

Adapting to change: Time for climate resilience and a new adaptation strategy

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with
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A picture taken on 13 February 2020, from Lavau-sur-Loire, western France, shows the ruins of a house in a flooded area, as the Cordemais coal-fired power station is seen in the background, on the banks of the Loire river. Credit: Loic VENANCE / AFP.

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Launched in 2019, the EPC project “Building a climate-resilient Europe” provided a platform for an assessment of the state of play in adaptation in Europe and a discussion on the needed measures to improve Europe’s resilience to climate change. This Issue Paper builds on the findings of two EPC workshops organised in 2019 and paves the way for a revision of the EU’s Adaptation Strategy. The project has been supported by Zurich Insurance Company Ltd.

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List of abbreviations

BBB	build back better
CBA	Cost-benefit analysis
CAP	Common Agricultural Policy
DG	Directorate-General
DRR	disaster risk reduction
EAV	European added value
ECA	European Court of Auditors
ECB	European Central Bank
EEA	European Economic Area
EIB	European Investment Bank
EIOPA	European Insurance and Occupational Pensions Authority
ESIF	European Structural and Investment Funds
EU	European Union
GHG	greenhouse gas
H2020	Horizon 2020
IPCC	Intergovernmental Panel on Climate Change
JRC	Joint Research Centre
MFF	Multiannual Financial Framework
NAP	National Adaptation Plan
NAS	National Adaptation Strategy
OECD	Organisation for Economic Co-operation and Development
UCPM	EU Civil Protection Mechanism
UNFCC	United Nations Framework Convention on Climate Change

Executive summary

The dramatic effects of climate change are being felt across the European continent and the world. Considering how sluggish and unsuccessful the world has been in reducing greenhouse gas (GHG) emissions, the impacts will become long-lasting scars. Even implementing radical climate mitigation now would be insufficient in addressing the economic, societal and environmental implications of climate change, which are expected to only intensify in the years to come.

This means climate mitigation must go hand in hand with the adaptation efforts recognised in the Paris Agreement. And although the damages of climate change are usually localised and adaptation measures often depend on local specificities, given the interconnections between ecosystems, people and economies in a globalised world there are strong reasons for European Union (EU) member states to join forces, pool risk and cooperate across borders. Sharing information, good practices, experiences and resources to strengthen resilience and enhance adaptive capacity makes sense economically, environmentally and socially.

The European Commission's 2013 Adaptation Strategy is the first attempt to set EU-wide adaptation and climate resilience and could be considered novel in that it tried to mainstream adaptation goals into relevant legislation, instruments and funds. It was not very proactive, however. It also lacked long-term perspective, failed to put the adaptation file high on the political agenda, was under resourced, and suffered from knowledge gaps and silo thinking.

The Commission's European Green Deal proposal, which has been presented as a major step forward to the goal of Europe becoming the world's first climate-neutral continent, suggests that the Commission will adopt a new EU strategy on adaptation to climate within the first two years of its mandate (2020-2021). In light of the

risks climate change poses to ecosystems, societies and the economy (through inter alia the vulnerability of the supply chain to climate change and its potential failure to provide services to consumers), adaptation should take a prominent role alongside mitigation in the EU's political climate agenda.

Respecting the division of treaty competences, there are important areas where EU-wide action and support could foster the continent's resilience to climate change. The European Policy Centre (EPC) project "Building a climate-resilient Europe", which has culminated in this Issue Paper, has identified the following: (i) the ability to convert science-based knowledge into preventive action and responsible behaviour, thus filling the information gap; (ii) the need to close the protection gap through better risk management and risk sharing; (iii) the necessity to adopt nature-based infrastructural solutions widely and tackle the grey infrastructure bias; and (iv) the need to address the funding and investment gap.

This Issue Paper aims to help inform the upcoming EU Adaptation Strategy and, by extension, strengthen the EU's resilience to climate change. To that end, the authors make a call for the EU to mainstream adaptation and shift its focus from reacting to disasters to a more proactive approach that prioritises prevention, risk reduction and resilience building. In doing so, the EU must ensure fairness and distributive justice while striving for climate change mitigation and protecting the environment and biodiversity.

To succeed, the new EU Adaptation Strategy will need to address specific challenges related to the information, protection, funding and investment gaps; and the grey infrastructure bias. To tackle and address those challenges, this Paper proposes 17 solutions outlined in Table 1 (see page 6).

Table 1: Recommendations for a renewed EU adaptation strategy

Gaps in the current strategy	Recommendations
The information gap	<ol style="list-style-type: none"> 1. Value information on losses as a public good. 2. Empower the European Environment Agency and EIOPA to provide more comprehensive monitoring and mapping of risks. 3. Put in place a single, unified and accessible data collection and a transparent reporting mechanism for risk and disaster damages and losses. 4. Strengthen building codes with mandatory standards and support the use of insurers' data in zoning and construction standards. 5. Bolster the efforts to develop EU metrics to evaluate the impacts of adaptation efforts. 6. Foster structured discussion forums on bottom-up and co-designed adaptation options.
The protection gap	<ol style="list-style-type: none"> 7. Make use of NASs and NAPs to increase awareness of climate risk management among stakeholders. 8. Guide the introduction of smart subsidies, tax deductions or insurance vouchers to the poor and vulnerable. 9. Encourage member states to include investment opportunities to reduce climate change-related risks in their budgets and planning. 10. Create an EU-wide weather and climate risk insurance pool or voluntary regional risk pool.
The grey infrastructure bias	<ol style="list-style-type: none"> 11. Evaluate infrastructure investments based on their climate resilience, mitigation potential and embedded carbon. 12. Explore a BBB requirement that does justice to the undervalued benefits of green infrastructure. 13. Consider green infrastructure's co-benefits when assessing adaptation options.
The funding and investment gap	<ol style="list-style-type: none"> 14. Integrate DRR and climate resilience efforts into insurance, investment risk models, capital requirements and rating agencies, all under the umbrella of the action plan on sustainable finance. 15. Agree on and apply consistently a climate risk proofing methodology across every MFF budget chapter. 16. Establish clear tracking methodologies and effective ex ante conditionalities for climate-related EU spending. 17. Link the disbursement of EU budget to the adoption and implementation of NASs and NAPs.

Introduction

Too little, too slow. The EU was slow to act on the 1992 United Nations Conference on Environment and Development's efforts to put environmental needs of present and future generations at the heart of developmental policies, and the 1997 Kyoto Protocol on the reduction of GHG emission targets and it dragged its feet until 1999 before finally adopting its first projects on climate change mitigation (i.e. the LIFE programme). Its adaptation policy is now suffering from a similar fate. Adopting the Intergovernmental Panel on Climate Change's (IPCC) 2014 definitions, *climate change mitigation* aims to reduce or eliminate the drivers of climate change by reducing anthropogenic greenhouse gas (GHG) emissions, whereas *climate change adaptation* attempts to limit or manage climate change impacts, both real and expected.¹

Adaptation has historically been considered a national issue. As such, member states have been reluctant to attribute additional competences to address the issue to the EU.

EU adaptation to climate change has long been relegated to the passenger seat for several reasons:

1. There was a longstanding concern that embracing adaptation as a policy option would affect efforts to reduce GHG emissions negatively, which was one of the first priorities of European climate policy.
2. Adaptation has historically been considered a national issue. As such, member states have been reluctant to attribute additional competences to the EU to address the issue.
3. The perception of adaptation being an (almost exclusive) issue of low- and middle-income countries with low levels of investment has added spanners in the efforts to strengthen climate resilience in wealthier countries, namely EU members.² However, recent catastrophes such as the 2019-2020 Australian bushfire season might mark a turning point in high-income countries' embracing of adaptation measures.
4. A strong belief in future innovation and technological development as the means of fighting climate change impacts seems to have hindered policymaking related to adaptation.
5. Adaptation efforts that were taken tended to be weak, insufficient and centred on costly and ambiguous infrastructure projects rather than systems-based, multifunctional, science-grounded ones due to a

lack of knowledge and/or incentive systems (e.g. availability of funding). Most member states have been more than slow to adopt proactive measures.³

6. The changing nature of risk and the fact that the past is no longer a reliable indicator of the future, requiring the EU to use more forward-looking scenarios and embrace their inherent uncertainty, is yet to be fully grasped.⁴ This also calls for the implementation of more robust, no-regret or low-regret solutions, which can support further the shift to nature-based solutions.

The early 2000s marked a turning point in the adaptation discourse. Think of the IPCC's 2001 Third Assessment Report publication which emphasised that adaptation is an imperative for all countries, irrespective of their economic development;⁵ or the widely disseminated 2006 Stern Review on the Economics of Climate Change which highlighted that the benefits of both mitigation and adaptation action outweigh the economic costs of climate inaction.⁶ The 2015 Paris Agreement embraced this view further.

The need for effective and urgent climate action is paramount. Concretely, reducing GHG emissions and limiting global temperature increase to 1.5°C (instead of 2°C) above preindustrial levels would generate significant savings and non-monetary benefits and would therefore lower adaptation needs considerably.⁷

The effects of climate change on Europe are unequivocal and the cost of foreseen damages significant. Science has unflinchingly put it down in black and white: Europe does not have the luxury to only focus on mitigation efforts. Even in the unlikely case where a 1.5°C increase limit is attained, mitigation will not be enough. Given the fact that some effects of climate change are irreversible, adaptation will be essential to build resilience and ought to be mainstreamed across all policy developments, strategies and scenarios that strive towards climate neutrality and a just transition.

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A decade after the launch of the EPC-King Baudouin Foundation joint Task Force on Climate Change Adaptation in Europe that culminated in the 2012 publication "The climate is changing – is Europe ready? Building a common approach to adaptation",⁸ which helped shape the EU's 2013 Adaptation Strategy,⁹ the EPC studies how it has fared. To do so, this Issue Paper builds on the 2019 EPC project "Building a climate-resilient

Europe”, which showed consensus between a variety of stakeholders regarding the most pressing gaps in the EU framework for climate adaptation and the lessons learnt from the midterm 2018 review,¹⁰ and explored possible ways forward. Capitalising on the window of opportunity declared in the European Commission’s Green Deal to renew the Adaptation Strategy in the first two years of its mandate, the Paper advocates for a new strategy that strives to close the information, protection, funding and investment gaps as well as address grey infrastructure bias.

The discussion is organised as follows. Chapter 1 examines the effects of climate change on Europe.

Chapter 2 presents the state of play of EU action on climate adaptation.¹¹ Chapter 3 identifies the main challenges, areas for European added value (EAV) and gaps in the current framework. The concluding section outlines the authors’ recommendations for a new EU adaptation strategy.

Although an in-depth discussion on the external dimension of the EU’s Adaptation Strategy is beyond the scope of this Issue Paper, it should be noted that the success of the strategy will depend on its comprehensive approach and the adaptation-proofed use of foreign policy tools (e.g. humanitarian aid).

Chapter 1: The effects of climate change on Europe

The effects of climate change on socio-ecological systems are increasingly being felt across Europe, be they the intensification of extreme weather events; pluvial, coastal and river flooding; droughts; wildfires; heatwaves and desertification; rising sea levels; or a reduction in pollination. Even if global efforts to reduce GHG emissions prove to be successful, adverse impacts of climate change will be experienced in the future.¹²

However, while we cannot escape the impacts of climate change anymore, we do have the power to influence the magnitude of the events.¹³ Just like the other continents, Europe is experiencing a series of disruptive blows that are expected to lead to fundamental changes and affect natural and human systems gravely.¹⁴ Global environmental breakdown¹⁵ and climate emergency¹⁶ – general terms that convey the reality of the issue crudely – have spread rapidly. The severity and unavoidability of the situation make the embracing of adaptation efforts extremely crucial.

Anthropogenic climate change will lead to profound environmental, geopolitical and socioeconomic ramifications across Europe unless robust adaptation measures are embraced.

The importance of both climate change adaptation and climate-related disaster risk reduction (DRR) have been recognised at both the EU and international levels. Bold initiatives like the 2015 Sendai Framework for Disaster Risk Reduction and 2015 Paris Agreement heralded a fresh impetus on a global scale. The EU picked up the baton by supporting the Mayors Adapt initiative, a voluntary commitment within the Covenant of Mayors; and by adopting the 2013 EU Adaptation Strategy that led to some encouraging results, as demonstrated in its 2018 evaluation.

