

HOW DO CLIMATE RISK INSURANCES DIFFER ACROSS EUROPE?

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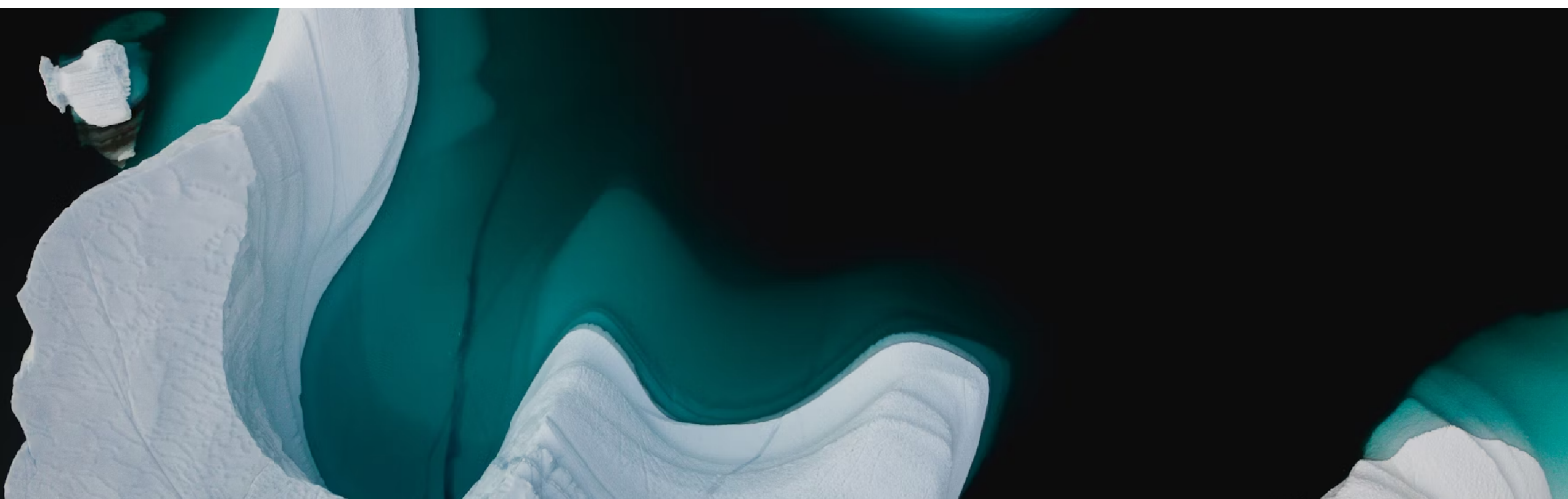
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Climate change is causing multiple risks to both households and businesses.

As climate change advances, these risks become more severe, and the potential damage caused becomes greater. Globally, the annual losses caused by natural hazards have increased from around \$421 billion in 2011 to \$3000 billion in 2022. Due to climate change, the increase is expected to continue at a rate of 5 % per year (GFIA, 2023). The total losses in Europe due to natural hazards are expected to be doubled by 2050 and tripled by 2100 (Gagliardi et al., 2022).

Insurance schemes can be used to manage the risks caused by climate change that cannot be sufficiently addressed by other adaptation and mitigation efforts. However, the take-up of insurance is still relatively low. Between 2011 and 2022, over 60 % of the damage caused worldwide by natural catastrophes was not insured (GFIA, 2023). In Europe, only a quarter of the losses due to extreme weather conditions are currently covered by insurance (EIOPA, 2023b).



01. National Insurance Regimes

National insurance regimes are country-wide policy and institutional frameworks intended to regulate, provide and guarantee financial protection for citizens and businesses. They are characterised by a number of defining features: the type of insurance and reinsurance supply systems, the presence of coverage requirements, the premium structure, the availability and type of post-disaster relief and of public guarantee. As a result of historical, geographical, political and cultural backgrounds, European countries have developed national insurance regimes in a multitude of ways, with different outcomes in terms of diffusion (penetration rate) of natural catastrophe insurance and financial sustainability.

This info card synthesises the main features of national insurance regimes and their connotations in European countries. Finally, it shows how they impact the diffusion of insurance coverage against various weather and climate-related hazards (windstorm, wildfires, coastal flooding, inland flooding) in Europe. A more in-depth discussion can be found in the PIISA Deliverable 1.1 (Ceolotto et al., 2024).

