

D2.4 Lessons learnt and insights for the funding of climate resilience in national and regional adaptation plans from the European Budget

SEPTEMBER 2023

www.regilience.eu



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement no. 101036560.



Project Acronym	REGILIENCE
Programme	Horizon2020
Type of Action	Coordination and Support Action
Grant Agreement number	101036560
Start day	01/11/2021
Duration	48 months
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Document information

Document Factsheet	
Full title	Deliverable 2.4 Lessons learnt and insights for the funding of climate resilience in national and regional adaptation plans from the European Budget
Work Package	WP2
Task(s)	T2.3 Opportunities for financing innovation packages through EU, national and third-party financing
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Date	September 2023

Document dissemination Level

Dissemination Level	
X	PU - Public
	PP - Restricted to other programme participants (including the EC)
	RE - Restricted to a group specified by the consortium (including the EC)
	CO - Confidential, only for members of the consortium (including the EC)



Document history

Version	Date	Main modification	Entity
V0.1	20.04.2023	Draft version distributed for quality review	FT, IEECP
V0.2	01.08.2023	Internal Quality review (after adding 'Regional promising practices' section and performing validation calls with regional experts)	ICLEI, IEECP, FT
V0.3	21.09.2023	Review by the project coordinators after second round of revision by IEECP	FT, IEECP

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How to cite this report: REGILIENCE (2023). Lessons learnt and insights for the funding of climate resilience in national and regional adaptation plans from the European Budget. Weblink



Project partners



About

REGILIENCE is committed to supporting the European Green Deal and the EU Mission “Adaptation to Climate Change” by fostering the adoption of regional climate resilience development pathways.

The project develops, compiles, shares, and promotes tools and scientific knowledge to support European regions in identifying and addressing their climate-related risks. We work closely with sister projects, such as ARSINOE, IMPETUS, and TransformAr to enhance the capacity of 7 focus regions to tackle the unavoidable impacts of climate change.

The project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 101036560.

Gender Statement

The need for gender mainstreaming arises from persistent inequalities in power distribution and access to services and opportunities between people of different sex and/or gender identities. As demonstrated by literature and advocated in the European and international arena, this influences the understanding and perception of climate change dynamics and effects. Women and men, but also people in the LGBTQI+ community, are differently affected by the accelerated change of climate. Only by taking into consideration their diverse visions can scientific research reach meaningful and universal conclusions that properly inform climate action.

For these reasons, the REGILIENCE consortium is committed to including gender and intersectionality as a transversal aspect in the project’s activities. In line with EU guidelines and objectives, all partners – including the authors of this deliverable – recognise the importance of advancing gender analysis and sex-disaggregated data collection in the development of scientific research. Therefore, they commit to paying particular attention to including, monitoring and periodically evaluating the participation of different genders in all activities developed within the project, including workshops, webinars, and events but also surveys, interviews, and research, in general. While applying a non-binary approach to data collection and promoting the participation of all genders in the activities, the partners will periodically reflect and inform about the



limitations of their approach. Through an iterative learning process, they commit to plan and implement strategies that maximise the inclusion of more and more intersectional perspectives in their activities.

Specifically in this report, the authors considered the balance of gender by monitoring the interviewees and the data collected will be carefully used in the conclusion and final consideration.



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Abbreviations

CCA	Climate Change Adaptation
DNSH	Do-Not-Significant-Harm
EC	European Commission
FAP	Federal Action Plan
FCiencias.ID	Croatia and Faculdade de Ciências de Universidade de Lisboa
GDP	Gross Domestic Product
GVA	Generalitat Valenciana
ICLEI	International Council for Local Environmental Initiatives (ICLEI)
MS	Member State
MtCO ₂ eq	Million tons of carbon dioxide equivalent
NAF	National Adaptation Framework
NAP	National Adaptation Plan
NAS	National Adaptation Strategy
NBS	Nature-based solutions
NECP	National energy and climate plan
(N)RRP	(National) Recovery and Resilience Plan
PON	Programma Operativo Nazionale Cultura e Sviluppo
RAM	Autonomous Region of Madeira
REGEA	North-West Croatia Regional Energy and Climate Agency
RDFCM	Regional Development Fund of Central Macedonia
RRF	Recovery and Resilience Facility
UNFCCC	United Nations Framework Convention on Climate Change
UIA	Urban Innovative Actions



Executive Summary

The Recovery and Resilience Facility (RRF) is the centrepiece of a wider EU's plan to recover from the economic and social damages due to Covid-19 pandemic crisis. In the framework of RRF, Member States (MS) submitted National Recovery and Resilience Plans (NRRP), outlining the reforms and investments they will implement by end-2026, with clear milestones and targets, including for the Green Transition category, featuring as of March 2023 an overall 6% of RRF funds allocated to '**climate change adaptation**'.

The core aim of this deliverable is twofold: i) analyse **if and how** the NRRP developed by European MS **include key measures dedicated to climate adaptation**, in **alignment** with their existing National Adaptation Strategies and National Adaptation Plans (NAS/NAP); and ii) evaluate whether national NRRP **sufficiently allocate investments** to climate adaptation to match their NAS/NAP. These aims are further detailed in the methodology section, alongside the definition of sufficient investments, utilised for the analysis within the scope of this report. The comparative analysis included the review of 158 policy documents. The preliminary conclusions from the above were additionally corroborated during validation calls with regional experts from 4 countries and 5 regions. In doing so, **regional promising practices** are presented. This report **major findings** are as follows:

- out of 27 MS, 15 were found – to the best of this analysis – to allocate RRF fundings to climate adaptation measures (Belgium, Croatia, Cyprus, Czechia, France, Greece, Italy, Latvia, Lithuania, the Netherlands, Portugal, Romania, Slovakia, Slovenia, and Spain);
- as apparent in Figure 10, for many MS, the investment in adaptation measures laid out in the NRRP is significantly less than the investment needs described in the national NAS/NAP, with exceptions. In fact, the study reveals that (as of data gather till March 2023) Greece, Portugal, and Slovenia allot a bigger amount of RRF funds compared to their NAS/NAP;
- climate mitigation measures still constitute a significant share of the total NRRP funds allocated to the Green Transition Pillar, specifically in Denmark, Estonia, Germany, Ireland, Poland. This means that more EU countries other than the 15 identified above may have allocated RRF funds to adaptation but in synergy with existing mitigation measures and without a clear break-down of expenditures between adaptation and mitigation;
- 5 cases of promising practices were identified in 3 regions participating to the REGILIENCE project as summarised in Table 3.

Overall, the findings seem to imply that: i) there is a **lack of policy consistency** when budgeting for/prioritising adaptation actions in NRRF, which in several cases are not aligned with the priorities and actions drafted in their pre-existing NAS/NAP documents. These results can vary, since some countries that do not seem to allocate funds to adaptation measures may be doing so under their national mitigation packages, embedding synergies between adaptation and mitigation in their measures; and ii) the **information** drafted in NAS/NAP in relation to each country's climate hazards would urgently **need to be updated** to better reflect most recent hazards, risks and losses. This would provide a better alignment with the present-day, concrete high vulnerability in extreme climate events.

Some **pending challenges** were identified, including the role of national government in funds disbursement to regions, management of resources (project-based vs long-term vision), monitoring and evaluation on the progress on budget expenditures, alignment of NRRP with NAS/NAP on objectives and budgeted support at different governance levels. It is important to highlight that the analysis is not reflecting the actual implementation stage, but it aims at summarising what is included in the plans and strategies, which are drafted by MS. In this regard, **recommendations** were drafted in response, including on policy coherence when drafting strategies and plans, governance of monitoring and evaluation, the role of national government in redistributing funds, and the RRF structure, which must detail the financial resources foreseen to be necessary for the implementation of the proposed adaptation measures and actions. Further, the reporting by MS should include an update of the reached progress in the implementation of key measures, including the detailed breakdown of mitigation and adaptation actions.



1. Introduction: Recovery and Resilience Facility and National Recovery and Resilience Plans

The following chapter describes the RRF and its application in National Recovery and Resilience Plans (NRRP) designed by each MS. The reports body includes general comments and observations made while analysing each NRRP; the summary of each NRRP can be found in Annex I at page 56.

1.1 The Recovery and Resilience Facility

The RRF was established in February 2021 by the Regulation (EU) 2021/241 to promote cohesion by mitigating the social and economic fallout of the COVID-19 pandemic and by better preparing the Union for future challenges, notably by supporting the green and digital transitions. At the time of writing, one year and a half after the RRF establishment, the implementation of the Facility is well on track, progressing quickly according to the timeline of reforms and investments set by MS. The RRF is a temporary mechanism to allow the European Commission (EC) to raise funds to support all MS to address their social and economic challenges and mitigate impacts of the coronavirus pandemic. These reforms and investments proposed by each MS are aligned with the EU's priorities under the European Semester framework of social and economic policy coordination. The EC has successfully raised €723,8 billion in grants and loans for EU countries to invest, create jobs, and build a green and digital future for all. To date, €100 billion in RRF funds have already been distributed, €56,6 billion in pre-financing and €43 billion on payments, and the implementation of the NRRP is producing tangible results on the ground, both for investments and reforms, across the six pillars covered by the Facility (see section below).

The process from plans to implementation is performance-based, meaning that each MS submits their NRRP to the EC along with the reforms and investments to be implemented by 2026. Each plan should address challenges identified in the European Union's framework on country specific recommendations from 2019 to 2022. Then the EC assesses the plans' fulfilment of agreed milestones and targets in achieving reforms and investments proposed in the plans. After the assessment, the Council approves NRRP per measure and finally, the Commission pays up to 13% of the support to start the implementation.

In terms of monitoring, the EC Recovery and Resilience Scoreboard¹ provides an overview of the implementation on the RRF and the progress of NRRP. This aims to foster MS in using the funds to invest in a more sustainable, resilient, and greener transition by 2050. The progress will be monitored by listing the milestones and targets that have been satisfactory fulfilled. The first investment cycle started in February 2020 and will run until 31 December 2026. Financing made available by the EU is borrowed on capital markets and distributed amongst MS. Other monitoring bodies exist, among all, the 'Recovery and Resilience Facility Monitor' by the Centre for European Policy Studies² and the 'Green Recovery Tracker'³, which are focused on the fiscal and economic implications of the RRF package.

1.2 The six pillars of the Recovery and Resilience Plans

The six policy pillars reflect priority policy areas of European relevance and the overall scope of the RRF, and are distributed as follows:

- Green transition
- Digital transformation
- Smart sustainable and inclusive growth, including economic cohesion, jobs, productivity, competitiveness, research, development and innovation, and a well-functioning internal market with strong SMEs
- Social and territorial cohesion

¹ https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/index.html

² <https://rrfmonitor-ceps.eu/homepage>

³ <https://www.greenrecoverytracker.org>



- Health and economic, social and institutional resilience, including with a view of increasing crisis reaction capacity and crisis preparedness
- Policies for the next generation, children and youth, including education and skill

To be consistent with the multifaceted nature of the individual measures, where a measure is often linked to several pillars, the reporting is based on the assignment of each measure (or sub-measure) to two policy pillars such as primary and secondary pillar, as displayed in Figure 1, which provides an overview of the estimated expenditure per policy pillar based on 25 plans adopted by the Council. Green transition, smart sustainable and inclusive growth, as well as social and territorial cohesion are on top of the spending priorities (with a contribution rate between approximately 40 to 51%) for the examined MS. Expenditures related to digital transformation measures amount to 29%, whereas 16% to policies related to health, economic, social, and institutional resilience also reflect the responses to the COVID pandemic. Finally, over 12% of expenditure contributes to policies for next generations, including education and skills.

The measures displayed in Figure 1 are based on the total contribution to all pillars of the NRRP. The biggest share of the fund has been allocated to *Green Transition*, to which over 38% of measures relate as their primary pillar, followed by 23% of measures primarily allocated to *Digital Transformation* pillar. However, second pillar attribution does also matter, as show the allocation to *Smart, Sustainable and Inclusive Growth* and *Social and Territorial Cohesion* are accounted up to 35% in the secondary pillar. All things considered, each measure of the six pillars contributes towards two policy areas, therefore allocating 100% to primary and 100% to secondary. As a result, the total contribution to all pillars displayed on this chart amounts to 200% of the estimated cost of approved NRRP of the RRF funds allocated to MS.