However, in light of the scale of the challenge and growing threats, efforts to enhance the coherence between climate change adaptation and DRR need to be stepped up. Moreover, considering the Union's commitment to the Paris Agreement and Sustainable Development Goals, renewing the EU's Adaptation Strategy should be a priority for the new European Commission.

1.1. THE ECONOMIC, SOCIAL AND SECURITY IMPLICATIONS OF CLIMATE CHANGE IN EUROPE

Anthropogenic climate change will lead to profound environmental, geopolitical and socioeconomic ramifications across Europe unless robust adaptation measures are embraced, as the means of averting and

learning to cope with the most devastating impacts. Climate change will have implications on people's health by increasing the number of deaths from heat stress, malnutrition and diseases like malaria.¹⁷ It is already contributing to biodiversity loss and changes in ecosystems, thus affecting the availability of water and other resources. The effects are also felt across the economic sectors, from agriculture to tourism. Extreme events damage critical infrastructure needed for the provision of energy, water, health services and such. Moreover, disruptions in international supply chains, forced migration to the EU, and political instability and security challenges are an expected consequence of climate change.

These outcomes will not be felt uniformly; instead, regions across Europe will be impacted in varying degrees, dealing a blow to economic activities and asset values and affecting all European citizens. It should also be noted that the social costs wrought by these unfolding climate-related events will have varying impacts depending on gender, class, ethnicity, age and (dis)ability. As stated in the IPCC Fifth Assessment Report, "People who are socially, economically, culturally, politically, institutionally, or otherwise marginalized are especially vulnerable to climate change and also to some adaptation and mitigation responses [...]."¹⁸

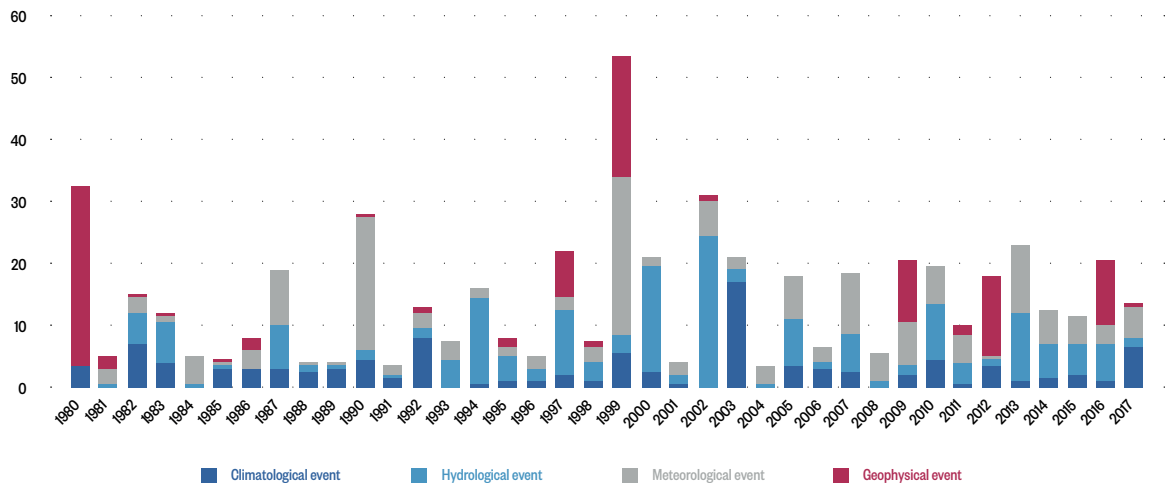
The economic losses caused by extreme weather events in the European Economic Area (EEA) between 1980 and 2017 amounted to approximately €453 billion (in 2017 values; almost triple the 2017 EU budget, see Figure 1, page 10). Furthermore, research indicates that the frequency, magnitude and duration or a combination of all three, and the consequent cost of these climate and weather events will continue to increase unless drastic actions are taken.

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While the estimations for current and future climate-induced damages to vital infrastructure (see Figure 2, page 10) and major investments in the energy, industrial and social sector differ, the scale of the impact of climate change is already visible. A study produced by the European Commission's Joint Research Centre (JRC) in 2016 suggests that the current annual cost of multi-hazard and -sector impacts of critical infrastructures in the EEA³³ reached €3.4 billion in 2010 values, and is expected to multiply six-fold by mid-century in the business-as-usual scenario. The same study estimates

Fig. 1

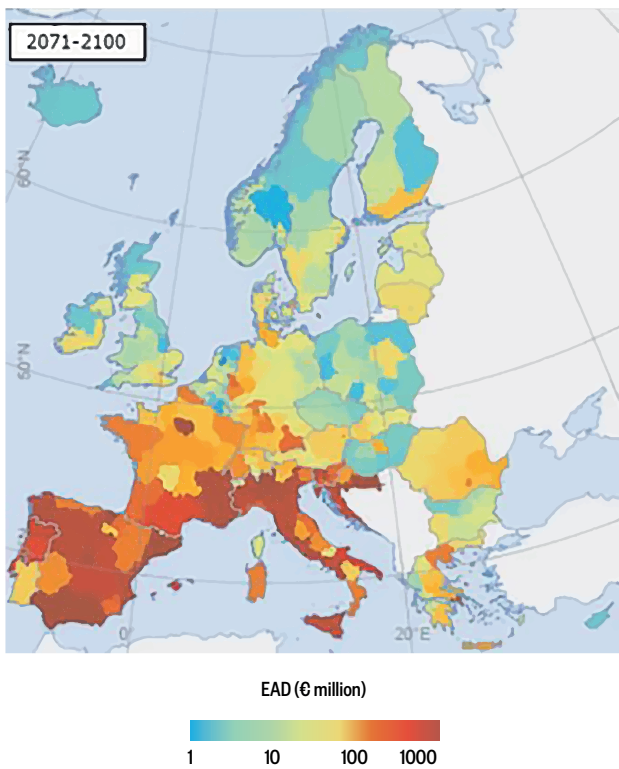
ECONOMIC DAMAGE CAUSED BY WEATHER AND CLIMATE-RELATED EXTREME EVENTS IN ALL EEA MEMBER STATES (2017 VALUES) (€BILL., 1980-2017)



Source: European Environment Agency (2019a)¹⁹

Fig. 2

EXPECTED ANNUAL DAMAGE TO CRITICAL INFRASTRUCTURE BY CLIMATE CHANGE (€ MILL., 2071-2100)



Source: European Commission (2018a)²⁰

that the strongest increase in multi-hazard damages is projected for the energy sector (i.e. over €4.4 billion per year, in 2010 values by the 2050s).

These stark figures continue to rise in the business-as-usual trajectory, with some estimates signalling that the cost of damages to critical infrastructures and the aforementioned key investments may triple by the mid-2020s and multiply by a factor of 10 by the close of the century.²¹

Central and Southern Europe will experience droughts of increased frequency, duration and severity (see Figure 3). Eastern and Northern Europe will likely suffer from more frequent heavy rains and winter flooding. A recent assessment by the European Environment Agency shows that in both low emission (i.e. keeping global temperature increase well below 2°C, in line with the Paris Agreement) and high emission scenarios, there is an increased danger of fire in most European regions. Forest fires are expected to continue occurring, including in the regions of Northern and Western Europe, which traditionally are more immune to them (see Figure 4). Droughts and wildfires will be rife and worsen air quality, diminish the availability of water resources and cut back crop productivity.²²

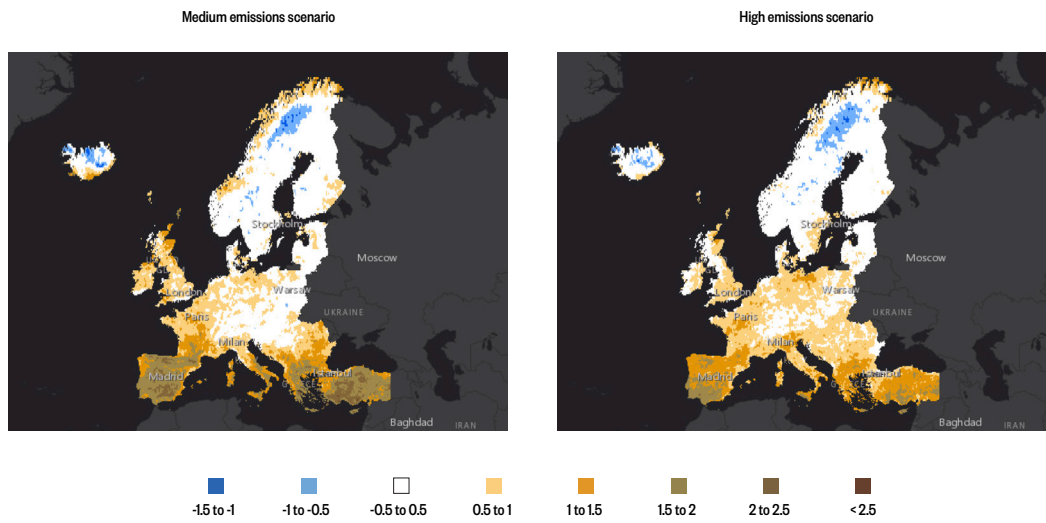
If no efforts to adapt to the peril of wildfire are made, some estimates point to a worrying 200% total increase of burned areas in Europe by 2090.

If no efforts to adapt to the peril of wildfire are made, some estimates point to a worrying 200% total increase of burned areas in Europe by 2090 compared to the 2000-08 rate. The Balkan and Eastern European countries are predicted to suffer the highest increase of between 150% and 560%, the Mediterranean region a rise between 150% and 220%, and Central European and Baltic countries between 120% and 340% (see Figure 4).²³

Other impacts – like the permanent inundation of low-lying coastal areas, coastal erosion, the degradation of coastal ecosystems, and salinity intrusion in deltas and estuaries – are expected to affect a vast swathe of the EU population (see Figure 5, Table 2, page 12). Approximately a third of EU citizens live within a 50km radius of coastal

Fig. 3

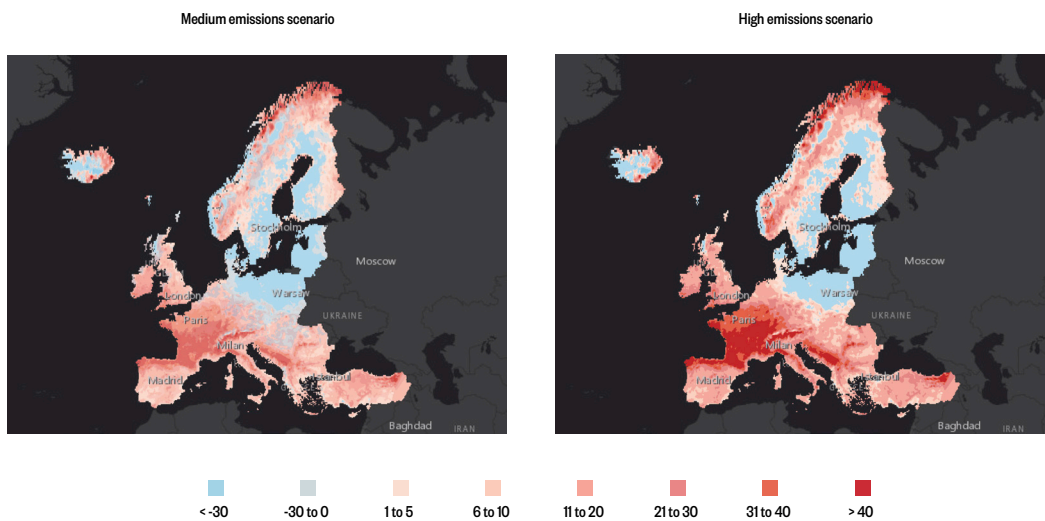
PROJECTED CHANGES IN THE FREQUENCY OF METEOROLOGICAL DROUGHTS FOR TWO EMISSIONS SCENARIOS, FOR THE PERIOD 2041-2070 COMPARED TO 1981-2010



Source: European Environment Agency (2020)²⁴

Fig. 4

PROJECTED CHANGE IN METEOROLOGICAL FOREST FIRE DANGER BY THE LATE 21ST CENTURY FOR TWO EMISSIONS SCENARIOS, COMPARED WITH THE PERIOD 1981-2010 (%)