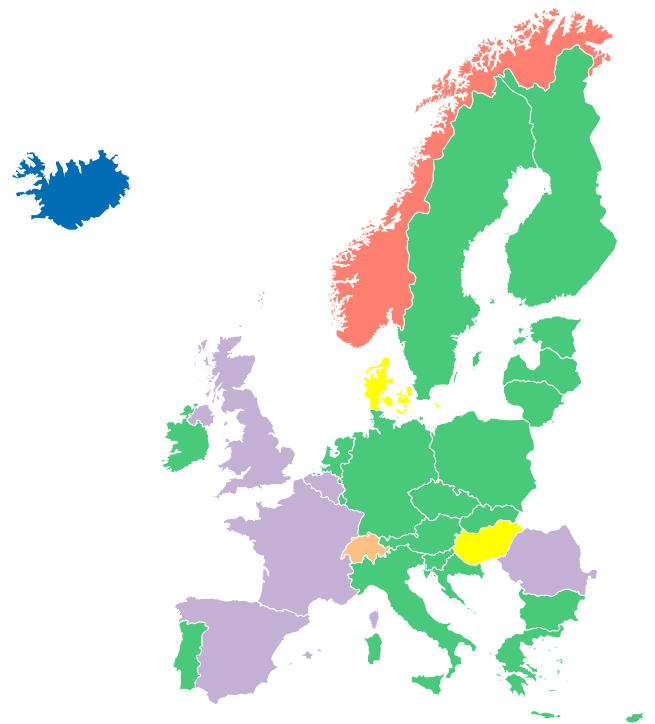
INSURANCE SUPPLY SYSTEMS AND COVERAGE REQUIREMENTS

Insurance supply systems vary a lot across Europe (Figure 1). Generally, this is due to a different level of involvement by the state in regulating or providing insurance. Insurance may also range from mandatory to voluntary (Figure 2) depending on the coverage requirements.

The systems include **market-based** systems, **private-public partnerships** (PPP), and **public monopolistic insurers** with some overlap between them (Figure 1). This overlap may, for example, be a public insurer offering insurance for properties that are deemed uninsurable by the free market. Market-based systems have the lowest level of state involvement, and commercial insurance is provided on the free market. Public monopolistic systems range from the state covering all assets to providing coverage for uninsurable properties. In private-public partnerships (PPP) there is structural collaboration between the insurance industry and the state, which can act as a direct supplier of coverage or guarantee financial resilience of the insurers. Overall, among the regimes, private-public partnerships and public monopolistic insurers or insurance options achieve the widest coverage against natural hazards.

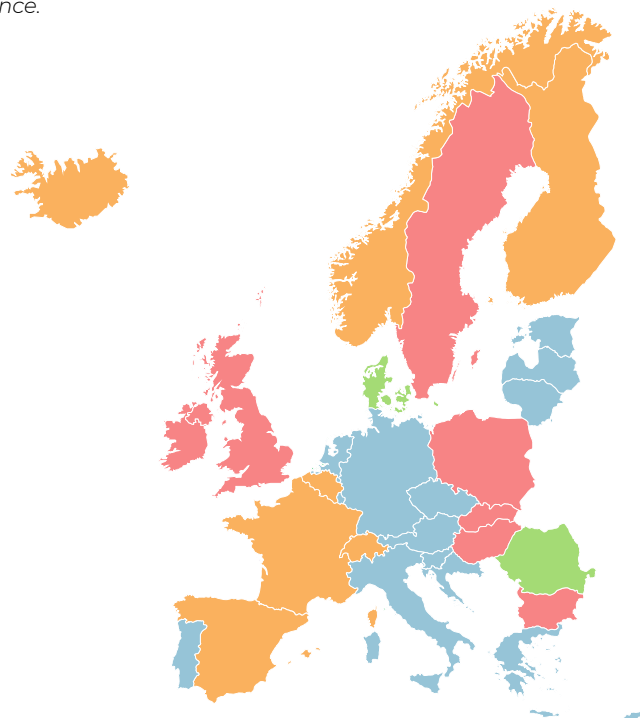
Figure 2. Insurance cover requirements in Europe, ranging from voluntary to mandatory. In intermediate systems insurance may be a mandatory condition for a mortgage or an extension of other products such as standard home insurance.

Figure 1. Insurance supply systems in Europe. The systems vary depending on the extent of the involvement of the state.



