-sector governance that connects existing data, enables coordination across actors, and sustains action beyond political cycles**, recognizing cooperation as a prerequisite.

This policy brief builds on these experiences to reflect on the legacy of SOTERIA and outlines a possible way forward so that others can build on the work undertaken and continue on this path. Its objective is not to introduce new concepts, but rather to synthesise what was learned, clarify the conditions under which insurance can effectively support adaptation, and outline how these approaches can be consolidated, and potentially replicated and/or scaled beyond pilot initiatives to help strengthen climate resilience across Europe.



2. KEY LESSONS FROM SOTERIA: THE ROLE OF INSURANCE IN BUILDING CLIMATE RESILIENCE

This section brings together the main lessons learned from SOTERIA's work across its case studies and pilots. It summarises what the project observed in practice on how the insurance sector can contribute to climate change adaptation, and under which conditions this contribution can be effective. To structure these findings, this section groups the evidence generated by SOTERIA around three key pillars.

Pillar 1: Insurance as providers of risk data, models, and analytics

Effective **climate adaptation depends on access to reliable and usable climate-related risk and loss data**. Across Europe, many decisions on prevention and adaptation are still taken based on incomplete or fragmented data, which prevents regions, municipalities, and other actors to properly plan, and prioritise actions.

Climate-related risk and loss data is the backbone of risk assessment and competitive pricing in the insurance sector. Insurers, therefore, hold some of the most detailed information on past climate-related losses, covering where and when the damage occurred, what caused the damage, and how costly it was. However, **this data is underused outside of the insurance sector**. The main challenge is not the lack of data, but the absence of reliable mechanisms enabling the sharing, combining, and using of climate-related risk and loss data safely across public and private actors.

The **project highlights the value of developing and putting in place common standards, shared definitions, and climate-related risk and loss data ontologies to improve data interoperability and reduce silos**. For example, climate-related risk and loss data often already exists, but it is collected and stored across different ministries, private sector entities, and levels of governance in isolated, vertically organised data systems, using inconsistent definitions, classifications, and formats that hinder sharing and integrated analyses. **The project also demonstrates how regional (or national) climate-risk data hubs can help translate insurance loss data into practical decision-support for municipalities or other interested parties** to support adaptation planning, by combining it with climate and hazard information.

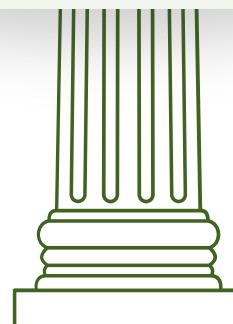
At the same time, **SOTERIA confirms that data protection, confidentiality concerns, limited trust, and lack of obvious benefits remain major barriers, particularly for sharing granular loss data**. Experiences such as the Norwegian Knowledge Bank show that these challenges can be addressed through clear legal frameworks, trust-based cooperation between different actors, and well-defined rules for data access and use.

In this sense, SOTERIA highlights that the insurance sector can play a key role as a provider of climate-related risk and loss data and analytics. When data is shared in a structured and trusted way, it can turn past losses and damage into insights leading to informed decisions, prevention, and ultimately, climate resilience.



MAIN FINDINGS

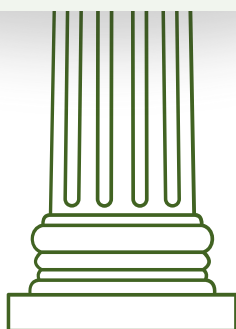
- Establish permanent public–private cooperation mechanisms for sharing climate-related risk and loss data, moving beyond temporary or project-based arrangements.
- Establish clear rules for data governance and confidentiality to facilitate the use of insurance loss data for planning and prevention, particularly by public bodies, while safeguarding privacy and commercial interests.
- Support interoperable data infrastructures and common standards that connect insurance loss data with adaptation, particularly public, and disaster risk management systems.
- Invest in capacity building at local and regional levels to ensure that climate-related risk and loss data is understood and used in practice.