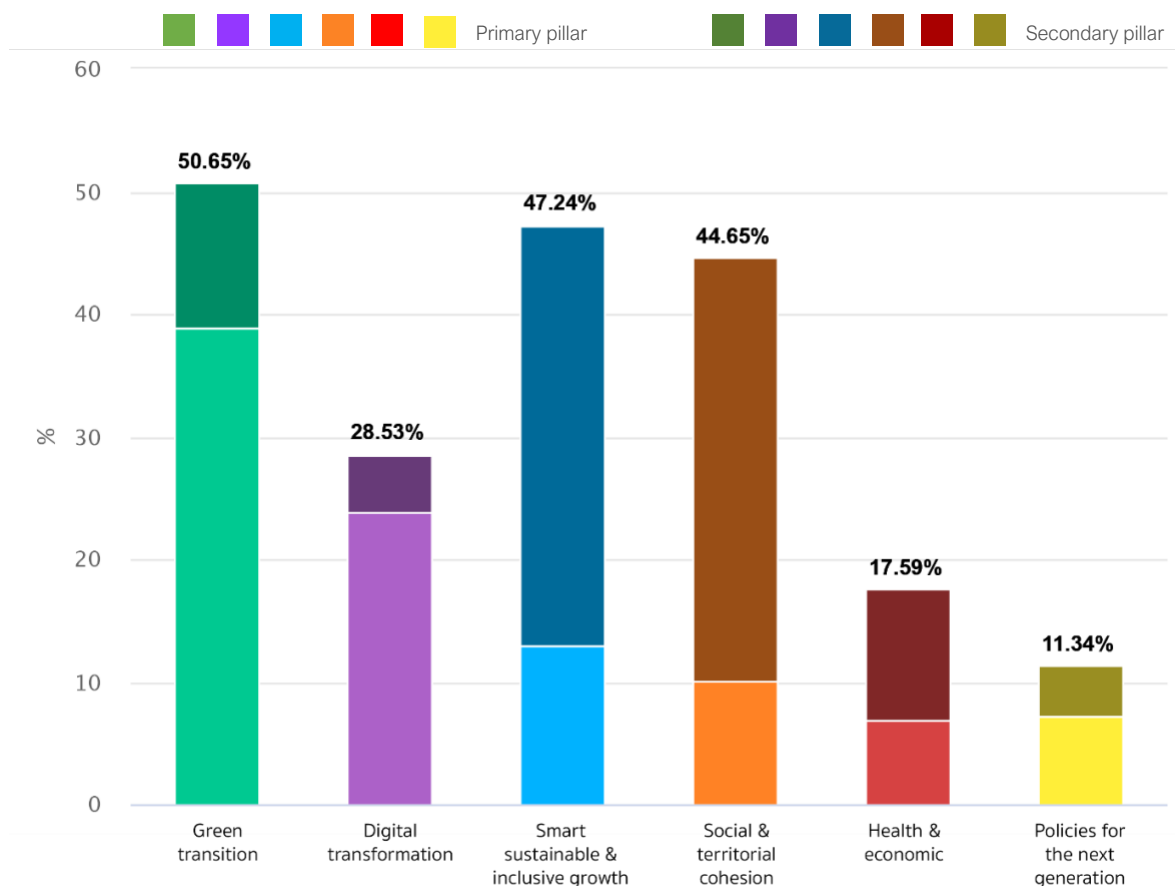


Figure 1: Share of NRRP estimated expenditure per policy pillar by 2050

Source: European Commission, 2022

Social and Territorial Cohesion has been one of the aims of the RRF to mitigate the social impact due to shocks and crises. MS have endorsed many reforms and investments with social objectives that share expenditure in employment and skills; education and childcare; health and long-term care; and social



policies. Besides that, MS have successfully endorsed 397 measures with a focus on children and youth and 129 measures on gender equality in the NRRP.

In addition, the scoreboard displays the status of each NRRP as well as the progress of the disbursement of the financial contributions and expenditure of the six pillars. For instance, Figure 2 shows the disbursement under the RFF related to the two pillars of Green Transition and Digital Transformation. Based on the EC Scoreboard, the amounts were calculated by linking the milestones and targets covered by a given disbursement to the pillar tagging (primary and secondary) of their respective measures.

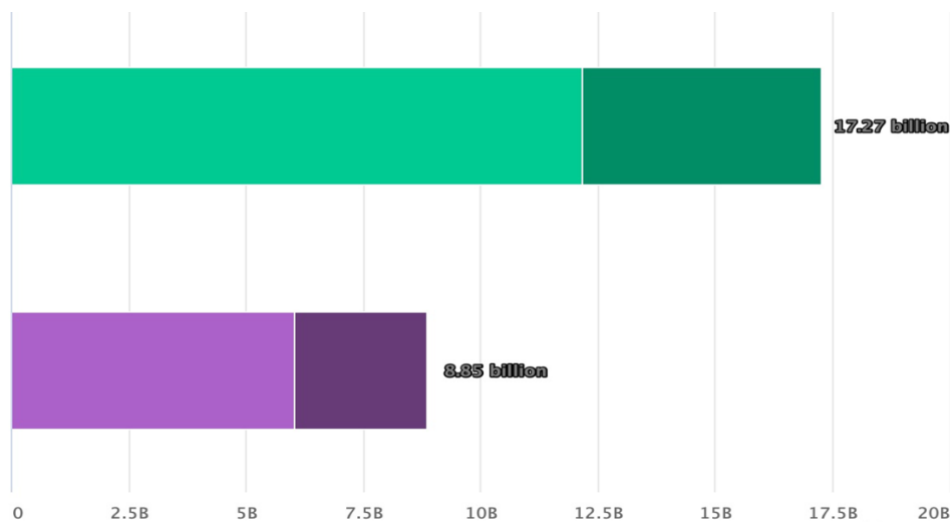


Figure 2: RRF disbursement per pillar based on targets for climate and digital sectors

Source: European Commission, 2023⁴

The next section focuses on the NRRP of the 27 MS, which have been endorsed by the EC and the European Council. Reforms and investments included in the NRRP contribute to addressing the climate change challenges that are aimed to support environmental objectives across the EU.

1.3 National Recovery and Resilience Plans

MS' NRRPs are based on the analyses from the European Commission's Staff Working Documents accompanying the Proposal for a Council Implementing Decision on the approval of the assessment of the NRRP in each country. To avoid repetitive referencing for NRRP and NAS/NAP, the references and links will be directly available in the

⁴ https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/disbursements.html?lang=en



References

section. The allocation of grants to MS is determined by criteria set by the EU Commission. It will consider these factors for 70% of the total €312,5 billion available in grants:

- Member State's population.
- the inverse of its GDP per capita.
- its average unemployment rate over the period 2015-2019 compared to the EU average.

For the remaining 30%, instead of the unemployment rate, the observed loss in real GDP over 2020 and the observed cumulative loss in real GDP over the period 2020-2021 will be considered. While Annex I of the Regulation provides an indicative amount for the 30% in current prices based on the Autumn forecast⁵, this was only finalised when Eurostat presents the final data in June 2022. Each MS can also request a loan worth up to 6.8% of their 2019 GNI as part of the submission of their Recovery and Resilience Plan. Figure 3 below displays an overview of the allocated NRRP funds in the 27 Member States.

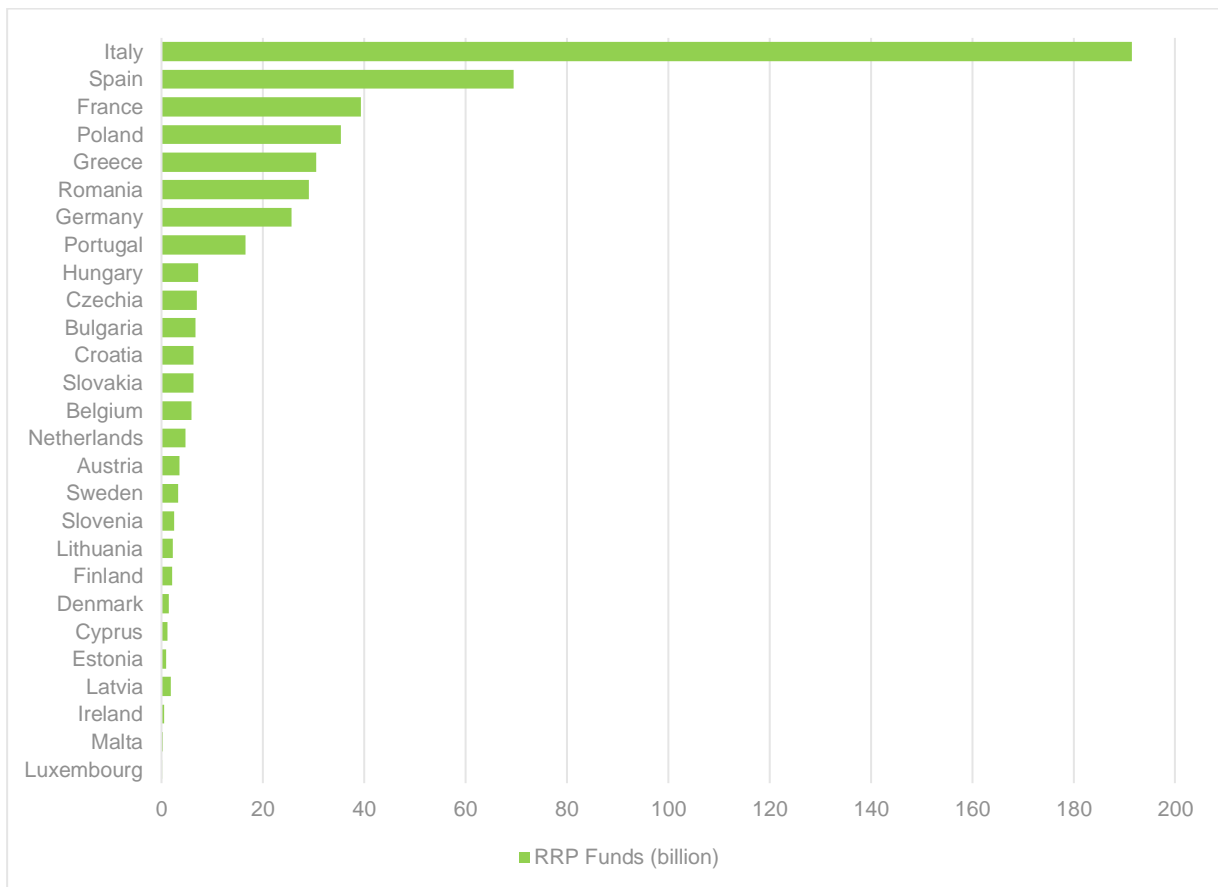


Figure 3. Allocation of NRRP Funds per MS as of January 2023

Based on the above results, Italy has a noticeable higher NRRP funds allocation (€191,5), followed by Spain (€69,5 billion), and France (€39,4 billion). The higher allocation of NRRP to Italy is dedicated to the country’s pandemic recovery, being hit the hardest both economically and in its health system (i.e. pandemic death toll). The amount (loans and grants) was granted by the Union’s executive Commission in June 2021⁶.

⁵ https://ec.europa.eu/commission/presscorner/detail/en/ip_22_6782

⁶ <https://www.mef.gov.it/en/focus/The-National-Recovery-and-Resilience-Plan-NRRP/>

2. Assessment of National Adaptation Strategies and National Adaptation Plans

2.1 The National Adaptation Strategies and National Adaptation Plans

This report considered two main National Adaptation Policies: 1) National Adaptation Strategy (NAS) and 2) National Adaptation Plan (NAP)⁷. The drafting of these documents supports countries in medium- to long-term planning for climate resilience, by identifying and addressing adaptation priorities, informed by the latest scientific evidence. Reporting on future climate changes and adaptation needs is a critical step to integrating countries' climate adaptation measures into developing, planning, budgeting, and decision-making on lower governance levels, to foster implementation of adaptation actions. The European countries analysed within the scope of this report on their National Adaptation Actions to the EC to make the information accessible to the wider European public. According to the United Nations Framework Convention on Climate Change⁸ (UNFCCC), there are two objectives of NAP: i) to reduce vulnerability to the impacts of climate change, by building adaptive capacity and resilience, and ii) to facilitate the integration of climate change adaptation, in a coherent manner, into relevant new and existing policies, programmes and activities, in particular development planning processes and strategies, within all relevant sectors and at different levels, as appropriate.