INSURANCE SUPPLY

- market based
- market based, industry co-insurance
- market based, public monopolistic insurer for extreme events
- public monopolistic insurer or market based, according to cantons
- public monopolistic insurer, residually market based
- solidaristic private-public scheme (PPP)



INSURANCE REQUIREMENT

- mandatory by law
- mandatory extension of other insurance products
- mortgage requirement
- voluntary

Coverage requirements range from **voluntary** to **mandatory by law** (Figure 2). In intermediate systems insurance may be a **mandatory condition** for a mortgage or be a **part of other insurance products** such as standard home insurance. Requiring coverage as a precondition for mortgage generally yields comparable (or higher) penetration rates as legal requirements. However, under such arrangements penetration tends to vary more, as it fluctuates with trends in home purchases and ownership rates as has happened in, for example, Ireland and Poland. Mandatory legal requirements may not result in higher insurance penetration rates if there is no sufficient ability to enforce them (e.g. Romania). The highest penetration rates in voluntary free market-based systems are in Germany and the Czech Republic, which approach 50%. This is due to recurring floods in the countries.

Premium Structures

Insurance premiums, the pricing of insurance contracts, may be **based on risk** or have a fixed cost. The different premium systems used in Europe can be seen in Figure 3. Premiums based on estimated risks and their financial impact are common in market-based systems. It is considered the most accurate way to signal risk to policyholders and incentivise investment in risk reduction. However, risk-based pricing can generate problems in terms of unaffordability or uninsurability in certain areas, as is happening, for example, in Hungary and Ireland (see information box).

Instead of risk-based premiums, **flat rates** or **fixed fees** (set percentage of property value or fixed surcharge, respectively) can be used. These are currently the primary alternatives to apply the **solidaristic principle**, distributing risk across geographical areas and policyholders, and thus to ensure affordability, and reach high penetration rates. However, to achieve a large enough coverage for efficient risk distribution, insurance typically needs to be mandatory or a prerequisite for other financial products as described above. More importantly, these pricing schemes do not provide incentives for policyholders to prevent risks, thus exacerbating problems of **moral hazard**. Hence, such incentives should be introduced via specifically designed policies.

Mixed systems combine risk-based pricing with either flat rate or fixed fee premiums. Often in mixed systems risk-based pricing is applied to minor climatic risk, while the fixed fees are collected to cross-subsidise the coverage of properties that face the highest risks, such as flooding in the UK, or fires in Denmark. To date, they seem better suited to ensure affordable and widespread coverage.

Hungary has a market-based insurance system for the most part, but there is a publicly backed insurance option for those deemed uninsurable by the private insurance industry. The opt-in compensation fund is aimed at houses in high-risk floodplains to prevent reliance solely on ad hoc disaster relief. The system is being phased out and no new contracts have been signed since 2016 to discourage building in high-risk areas.

Ireland faces both riverine and coastal floods due to high tides, as well as windstorms. In the market-based system, the areas where the premiums are unaffordable or where properties are uninsurable due to flood risk are expanding due to climate change. While there is some public back-up for households with low income as well as no requirement of insurance coverage for homeowners or small enterprises, insurance is still a mandatory condition for a mortgage.

PREMIUM STRUCTURE

- Fixed fee(s)
- Flat rate(s)
- Public tax
- Risk based
- Risk based, fixed fee(s)
- Risk based, flat rate(s)