MAIN FINDINGS

- Encourage insurers to adjust prices and policy conditions to reward proven risk reduction and adaptation measures, where reliable data is available.
- Bring insurance insights earlier into planning and decision-making, so that risks are anticipated and reduced through local adaptation strategies and investment choices, rather than addressed only after disasters.
- Promote affordable and transparent insurance products tailored to local risk profiles and socio-economic conditions.
- Address demand-side behavioral barriers by improving communication and awareness techniques, utilising behaviorally-informed approaches to improving the understanding of insurance solutions, trust, and engagement, particularly at the local level.
- Embed participatory processes, such as local climate resilience dialogues, to co-design development of insurance solutions with key stakeholders.



Pillar 2: Insurance as risk managers and incentive setters

Insurance can support climate adaptation not only by compensating losses after disasters, but also by encouraging prevention and risk reduction before damage occurs. Thanks to their detailed knowledge about where climate impacts are most likely to generate losses, **insurers are well placed to help keep insurance available and affordable by linking pricing and underwriting conditions to concrete adaptation measures.** When this link is made, it creates shared benefits for all involved: households and businesses face fewer losses, insurers reduce payout volatility by improving risk management, and public budgets experience less pressure as the protection gap narrows.

In practice, this also means that insights from the insurance sector can be used earlier in the governmental decision-making process. When information on risk is reflected, for example in land use planning choices, investment decisions, and local adaptation strategies, **risks can be anticipated and intentionally reduced, rather than compensated for after losses have actually already occurred.**

However, SOTERIA reveals that important **barriers** still remain. Across the different case studies, the project has identified that **price, misperceptions about costs and benefits, low risk awareness, and behavioural factors continue to limit insurance uptake.** Many households, businesses, and local authorities struggle to understand their climate risk exposure and/or how adaptation measures can reduce risk, and improve insurance conditions. As a result, demand for insurance often remains low, even in areas facing increasing climate pressure where there is potential for reducing the insurance protection gap.

To address this gap, **the project demonstrates the importance of translating climate risk data into clear, simple, and locally relevant actionable insights.** For example, when risk information is easy to understand and communicated by trusted sources, when awareness efforts reveal with clarity how preventive actions could reduce risk, and when insurance products are supported by reliable agents, trust is strengthened and engagement is improved. In this context, **adjusting pricing and underwriting to reward adaptation measures** (provided that data is of sufficient quality) **can help reduce risks and encourage the uptake of insurance.**

Likewise, SOTERIA also confirms that technical solutions alone are not enough. **Behavioral approaches play a crucial role** in overcoming often-ignored yet crucial psychological and institutional barriers. **Targeted communication** addressing specific perceptual barriers, **co-designed insurance products**, and **participatory dialogues are essential to align the relevant insurance solutions to the local hazard profiles and governance contexts.** In particular, the hosting of Climate Resilience Dialogues has proven very valuable in building trust, improving mutual understanding, and supporting more inclusive approaches to designing the appropriate climate insurance solutions.

Finally, the project highlights the **importance of institutional and regulatory frameworks.** In some contexts, existing compensation schemes remain focused on paying for damage after disasters and do not yet support preventive approaches such as “building back better”. However, it is important to take into account that rebuilding in a more resilient way often immediately increases repair costs, which may lead insurers to raise premiums in the short term, and if premiums increase, policyholders may be less willing to opt for enhanced coverage, limiting the ability of insurance to promote long-term risk reduction. Therefore, **longer-term contracts and a closer alignment between insurance incentives, public compensation schemes, and adaptation policies are needed to ensure that resilience measures remain both affordable and attractive for policyholders.**



Pillar 3: Insurance as Financial Leverage and Partners in Adaptation Governance

Insurance plays a key role in limiting the macroeconomic, fiscal, and financial impacts of climate-related disasters. By providing rapid compensation after extreme events, insurance helps households and businesses recover faster, stabilises local economies, and reduces future debt and acute sudden pressure on public budgets. Beyond payouts, insurers can also mobilise capital, support investment decisions, and provide risk expertise that is essential for managing climate risks over time.