Source: European Environment Agency (2020)²⁵

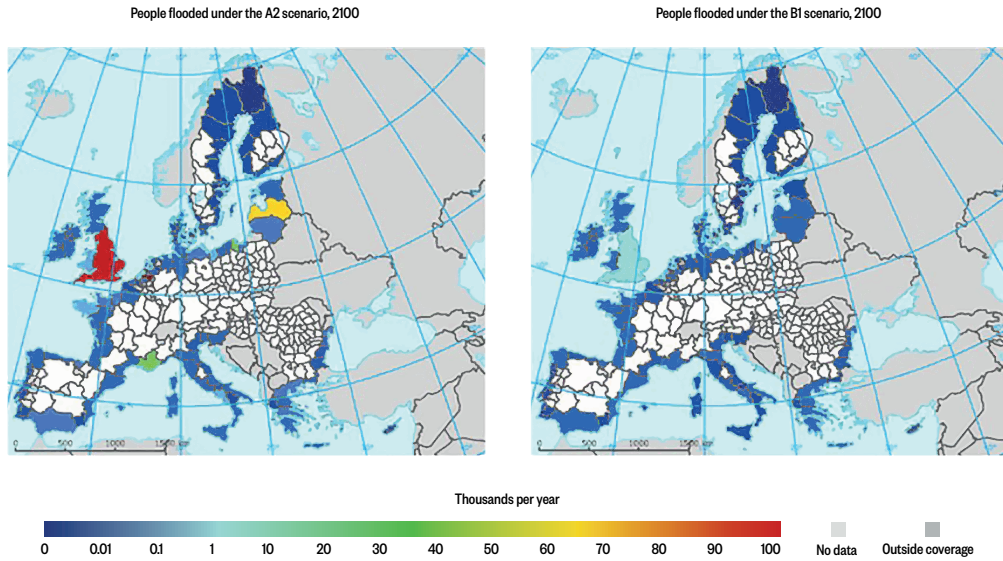
locations, which are regions that contribute over 30% of the Union's total GDP. Assets located in these areas are estimated to hold an economic value of between €500 billion to €1 trillion. The magnitude of climate change impacts in the coastal areas vary between regions, however, based to some extent to their flood protection measures.²⁶

Extreme weather and climate events are expected to transform crop production patterns across the continent drastically.

The impact of climate change could also completely upend Europe's agricultural sector. Extreme weather and climate events are expected to alter current trade structures and agriculture income circulation within the EU significantly, thus transforming crop production patterns across the continent drastically.²⁷ The current agricultural heartlands in Southern Europe (i.e. Spain, Greece, Italy, Portugal) are foreseen to experience losses of farmland value of -5% to -9% per every degree Celsius increased (see Figure 6, page 13) while regions in Northern and Western Europe will have elongated growing seasons and improved climatic conditions for agricultural practices. If the Mediterranean region is to adapt its agricultural practices and improve flood protection, it must improve its water usage considerably, abandon monoculture and adopt new types of crops.²⁸

Fig. 5

PEOPLE EXPECTED TO BE AT RISK OF FLOODING WITHOUT ADAPTATION (2100)



Source: European Environment Agency (2011)²⁹

Table 2: EU27 simulations for scenarios A2 and B1

	People flooded [thousand/year]		Land loss [km ² /year]		Damage cost [million €/year]		Adaptation cost [million €/year]		Total cost [million €/year]	
2010	15.0	14.8	3.4	3.4	3,136	3,329	0	0	3,136	3,329
2030	21.3	20.1	6.7	5.6	4,767	5,662	0	0	4,767	5,662
2050	35.0	28.9	9.9	7.8	6,450	8,192	0	0	6,450	8,192
2100	776.2	204.5	16.4	12.2	16,933	17,496	0	0	16,933	17,496

Source: Hinkel *et al.* (2010)³⁰

According to a recent assessment by the European Environment Agency, adaptation measures could significantly reduce the negative economic impacts of climate change in the agricultural sector (see Figure 7).

Climate change could act as a threat multiplier in the Mediterranean neighbourhood, and translate into an increase in climate refugees heading for the EU, as witnessed during the onset of the Syrian Civil War.

Furthermore, higher temperatures are expected to translate into an increase in deaths caused by heat stress and a decrease in the daily average outdoor labour productivity (which is especially relevant in the

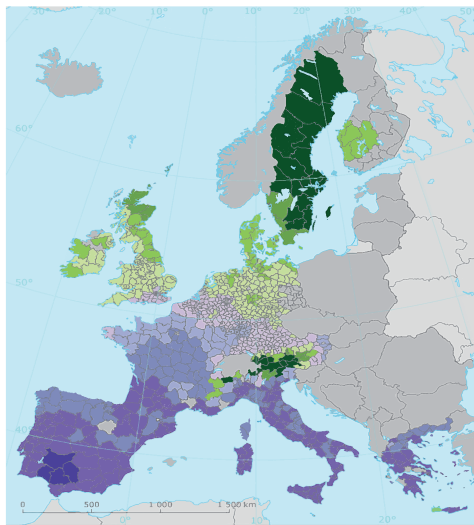
agricultural and construction sectors) by 17% in Southern Europe and up to 4% in Northern Europe.⁵¹

Lastly, climate change could act as a threat multiplier in the Mediterranean neighbourhood – one of the most at-risk regions due to climate change – and translate into an increase in climate refugees heading to the EU, as witnessed during the onset of the Syrian Civil War.⁵² As argued in the 2018 Global Compact on Refugees, “climate, environmental degradation and natural disasters increasingly interact with the drivers of refugee movements.”⁵³

In a 2017 resolution, the European Parliament called on the EU and its member states to implement the UN’s Paris Agreement and take the lead in recognising the influence of climate change on mass displacement. The Parliament also advocated for a special international protection status for the displaced. In addition, in his 2015 State of the Union speech, former European Commission President Jean-Claude Juncker unequivocally stated that “[c]limate change is [...] one [of] the root causes of a new migration

Fig. 6

PROJECTED CHANGE IN AGRICULTURAL LAND VALUE IN EU15 FOR 2071-2100 VS 1961-1990, IN CASE OF NO ADAPTATION



Predicted climate change impact on land values (2100)



Source: Van Passel et al. (2017)³⁵

phenomenon” and that “[c]limate refugees will become a new challenge – if we do not act swiftly.”³⁴ The EU will thus need to mobilise its foreign policy toolbox to address climate-induced challenges outside of its borders more proactively, while simultaneously investing more resources in its own adaptation policy.

1.2. THE RATIONALE FOR ACTION AT THE EU LEVEL

Adapting to climate change is, therefore, a social, environmental and economic imperative. While the damages are usually inflicted within a localised setting, their effects are felt across member states, pointing to a strong rationale for EU-level coordination and cooperation

in building climate resilience. For example, unexpected changes in the supply of a product or commodity (i.e. supply chain shocks) by an external partner can create threats to the entire Union. In light of the interconnectedness of world markets, the EU also has a big role in pushing for more ambitious international efforts in the field of adaptation, as argued by the European Parliament.³⁶

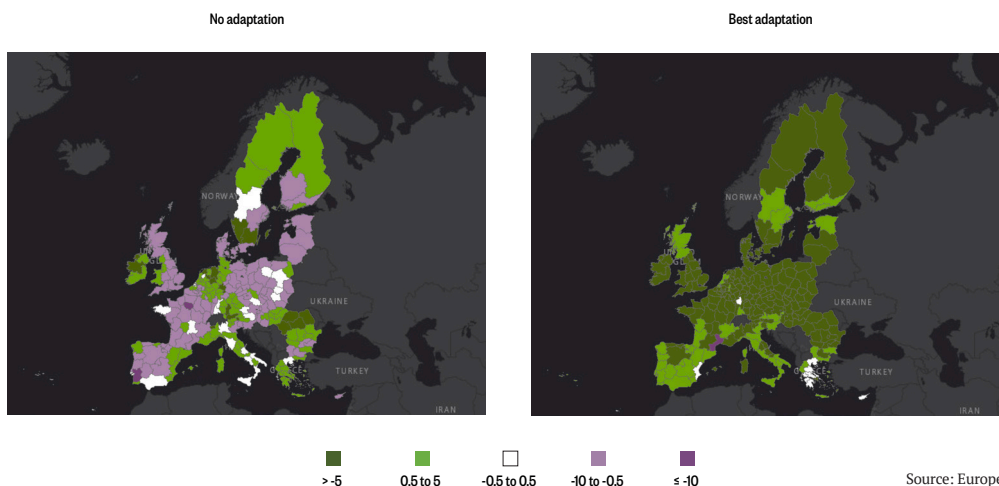
Unexpected changes in the supply of a product or commodity by an external partner can create threats to the entire Union. The EU has a big role in pushing for more ambitious international efforts in the field of adaptation.

Another reason for strengthening adaptation efforts at the EU level concerns the importance of EU funds for member states. A renewed climate adaptation strategy could incentivise resilience building and strengthen risk understanding by member states if said funds are climate-proofed and a sound and equitable financial management is ensured so that all countries have the same climate risk management rules.

While there cannot be a one-size-fits-all approach to adaptation, the EU has accumulated a level of knowledge and expertise that no member state can procure alone and which can be utilised for local circumstances. Moreover, several studies have concluded that adaptation measures to serious challenges like forest fires and sea level rise would be both beneficial and affordable, but these would be best addressed by pooling resources and applying similar approaches throughout the Union.³⁷ In other words, risk pooling and cross-border cooperation make economic, environmental and social sense.

Fig. 7

ESTIMATED INCOME CHANGE FOR FARMERS WITH AND WITHOUT ADAPTATION (%)



Source: European Environment Agency (2020)³⁸

The rationale for action at the EU level also resides in the power – albeit symbolic for the time being – of the country-specific recommendations that the European Commission makes to member states as part of the European Semester. The Semester enables members to coordinate their economic policies and address the economic challenges facing the Union, as well as climate, energy and social issues. In 2019, the recommendations for three member states – Bulgaria, Czechia and Germany – explicitly mentioned the need to step up climate adaptation action. Despite the Commission's inability to enforce the European Semester recommendations, they remain a useful tool to highlight major deficiencies in member states' adaptation efforts that could potentially lead to serious economic costs if they are not addressed adequately.

Lastly, although the European Central Bank (ECB) does not have exclusive powers in the field of financial stability nor the competence to act on its own, it

does play a contributory role in this area through its advisory functions. Since financial stability relies on risk management exercises, the pursuit of this objective should be cognisant of climate risks. Put differently, through the ECB, the EU can contribute to dealing with the risks climate change poses to financial stability.³⁹

Despite the Commission's inability to enforce the European Semester recommendations, they remain a useful tool to highlight major deficiencies in member states' adaptation efforts that could potentially lead to serious economic costs.

Chapter 2: The state of play of EU action on climate adaptation

The EU's Adaptation Strategy was launched in April 2013, four years after the publication of the White Paper on Climate Adaptation and after months of consultations with member states. The Strategy is the result of a transparent drafting process where member states were given the opportunity to provide their feedback from an early stage, to enhance Europe's resilience to the ever-increasing challenges posed by climate change, by encouraging countries to act rapidly. More specifically, it is structured around three priority areas: (i) bolstering awareness-raising and encouraging action on the part of member states; (ii) coordinating adaptation information; and (iii) mobilising new forms of analysis and quantifying the resulting outcomes for those major sectors that are deemed to be most exposed to damaging impacts. A subset of related actions accompanies each priority area (see Table 3).

A major objective of the 2013 Adaptation Strategy consists of the EU becoming climate-resilient by mainstreaming adaptation goals into some of the relevant legislation and instruments.

This non-binding blueprint establishes the framework and mechanisms through which the EU can implement climate adaptive and resilient measures, while

simultaneously paving the way for a holistic approach that covers the cumulative nature of effects on the environment, harmonised and transboundary measures.

2.1. MAINSTREAMING ADAPTATION GOALS INTO ALL RELEVANT LEGISLATION AND INSTRUMENTS

A major objective of the 2013 Adaptation Strategy consists of the EU becoming climate-resilient by mainstreaming adaptation goals into some of the relevant legislation and instruments. It was devised as a 'framework strategy' that simply establishes the overarching objectives of the Strategy without stipulating a strict set of criteria for its implementation, hence its mixed record.