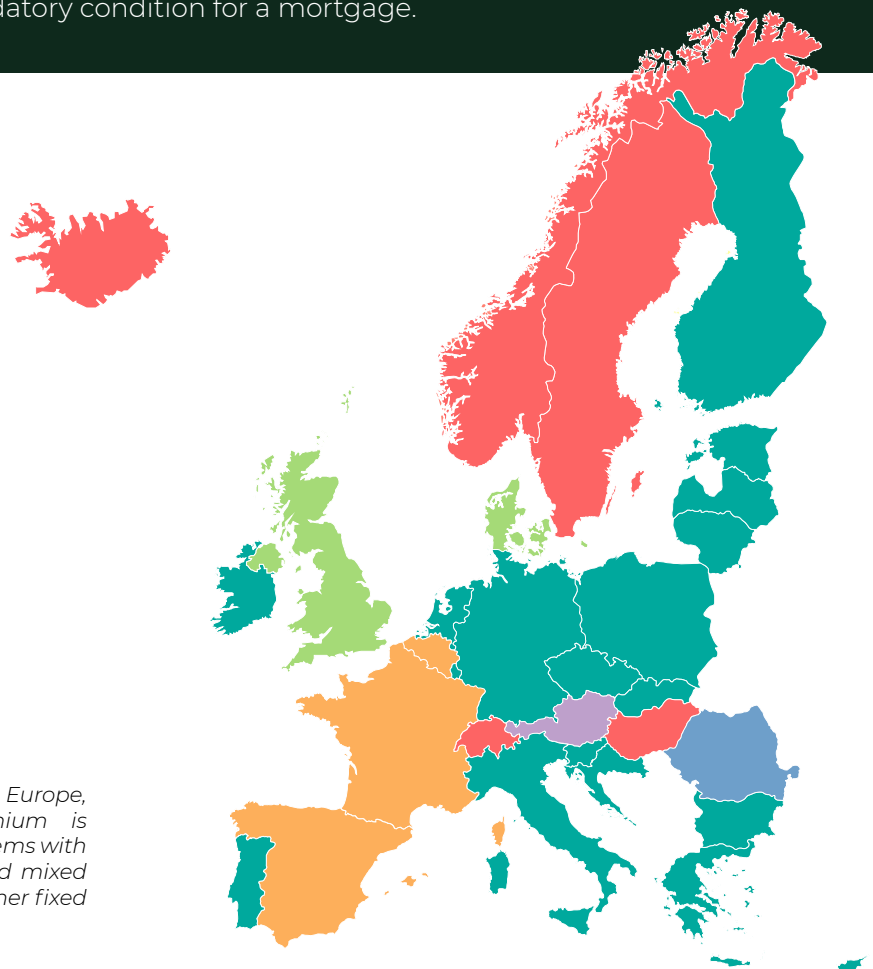


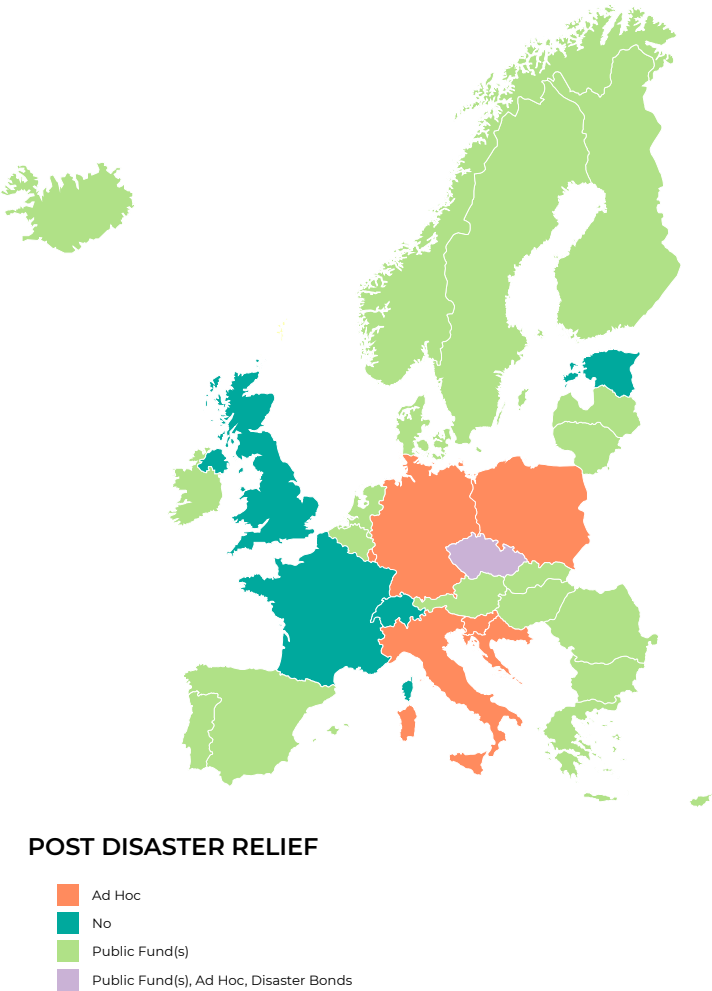
Figure 3. Different premium structures in Europe, ranging from systems where the premium is determined solely by the estimated risk to systems with fixed fees or flat rates (of property value), and mixed systems combining risk-based pricing with either fixed fees or flat rates.