To date, 27 EU MS have adopted a NAS and 22 have developed a NAP. There has been an increase in the number of countries that have adopted NAS⁹. However, information on the policies' progress in boosting resilience and decreasing vulnerability is limited. Figure 4 below shows that the climate change impact and vulnerability assessments are organised at country level, reflecting data as of March 2023. As a result, we can observe different progress in developing and adopting adaptation strategies and/or plans from one country to another:

- **Countries where NAS is adopted:** Italy, Malta, Sweden, Poland, Slovenia, and Turkey.
- **Countries where NAP is adopted:** Latvia.
- **Countries where SAP is adopted:** Sweden, Finland, Ireland, Spain, Portugal, Italy, and Bulgaria.
- **Countries where both NAS and NAP are adopted:** Finland, Estonia, Lithuania, Denmark, Ireland, the Netherlands, Germany, Belgium, France, Luxembourg, Spain, Portugal, Czechia, Austria, Slovakia, Hungary, Croatia, Romania, Bulgaria, Greece, and Cyprus.

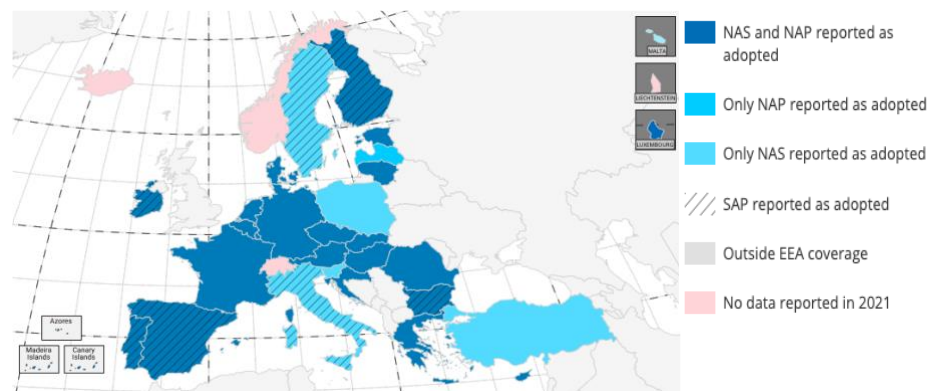


Figure 4: Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action and updates by the EEA member countries

Source: <https://climate-adapt.eea.europa.eu/countries-regions/countries>

⁷ <https://unfccc.int/topics/adaptation-and-resilience/workstreams/national-adaptation-plans>. NAS outlines the country's overarching direction to achieve resilience to the impact of climate change, whereas NAP delivers specific measures and actions towards achieving the medium- to -long-term objectives. The NAP process was established in 2010 to support European countries in integrating adaptation as part of core development decision-making. Additionally, the NAP includes analyses of current challenges and predicts future climate change and its vulnerability impacts.

⁸ <https://unfccc.int/topics/resilience/workstreams/national-adaptation-plans/overview>

⁹ <https://www.eea.europa.eu/airs/2018/environment-and-health/climate-change-adaptation-strategies>



3. Alignment of NRRP with NAS/NAP

The first section of this chapter establishes the methodology to carry out the alignment of NAS/NAP and NRRP. Results are presented in the following sections, whereas section 3.2.6 is dedicated to the regional promising practices and allocation of funds from NRRP.

3.1 Methodology

The methodology consists of a two-steps approach policy review:

1) Carry out an analysis of **if and how** NRRP have adopted objectives, actions and/or measures from their respective country's adaptation strategies and/or plans (alignment). The assessment framework consists of three general categories: i) number of inhabitants/ country (in million), ii) climate hazards/key topics of measures, and iii) adaptation priorities. After the assessment process, the content was reviewed by a different reviewer which then revised according to the remarks and proceeded with the study conclusions and recommendations. The review aimed to provide a better understanding of how many NRRP have made progress in addressing climate change adaptation, based on the inputs from existing NAS/NAP.

2) Analyse if NRRP **sufficiently allocate investments** to climate adaptation and **is in line with** already adopted NAS and/or NAP. The concept of 'sufficient allocation of funds' is defined as the amount earmarked in each country's NRRP for adaptation measures that equals the investment as described in NAS/NAP.

Between September 2022 and March 2023, national strategies, plans and policy documents (briefings, summaries, presentations) have been collected for each of the 27 MS NRRP profile pages via the EC's RRF page¹⁰ and more official government websites on national climate adaptation plans and strategies. More information on population size was taken from the World Bank datasets¹¹. Additional results from other policy studies were considered, for instance, the Recovery Watch report published in January 2023 on assessing the potential systemic transformation of Member States' energy and mobility sectors through their NRRP¹². The scope of the content analysis included a total of **158 policy documents across 27 countries**. The review of the Climate-ADAPT database has been one of the initial steps in creating the inventory of policy documents within the scope of this analysis¹³. The following list reports the complete set of additional steps taken to carry out the report objectives, as well as the comparative analysis of the NRRP. The analysis was carried out based on the following steps to align NRRP to NAS/NAP:

1. **Describe** the setup of the RRF and NRRP for 27 MS.
2. **Assess** the National Adaptation Strategies (NAS) and Plans (NAP) for 27 MS.
3. **Identify** the number of inhabitants (World Bank data), climate hazard, and adaptation priorities (Climate-ADAPT) of each of the 27 MS.
4. **Compare** the NRRP and NAS/NAP with several criteria such as objectives, adaptation actions, available funds, share percentage of the total allocation to Green Transition, and share percentage of allocation to adaptation measures.
5. **Analyse** 15 NRRP documents in-depth, which were found to include adaptation actions in their plans (EU Scoreboard) based on their NAS/NAP, by:
 - a. **Illustrating** the allocation of NRRP and NAS/NAP funds, first, looking at the overall share (%) of NRRP funds per MS allocated to 'climate change adaptation' policy area, and then, looking at the share of funds allocated to adaptation measures per million inhabitants in each MS (refer to Figure 8, Figure 9 and Figure 10 specifically).
 - b. **Considering** a list of promising practices on the general allocation of NRRP funds to climate adaptation measures, which are related to NAS/NAP measures (previously analysed).
6. **Describe** pending challenges in the funding of NRRP key adaptation measures.
7. **Summarise** recommendations and lessons learned for the insights of the alignment of NRRP with NAS/NAP on climate key adaptation measures.

¹⁰ https://commission.europa.eu/business-economy-euro/economic-recovery/recovery-and-resilience-facility_en#national-recovery-and-resilience-plans

¹¹ <https://databank.worldbank.org/source/population-estimates-and-projections>

¹² <https://feps-europe.eu/wp-content/uploads/2022/12/Systemic-Transformation-or-status-quo-PS-RW.pdf>

¹³ <https://climate-adapt.eea.europa.eu/en/countries-regions/countries>



The analysis was performed in English and other EU languages (i.e. Italian, Spanish, French), with translation from Czech, Greek, Hungarian and Lithuanian (see Table 1 below). A list of translated keywords was adopted to facilitate the review of documents in other languages within the EU: “climate”, “adaptation”, “climate adaptation”, and “adaptation measures”. This served to mitigate language barriers to a degree through the basic coding methodology.

Country	Key words	NAS/NAP English version	No. of policy documents
Austria	Anpassung, Klima, Klimaanpassung, Maße	Y	6
Belgium	adaptation, climat, adaptation climatique, dimensions	Y	6
Bulgaria	адаптация, Климат, Адаптация към климата, мерки	Y	5
Croatia	prilagodba, Klima, Prilagodba klimatskim uvjetima, mjere	Y	5
Cyprus	προσαρμογή, Κλίμα, Κλιματική προσαρμογή, μέτρα	Y	6
Czech Republic	přizpůsobování, Podnebí, Přizpůsobení klimatu, opatření	N	6
Denmark	tilpasning, Klima, Klimatilpasning, foranstaltninger	Y	6
Estonia	kohanemine, Kliima, Kliimaga kohanemine, meetmed	Y	5
Finland	sopeutumista, Ilmasto, Sopeutuminen ilmastoon, toimenpiteet	Y	5
France	adaptation, climat, adaptation climatique, dimensions	N	6
Germany	Anpassung, Klima, Klimaanpassung, Maße	Y	5
Greece	προσαρμογή, Κλίμα, Κλιματική προσαρμογή, μέτρα	N	6
Hungary	alkalmazkodás, Éghajlat, Az éghajlathoz való alkalmazkodás, intézkedéseket	N	4
Ireland	adaptation, climate, climate adaptation, dimensions	Y	7
Italy	adattamento, Clima, Adattamento climatico, (le) misure	N	8
Latvia	pielāgošanās, Klimats, Pielāgošanās klimatam, pasākumiem	Y	6
Lithuania	prisitaikymas, Klimatas, Klimato prisitaikymas, priemonės	N	7
Luxembourg	adaptatioun, Klima, Klimaadaptatioun, Dimensiounen	N	5
Malta	adattament, klima, adattament klima, dimensjonijiet	Y	5
Netherlands	adaptatie, klimaat, klimaatadaptatie, dimensies	Y	5
Poland	dostosowanie, Klimat, Adaptacja klimatyczna, środki	Y	5
Portugal	Adaptação, clima, adaptação climática, medidas	N	6



Romania	adaptare, Climat, Adaptarea la climă, măsuri	Y	6
Slovakia	prispôsobenie, Klíma, Adaptácia na klímu, Opatrenia	Y	6
Slovenia	prilagajanje, Podnebje, Prilagoditev podnebjju, ukrepe	Y	6
Spain	adaptación, Clima, Adaptación climática, medidas	Y	10
Sweden	anpassning, Klimat, Klimatanpassning, åtgärder	Y	5
Total number of policy documents researched and analysed outside the Climate-ADAPT Countries Profiles database			158

Table 1. List of countries, key words per NRRP and NAS/NAP document, with number of policy documents analysed within the scope of the report

In chapter 3.2.6, results of **specific regional cases in 4 countries** are presented, displaying **promising practices**. The cases are selected from the 7 focus regions within the REGIANCE project: Adriatic Croatia (Croatia), Central Macedonia (Greece), the Autonomous Region of Madeira (Portugal), and the Valencian Community as well as the Region of Murcia (Spain). Validation calls and consultations have been performed with regional experts for each selected region to corroborate previous findings and identify new adaptation measures. The online validation calls have been performed between June 2023 and July 2023, reaching out to 4 regional experts, and to 1 expert via email communication (by sending our questions in writing to REGEA as intermediate between IEECP and the expert). All experts were asked questions on regional actions, interventions and measures specifically related to the new NRRP key measures of climate adaptation.

Notably, because of the autonomous legislative nature of some regions, not only have the authors reviewed and analysed NRRP, but also regional-level adaptation measures included in additional regional documents. Finally, further resources on government websites (in the original language), regional policy documents and briefs have been analysed with the support of REGIANCE consortium partners International Council for Local Environmental Initiatives (ICLEI) for Spain, FEDARENE for Greece, North-West Croatia Regional Energy and Climate Agency (REGEA) for Croatia and Faculdade de Ciências de Universidade de Lisboa (FCiências.ID) for Portugal.