From a legislative standpoint, EU directives such as the Flood Directive 2007/60/EC and Water Framework Directive 2000/60/EC already integrate adaptation considerations. Adaptation has also been assimilated into platforms, including the European Climate Adaptation Platform (Climate-ADAPT) and the EU's Earth observation programme, Copernicus. Furthermore, adaptation goals are embedded in National Adaptation Strategies (NASs) and National Adaptation Plans (NAPs) and integrated into relevant sectorial legislation. If done properly, mainstreaming adaptation across numerous policies (e.g. development cooperation) and programmes will ensure that the EU is set up better to address current and future climate shocks and stressors.⁴⁰

Table 3: Overview of the 2013 EU Adaptation Strategy's priorities areas and their associated actions

Priority 1: Promoting action by member states
Action 1: Encouraging member states to adopt NASs and NAPs
Action 2: LIFE funding, including adaptation priority areas
Action 3: Promoting adaptation action by cities along the Covenant of Mayors
Priority 2: Better informed decision-making
Action 4: Knowledge-gap strategy
Action 5: Climate-ADAPT platform
Priority 3: Major vulnerable sectors
Action 6: Climate proofing the CAP, Cohesion Policy and Common Fisheries Policy
Action 7: Making infrastructure more resilient
Action 8: Promoting products and services by insurance and finance markets

2.2. 'ADAPTING' THE EU ECONOMY: DESIGN AND FUNDING ISSUES?

Besides policies, climate adaptation is also being mainstreamed into various EU financial instruments and funds, usually as part of a wider effort to mainstream climate actions. The current Multiannual Financial Framework (MFF) contains a 20% climate mainstreaming target – a share that exceeds far beyond what most individual countries are committing to. That share is likely to increase following the European Commission’s suggestion to earmark 25% of the upcoming 2021-27 MFF to climate-related spending – a target that was broadly endorsed by the Council in March 2019.⁴¹ However, it remains to be seen whether the overall budget for climate action will grow.

The current MFF contains a 20% climate mainstreaming target, which is expected to increase following the Commission’s suggestion to earmark 25% of the upcoming 2021-27 MFF to climate-related spending.

The Commission is also spearheading efforts to climate proof and include tailor-made climate adaptation mainstreaming targets into the different programmes of the new budget (e.g. European Structural and Investment Funds or ESIF, Horizon Europe, Common Agricultural Policy or CAP, research programmes), as is the case with regional funding, InvestEU and the Connecting Europe Facility.

The European Agricultural Fund for Rural Development is currently, on paper, the primary contributor to climate

adaptation funding, followed by a combination of the European Regional Development Fund, Cohesion Fund and European Territorial Cooperation (see Figure 8).

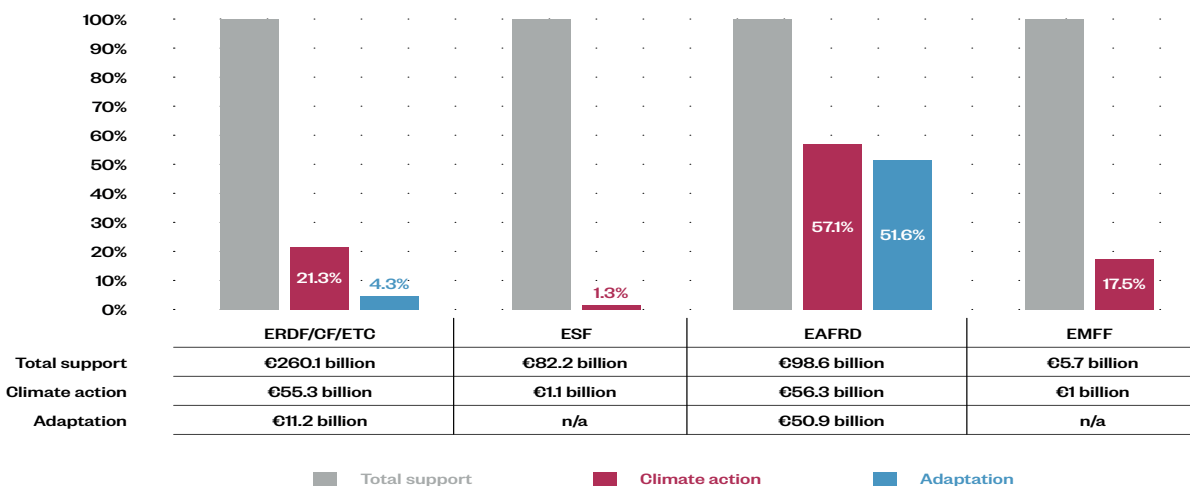
The longstanding LIFE programme is, however, the only funding programme dedicated specifically to supporting climate and environmental policy. In keeping with Action 2 of the Adaptation Strategy (see Table 3, page 15), its sub-programme for climate action provides funding for numerous adaptation practices that support capacity building and the stepping up of adaptation action, including the management of cross-border flooding events and coastal regions, mountainous areas and islands, territories susceptible to drought and desertification, and urban environments. LIFE is expected to be revamped in 2021 and divided into two sub-programmes: climate change mitigation and adaptation, implemented by the Directorate-General (DG) for Climate Action; and Clean Energy Transition, to be placed under the aegis of DG Energy.

Lastly, Horizon 2020 (H2020), the EU’s flagship research and innovation initiative, considers climate action to be a central pillar of the programme as well as a cross-cutting theme. In line with Action 4 of the Adaptation Strategy, funding has been allocated to projects that attempt to bridge the knowledge gap. Estimates indicate that climate-oriented expenditure could surpass 35% of the total H2020 budget by the end of the programme.⁴² Under Horizon Europe (2021-27), H2020’s successor, climate-related challenges are expected to play a more prominent role. Five mission areas have been identified and are currently being developed; climate change and climate-neutral cities being two of them. Horizon Europe could be a huge catalyser for positive change, for its very goals are to convert theory into practice, deliver testing and demonstrate solutions and that could be scaled up.

A disclaimer put forward by the European Court of Auditors (ECA) should be mentioned, however: “the [climate financing] tracking method does not reflect

Fig. 8

SHARE OF ESIF SUPPORT FOR CLIMATE ACTION (MITIGATION, ADAPTATION) AND ADAPTATION SPECIFICALLY IN EACH FUND, INCLUDING RESPECTIVE ALLOCATIONS (2014-2020)



Source: Olesen et al. (2017)⁴⁵

the full financial effects of EU spending on climate action through financial instruments, nor does it distinguish between funding for mitigation and adaptation measures.”⁴⁴ Put differently, unlike other international systems (that are based on the principle of conservativeness) which prefer to under-report rather than over-report (i.e. when climate finance data is unavailable or uncertain), the “EU’s tracking system provides no information on how much is spent on climate change mitigation and adaptation”.⁴⁵

This design flaw makes it difficult to determine which amount spent to withstand climate change corresponds to pure adaptation spending and which to the usual brick and mortar. For instance, an ‘adapted’ energy distribution and transmission network do not only require higher temperature-proof transmitters and taller poles, but also a careful selection of location.

Despite the absence of a solid tracking method, the importance of increasing the means to mainstream adaptation is generally not contested. Another disclaimer is worth mentioning, however: any increase in funds will be counterproductive if the money is not (well) spent on measures that mitigate climate change and ensure the target’s adaptive capacity and resilience to climate change.

2.3. ANALYSIS OF THE CURRENT FRAMEWORK

The 2013 Strategy has provided a clear and productive framework for stimulating, facilitating and supporting adaptation activities throughout the EU. The three goals and eight related actions have helped set the basis for implementation. These actions translated into concrete products, such as guidelines on developing adaptation strategies, which in turn made it easier for member states to approve NASs (see Figure 9, page 18).

Climate-ADAPT (i.e. Action 5 of the Adaptation Strategy) has led to particularly positive results concerning the spreading of adaptation knowledge across all governance levels. This initiative is seen as a one-stop-shop for adaptation information in Europe and is resourced by the European Commission and EEA. Its main activity has been to develop a website to enhance stakeholders’ understanding of the bloc’s vulnerability to climate change impacts and measures that improve resilience. The Copernicus programme, which administers climate change services, has been integrated into the platform.

Lastly, the Strategy has allowed for a higher degree of visibility for the need to have climate adaptation considerations integrated across EU-level policies and budgets, as demonstrated in the independent and thorough 2018 review ordered by the Commission.⁴⁶

However, there is also room for improvement. Many member states – including Germany, which played an active role in protecting the principle of subsidiarity and guaranteeing German sovereign statehood – have shown a lack of commitment to the EU Adaptation Strategy and

perhaps because of that, the 2018 evaluation thereof concluded that the objectives of the blueprint “have not been completely fulfilled”.⁴⁷ For instance, at the time of publishing the evaluation, three member states – Bulgaria, Croatia and Latvia – did not have a NAS. In fact, not only were none of the priority knowledge gaps⁴⁸ fully closed, but new ones emerged, too.

This has partly to do with the fact that knowledge gaps were not presented specifically according to sectors but rather remained open-ended – which complicated their correct measuring. Although knowledge “may never be complete and certain”, the evaluation report highlighted that uncertainty is “no excuse for inaction” as it can be incorporated in modelling as well as transparent and open decision-making.⁴⁹ Progress in mainstreaming climate adaptation in areas where the EU has exclusive competence (e.g. trade, fisheries) has also been insufficient.⁵⁰

Many member states have shown a lack of commitment to the EU Adaptation Strategy. The 2018 evaluation thereof concluded that the objectives of the blueprint “have not been completely fulfilled”.

Moreover, the Strategy seems to have been reactive by nature, with a strong focus on covering the costs of climate-induced disasters instead of investing to avoid disaster risks. The Commission itself has estimated that for every euro spent in DRR and preparedness, savings of €4 to €7 can be generated.⁵¹ It is time for the EU to reflect this logic in its own actions.

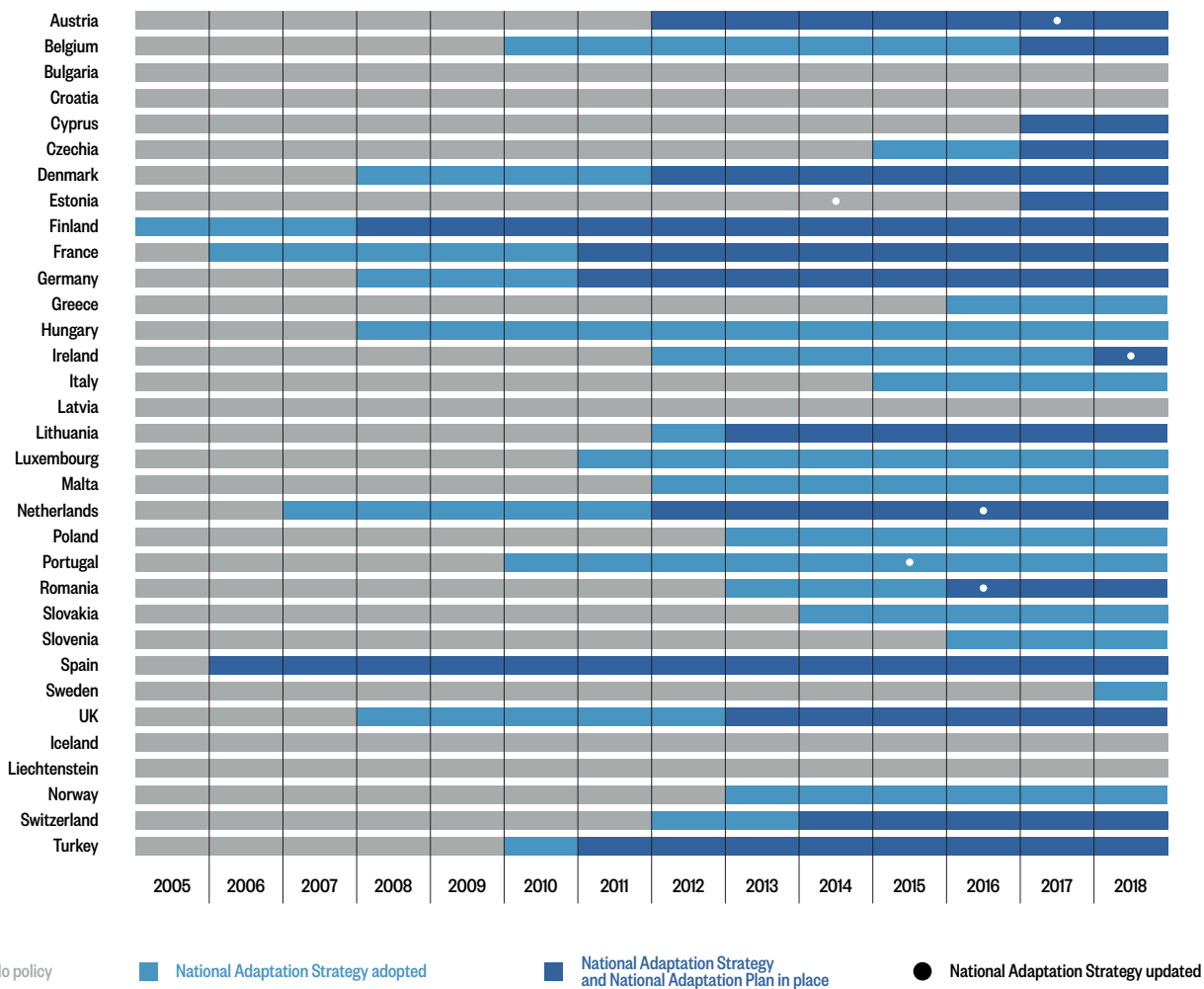
The Commission has estimated that for every euro spent in DRR and preparedness, savings of €4 to €7 can be generated.