However, **SOTERIA confirms that this stabilising role is currently constrained by Europe's gap in insurance protection** i.e., those that are uninsured. Only a small share of climate-related losses is insured, leaving governments to absorb a growing share of disaster costs through public compensation and emergency funding. As climate impacts intensify, the declining availability of insurance due to potential retreat from certain locations and reduced affordability will widen this gap, increasing fiscal vulnerability and undermining the overall economic resilience.

Across its case studies, **SOTERIA shows that insurance is most effective as a financial stabiliser when it operates within strong public-private and multi-level governance arrangements.** Collaboration between insurers, public authorities, and local actors helps to make insurance more affordable, predictable, and accessible, while reducing financial exposure after disasters. Integrating insurance insights into local and regional adaptation planning also helps to align prevention, compensation, and recovery measures, thus reducing the reliance on post-disaster responses.

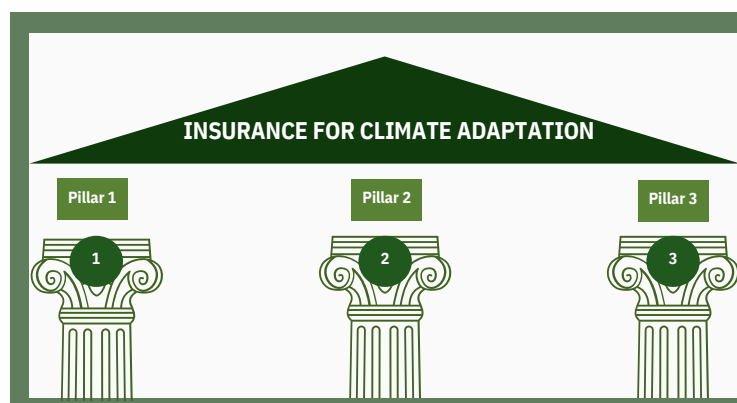
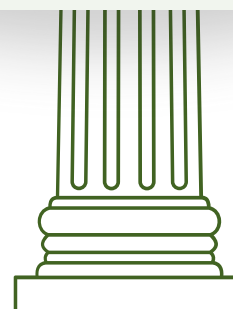
In this context, the project highlights the value of **gradual approaches to managing climate-related risks, such as the “ladder approach” discussed by EIOPA.** Rather than relying on a single solution, this approach builds on existing private insurance systems and progressively strengthens public-private cooperation and shared solutions at the national level. SOTERIA shows that these step-by-step approaches can help maintain insurance coverage, support risk reduction and adaptation efforts, contributing to more effective use of public funds and reduced reliance on post-disaster compensation.

Therefore, **SOTERIA demonstrates that insurance can act as a powerful financial stabiliser in the context of climate change, but only when it is embedded in wider adaptation governance.** Strong public-private cooperation, shared financing solutions, and alignment between insurance, compensation schemes, and adaptation policies are essential to reduce vulnerability, limit fiscal exposure, and support resilient recovery across Europe.



MAIN FINDINGS

- Explicitly recognise insurance as a policy tool for climate adaptation, not only as a post-disaster compensation mechanism.
- Strengthen public-private cooperation and shared financing arrangements to maintain coverage in high-risk areas and particularly to protect vulnerable groups.
- Apply the ladder approach that builds on existing insurance systems while gradually reinforcing shared resilience mechanisms.
- Ensure long-term institutional support and regulatory clarity to enable stable cooperation between insurers, public authorities and local actors.