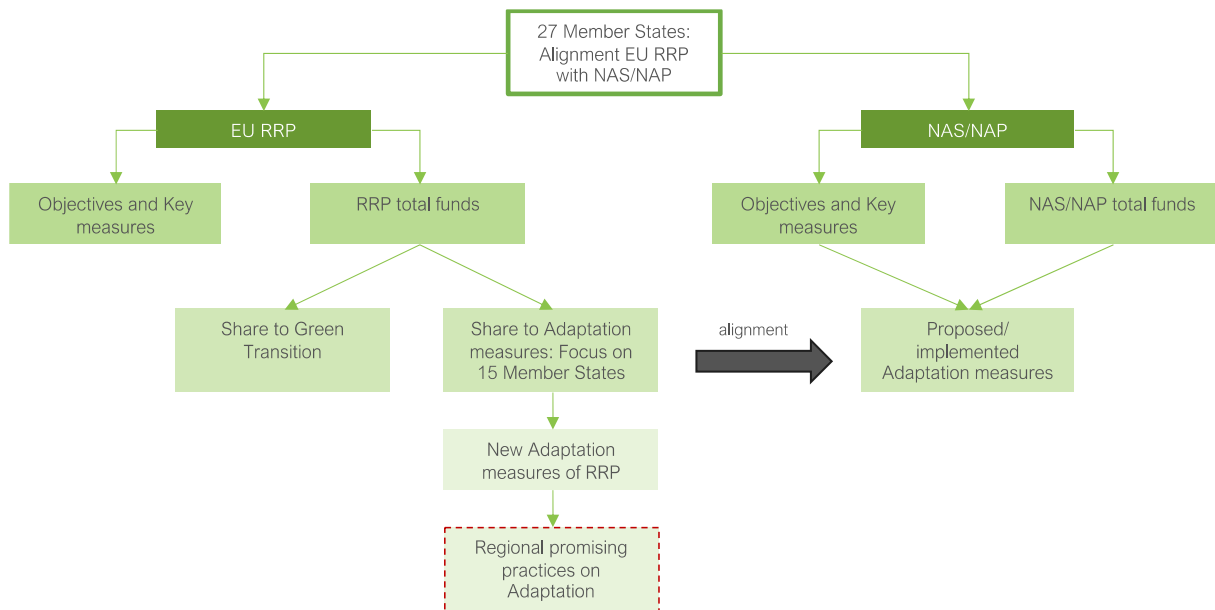


Figure 5: Methodological approach and key elements in the NRRP and NAS/NAP alignment analysis

3.2 Alignment of NRRP with NAS/NAP



According to the EU Regulation 2018/1999 of the European Parliament and of the Council, several climate hazards and existing pressure have been identified and classified into key affected sectors.¹⁴ These include temperature, wind, water, and solid-mass related hazards. Similarly with vulnerability, adaptive capacity and the risk of potential future impacts can be identified and measured quantitatively using scales and scientific methodologies.

This chapter analyses NRRP in comparison to NAS/NAP to gain a better understanding of **whether adaptation needs are integrated in how MS invest their resources and efficiently track their progress to plan for the future.**

3.2.1 National climate hazards and key topics

The climate hazards and key topics of adaptation measures have been summarised in seven clusters (see Figure 6 for an overview of different clusters). It is important to highlight that the analysis is not reflecting the reality of the plans implementation stage, but it aims at **summarising what is included in the plans and strategies**, which are drafted by MS. Each MS has been analysed according to whether they include or exclude references to measures and actions for each cluster. For example, observed climate hazards in Portugal and Slovenia show that both countries are exposed to almost all climate hazards, such as hydrologic variability (water scarcity, water quality deterioration, sea level rise, and floods), temperature variability, precipitation patterns variability, tornado, cyclone, storms, changing wind patterns, wildfire, and soil degradation. In comparison with Germany and Ireland which have low-moderate vulnerability in hydrological variability and temperature variability due to their mitigation measures of the impacts.

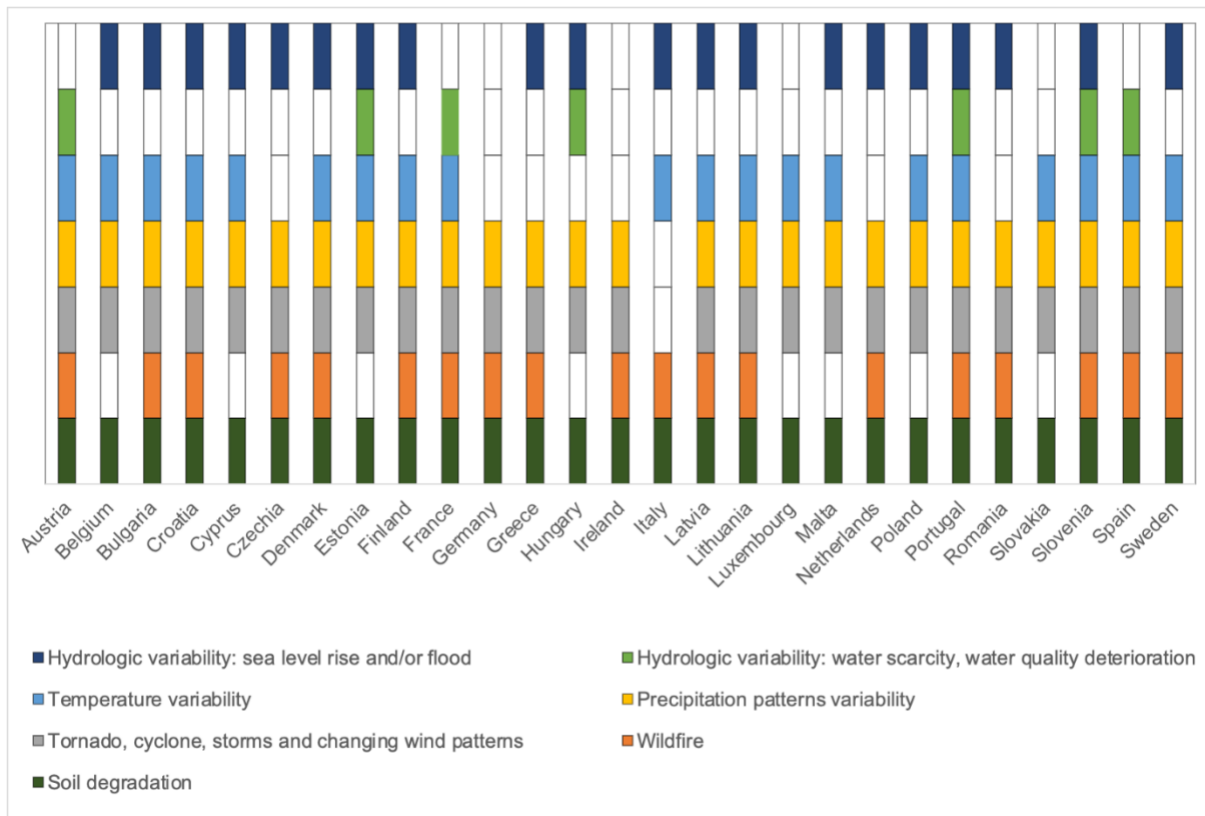


Figure 6: Breakdown of the observed climate hazards per country as reflected in NAS/NAP (summarised in 7 clusters)

The countries that have identified 4 clusters (out of 7) are Germany, Ireland, Italy, Luxembourg and Slovakia. It is important to highlight that the data illustrated above is reflective of the information drafted by MS, and it is thus not representative of most recent events. As a matter of fact, more recent news reveals extreme

¹⁴ <https://eur-lex.europa.eu/legal-content/EN/LSU/?uri=CELEX:32018R1999>



climate events such as Cyclone Circe in summer 2023, affecting Croatia, Italy, Malta, Portugal and Slovenia¹⁵. The full picture would suggest to, even urge, countries like Italy to update their NAS/NAP and reflect recent climate hazards (and losses). This would provide a better alignment with the present-day, concrete high vulnerability in precipitation patterns variability, tornado, cyclone, storms, and changing wind patterns.

Furthermore, Croatia and Finland are excluded from the soil degradation hazard which causes acidification, climate change, change of biodiversity, and water stress. In western and northern Europe, urbanisation, infrastructural development, and erosion are the main causes of soil deterioration (in the Mediterranean region). One-third of Europe currently faces a high to extremely high danger of water erosion, which is mostly a problem in southern, central, and the Caucasus regions¹⁶.

3.2.2 Alignment of NRRP with NAS/NAP per policy area

It should be emphasised based on the findings of our policy assessment, that the NRRPs only focus on the six pillars and do not consider the complete country's investment in other policy areas as defined by the European Commission. In several cases, the NRRP can be considered as an additional contribution to a larger set of national plans set out by each MS to support their pandemic recovery. Nonetheless, the NRRP provides an indication of a MS's adaptation objectives and priorities.

Based on the RFF annual report¹⁷, a few milestones and targets in implementing reforms and investments have been fulfilled by **15 Member States** to date, namely **Belgium, Croatia, Czechia, Cyprus, France, Greece, Italy, Latvia, Lithuania, the Netherlands, Portugal, Romania, Slovakia, Slovenia, and Spain**. Based on the information provided on the Scoreboard¹⁸, Hungary has no data available as of now, and is thus excluded from the analysis. Figure 7 provides a breakdown of the share percentage of NRRP's funds allocated to the climate change adaptation policy area in the 15 MS.

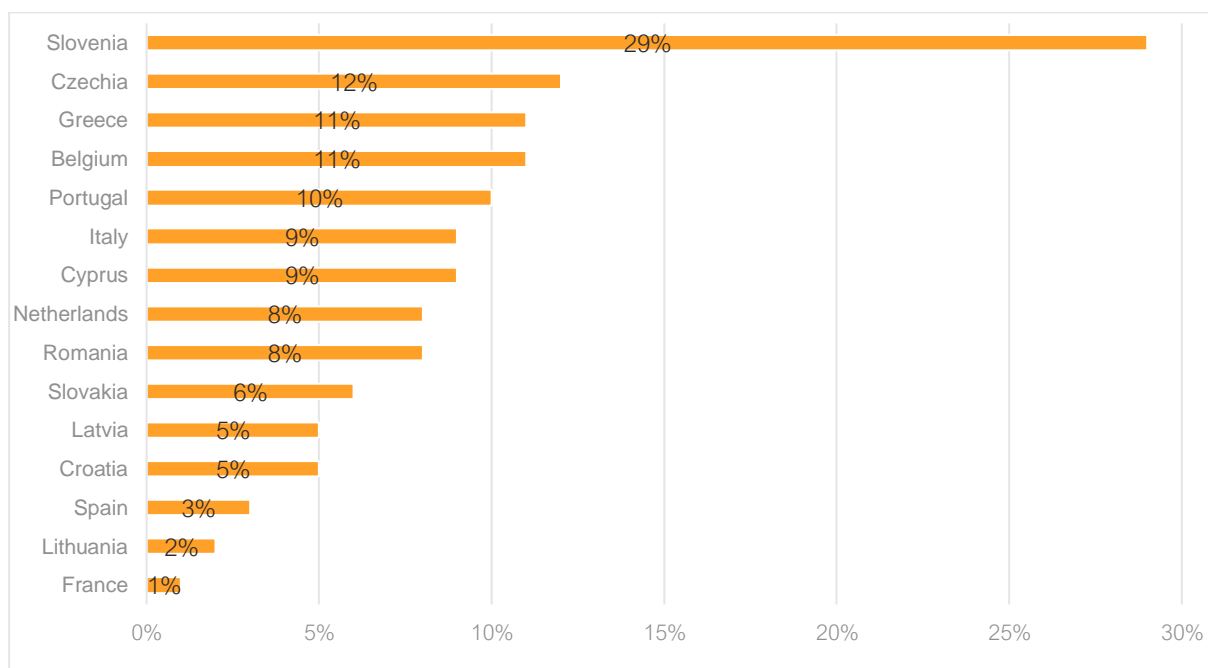


Figure 7: Share (%) of NRRP funds/country allocated to 'Climate change adaptation' policy area

Source: NRRP Scoreboard

The RRF provides a total of €723,8 billion in loans (€385,8 billion) and grants (€338 billion) to implement reforms and investments that are in line with the EU's priorities and better prepared for future shocks. Based on Figure 7, only **15 MS include adaptation actions** in their NRRP, for a total of €34,07 billion funds allocated

¹⁵ <https://bnn.network/breaking-news/climate-environment/italy-braces-for-three-days-of-extreme-weather-as-cyclone-circe-approaches/>

¹⁶ <https://www.eea.europa.eu/publications/92-9157-202-0/page306.html>

¹⁷ https://commission.europa.eu/system/files/2022-03/com_2022_75_1_en.pdf

¹⁸ https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/country_overview.html?lang=en



to these measures, that is **21.24%** of the total of EU disbursement of grants and loans under the RRF, see Figure 8.