The application of CAP rules is a case in point. For example, farmers have received advanced direct payments in weather-afflicted regions.⁵³ While this might administer a short-term safeguard against economic losses, it places an increasing strain on financial flows in the long run as they are not designed to deal with the multiplying impacts of climate change. Instead, the focus should be to proactively create the conditions for the agriculture sector to become climate-neutral and -resilient. To sum it up, EU “[g]oals to minimize and adapt to climate change, protect the environment and promote rural development are poorly served.”⁵⁴

The Union’s disaster response mechanisms – the EU Civil Protection Mechanism (UCPM) and EU Solidarity

Fig. 9

OVERVIEW OF NATIONAL ADAPTATION STRATEGIES AND PLANS (2005-2018)



Source: European Environment Agency (2019c)⁵²

Fund – are also faced with growing criticism from experts for their weak coordination with regional and local authorities, and focus on a reactive instead of preventive approach.⁵⁵ In its annual report on the implementation of humanitarian aid and civil protection policies, the European Commission also referred to the inadequate funding of the UCPM, which is made all the starker by the accelerating frequency and severity of climate-induced and hazard-related risks.⁵⁶ The 2018 review of the Strategy expressed that the renewed UCPM was expected to strengthen the link between climate adaptation and DRR.

The EU still does not have a single standardised data collection and recording system for disaster losses.

The challenges do not end there. In 2018, the ECA released two reports worth mentioning. One focused

on the Flood Directive and highlighted issues like insufficient funding for flood planning action and a lack of up-to-date knowledge on probable impacts.⁵⁷ The other concentrated on the looming threat posed by desertification and noted that while measures are being taken to repel this challenge, there is a lack of coherence with legislation.⁵⁸ There are no explicit directives or regulations concerning desertification, nor any specific funding. Such disparities and disjointedness point to a lack of long-term planning and the absence of a dynamic perspective.

Lastly, the EU still does not have a single standardised data collection and recording system for disaster losses despite the recommendations of the JRC⁵⁹ and the Organisation for Economic Co-operation and Development (OECD). As put aptly by the OECD’s Council on Disaster Risk Financing Strategies (to which most EU member states adhere), all data on assets, structural vulnerabilities, hazards and past losses should be produced, gathered, shared and made publicly available⁶⁰ to quantify potential exposures.

Additionally, countries should consistently carry out and coordinate post-disaster loss assessments with the

private sector to better evaluate exposures to disaster risk.⁶¹ The absence of a single standardised disaster loss data collection and recording system particularly affects local authorities. Standardised information sharing and the development of standardised stress tests and solid guidelines for local NASs and NAPs should become an integral part of the relations between the different levels of government.

The new adaptation strategy should address these shortcomings ambitiously. While acknowledging that the choice of adaptation actions depends, to some extent,

on local circumstances, this updated blueprint should focus on helping both public and private actors to address the growing impacts of climate change in Europe, push for binding national legislation which requires local adaptation plans and disseminate public and private financial assistance. Ultimately, however, if member states do not fully commit – as seen in the current Strategy –, the benefits of a renewed strategy will be severely curtailed.

Chapter 3: Identifying challenges, areas for European added value and gaps in the current framework

3.1. GENERAL CHALLENGES

Adaptation policy in the EU is facing several challenges. These include limited public awareness and an insufficient sense of urgency. Moreover, climate adaptation – contrary to mitigation – is not viewed as a politically pressing issue. There are also coordination problems across the different levels of governance and a suboptimal allocation of resources.

Adaption measures do not necessarily require huge investments. They do, however, demand smart planning.

- ▶ **Public awareness:** Despite the rising frequency and intensity of climate change-related events and their devastating impact, some politicians, government authorities and some media overlook or downplay the link between natural hazard events and climate change. This fosters a misperception that events are sporadic and unrelated and not part of a dynamic and structural transformation of socioecological systems. These misperceptions then feed back into a lack of adaptation or maladaptation, or in other words, incomplete, faulty or inadequate adaptation.
- ▶ **Political priority and polarisation:** Academic literature confirms that climate adaptation is “seen as less **politically pressing** than other issues”⁶² – including mitigation –, especially at the local level. This is even more interesting given that climate adaptation, *contrary* to mitigation, is seen as place-based and therefore very relevant to local governments.⁶³ Furthermore, both adaptation and mitigation policies but also climate change more generally have become enmeshed in the so-called culture wars, where the debate on climate change diverts from science to ideology, culture and values⁶⁴ and is exposed to growing political polarisation. If certain political parties develop a climate-sceptic political narrative and argue against the likes of carbon taxes, lifestyle changes and investments in climate resilience, and adaptation efforts could be more heavily scrutinised, shelved or scrapped altogether.
- ▶ **Coordination:** Adaptation requires coordination between different sectors and levels of government that are beyond the local-to-national level. In addition, despite some evident functional synergies between different policy areas relevant for climate adaptation, silo thinking persists due to the multidisciplinary

nature of adaptation and the different professional and policy communities involved which compete for limited financial resources.

- ▶ **Resources:** Resources to invest in climate adaptation include not only the financial, but also technology, information, skills and time. On the one hand, public resources – especially at the local level – will be insufficient to cope with the magnitude of the challenge. On the other, private resources confront less immediate returns on investments in climate adaptation. Two challenges arise from this: firstly, the need to understand that both private and public players are responsible for their actions in their respective spheres. The second concerns the extent and method in which the private and public sectors can collaborate to de-risk investment and reduce avoidable costs as much as possible. In light of this challenge, an alignment between the private and public sectors is very much needed. If building climate resilience was integrated in the regular, day-to-day decisions of building and maintaining critical infrastructure in sectors like transport, water management, energy systems, building stock and soil management, it could prevent massive future damages and losses. Adaptation measures do not necessarily require huge investments. They do, nevertheless, demand smart planning.

3.2. AREAS FOR EUROPEAN ADDED VALUE

The general challenges (see section 3.1.) reveal a difficult environment for the boosting of political action on climate adaptation. However, there are important areas where EU action and support can help foster the continent’s resilience to climate change (see section 1.2.)

As will be explained in the following sections, there is room for improvement in the conversion of knowledge into action, coordination between insurers and the public sector, adoption of nature-based infrastructural solutions, and build-up of more effective funding frameworks for both EU money and private investment. We will first identify and study the different gaps in the current adaptation strategy, the overall approach to adaptation and the main areas of action before putting forward a series of recommendations which address these issues.

3.2.1. Knowledge: The information gap

Although studies show that there is no clear link between the provision of environmental information in and of itself and the influencing of behaviours, “we must [...] guard against the danger that what we can measure becomes the sum total of what we aim to achieve.”⁶⁵ Despite these challenges, organisations like the World Bank are convinced that communication to raise

awareness, reinforce preparedness and encourage the willingness to adapt is necessary.⁶⁶

Thus, arguably, the Sendai Framework's recommendations on education and training for prevention and protection are an essential starting point for awareness.⁶⁷

Policymakers' and citizens' access to information about the magnitude, location and exposure to climate-related hazards is but one of the many determinants of behaviour change⁶⁸ and as such can play an effective role in DRR and adaptation. Information helps educate the public, industry and authorities about responsible behaviour and incentivises preventive action, thus reducing the cost of post-disaster interventions. Publicly collected and recorded, standardised and open-source data, risks assessments and open-source hazard modelling can aid national and regional bodies to manage risk and shape their investment decisions. They are also a crucial part of any insurance.⁶⁹

At the EU level, over the last years, a vast amount of knowledge on climate-related risks has been developed and disseminated through instruments like Copernicus and Climate-ADAPT. In addition, methodologies available to private actors in cost-benefit analyses (CBAs) and scenarios are becoming increasingly robust.

However, when it comes to turning knowledge into action, limitations persist. Besides the inherent limitations of CBAs,⁷⁰ analyses in general face the following challenges:

- ▶ Difficulties of factoring in long-term dynamics. While many risk analyses, CBAs and scenarios provide guidance on short-term resilience, they generally do not capture the risks associated with a large increase in temperature over the long term. This results in insufficient or maladaptive action.⁷¹
- ▶ Difficulties of factoring in the value of indirect effects on society and environment as well as intangible impacts of disaster risks. These include unemployment or increasing mortality rates as a result of changing patterns of disease from sources such as certain species of mosquitoes, or damages to cultural heritage through greater exposure to severe weather events and change in average climatic conditions.
- ▶ The lack of attention to non-climatic factors, cross-sectorial interactions and international impacts when reviewing climate vulnerabilities in CBAs and scenarios. For example, careful reflection on social vulnerability factors would allow for a better understanding of the social justice ramifications of climate change, as some groups suffer more than others.⁷²

Together with the limits mentioned above, heuristics – using shortcuts to produce 'good enough' solutions – explain to some extent why reactive and fragmented approaches still prevail over comprehensive preventive actions. For example, between 1991 and 2010, only 13% of global funding for disasters have gone to DRR efforts, while 87% went to post-event relief.⁷³ All of the aspects is a challenging task and we may never be able to close the knowledge gap entirely, as acknowledged by

the European Commission.⁷⁴ Nonetheless, there is room for more effective use of information at the EU level, both in terms of reducing fragmentation in awareness and information asymmetries and translating knowledge into preventive policy responses.

Between 1991 and 2010, only 13% of global funding for disasters have gone to DRR efforts, while 87% went to post-event relief.