Post-disaster Relief Systems

Outside of insurance, disaster relief is generally provided either through dedicated public funds or ad hoc measures depending on the country (Figure 4). Disaster relief through **ad hoc measures**, financed via unforeseen public spending or debt, has proven to be counterproductive, as people do not purchase insurance due to expected aid (e.g., Germany, Italy), a phenomenon known as **charity hazard**. Additionally, there may be some ambiguity in the timing and amount of aid (e.g., more aid right before elections). Moreover, households and businesses that have purchased insurance coverage may even be penalised, as in Slovenia, where following an earthquake in 1998, the government confiscated and redistributed insurance funds to the whole population that was affected. Overall, systems characterized by the use of ad hoc disaster relief measures often have low insurance penetration rates.

Most European countries have **dedicated public funds** for disaster relief. While the funds tend to be limited, they decrease or prevent pressure on public finances in the aftermath of a disaster. They are usually matched with strong checks on claims and financial redistributive measures (as in Austria). Some private-public partnership systems where insurance covers almost the whole population and assets (e.g., Belgium, France, UK) have virtually no need for separate public compensation.

Figure 4. National disaster relief beyond insurance. In ad hoc systems the one-off relief is financed by public spending or debts, whereas in systems using public funds, the funds are dedicated in a budget in advance.



REINSURANCE RISK TRANSFER

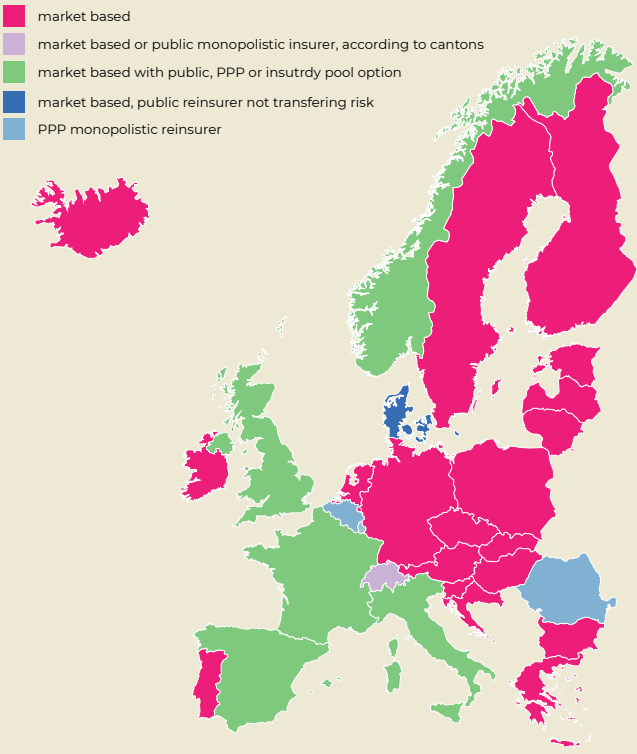


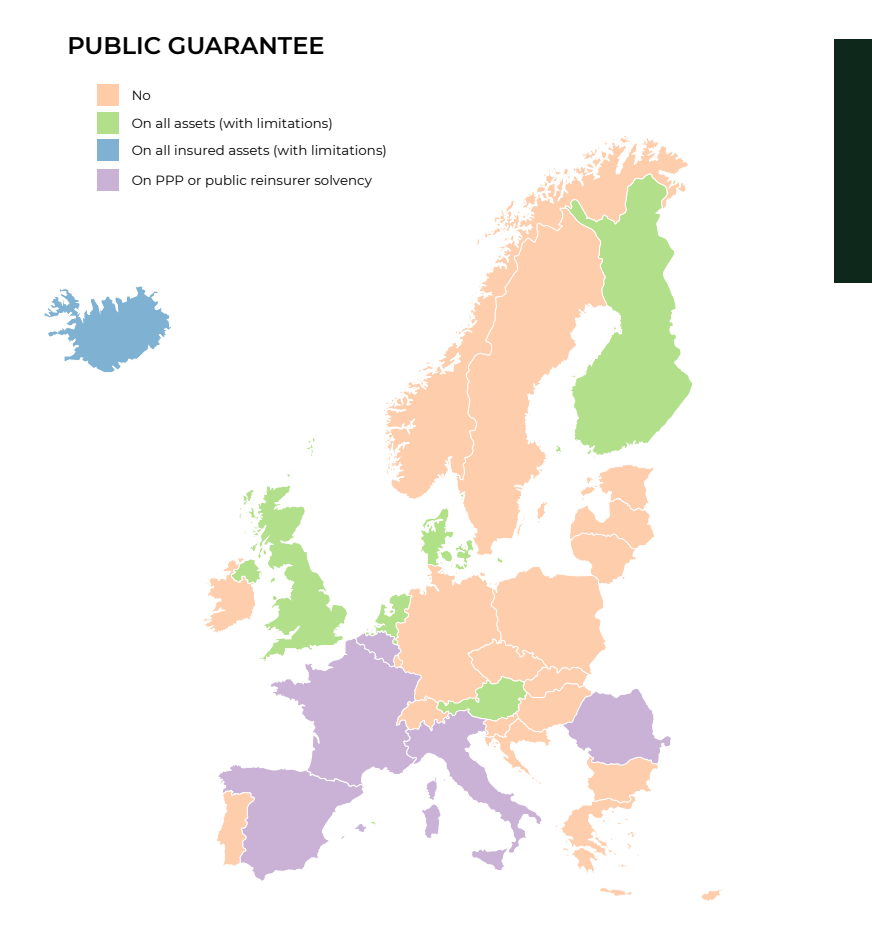
Figure 5. Risk transfer by reinsurance mechanisms. Commonly, risk transfer is managed by international capital markets. In case of private-public partnerships (PPP) or shared pools, reinsurance conditions may be better due to the distribution of risk or state financial guarantee.