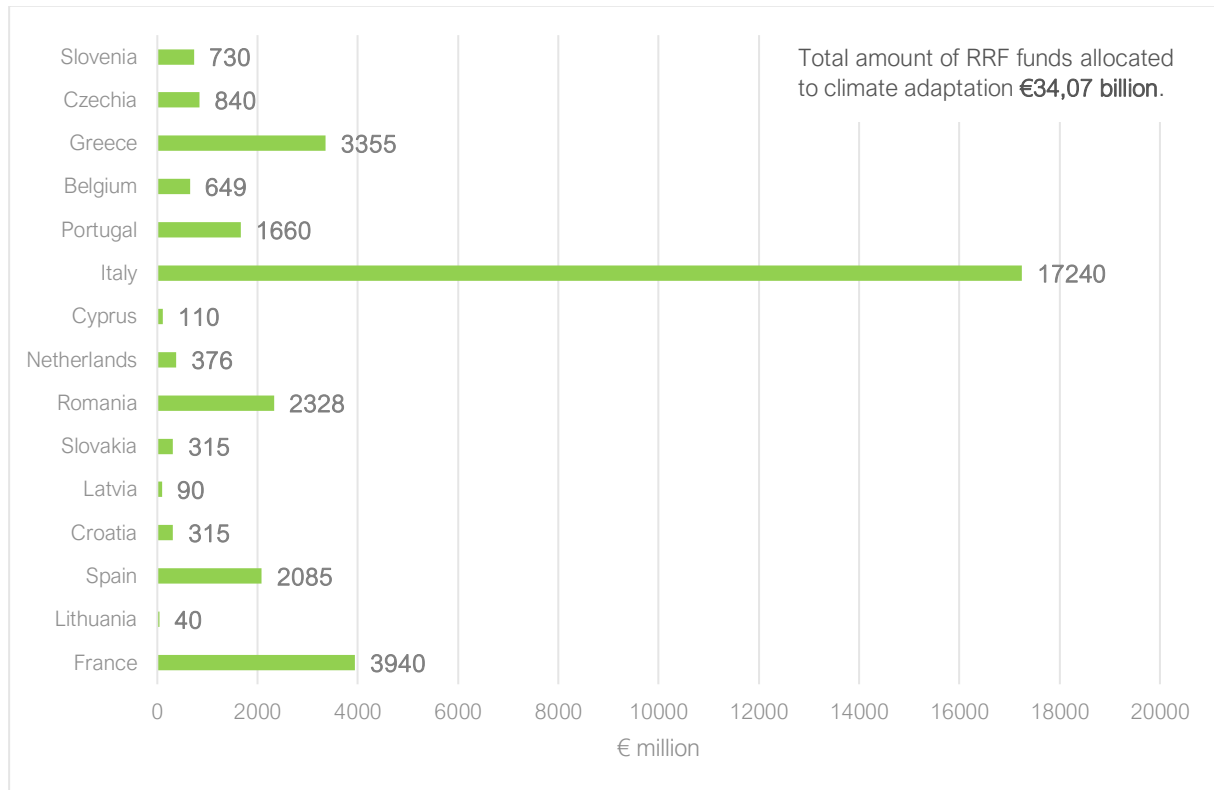


Figure 8: RRF budget allocation: share (million EUR) of NRRP funds/country allocated to climate adaptation

Italy – with a share of 9% of RRF funds – shows the highest budget, i.e., €17,240 million (or €17.24 billion), allocated to adaptation measures. Second in terms of budget is France, with €3,940 million (or €3.94 billion) of RRF funds earmarked for adaptation, but with a share of 1%, as seen in Figure 7. Third is Greece, with a total allocation of €3,355 million (or €3.355 billion) to adaptation measures, and a share of 11%. Whereas Slovenia – with the highest share of their NRRP funds allocated to their adaptation measures, that is, 29% – invests a total of €730 million. Such analysis holds true within the timeline of this report, and figures are subject to change in the future, as Member States update their adaptation expenditures.

Given the definition in the methodology section, a sufficient level of investment is defined as an investment that equals the amount described in the NAS/NAP: when considering all 15 MS illustrated below, the **average investment** to adaptation measures **under RRF is of €1,26 billion, whereas the investment planned in NAS/NAP amounts to €1,88 billion/year**. In other terms, the investment for climate adaptation measures is higher in NAS/NAP than the one budgeted under RRF. One conclusion that can be drawn is that the analysed MS have drafted their NRRP planning for climate adaptation but allocating an investment (in average terms) that is lower (or not at a sufficient level) to match the one planned in their pre-existing NAS/NAP.

However, these findings are based on the average of all 15 MS analysed in this section, and thus need to be considered on a case-by-case basis, as each MS is different. For instance, Greece, Portugal, and Slovenia have allocated a significantly higher amount of funds to adaptation within their NRRP, compared to the earmarked investments in their NAS/NAP, as shown in Figure 9.

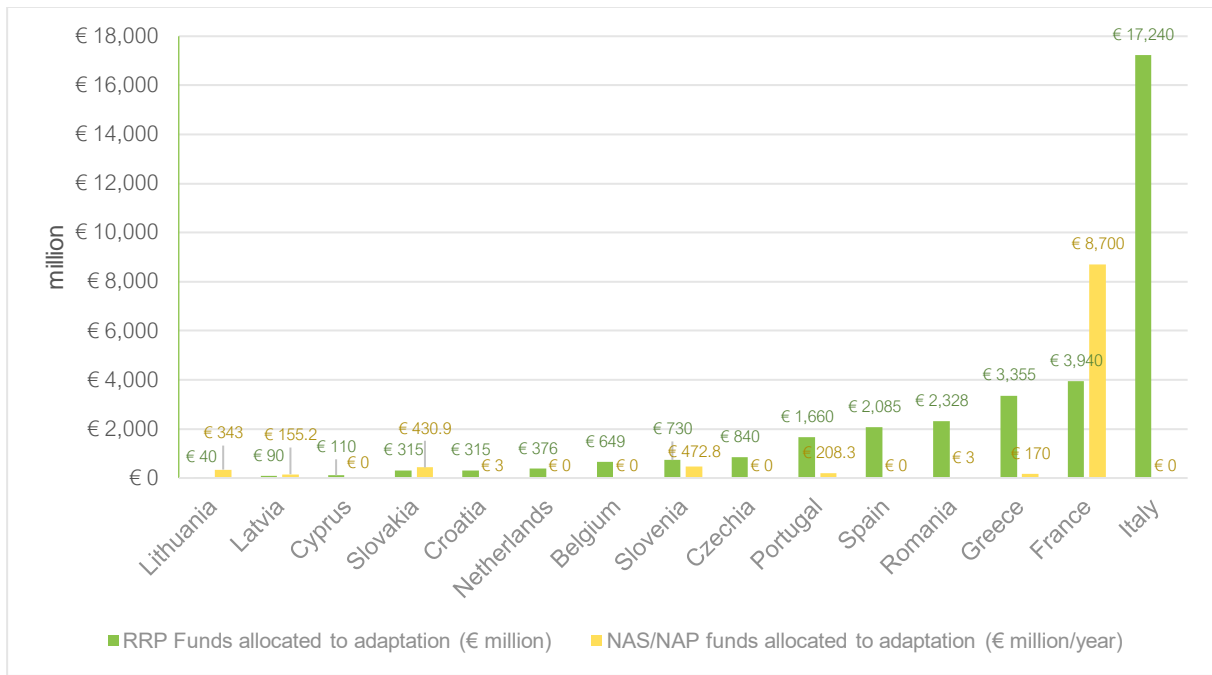


Figure 9: RRF budget allocation: share (million EUR) of NRRP funds/country allocated to 'Climate change adaptation' compared to funds allocated by NAS/NAP

3.2.3 Alignment of NRRP with NAS/NAP per million inhabitants

In this section, the report presents the results from the comparison of funds allocated to adaptation per million inhabitants, for NRRP funds and for NAS/NAP. These are illustrated in Figure 6.

In some MS among the ones analysed within the scope of this report, the expenditure plan for adaptation is not always readily available and may not yet be specified due to various reasons: the strategy and/or plan is yet to be approved, or priorities and/or impact factors need final validations. In countries such as Spain, the list of funding entities is available with no data on the actual state of play for climate adaptation spending, including disaster risk management. In other MS, such as Czech Republic, the evaluation of NAP does not provide a complete picture of climate adaptation finance¹⁹.

Each bar in the graph below reports the overall funding to the country's adaptation measures (100% represented in the Y-axis) allocated per million inhabitants (€ million as in the X-axis), both under NAS/NAP or NRRP. Based on the analysis, seven bars in the chart below (Figure 10) are coloured in green only, meaning that all adaptation measures appear to be solely funded under the Recovery and Resilience Facility. The data may change after the publication of this analysis, as Member States may initiate their voluntary reporting to update their expenditures under NAS and NAP.

As for other 9 countries, adaptation measures appear to receive funds from both RRF and NAS/NAP (i.e., bars coloured in both yellow and green). The full overview of funds allocation is available in Annex II at page 64 and Annex III at page 65.

¹⁹ <https://climate-adapt.eea.europa.eu/en/countries-regions/countries>

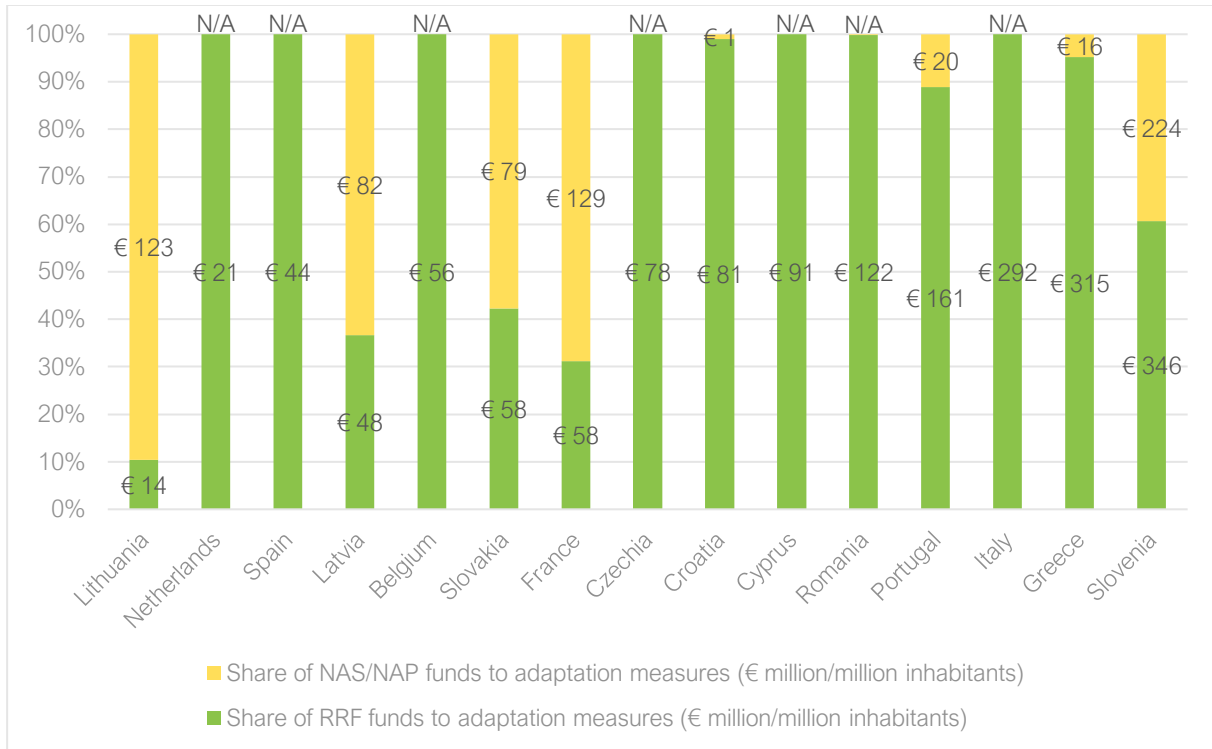


Figure 10: Distribution of adaptation funds between RRF and NAS/NAP per Member State (ascending order based on the amount of NRRP funds allocated to adaptation measures per million inhabitants)

In addition, the order of how countries are listed from left to right is based on an ascending order of National Recovery and Resilience funds allocation: from Lithuania that allocates the lowest funds to adaptation, to Slovenia allocating the highest share of RRF investments to adaptation, always per million inhabitants. By observing the distribution in percentage (Y vertical axis), it is possible to clearly observe that four countries allocate more than 50% of funding to adaptation through their NAS or NAP, namely: Lithuania, Latvia, Slovakia, and France. Further, the results show that three countries allocate more than 50% of their NRRP funds to adaptation, namely: Croatia, Portugal, Greece, and Slovenia.