3.2.2. Insurance: The protection gap

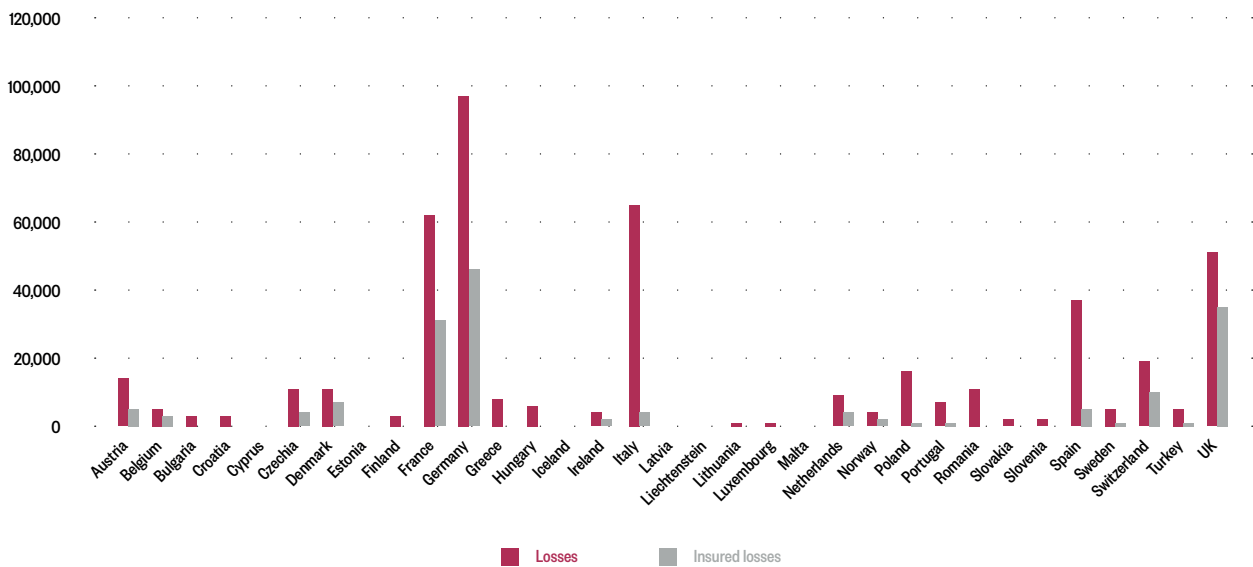
Insurance is the best-known tool for risk sharing and transfer⁷⁵ and as such, it has been embraced as a tool to buffer against the financial effects of climate variability and change in international climate impact-related discourses since the early 1990s⁷⁶ and features in the Paris Agreement and the Sendai Framework. Insurance is also seen by the EU in its current Adaptation Strategy as central in the reinforcement of societal resilience to climate change. Despite its long trajectory as an important instrument to both enhance resilience and finance the recovery from climate change attributed events that are extreme, sufficiently random, infrequent and non-gradual,⁷⁷ most economic losses derived from climate-related impacts since the 1980s were uninsured and therefore unrecoverable.⁷⁸ The high level of uninsured assets can be partly explained by the fact that people tend to understate the rare probability of highly impactful events and as risk perceptions across the EU bloc vary this makes the application of insurance schemes complicated. As shown by renowned scholars Kunreuther and Pauly, even when insurance "is offered at favourable premiums [...] people often fail to purchase [it] against low-probability high-loss events."⁷⁹

Furthermore, in some countries, **gaps in insurance uptake** are caused by a lack of awareness, ineffective legal systems⁸⁰ or the population's large exposure to hazards as well as distributional issues. Within the EU, insurance uptake tends to be lower in Southern, Central and Eastern countries (see Figure 10, page 22). Of the extreme weather and climate-related events occurring in the EU between 1980 and 2017, insured losses varied between 2% in Greece and 70% in the UK.⁸¹ From an EU perspective such a fragmentation poses a two-fold challenge: differentiated levels of insurance uptake can impact the Union's resources since countries that receive large amounts of EU investment tend to be those that suffer the most from the protection gap. It can also lead to tensions if funds (e.g. the EU Solidarity Fund) are primarily spent on damages suffered by those who did not adopt preventive measures (e.g. by taking an insurance).

To reduce the number of unrecoverable losses, that is, to address the protection gap, prevention and resilience building efforts should be doubled. Prevention, in other words, not only pays off but also improves risk quality and makes it more insurable. However, since certain layers and sectors of the population – notably low-income,

Fig. 10

TOTAL LOSSES VS INSURED LOSSES FROM CLIMATE-RELATED EXTREME IN EUROPE (€MILL., 1980-2017)



Source: European Environment Agency (2019d)⁸²

high-risk people – might struggle with affording an insurance, measures like tax credits or smart subsidies could be explored to ensure that no one is left behind. Aware of the need to build a functioning insurance market to strengthen the EU’s overall adaptation efforts, the EU Adaptation Strategy included the promotion of products and services by insurance as one of its priorities. Prior to that, the Commission’s Green Paper on the insurance of natural and man-made disasters had attempted to “encourage improvement in the ways insurers help to manage climate change risks”.⁸³ More specifically, the document sought to improve the market penetration of natural disaster risk insurance and unleash the full potential of insurance pricing to promote risk-awareness, prevention and mitigation, as well as long-term resilience in investment and business decisions.

However, the 2018 review of the EU Adaptation Strategy concluded that the “action on insurance and the financial sector may not have been sufficient to overcome hurdles for public-private cooperation” and that “EU action has yet to bring clear results.” The EAV resides in “enabling cooperation between governments and insurers, raising awareness about the coverage gap and about the need for governments to integrate insurance in the management of all climate risks.”⁸⁴ The European Parliament, one of the co-legislators, unequivocally stressed in a November 2019 resolution the need “for the insurance industry to invest in adaptation”.⁸⁵

As hinted at in the 2018 review, the insurance market will only function if the public and private sectors work together.⁸⁶ Governments have a crucial role to play in shaping a policy, regulatory and legal environment, addressing market and regulatory shortcomings and weaknesses such as information asymmetries and low-level risk awareness among individuals.⁸⁷ Conversely, private insurers have room for improvement with respect

to investment in preventive risk reduction as it remains considerably lower than public insurers’ efforts.⁸⁸

The insurance market is currently also characterised by the fragmentation of risk transfer type: ex post compensation by public mechanisms, private insurance or both; levels of compulsion of insurance uptake; and such. All of them are differently and often insufficiently integrated into national adaptation decision-making processes or broader climate risk management strategies.⁸⁹ Future EU efforts should, therefore, try to address this.

There is a fundamental issue to be addressed by the future EU Adaptation Strategy: the misperception surrounding the function of insurance.

However, there is a more fundamental issue to be addressed by the future EU Adaptation Strategy: the misperception surrounding the function of insurance, which is viewed in many cases as a stand-alone risk management tool rather than an integral part of the toolbox for adaptation. This toolbox should also include the four priorities for action present in the Sendai Framework, namely understanding disaster risk, strengthening disaster risk governance (to manage disaster risk through i.e. data sharing), ex ante planning for risk reduction and resilience building, enhancing disaster preparedness for effective response and build back better (BBB) in recovery, rehabilitation and reconstruction.

Risk reduction priority tools and insurance recognised by Sendai can be further linked through many channels, in

the eyes of some scholars. Some of the options for linking them include risk awareness raising, risk pricing, direct financing of risk reduction measures and adopting risk reduction as a requirement for insurance.⁹⁰ However, the IPCC see a “weak” evidence in the claims that insurance can “directly provide incentives for reducing risk” and believe that the “presence of many counteracting factors often leads to disincentives”.⁹¹ It is therefore fair to say that if insurers want to better promote risk reduction practices, a reform of the sector will be necessary.

In light of this analysis, Lorant, Linnerooth-Bayer and Hanger,⁹² building on the work by Surminski and Eldridge,⁹³ suggest ways for insurers to contribute more effectively to DRR, inter alia:

- ▶ **Making better use of hazard maps:** The collection and provision of information about risk can help drive individual action and set up the appropriate regulation and standards aimed at DRR. A good example of this is HORA, the Austrian nationwide risk zoning system for flood and natural disasters (see Chapter 4).
- ▶ **Rewarding risk mitigation with premium discounts:** For instance, through price signalling, homeowners who fortify their roof decks against hail and wind damage could be charged with a lower premium or deductible. The discount depends on the kind of risk management activities undertaken by the policyholder and can allow insurers to save costs linked to potential large claims. Barriers persists, however, as households and governments tend to underestimate the risks in comparison to the upfront cost of investment. At the same time, insurers could be reluctant to engage directly without a guarantee that the beneficiary of the investment will not choose a competitor once the investment is performed. A long-term insurance contract with dynamic and transparent risk-based pricing and premium discounts for risk reduction could strengthen the incentives to reduce risks for both the demand and supply side of the insurance market.⁹⁴
- ▶ **Monitoring household risk management improvements** at the member state level (i.e. households insurance against adverse shocks to financing needs, income and assets): Household risk management tends to be very limited and is often completely absent from low-income households.
- ▶ **Inserting conditions or warranties into contracts:** Risk reduction and climate resilience building can be imposed as a condition for a policy to be operative. For instance, if the insurance holder does not take any measures against the risk to which they are exposed, the pay-out will be lower. This approach can however be resisted by policyholders if no appropriate “carrot” is added, for instance in the form of premium discounts or tax incentives.

3.2.3. Infrastructure: The grey bias

In 2013, the European Commission defined green infrastructure as a “strategically planned network of natural and semi-natural areas with other environmental

features designed and managed to deliver a wide range of ecosystem services.”⁹⁵ Ecosystem services deliver a range of environmental and socioeconomic benefits, including the maintenance and improvement of ecological functions through, among others, conservation, connectivity building in ecological networks and the promotion of green spaces. The EU recognises the value of green infrastructure, as demonstrated in the adoption of the EU Strategy on Green Infrastructure, and the launch of the EU-wide network Natura 2000 initiative of natural and semi-natural areas that tackles habitat loss while contributing to smart and sustainable socioeconomic growth. Natura 2000 provides a legal and organisational setting which contributes to the efficiency, long-term security and cost-effectiveness of green infrastructure investments (e.g. by restoring floodplains).

Although the main driver of EU initiatives on green infrastructure is the protection of biodiversity, nature-based approaches are seen – including by the European Parliament – as crucial enablers of climate change adaptation and mitigation, too.⁹⁶

Although the main driver of EU initiatives on green infrastructure is the protection of biodiversity, nature-based approaches are seen as crucial enablers of climate change adaptation and mitigation, too.

Firstly, urban greening is a valuable intervention against the detrimental urban heat island effect. Urban areas tend to heat disproportionately partly because of the impermeable and reflective materials used in the construction of most buildings (i.e. grey infrastructure) and the use of short-sighted grey (mal)adaptation measures (e.g. indoor air conditioning), hence the value of green infrastructure in moderating high temperatures, sequestering carbon and reducing building energy use altogether. An example of how green infrastructure can tackle these issues can be found in the city of Barcelona. Barcelona’s Tree Master Plan for 2017-37 and Green Infrastructure and Biodiversity Plan 2020 have put the emphasis on the planting and managing of trees to moderate the urban climate by cooling it and prevent local flooding by helping to reduce the amount of storm water runoff.

Second, and in connection to this, green infrastructure helps manage flood risks, as contrary to impermeable grey infrastructure it allows for water absorption as well as wastewater treatment.

Third, green infrastructure enhances general ecosystem resilience by reducing habitat fragmentation (e.g. through the development of corridors for species migration or expansion of core conservation areas) and therefore strengthening the ability of the ecological system to absorb disturbances.

In addition to the adaptation benefits mentioned above, green infrastructure can also play a role in climate change mitigation, biodiversity conservation, water management, food supply and provision of health and social benefits through, for instance, the creation/expansion of recreational spaces.⁹⁷ Intuitively, these numerous priceless benefits should enhance green infrastructure's political appeal. As an example, the analysis of the 'wide green dikes' built along the Dutch part of the Dollard estuary reveals four primary advantages compared to a traditional dike: lower initial costs (based on standard unit prices), greater ease of doing repairs, increased adaptability and enhanced spatial quality.⁹⁸

Despite the clear pros of green infrastructure and the fact that it is often a cheaper and more durable investment than grey infrastructure, the latter continues to be privileged in the adaptation discussion.

However, despite the clear pros of green infrastructure and the fact that it is often a cheaper and more durable investment than grey infrastructure,⁹⁹ the latter continues to be privileged in the adaptation discussion. This is due to many reasons, the main being that grey infrastructure has a clearer asset life, depreciation and return on investment. Moreover, green infrastructure as a concept suffers from a lack of scientific, socio-political and decision-making impetus. All of these challenges combined with a weaker financial support for green infrastructure, in contrast to the historical support provided for the grey infrastructure, continue to prevent a larger use of green infrastructure in the context of climate change adaptation,¹⁰⁰ and despite a generally supportive EU policy framework.¹⁰¹

3.2.4. Funding: The investment gap

With its considerable impact on EU agriculture, energy, transport, research, and regional development, the EU budget constitutes important leverage for climate-related investments. In the context of climate adaptation, the MFF plays a relevant role as it provides financial support to disaster response and can bolster investment in disaster risk reduction. In the budget cycle 2014-20, the EU is said to have spent approximately €206 billion on climate action – including mitigation and adaptation – based on its 20% climate mainstreaming objective. It is estimated that during the current budget cycle, €62.1 billion were spent on climate adaptation, with investment in the EU's agricultural sector taking the lion's share of these interventions (€50.9 billion).¹⁰² Figure 7 in Chapter 2 shows the share of interventions in climate action (i.e. mitigation, adaptation) and adaptation separately by the ESIF. It does not provide, however, a clear picture of the EU budget's effective contribution to climate adaptation and mitigation.