All things considered, the lessons from SOTERIA show that insurance can make a meaningful contribution to climate resilience when its different functions are connected and aligned. Data sharing enables better understanding of risk, incentives help translate that understanding into preventive action, and governance arrangements determine whether these efforts are sustained and scaled. Across very different territorial contexts, the project demonstrates that insurance is most effective when it is embedded in wider adaptation strategies, supported by trust, cooperation and long-term institutional frameworks.



3. FROM LESSONS LEARNED TO NEXT STEPS

SOTERIA has generated a wide range of insights on how insurance can better support climate change adaptation. The key question now is how to move forward. The project shows that many useful approaches already exist, from data-sharing practices to innovative insurance solutions and governance arrangements, but these different elements are often applied in isolation or remain limited to one place. The challenge ahead is therefore to build on what was learned and ensure that these approaches are consolidated, connected, and deliver impact beyond individual cases.

A primary priority is data sharing. Climate-related risk and loss data is still dispersed across institutions, sectors, and governance levels, limiting its use for risk assessment, decision-making, and adaptation planning. Future efforts must focus on moving from fragmented data to integrated and trusted data-sharing systems. This includes improving interoperability, clarifying data governance rules, incentivising proactive sharing, and addressing confidentiality constraints practically and effectively. At the same time, investment in capacity building is essential, particularly at the municipal level, so that local authorities can access, understand, and effectively use risk and loss data in planning and prevention.

Second, future perspectives must address the **design and uptake of insurance solutions in a socially inclusive way**. SOTERIA shows that insurance can help build resilience if it remains affordable, accessible, and relevant for those most exposed to climate risks. This requires particular attention to vulnerable households, small businesses, and high-risk regions. Likewise, **behavioral and cultural factors remain central**. Misperceptions about risk, limited understanding of insurance, lack of trust, and continued reliance on post-disaster compensation all constrain uptake. Future approaches must therefore prioritise transparency, clarity, and insurance solutions must

4. CONCLUSIONS

In conclusion, SOTERIA demonstrates that insurance can contribute more effectively to climate adaptation when it is treated as part of a wider system, rather than as a standalone response to disasters. In this sense, the project shows that progress depends less on creating new instruments and more on connecting existing data, insurance practices, and governance structures in a coherent way.

At the same time, the main legacy of SOTERIA lies in showing that climate-resilient insurance is achievable when data are usable, incen-

therefore prioritise transparency, clarity, and insurance solutions that are context-specific and adapted to local circumstances and needs, and where possible, they should be co-designed with the relevant local actors they seek to protect. This recognises that insurance solutions cannot be uniform across countries or regions and that there is no one-size-fits-all scenario.

Finally, **governance and legal frameworks will be decisive for the future of climate adaptation insurance**. SOTERIA reveals that insurance is most effective when it is integrated into adaptation policies, rather than treated as a separate or purely financial instrument. In this context, the project also highlights that, in many cases, the challenge is not the lack of regulation but the limited integration and coordination of existing frameworks across policy and governance levels. Consequently, stronger public-private cooperation, shared resilience approaches, and participatory processes involving all actors exposed to shared risks become essential to the development of truly effective solutions. At the same time, this requires clear regulatory conditions, sustained institutional support, and long-term cooperation between insurers, public authorities, and local actors, including continued attention to data governance and confidentiality issues.

Looking ahead, the **future** of climate adaptation insurance in Europe is **less about introducing new concepts and more about strengthening and drawing connections between elements that already exist**. Thus, the challenge is to turn lessons from case studies into durable, sustainable, and actionable frameworks that support prevention, reduce risk, and help close the protection gap. In this sense, the legacy of SOTERIA focuses on coordinated, inclusive, and well-governed insurance systems capable of evolving alongside climate adaptation itself and emerging needs.

tives support prevention, and cooperation between public and private actors in a stable and inclusive manner. Looking ahead, turning SOTERIA's insights into lasting impact will require further consolidation and real application of these findings, so that successful approaches can move beyond pilots to include insurance as a key tool for adaptation for shared resilience across Europe.

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