Another observation the authors could make is in relation to the breakdown of climate hazards included in Figure 6. Notably, some countries that are facing larger numbers of climate hazards, like Portugal and Slovenia, are prone to allocate more RRF funds to adaptation measures under their NRRP, compared to their NAS/NAP. Other countries instead, like Latvia and Lithuania, which are also facing a high number of hazards (or climate losses), appear to have allocated an amount of RRF funds that is lower than the one budgeted in their NAS and/or NAP. See Figure 10. Within the scope of this report, it would not be possible to assess at this stage whether a higher number of climate hazards can be correlated to a higher share of RRF funds to implement adaptation measures under NRRP, or whether higher RRF funds can indicate that a certain country is facing greater climate hazards. Overall, it is important to stress that the above data is illustrated to represent the information within NRRP and NAS/NAP drafted by MS, and thus may not represent the full picture of current, most recent events or climate impacts.

3.2.4 Key measures in the Green Transition: adaptation and mitigation synergies

In this section, a breakdown of key measures to secure EU countries' climate change adaptation is presented. In addition, our findings show the comparative analysis of adaptation objectives and key measures between NRRP and NAS/NAP in 15 Member States whose funds earmark climate adaptation. By doing so, the additional adaptation measures in NRRP are further highlighted, compared to NAS/NAP. The Recovery and Resilience Scoreboard already presents a breakdown of expenditure supporting the Green Transition pillar in all EU countries (see Figure 1).



Figure 11 shows a breakdown of the estimated contribution to the policy pillar according to a list of policy areas established by the European Commission. The breakdown of climate objectives (falling into the “Green Transition” category) provided by the EC shows that **6% of the total allocated share is tagged under ‘climate change adaptation’**. The percentage relates to the overall share of the plan tagged under this policy pillar, in comparison to the larger share of investments earmarked for mitigation measures²⁰.

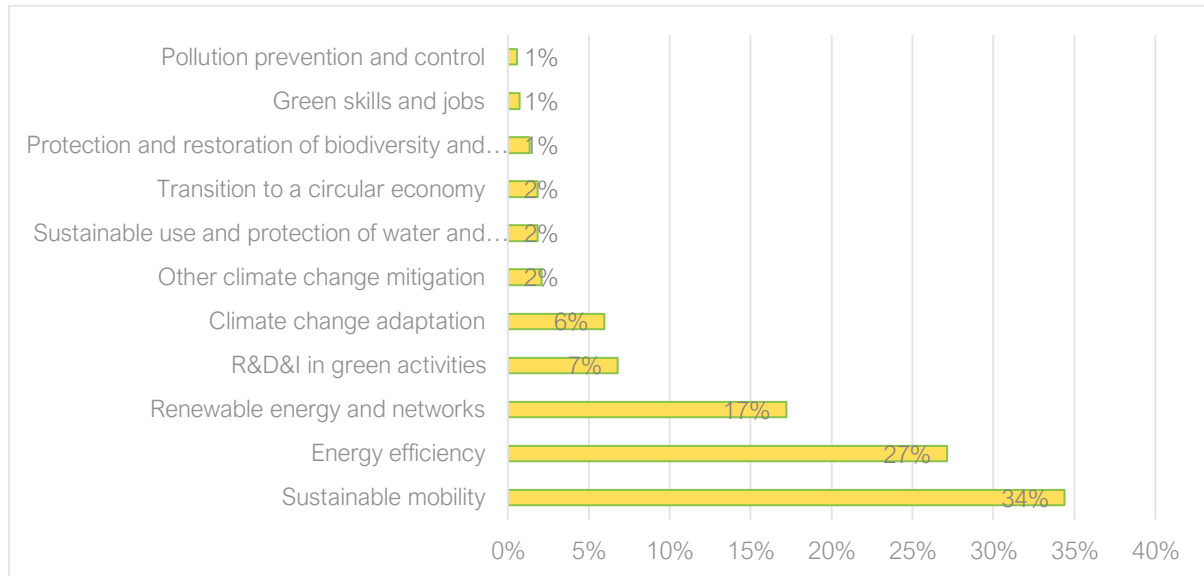


Figure 11: Green transition pillar - Breakdown of expenditure supporting the green transition per policy area

Source: European Commission (https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/green.html)

Our analysis further investigated each country’s share of funds allocated to adaptation within the Green Transition pillar. In Figure 12, the light green columns indicate the overall share (%) of fundings allocated to the Green Transition pillar. For instance, Luxembourg has allocated the highest amount of RRF funds (68%) while Italy, Hungary, and Ireland the lowest (37%). The orange sections within the light grey bars indicate the share of funds earmarked for adaptation measures within the Green Transition pillar. It is shown that Slovenia has allocated the highest share of funds to adaptation measures (29%), whilst other countries have allocated a significantly lower amount, ranging between 2% to 12%.

²⁰ https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/green.html

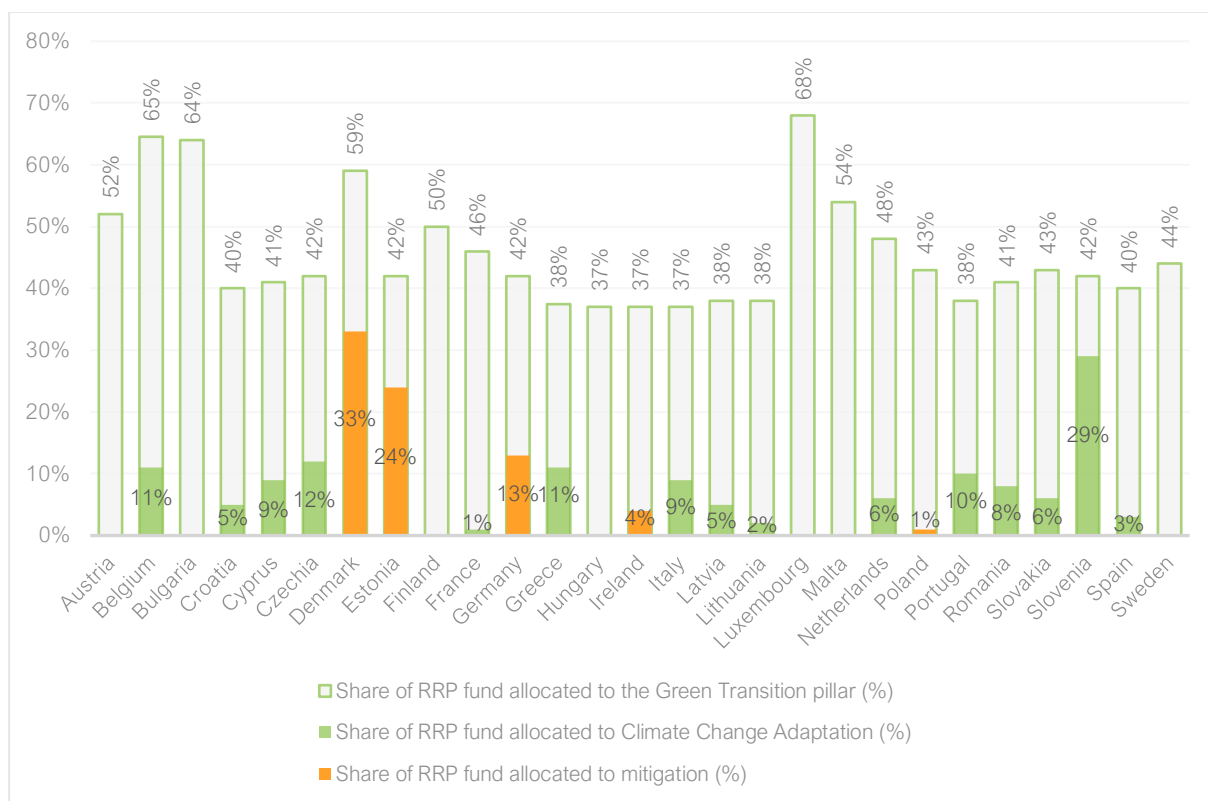


Figure 12: Share (%) of NRRP funds allocated to the Green transition, adaptation, and mitigation

In some cases, mitigation constitutes a significant share of total allocated funds. These countries are also highlighted by the orange sections within the Green transition bars, specifically:

- Denmark, 33% mitigation (0% adaptation)
- Estonia, 24% mitigation (0% adaptation)
- Germany, 13% mitigation (0% adaptation)
- Ireland, 4% mitigation (0% adaptation)
- Poland, 1% mitigation (0% adaptation)

The case of Italy – Figure 10 shows that €17.24 billion are earmarked within the Italian NRRP for climate change adaptation measures. However, such clear allocation is not available for the Italian NAP, as there is no distinction between mitigation and adaptation measures. Overall, the planned expenditure that Italy sets-out in its draft NAP (December 2022 version) is **€2.08 billion** (see ‘References’ section). Notably, based on Italy’s profile and its draft NAP on Climate-ADAPT, no expenditure planning for only adaptation is available to date²¹. For this reason, this report adds onto the current Climate-ADAPT database, by providing additional information on projects, activities and initiatives that finance adaptation and mitigation measures in Italy:

- The LIFE Program budget for the period 2021-2027 is set at €5.45 billion, of which **€0.95 billion** is intended to co-finance actions under the LIFE sub-programme “**Mitigation and adaptation** to climate change” (LIFE CLIMA) and of the areas of intervention included in the three priority sectors of the sub-programme: 1) “Climate change **mitigation**”; 2) “**Adaptation** to climate change”; 3) “Climate Change Governance and Information.”
- The budget for climate action set by the Urban Innovative Actions (UIA)²² is allocated for the period 2021-2027. It accounts for **€450 million, including adaptation** measures.
- The National Program “Metro Plus Southern Medium-Sized Cities” (Metro Plus Città Medie Sud 2021-2017), intended for metropolitan cities to be climate-resilient, foresees the allocation of

²¹ <https://climate-adapt.eea.europa.eu/en/countries-regions/countries/italy>

²² <https://uia-initiative.eu/en/eui/european-urban-initiative>



approximately **€330 million** for point 2. Environmental sustainability and for point 3 multimodal and sustainable urban mobility²³.

- Similarly, the Programma Operativo Nazionale – *National Operational Programme* - (PON) Culture and Development 2014-2020 (**€270 million**), currently under development for the period 2021-2027, could be a source of funding for those measures aimed at protecting cultural heritage against the risks of climate change²⁴
- The "Experimental program of interventions for adaptation to climate change in urban areas" provides for around **€80 million** aimed at increasing the resilience of settlement systems subject to the risks generated by climate change.

Thus, this amount was not considered (marked as 'unknown' in Appendix I) within the scope of this analysis as this section focuses on adaptation measures only²⁵.

The results of the analysis as presented in the above chart aided in the visualisation of which countries currently allocate insufficient or sufficient investments to adaptation measures in their national NRRP (per million inhabitants) to cover the investments foreseen by the NAS/NAP, in case such figures are available. The analysis is based on the public data accessed between September 2022 and March 2023. Some **countries that do not seem to allocate funds to adaptation measures may be doing so under their national mitigation packages**, as in the above-mentioned case of Italy, for which it would be challenging to provide a clear breakdown of budgetary expenses for adaptation compared to mitigation. Consequently, where either NRRP or NAS/NAP funds are allocated to both adaptation and mitigation measures, the authors have collected additional information from national websites, in an attempt to provide an as-close-as-possible estimate of funds earmarked for adaptation. Other reasons for not disclosing information or providing justification for the envisaged NRRP investments in climate adaptation may include:

- a strategy and/or plan is yet to be approved,
- priorities and/or impacts factors need final validations,
- the list of funding entities is available with no data on the actual state-of-play for climate adaptation spending, e.g., for categories such as disaster risk management,
- the evaluation of NAP costs and benefits does not provide a complete picture of climate adaptation finance²⁶.