Hurdles related to funding include the fact that climate spending adopts a tracking methodology (known as Rio

Markers) that tends to overestimate the budget's actual contribution to climate action. Practically speaking, it estimates the volume of finance streams based on policy objectives as opposed to an exact quantification of spending. This has had a very pervasive effect in the case of adaptation. The definitions and eligibility criteria for climate adaptation projects leave the door open to different interpretations and inaccurate policy signals.¹⁰⁵ As a result, projects that are thought to be supporting adaptation efforts in one context may be maladaptive in another, depending on climatic, socioeconomic, environmental, cultural and institutional factors.¹⁰⁴

Moreover, ex ante climate-related conditionalities concerning the promotion of climate change adaptation, risk prevention and management – prerequisites for the effective and efficient use of the EU funding for all European Structural and Investment funds – are hardly enforced as they suffer from institutional mismatching.¹⁰⁵ Conditionalities have fallen primarily under the responsibility of the services managing the funds (i.e. DG Regional and Urban Policy or DG Agriculture and Rural Development), with limited to no role for the DGs responsible for climate action and the environment.

The EU budget constitutes important leverage for climate-related investments: the EU is said to have spent approximately €206 billion of the MFF 2014-20 on climate action.

Additionally, contributions towards climate mainstreaming very often turn into an accounting exercise, partly because of the absence of any internationally agreed definition of what exactly counts as climate finance. Furthermore, while 20% of the EU budget should at present be spent on climate action explicitly, there are no 'climate-proofing' requirements for the remaining 80% of the budget. As the EU member states are currently negotiating the forthcoming budget cycle 2021-2027, the abovementioned shortcomings should be corrected. The EU will need to continue to invest in climate resilience if it is to confront the growing number and intensity of climate-related events – but as the budget is limited, the money needs to be spent wisely. In other words, the share of the budget that is not explicitly earmarked for climate action should not be spent on projects and malpractices that counter adaptation efforts.

Public finance, however, is not and should not be the only funding that can be mobilised for DRR. While public support has an important signalling role and is crucial for protecting public services that are at the frontline of disaster management and prevention such as emergency services or healthcare, private finance can and should provide a significant contribution to increase the EU's resilience to climate change.

However, challenges remain, as most investment tends to overlook climate-related risk. Several reasons explain this:

- ▶ Firstly, the large amount of information on disaster risk, accumulated mostly by the insurance sector based on claims data, is not necessarily available due to personal and business privacy concerns and legislation.
- ▶ Secondly, climate scenarios remain somewhat insufficient, as they tend to focus on a future where the rise in temperature is close to internationally agreed climate targets, thereby failing to take into

consideration higher levels of warming and non-climatic influential factors (e.g. social, political, legislative, economic).

- ▶ Thirdly, adaptation is a context-specific concept that can be considered a process rather than an outcome.¹⁰⁶ As the EU reforms its investment-related legislation following the Union's Sustainable Finance Action Plan,¹⁰⁷ there is now an opportunity to create an incentivising framework that includes DRR and climate resilience at the core of its finance considerations.

Chapter 4: Roadmap for action – Recommendations for a renewed adaptation strategy

Due to the magnitude of the climate challenge, climate adaptation efforts need to be part of a system-wide policy built around two guiding principles: **the need to truly mainstream adaptation**; and **shift from post-disaster responses to prevention, risk reduction and resilience building**. Considering this, how can the gaps identified in the previous section be addressed by a renewed EU adaptation strategy?

4.1. BRIDGING THE INFORMATION GAP

How can the EU improve the quality of its knowledge and ensure that sufficient policy guidance is provided? Although the volume of knowledge acquired thanks to coordinated EU action is not negligible, findings have not informed policy action sufficiently. The three priorities for action in this area at the EU level should, therefore, be to (i) conduct economic research which considers the costs of adaptation and non-action comprehensively,¹⁰⁸ (ii) harmonise risk perception among individuals, groups, sectors and countries (which is not an easy task considering the diversity of audiences); (iii) ensure that knowledge can be translated into guidance for decision-making. In order for adaptation strategies to be implemented successfully, it is crucial that decision-makers have free and user-friendly access to the relevant data and knowledge about climate risks in their respective regions.

In addition to showing an understanding of the policy cycle; collaborating with receptive policymakers; and accompanying evidence with effective campaigning, insider influencing strategies (i.e. direct lobbying) and political mobilisation, some key recommendations for bridging the information gap are the following:

RECOMMENDATION 1

Value information on losses as a public good. Better access to research data on hazards, exposure, past losses and assets promotes scientific advancement, facilitates scientists' designing of risk models and allows society to protect itself better. The lack of publicly available compiled data might shield companies and authorities from liability if affected residents struggle to attribute responsibility for damages to their assets. For example, owners of a house on a riverbank for which flood maps were not available upon purchase might struggle to pinpoint who is liable in case of a destructive flood.

Understanding knowledge about losses as a public good can also be justified by the need to ensure sound public expenditures. Climate change impacts take a toll on public infrastructure – that is, on the public purse. Considering this issue, the Council could encourage member states to release information on losses, and mandate and resource

the European Environment Agency to analyse the data. Alternatively, EU countries could consider creating a new agency, the 'EU Risk Management Agency', to deal with this task as well as the others described below.

Climate change impacts take a toll on public infrastructure – that is, on the public purse.

RECOMMENDATION 2

Empower the European Environment Agency to provide more comprehensive monitoring and mapping of risks, highlighting the cost of non-adaptation under different climate scenarios, for different sectors and geographical regions; and disseminating it widely among the general public through accessible online tools (e.g. Climate-ADAPT) and summarised evidence. The Agency's funds should also be increased to analyse how to mainstream climate adaptation comprehensively and identify the most effective measures. These findings and risk maps should then become an inherent part of the planning of future (re)construction projects.

Additionally, the European Insurance and Occupational Pensions Authority (EIOPA) should be resourced and continue to analyse potential climate-sensitive exposures in insurance investment portfolios and pension funds and ensure that the information is transparent. This includes working with the insurance sector to broaden the number of European (re)insurance groups participating in the stress test exercise that exposes them to a climate change-attributed natural catastrophe scenario.

RECOMMENDATION 3

Put in place a single, unified and easy-to-access EU-wide data collection for disaster damages and losses, as well as a transparent reporting mechanism. As mentioned in a JRC study, both collection and reporting mechanisms ought to be "consistent in terms of methodologies, metadata and procedures".¹⁰⁹ Standardisation helps ensure the quality and usability of analytical tools for both decision-makers and households. Free access to, visual clarity¹¹⁰ and comparability of data reduce information asymmetries and misalignments in risk perception and are therefore essential in risk reduction education. Moreover, from an international perspective, having a single and unified framework for damage and loss data recording and a

transparent reporting mechanism would bring significant advantages to the systematic reporting on the Sendai Framework indicators – which member states have committed to.

An ‘EU Risk Management Agency’ would combine the tasks of data collection, free and transparent reporting, early warning, disaster risk management, resilience building and risk finance.

If interpreted loosely, Articles 2 and 3 of the “regulation on the European Environment Agency and the European Environment Information and Observation Network” could be explored as a legal basis to extend the mandate of the former to coordinate the collection, analysis and reporting of data – provided that it is properly resourced to do so. Alternatively, should the extension of the mandate not be agreed, an EU agency – we suggest the name ‘EU Risk Management Agency’ – could be created. This pan-European agency would combine the tasks of data collection, free and transparent reporting, early warning, disaster risk management, resilience building and risk finance.

RECOMMENDATION 4

Strengthen building codes through mandatory standards and supporting the use of insurers’ data for zoning and construction standards. Given that it is considerably more expensive to rebuild homes than build them from scratch, member states should engage with the standardisation community and insurance sector to strengthen and update building codes for designs, constructions and operations regularly. Up-to-date codes not only offer enhanced protection against disasters and manmade hazards, but also make communities more resilient and lowers the price of climate change mitigation and adaptation.¹¹¹ An example of a secure code is the requirement of tighter building envelopes or better insulating windows.

Insurers’ data provides public administrations and developers with zoning, infrastructure and housing-related information that can help correct information asymmetries and, by extension, maladaptation. For instance, in the UK, the insurance industry engages with public authorities on flood defence funding, land zoning and construction standards.

RECOMMENDATION 5

Bolster the efforts to develop EU metrics to evaluate the impacts of adaptation efforts. The European Commission should convene an interdisciplinary group of experts to

work on a metric that, similarly to mitigation-related metrics (e.g. a one-tonne reduction of carbon dioxide emissions will always have the same impact, regardless of where the mitigation project has taken place), allows for the understanding of the feasibility, costs, effectiveness and likely extent of the implementation of adaptation options. Any proposed metric should go hand in hand with the no-harm assessment principle to assess the environmental and cultural impacts of adaptation projects.¹¹²

So far, at the EU level, the technical expert group on sustainable finance has to some extent embraced the need for economic activities eligible for Taxonomy, to avoid significant harm to a set of environmental objectives.¹¹³ The group is also focusing on a qualitative and not quantitative screening given the absence of measured baselines and accepted metrics, and “the complexity associated with defining eligibility of finance in the case of adaptation of an economic activity”.¹¹⁴

RECOMMENDATION 6

The Commission and member states should encourage the constitution of structured discussion forums where policymakers, the scientific community, businesses and local communities – especially the most vulnerable and exposed – can engage in **information exchanges on bottom-up and co-designed adaptation options.** This idea is reflected to some extent in the November 2019 European Parliament resolution.¹¹⁵

4.2. CLOSING THE PROTECTION GAP

Dealing with climate change calls for a balance between adapting to, tolerating and insuring against the impacts of climate change.¹¹⁶ How can the EU improve the market for DRR, enhancing insurance’s potential from a traditionally compensatory role to a damage prevention one?

Two main obstacles limit the closing of the protection gap at the EU level: intra-EU fragmentation, and insufficient integration of the role of insurance into a wider vision for DRR.

Two main obstacles limit the closing of the protection gap at the EU level: intra-EU fragmentation, which financially exposes public authorities to disaster risk to varying degrees, dependent on their insurance; and insufficient integration of the role of insurance into a wider vision for DRR. EU measures aiming to reduce the protection gap should, therefore, focus on the following chain of action: (i) increasing awareness about the need for risk management among stakeholders; (ii) fostering resilience which focuses on risk reduction; (iii) ensuring that the remaining risk is insured or insurable as much as possible

through private means; and (iv) defining a role for public finance to provide a backstop for those cases where previous intervention (i.e. awareness, risk reduction, private insurance) is insufficient, thus supplementing the insurance provided by the market.

To this end, the authors suggest that the renewed adaptation strategy focus on:

RECOMMENDATION 7

Make use of NASs and NAPs to increase awareness of climate risk management among stakeholders. Standardised information sharing and the development of standardised stress tests and solid guidelines for NASs and NAPs should become a crucial part of the relations between the different levels of government, include a strong educational dimension on risk management and address risk transfer as a part of a wider discourse on risk management.

RECOMMENDATION 8

Guide the introduction of smart subsidies, tax deductions or insurance vouchers to the poor and vulnerable groups. Although insurance companies are expected to provide adequate pricing, in order to not leave the vulnerable and poor behind, incentives that ease the pressure of risk premiums (e.g. insurance tax deductions) should be considered by national tax authorities. They should properly reflect climate risk, and specify the actions that would reduce excessive risk-taking and could be supported by EU guidance.

However, this support should only be provided for climate change insurance products that are “needs-based, adjusted to the local context and embedded into holistic risk management and resilience-building strategies.”¹¹⁷ Insurance vouchers, a more innovative option proposed by Kunreuther for low- and middle-income residents who cannot afford flood insurance coverage at risk-based premiums, could also be explored.¹¹⁸ As argued more recently by Kousky and Kunreuther, the voucher programme could be tied to a loan programme for investments in loss reduction measures, which would be linked to the property and rendered affordable through reductions in risk-based premiums. Future studies are nevertheless needed to estimate the costs and impacts to public authorities and the benefits in terms of reduced expected losses in the future.¹¹⁹

RECOMMENDATION 9

Encourage member states to include investment opportunities to reduce climate change-related risks in their budgets and planning. The first step could be for the EU to push the EU Semester recommendations forward. As mentioned in the European Green Deal communication, the Commission will use the European Semester to

“ensure that all available planning tools for the European Green Deal” and specifically national energy and climate plans are “fit for purpose” and implemented effectively.¹²⁰ Since many member states with climate adaptation goals have included them in their draft national energy and climate plans,¹²¹ the Commission could start by assessing the budget of those countries.