Reinsurance Systems and Public Guarantee

To protect against insolvency and default, insurance companies may cede their risks to another financial company, known as a **reinsurer**. Different reinsurance supply systems in Europe are presented in Figure 5. Reinsurance is most commonly obtained through **market mechanisms** by private operators. On the other hand, private-public partnerships, public **monopolistic insurers**, and industry-wide arrangement entities (e.g., Norway) may act as monopolistic reinsurers or enjoy a state guarantee of solvency. This allows them to outcompete the rest of the market. Public **guarantee of solvency** applied on public (e.g., Denmark, Iceland) or private-public partnership (e.g., France, Spain) entities allows them to raise reinsurance capital on the international financial market at advantageous rates. The public guarantor role should be as wide as possible and not limited (as in Italy where there is a limited solvency guarantee of up to €5 billion for the next three years) as this generates the risk of default for the domestic insurance industry.

The different public guarantees for assets or solvency are shown in Figure 6. **The guarantees for assets** range from no guarantee to guarantees on all assets with certain limitations. For example, in Finland there is a public guarantee on all assets in case of a flood event with a return time of 50 years. On the other hand, in Austria there is a public guarantee on all private assets, but with payouts limited to 20 % – 30 % of the replacement value.

Figure 6. Public guarantee availability on assets or solvency of the reinsurers and private-public partnership (PPP) entities in cases of natural catastrophes.



Natural hazard insurance penetration rates in European countries

The features discussed above and their combination define a country's national (natural catastrophe) insurance regime. This in turn is instrumental in determining the diffusion (penetration rate) of insurance coverage against weather- and climate-related hazards. This info card describes how various European countries perform in terms of insurance penetration rates for windstorm, wildfires, coastal flooding and inland flooding, distinguishing between the residential and commercial sector.

Both residential and commercial natural hazard insurance take-up rates vary greatly across European countries (Figure 7). This is due to historical, geographical, political and cultural backgrounds.

The coverage against **windstorm** hazard tends to be more prevalent in northern and Atlantic countries due to their geographic exposure to strong winds. On the other hand, while **wildfires** are the fastest-growing risk in Europe, especially in southern and central regions, penetration remains low in highly affected countries such as Portugal and Greece, where insurance purchase is voluntary. Conversely, Nordic countries have high insurance penetration rates against wildfires, even though wildfires are not particularly common in the area.

Coastal flooding is only significantly insured in certain countries in the North Sea and Atlantic regions. Due to the increasing extent of tidal flooding, certain regions (e.g., the Republic of Ireland) have also become practically uninsurable by local markets, resulting in low coverage. **Inland flooding** is the most widespread hazard in Europe, but in southern and eastern Europe coverage remains relatively low. Coverage is more widespread in countries with a greater state involvement, or where insurance is linked to other financial products (e.g. mortgage). Nordic countries have generally high penetration rates for all hazards and sectors. In addition, the commercial sector presents higher insurance take-up compared to the residential sector in all countries.

Figure 7. Residential and commercial insurance penetration rates in European countries covering different natural disasters.