The **results of the comparison of adaptation objectives and key measures in NRRP and NAS/NAP** are presented in the table in Annex I at page 56. This table has provided the groundwork for the next section on promising practices drawn from the analysed NRRP documentation, both at the national level and at the regional level of five cases, selected from the countries of the 7 REGILIENCE focus regions, namely, Spain, Greece, Croatia, and Portugal²⁷.

3.2.6 Regional promising practices

In the previous section, the methodology used served to assess whether Member States' NRRP sufficiently contribute to the necessary investments for climate adaptation within the Recovery and Resilience Facility. Using a comparative country-level analysis between NRRP and NAS/NAP, 15 Member States' NRRP seem to have allocated funds to adaptation measures so far. The following chapter provides selected examples of promising practices from regions on climate change adaptation (the full text analysis is available in **Error! Reference source not found.** at page 56).

Given the purpose of this report, the word "promising practices" is narrowed down following the definition provided by the UN Habitat²⁸. Promising practice denotes those practices that have been assessed as:

²³ <https://www.agenziacoessione.gov.it/wp-content/uploads/2023/02/Metro-Plus-Città-Medie-Sud-2021-2027.pdf>

²⁴ <https://ponculturaesviluppo.beniculturali.it/>

²⁵ The Italian Ministry of Environment, Land and Sea, Italy (MEIT). (2015). National Adaptation Strategy to Climate Change https://www.mase.gov.it/sites/default/files/archivio/allegati/clima/documento_SNAC.pdf

²⁶ <https://climate-adapt.eea.europa.eu/en/countries-regions/countries>

²⁷ <https://regilience.eu/the-project/>

²⁸ <https://www.urbanagendaplatform.org/best-practice>. An online repository of main social, economic, and environmental issues, success stories and lessons learnt on urban implementation of the New Urban Agenda 2022.



- covering relevant thematic areas,
- having the basic elements of the minimum criteria,
- showing good potential, but
- not existing for long enough for meaningful assessment – less than two years.

By combining the UN Habitat definition of promising practices with the core principles of EU Adaptation Strategy²⁹, the selection criteria defined within the scope of this report are as follows.

Promising practices should:	Selection criteria (EU Adaptation Strategy core principles):
Cover relevant thematic areas and basic elements	By including i) adaptation into macro-fiscal policy, ii) nature-based solutions for adaptation, and iii) local adaptation action (defined in the Strategy as more systemic adaptation), and/or By focusing on developing and rolling out adaptation solutions to help reduce climate-related risk, increase climate protection, and safeguard the availability of fresh water (faster adaptation)
Show good potential	By proposing actions that push the frontiers of knowledge on adaptation to gather more and better data on climate-related risks and losses and enhance Climate-ADAPT as the European platform for adaptation knowledge (smarter adaptation), and/or By providing opportunities for international action on adaptation to climate change, through stronger global engagement and exchanges on adaptation
Not exist for long enough for a meaningful assessment (<2 years)	With key measures being developed after NRRP were first published

Table 2: Selection criteria for promising practices in relation to NRRP activities

The following section is the findings from **specific regional cases in 4 countries** displaying promising practices.

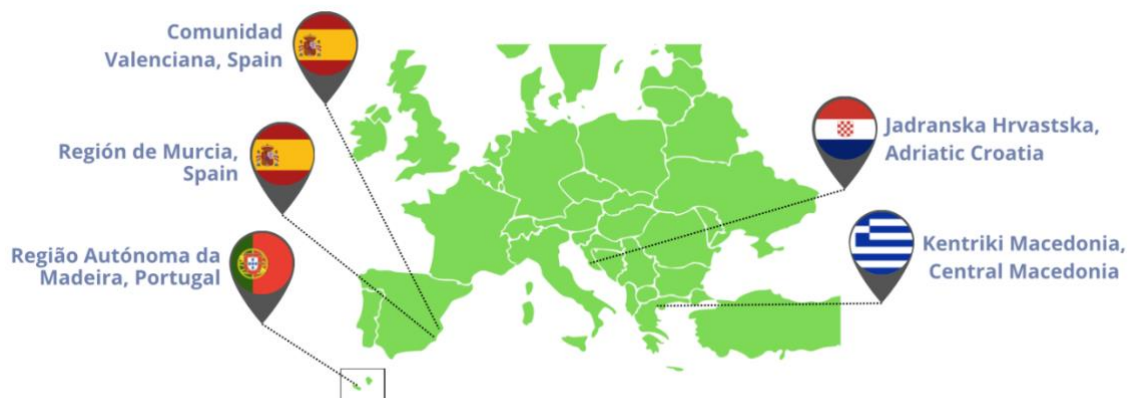


Figure 13: Map of 5 regions' case studies

Prior to tackling each regional case in detail, the table below provides an overview of the selected regional promising practices, based on the authors' desk research and the validation calls with regional experts from the below focus regions of the REGILIENCE project, for a total of 5 promising practices. Other initiatives are included below in relation to each respective region; although some adaptation initiatives/measures do not meet the methodology criteria of this report, some are directly funded by the RRF programme and are thus worth mentioning.

29 https://climate.ec.europa.eu/eu-action/adaptation-climate-change/eu-adaptation-strategy_en



	Jadranska Hrvatska (Adriatic Croatia)		Kentriki Macedonia (Central Macedonia)	Região Autónoma da Madeira (Autonomous Region of Madeira)		Región de Murcia (Region of Murcia)	Comunidad Valenciana (the Valencian Community)	
	Ekokarta Zagreba	Practices linked to 'IN-PLAN' project	No RRF fund allocation	Promote Florestar 4.0	Water efficiency and reinforcement plan for the supply and irrigation systems	No RRF fund allocation	Circular Economy planned tenders	Biodiversity and ecosystems
Cover relevant thematic areas and basic elements	✓ more systemic adaptation ☒ faster adaptation	✓ more systemic adaptation ☒ faster adaptation	☒ more systemic adaptation ☒ faster adaptation	✓ more systemic adaptation ☒ faster adaptation	✓ more systemic adaptation ☒ faster adaptation	☒ more systemic adaptation ☒ faster adaptation	✓ more systemic adaptation ☒ faster adaptation	✓ more systemic adaptation ☒ faster adaptation
Show good potential	✓ smarter adaptation opportunities for international action ☒	☒ smarter adaptation opportunities for international action ✓	☒ smarter adaptation opportunities for international action ☒	✓ smarter adaptation opportunities for international action ☒	☒ smarter adaptation opportunities for international action ☒	☒ smarter adaptation opportunities for international action ☒	☒ smarter adaptation opportunities for international action ✓	☒ smarter adaptation opportunities for international action ☒
Not exist for long enough for a meaningful assessment (<2 years)	☒ Since 2018	✓ 2022-ongoing	☒ not directly aligned with NRRP	✓ Actions planned in 2022	✓ 2022	☒ not directly aligned with NRRP	✓ Planned projects/open calls	☒ early efforts since 2017

Table 3: Summary of the results based on the analysis of regional promising practices (June-July 2023)

The case of Croatia (REGILIENCE region: Jadranska Hrvatska, Adriatic Croatia)

The Croatian Ministry of Sustainable Development and Economy oversees the development of the national climate change adaptation strategy (NAS) for the period up to 2040³⁰. The NAP is currently being developed. The NAS developed platform is online and operational (Republika Hrvatska - Prilagodba Klimi (prilagodba-klimi.hr)³¹, and additional information on the strategy is available (in Croatian) on the national portal:

- 01.09.2017 – DECISION on the content of the strategic study³².
- 19.07.2017 – DECISION on starting the strategic environmental impact assessment procedure³³.
- 19.04.2019 – DECISION on submitting the strategic environmental impact study and the draft proposal of the Climate Change Adaptation Strategy in the Republic of Croatia for the period up to 2040 with a view to 2070 for public discussion³⁴.

Within REGILIENCE, the region of Adriatic Croatia focuses on the following resilience topics/sectors: tourism, buildings, energy, coastal areas, and water management³⁵.

Based on the results displayed in Annex I at page 56 and on the interaction with the REGILIENCE project partner North-West Croatia Regional Energy and Climate Agency (REGEA)³⁶, the presence of key adaptation measures in NRRP, compared to Croatia’s NAS/NAP is described as follows:

- There are general connections with the adaptation strategy and some measures of the NRRP are based on the existing NAS (as there is still no readily available NAP), however this is more in terms of increasing resilience in several sectors.
- There was a call for projects in the tourism sector in Q4 2022, financed from the NRRP, with the obligatory requirement to develop climate adaptation documentation for each project. Such requirement obliged each individual project to present a climate risk and vulnerabilities assessment.
- The above call brought about real novelty in the sector, as projects needed to be designed in a way that all buildings will be climate change resilient, which has never been targeted before.

³⁰ <https://prilagodba-klimi.hr/hrvatska/>

³¹ [Republika Hrvatska - Prilagodba Klimi \(prilagodba-klimi.hr\)](https://prilagodba-klimi.hr/)

³² https://prilagodba-klimi.hr/wp-content/uploads/2019/05/1_odluka_o_sadrzaju_strateske_studije.pdf

³³ https://prilagodba-klimi.hr/wp-content/uploads/2019/05/2_odluka_o_zapocinjaju_postupka_SPUO.pdf

³⁴ https://prilagodba-klimi.hr/wp-content/uploads/2019/05/5_Informacija_o_JR_PKP.pdf

³⁵ <https://regilience.eu/the-project/>

³⁶ <https://regea.org/en/>



REGEA was first, among few other companies in Croatia, to develop the new climate proofing documentation under the NRRP financing and is now planning for executing the more systemic approach, that consists in mainstreaming energy and climate issues in all aspects of local and regional governance work, and across the relevant stakeholders' network³⁷. This is detailed in the good and replicable practices green box below.

Promising practice #1: Ekokarta Zagreba	
Criteria	Explanation (based on the EU Adaptation Strategy core principles):
Cover relevant thematic areas and basic elements	The Ecological map of the City of Zagreb (Ekokarta Zagreba) ³⁸ . The web GIS application is built as a spatial-temporal database and an operational tool providing the relevant city offices with insights on environmental factors to functionally manage the citizens' health and working environment. Citizens and other stakeholders have access to various real-time information on the state of both the environment and health factors (more systemic adaptation), ever more important since the global pandemic. ³⁹
Show good potential	<p>M.D. and PhD. Matijana Jergović considered the Ecological map as “a valuable tool for adaptation indicator monitoring and maladaptation prevention” (interview conducted by REGEA on October 20, 2022).⁴⁰ In detail, the web map integrates and showcases the results of monitoring land (soil), air and pollen as well as water and the status of invasive species in an open-access, easy-to-understand manner. By doing so, it does gathers more and better data on (climate) risks and losses, providing opportunities to exploit the results also outside of the country opening the pathway to knowledge exchange with other local/regional experts, as in the case of the Valencian Community below.</p> <p>Finally, the project is an example of how the City put in place a system and top-expert capacities to make adaptation an integral part of development planning, while ensuring it is an on-going practice (real-time data). This would suggest that it has the potential for enriching current knowledge on real-time changes on environmental factors, risks and losses (smarter adaptation), rather than a simple ad-hoc exercise. In addition to the City of Zagreb and Andrija Štampar Teaching Institute of Public Health (project initiator), the Ekokarta partners include the Institute for Medical Research and Occupational Health and the Meteorological and Hydrological Service. Other collaborators are the Faculty of Agriculture and the Croatian Agency for the environment and nature⁴¹.</p> <p>Furthermore, additional information on the realisation of the Ecomap can be found on the Teaching Institute for Public Health Dr. Andrija Štampar.</p> <p>Archives (in Croatian), featuring all stakeholders that contributed to the monitoring dataset, e.g. air-quality data are the responsibility of the City Office for Economy, Energy and Environmental Protection and the City Office for Health.⁴²</p> <p><i>“Analyses of collected data allow a more effective construction planning, the possibility of reducing pollution, obtaining current information in the event of certain incidents and providing timely information to citizens about possible health risks”</i></p> <p>Dr. Zvonimir Šostar, director of the Andrija Štampar Teaching Institute of Public Health (see footnote reference #30)</p>
Not exist for long enough for a	This criterion does not apply to the Ekokarta. In terms of timeline, the authors could infer that it is more fit as an established good practice rather than a promising one. Below the

³⁷ https://projects2014-2020.interregeurope.eu/fileadmin/user_upload/tx_tevprojects/library/file_1666685039.pdf

³⁸ <https://ekokartazagreb.stampar.hr>

³⁹ Paper in Conference Proceedings. Marić, Marko; Hrga, Ivana; Grgec, Danijel; Jukić, Mirela; Bach, Gordana. Web GIS Application “Ecological Map Of The City Of Zagreb” – City Operational Tool. 8th International Professional and Scientific Conference “Occupational Safety and Health” / Kirin, Snježana ; Štedul, Ivan ; Bubaš, Marija - Karlovac : Karlovac University of Applied Sciences, 2022, 466-472

⁴⁰ Interview with Matijana Jergović, M.D., PhD., primarius, Epidemiologist and Environmental Health specialist, Head of Risk Assessment and Logistics Division, Department of Environmental Protection and Health Ecology, Andrija Štampar Teaching Institute of Public Health. (20th of October 2022).