However, since climate change is already taking a toll on financial stability “when asset prices adjust rapidly to reflect unexpected realizations of transition or physical risks” and on monetary policy by “slowing productivity growth [...] and heightening uncertainty and inflation volatility”,¹²² actions beyond the European Semester recommendations could be explored. Given that climate change puts a strain on public finances and other public investment projects and threatens the Treaty-embedded principle of fiscal stability (Article 119(3) TFEU), the European Commission could take a proactive role in encouraging member states to factor these risks into their planning processes and national budgets.

Plus, if climate change-attributed impacts are factored into the budget planning process, it will be easier to calculate the benefit of risk reduction in monetary terms via the reduction in annual average losses due to climate change, for example. Furthermore, as suggested by scholars Hochrainer-Stigler and Lorant, if the risk is accounted for, then some risk reduction investments could be financed by the insurance sector and transferred in order to decrease premiums.¹²³

RECOMMENDATION 10

Create an EU-wide weather and climate risk insurance pool, or voluntary regional risk pool. This is all the more important in a time when the aggravation of catastrophes is linked to increasing interdependencies among member states.¹²⁴ Macro-level schemes have several potential advantages:¹²⁵

- 1) They are able to aggregate risk, diversify risk profiles and, by building economies of scale, allow for reduced premium costs.
- 2) Pay-outs can more quickly reach a larger number of beneficiaries if the mechanism used for transferring it (and the quality of fiduciary management, should there be a third party managing the assets) is sound.
- 3) Pooling risks creates a more stable, diversified and less-capital intensive portfolio. This allows countries to retain some of the risks through joint reserves and capital, and shift excess risk more cheaply to the reinsurance and capital markets.
- 4) By effectively putting a price tag on risk, risk pools can create incentives for member states to invest in risk reduction, and move away from humanitarian assistance and disaster assistance toward proactive planned development.

- 5) Risk pools would help member states cope with the macroeconomic and fiscal consequences of disasters. Existing examples like the African Risk Capacity, Pacific Catastrophe Risk Assessment and Financing Initiative or the Caribbean Catastrophe Risk Insurance Facility (which launched thanks to a contribution by the European Commission, among other partners) could provide some inspiration for the building of an EU-wide pool.

Pooling risks creates a more stable, diversified and less-capital intensive portfolio.

This regional pool would work as a public backstop, stepping in when risk is no longer privately insurable. The pool would make requirements as to how the disbursements ought to be used by requesting member states to communicate details about contingency management, and it would also set conditions for DRR or climate change adaptation that the agency would verify.

To avoid freeriding, strengthen disaster risk management systems, and incentivise solid work on climate adaptation and mitigation, member states exceeding their national risk budget could be excluded from the backstop or forced to provide more resources and participate in risk reduction and resilience-building measures, while those more successful at reducing risk at the national level could provide lower contributions.

4.3. TACKLING THE GREY INFRASTRUCTURE BIAS

How can the EU level boost nature-based solutions in climate adaptation? Previous pages have outlined the multiple benefits of nature-based solutions for climate adaptation. However, there remain barriers to deployment. In addition to funding challenges, the difficulties of internalising the cobenefits of green solutions undermine the business case for them. The following recommendations address this issue:

RECOMMENDATION 11

Evaluate infrastructure investments on their climate resilience, mitigation potential and embedded carbon. Grey infrastructure usually implies the use of large amounts of cement and construction products, demanding energy- and emission-intensive production processes. Embedded carbon and an LCA, priced according to a shadow carbon price, as well as mitigation potential and climate resilience should be included in cost-effectiveness analyses when evaluating different options of infrastructure.

RECOMMENDATION 12

Explore a BBB requirement that does justice to the undervalued benefits of green infrastructure. Member states, with the support of the European Commission (in case of infrastructure paid for by EU funds), could foster a dialogue with the insurance industry to study whether and how insurance reimbursements could be made conditional upon the reconstruction of property post-disaster following BBB requirements. These requirements entail ensuring the climate-resilience of the infrastructure whilst contributing to mitigation efforts as much as possible.

RECOMMENDATION 13

Consider green infrastructure's co-benefits when assessing adaptation options. These options should also compete based on the social, environmental and economic co-benefits of disaster risk management investments.¹²⁶ Introducing relevant criteria which quantify the additional societal (i.e. mental and physical health, recreational) and environmental (i.e. climate change mitigation, protection of biodiversity) benefits of investment in adaptation could help the uptake of ecosystem-based options over grey ones, which are typically mono-functional. Strategic use of public procurement would be essential to this aim. A first step could be for the Commission to sponsor the building of green roofs in public schools throughout Europe.

4.4. ADDRESSING THE FUNDING AND INVESTMENT GAP

How can the EU level improve the finance framework conditions to unleash investment in adaptation, overcoming the problem of limited return on investments?

Credit rating agencies should be encouraged to rate corporations based on their resilience to climate risk. This would open up new markets for their products.

RECOMMENDATION 14

Integrate DRR and climate resilience efforts into insurance, investment risk models, capital requirements and rating agencies, all under the umbrella of the action plan on sustainable finance. A comprehensive taxonomy of sustainable investment should include an indication of the investment's physical resilience to climate-related

natural hazards in the long term, to prevent institutional investors from supporting insufficiently adaptive or maladaptive investments. Although it is not part of their business field, credit rating agencies should be encouraged to rate corporations based on their resilience to climate risk. This would open up new markets for their products. Finally, disclosure requirements for financial and non-financial companies should extend to the reporting of climate risk exposure.

RECOMMENDATION 15

Agree on and consistently apply a climate risk proofing methodology across every MFF budget chapter. The EU budget can have non-negligible multiplier effects in policy areas such as energy or agriculture, thus highlighting the importance of factoring in adaptation concerns while not neglecting mitigation efforts. With a relatively small sum usually allocated to climate change spending explicitly (e.g. through the LIFE instrument), climate-proofing the entire budget to bring it in line with smart adaptation and mitigation objectives becomes all the more crucial. An interesting definition of climate-proofing covers the energy efficiency principle, the consideration of specific decarbonisation pathways and resilience to adverse climate change impacts.¹²⁷

RECOMMENDATION 16

Establish clear tracking methodologies and effective *ex ante* conditionalities for climate-related EU spending. Given the technical difficulties in determining the exact amount that is spent on climate change mitigation and adaptation, the Commission could lead the efforts to

conceptualise and establish clear tracking methodologies. Additionally, *ex ante* conditionalities for climate-related EU spending should be considered. A first step could be to make disbursements conditional to member states' adoption of both NASs and NAPs. Moreover, EU spending should prioritise interventions that include smart climate adaptation coupled with mitigation as a primary objective.

RECOMMENDATION 17

Link the disbursement of the EU budget to the adoption and implementation of NASs and NAPs. The EU budget and funding instruments of the European Investment Bank (EIB) and European Bank for Reconstruction and Development can be used as a powerful tool to upgrade member states' actions on climate adaptation. First, MFF and EIB investments in climate adaptation should be aligned with the objectives outlined in the NASs and the actions foreseen in the NAPs. Second, EU money should be used to reward both ambitious and/or correctly implemented NAPs. The EIB spent €906.1 million in 2018 solely on climate change adaptation, but almost ten member states – including two of three who did not yet have an NAS – did not benefit from this financing so it seems like a missed opportunity for many countries.¹²⁸

A way of using EU money to incentivise member states to upgrade their plans, or reward good performance in implementing NASs and NAPs could be the creation of a risk reduction reserve that would be put aside. The evolution of insurance premiums would provide an objective, independent measure of the performance of investments in climate adaptation if wide insurance penetration and a risk signal are achieved – two conditions that are not yet met by many member states.

Conclusion

The European Commission has announced that it will publish a new EU strategy on adaptation to climate change within the first two years of its mandate as part of the European Green Deal. This is a positive signal that the adaptation agenda will get the attention it deserves and demands. When working on the renewed strategy, the Commission will have to assess the mixed results yielded by the current one carefully.

As shown in this Issue Paper, although the strategy has proven to be a productive framework for the facilitation and support of activities throughout the EU and the spreading of some degree of visibility and knowledge on this file through Climate-ADAPT, several weaknesses persist. They concern the fact that none of the priority knowledge gaps has been fully closed, the progress on climate adaptation mainstreaming has been limited and the focus has been on post-disaster response actions as opposed to risk reduction and preparedness. Furthermore, the implementation of the Adaptation Strategy has suffered from the lack of political prioritisation of the adaptation file, silo thinking and insufficient resources allocated to ensure that the Strategy's priority areas are properly implemented.

Member states cannot afford to kick the can further down the road and postpone the adoption of firm mitigation and adaptation measures, as the science is clear: we are running out of time.

To address those weaknesses and bring all of the member states on board, the Commission must pull out all of the stops decisively. Member states cannot afford to kick the can further down the road and postpone the adoption of firm mitigation and adaptation measures, as the science is clear: we are running out of time to contain GHG emissions and global-mean temperature increase within manageable limits. Policies have finally caught up with the science – at least on paper – as manifested in the European Green Deal and the climate neutrality goal embraced by the EU. Now it is time to translate them into concrete actions.

The scale of the challenge is daunting, and no member state will be able to face it on its own, hence the obvious need to attach more importance to the upcoming adaptation strategy and strengthen intra-EU cooperation in this field. The time is ripe to invest in climate resilience building.

Drawing on the findings of two workshops organised in the framework of the EPC project “Building a climate-resilient Europe”, open-ended interviews with and valuable feedback provided by reviewers, and a literature review, this Paper provides a set of

recommendations to address each of the weaknesses of the current Strategy.

To close the information gap, the authors propose the following ideas:

1. Valuing information on losses as a public good.
2. Empowering the European Environment Agency and EIOPA to provide more comprehensive monitoring and mapping of risks.
3. Putting in place a single and unified data collection for pre- and post-disaster damages and losses as well as a transparent reporting mechanism.
4. Strengthening building codes through local mandatory standards and supporting the use of insurers' data for zoning and construction.
5. Bolstering the efforts to develop EU metrics to evaluate the impacts of adaptation efforts.
6. Fostering structured discussion forums on bottom-up and co-designed adaptation options.

The protection gap could be narrowed by:

1. Making use of the NASs and NAPs to increase awareness on climate risk management among stakeholders.
2. Guiding the introduction of smart subsidies, tax deductions or insurance vouchers to the poor and vulnerable.
3. Encouraging member states to include investment opportunities to reduce climate change-related risks in their budgets and planning.
4. Creating an EU-wide weather and climate risk pool or voluntary regional risk pool.

To fight against the grey infrastructure bias, the authors recommend:

1. Evaluating infrastructure investments based on their climate resilience, mitigation potential and embedded carbon.
2. Exploring a BBB requirement that does justice to the undervalued benefits of green infrastructure.
3. Considering green infrastructure's co-benefits when assessing adaptation options.

Lastly, the EU should address the funding and investment gap that hampers the adaptation agenda by:

1. Integrating DRR and climate resilience efforts into insurance, investment risk models, capital requirements and rating agencies, all under the umbrella of the action plan on sustainable finance.

2. Agreeing on and consistently applying a climate risk proofing methodology across every MFF budget chapter.
3. Establishing clear tracking methodologies and effective *ex ante* conditionalities for climate-related EU spending.
4. Linking the disbursement of the EU budget to the adoption and implementation of NASs and NAPs.

The European Commission is in the driver's seat. As the work on the Green Deal and achieving a climate-neutral EU continues, it is paramount that the new EU Adaptation Strategy addresses the urgency of the situation, the role of risk-prevention and the need for adaptation efforts to contribute to the mitigation goals, and that it ambitiously steers member states to improve collaboration. If the von der Leyen Commission succeeds in setting up an

agenda for action, inciting member states to collaborate and mobilise resources towards the building of a climate-resilient Europe, multiple benefits can be expected. The message is clear: adaptation is not an option, but a socially, environmentally and economically sound must.

If the von der Leyen Commission succeeds in setting up an agenda for action, inciting member states to collaborate and mobilise resources towards the building of a climate-resilient Europe, multiple benefits can be expected.

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