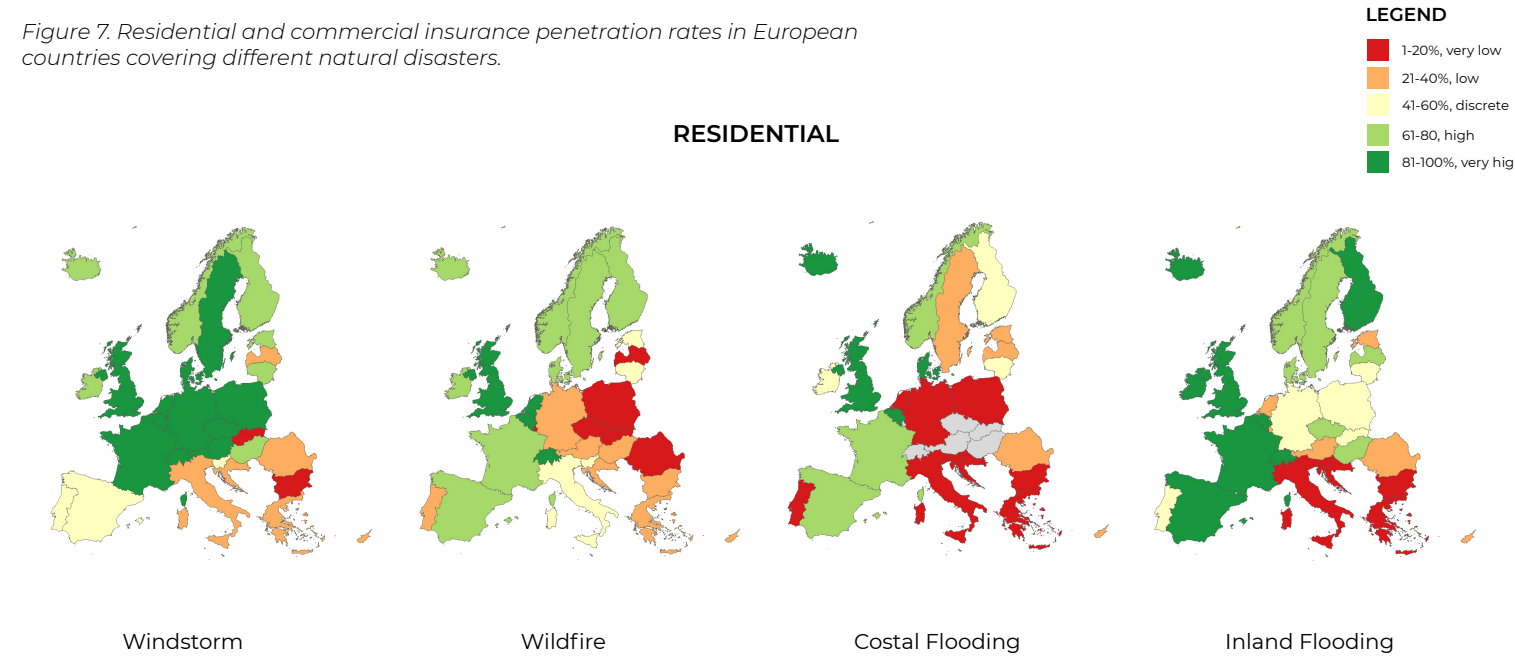
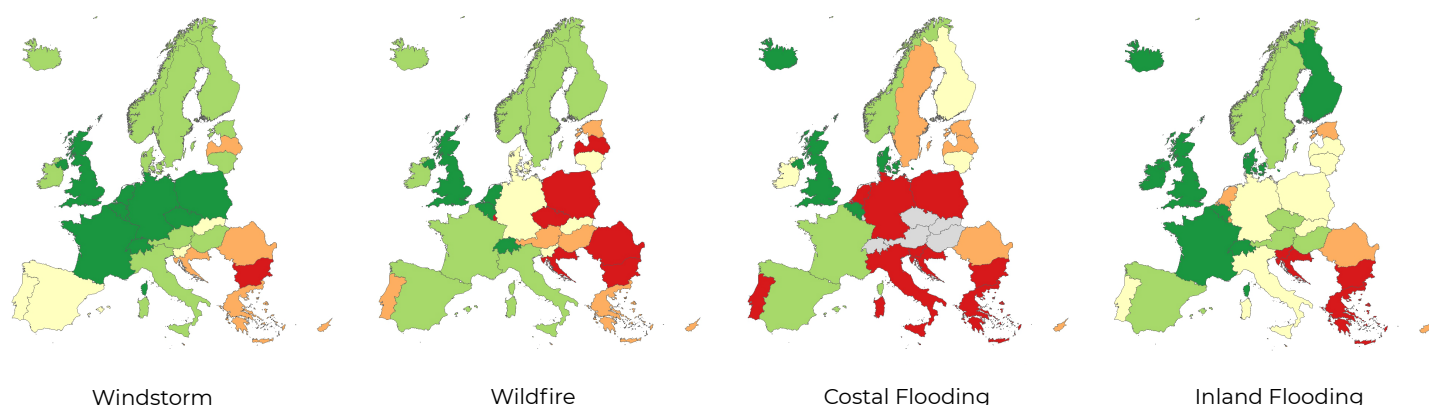
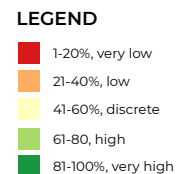


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COMMERCIAL



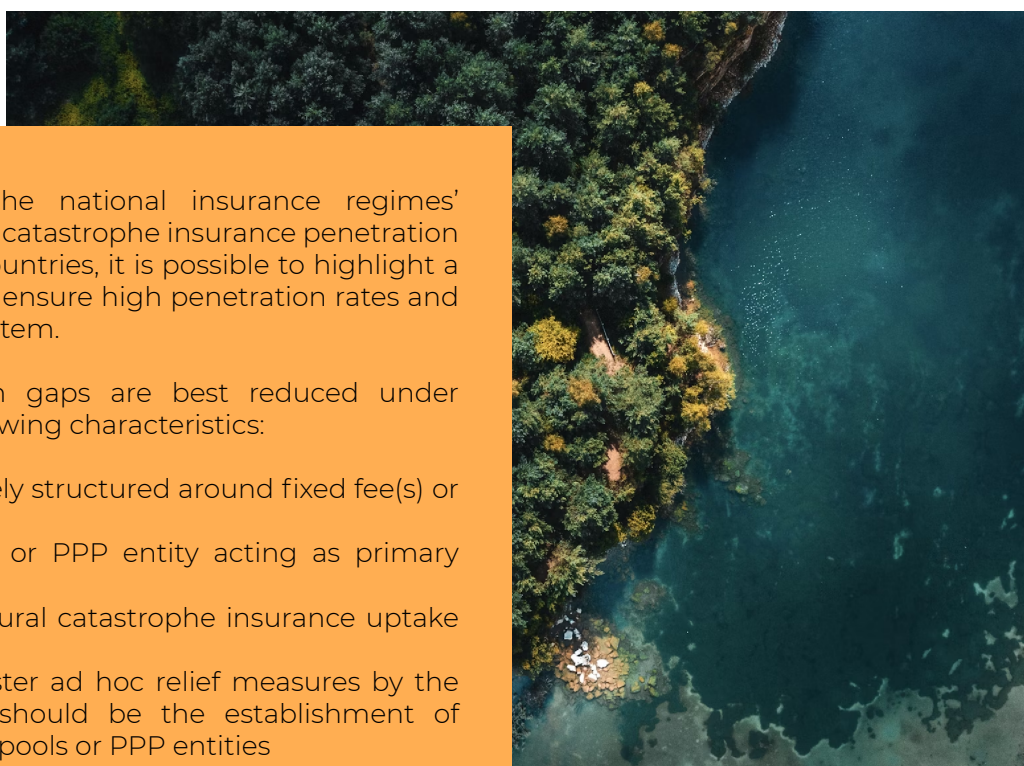
Best Practices

Based on the review of the national insurance regimes' characteristics and the natural catastrophe insurance penetration rates observed in European countries, it is possible to highlight a number of best practices that ensure high penetration rates and the financial stability of the system.

Climate insurance protection gaps are best reduced under national systems with the following characteristics:

- Premium partially or entirely structured around fixed fee(s) or flat rates(s)
- The presence of a public or PPP entity acting as primary insurer
- Legal requirements of natural catastrophe insurance uptake for asset owners
- Avoidance of ex-post-disaster ad hoc relief measures by the state, but, rather, there should be the establishment of dedicated public budgets, pools or PPP entities

Take-home message: the involvement of the state as a regulator, provider and/or guarantor improves the sustainability, affordability and penetration of a national natural catastrophe insurance regime.



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