⁴¹ <https://www.total-croatia-news.com/zagreb-blog/18476-ecological-map-of-the-city-of-zagreb-project-presented>

⁴² Ecological map of the City of Zagreb -

from idea to realization: http://zdravljezasve.hr/html/zdravlje13_ekologija-index.html



<p>meaningful assessment (<2 years)</p>	<p>justifications provided by Prim.Dr.sc. Matijana Jergović when contacted once again by REGEA in June 2023 to address the above statement.”</p> <p>The Ekokarta is powered by the Teaching Institute for Public Health “Dr. Andrija Štampar” since 2018. Prior to this, the Institute core focus has always been the monitoring of the safety of water and food - which are recognised as one of the adaptation priorities. One could conclude that the Institute has been carrying out activities with the aim of adapting to climate change since its foundation in 1965. The only difference is that, back then, it was defined under the umbrella term of environmental hygiene.</p> <p>Raising awareness among stakeholders and the public was focused primarily on climate change mitigation measures - that is, communication with key stakeholders through UNDP and WHO workshops on low-carbon development and through WHO workshops on the impact of heat on health, and local actions on monitoring the UV index and melanoma prevention.</p> <p>Based on the latest interaction with Prim.Dr.sc. Matijana Jergović in June 2023, the stakeholder awareness efforts on adaptation measures in healthcare and city management started more intensively in Zagreb in 2016. These were correlated with the implementation of cross-sectoral workshops on the preparation of the National Strategy for Adaptation to Climate Change, when systematically data sources for the health sector were announced⁴³.</p>
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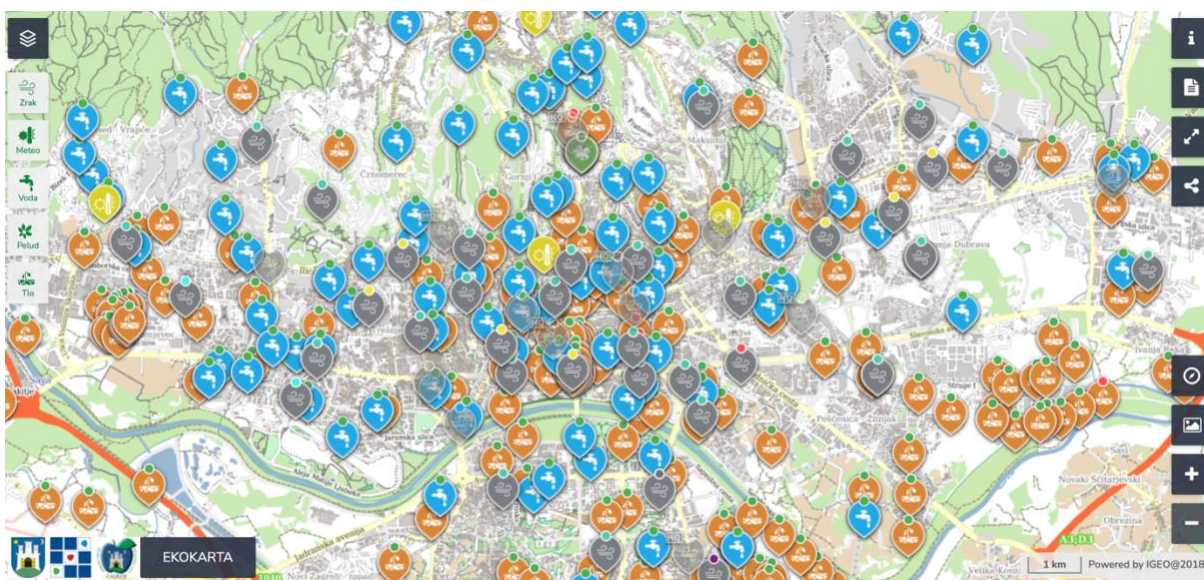


Figure 14: Snapshot of the online Ecomap of the City of Zagreb (2023)

Promising practice #2: IN-PLAN project ⁴⁴	
Criteria	Explanation (based on the EU Adaptation Strategy core principles):
<p>Cover relevant thematic areas and basic elements</p>	<p>The overarching objective of IN-PLAN (Integrated Energy, Climate and Spatial planning) is to develop, test, and roll out the IN-PLAN practice – a long-lasting support structure enabling local and regional authorities to effectively implement their sustainable energy, climate, and spatial plans⁴⁵. REGEA has so far tested the approach on several different plans, on multi-levels. In terms of adaptation under the NRRP funds, below some examples of integrated key measures:</p> <ul style="list-style-type: none"> Implementation of integrated NbS for new developments and reconstructions (systemic adaptation).

⁴³ Sub-activity 2.6.1.: Preparation Of The Working Version Of The Climate Change Adaptation Strategy In The Republic Of Croatia For The Period Until 2040 With A Look At 2070. Zagreb, October 2017. This project is financed by the European Union and is implemented by EPTISA Adria d.o.o. (Green Book). <https://prilagodba-klimi.hr/wp-content/uploads/2017/11/ZELENA-KNJIGA.pdf>

⁴⁵ <https://fedarene.org/project/in-plan/>



	<ul style="list-style-type: none"> ▪ Green infrastructure solutions (green roofs, facades etc.) for reconstructions and new developments (e.g., removing gas network, usage of 75% of RES for reconstruction, 100% of RES for new build etc.). ▪ Separation of rain and fecal sewage and implementation of rain gardens and permeable surfaces for rain collection and drainage⁴⁶.
<p>Show good potential</p>	<p>This practice is set within a context of international action with 9 EU partners, 15 local and regional government (“lighthouses”), 30 pilots, and 5 related projects and tackles the urgent need at the regional level to develop a new climate proofing documentation for projects in the tourism sector, which are funded under the NRRP in Croatia.</p> <p>REGEA is working with local and regional government bodies on developing a set of tools they could use to implement climate proofing projects (showing a certain degree of coordination and consistency across different governance levels, known as vertical integration⁴⁷), measures and actions systemically and strategically. The agency identified spatial plans of all levels plans (county urbanistic plan, regional plan, general urbanistic plan at the city level, urbanistic development plan at the district level) to be a powerful tool that could set a path for climate resilience (hence, carbon neutrality).</p> <p>In addition to the NAS, the newly designed guidelines for the implementation of the measures and spatial planning, including adaptation and resilience, are derived from Sustainable Energy and Climate Change Adaptation Plans (SECAPs). Once integrated into the spatial plans, the adaptation elements are prescriptive for all actors taking part in the spatial development and usage of space. Notably, the climatology data and models used for the emergency response of counties are drawn from the NRRP, to select which area is the most vulnerable to flooding, fires, earthquakes, and so forth (showing steps towards improving the collaborative capacity of government departments/bodies/agencies overseeing diverse (policy) issues in a horizontal or ‘cross-cutting theme’ manner). Most recently, disaster and risk management NRRP funds are directed for earthquakes emergency response⁴⁸.</p> <p>In short, Croatia has been financing - through NRRP funds – projects focused on strengthening resilience in the built environment, either new built or reconstruct, following the above parameters. Overall, this approach is a strategic first step in the integration of resilience in spatial planning, and in supporting industry actors and local governments to develop and implement their local adaptation strategies⁴⁹. Among the next steps, guidelines for building permits should be further developed, alongside awareness raising in the construction, design community as well as wider network of sector collaborations, and budget models should be developed and strengthen in the region.</p>
<p>Not exist for long enough for a meaningful assessment (<2 years)</p>	<p>The project is funded by LIFE programme 2022 – 2026.</p>

The case of Greece (REGIANCE region: Kentriki Macedonia, Central Macedonia)

The region of Central Macedonia focuses on the following resilience topics: flooding, transportation and energy buildings⁵⁰. Based on OECD data (2020), the region of Central Macedonia reported 21.7% of its

⁴⁶ <https://www.construction21.org/articles/h/stocktake-on-available-good-planning-practices-the-in-plan-introduction-to-an-integrated-vision-for-energy-climate-mobility-and-spatial-planning.html>

⁴⁷ <https://www.un.org/development/desa/dpad/publication/un-desa-policy-brief-115-horizontal-and-vertical-integration-are-more-necessary-than-ever-for-covid-19-recovery-and-sdg-implementation/>

⁴⁸ https://civil-protection-humanitarian-aid.ec.europa.eu/what/civil-protection/national-disaster-management-system/republic-croatia_en

⁴⁹ <https://regea.org/en/green-planning/>

⁵⁰ <https://regiance.eu/the-project/>



population at risk of poverty or social exclusion, alongside several other regions⁵¹. In this context, the impacts of flooding have become an exacerbating (social) issue, with energy consumption in buildings and transport infrastructures.

According to the additional data researched within the scope of this report on NRRP, the Green Recovery Tracker points at linking the economic recovery in Greece to the just transition of coal regions as good NRRP practice for the country. Such intervention leverages NRRP funds to support the phasing out of coal by mobilising additional investment in coal regions⁵².

Based on our analysis (results displayed in Annex I), the newly identified key measures in NRRP, compared to Greece’s NAS/NAP are as follows:

- Measures related to the environmental protection ranging from reforestation and biodiversity protection to improving the irrigation network and wastewater management.
- Measures on water supply and urban wastewater are linked with specific targets to reduce water leakage and energy consumption.
- A new system for permanent monitoring of species and habitat types, and the support to the reforestation of 16,500ha of degraded forest ecosystems, mainly through native species.
- Investments to strengthen the response to climate hazards are planned in different sectors, including key electricity infrastructure, flood mitigation projects and emergency response. These are aimed to address concerns around forest fires and extreme weather conditions, which are forecasted to increase in coming years.
- Preparation of local urban plans aiming to facilitate urban renewal and make the cities more climate resilient (considering regional disparities and the need to ensure social inclusion, Greece 2.0 NRRP, p.110)⁵³.

Focus on mitigation: regarding fourth bullet point (electricity infrastructure), the country is opting for prioritising social interventions and measures in coal-affected and coal-dependent areas (National Just Transition Plan and Territorial Just Development Plans, pp. 642)⁵⁴. This report’s comparative analysis reveals that Greece has been primarily focusing on transitioning from heavy fossil fuel-powered energy production (coal) by strengthening key electricity infrastructure; and the NRRP is drafted to support the above transition objectives. The evaluation of the efficiency of the national and territorial plans is beyond the scope of this report, which focuses on identifying new key NRRP measures aligned with NAS/NAP. Further research could stem from our findings summarized in bullet points above, to identify interested stakeholders and relevant decision-makers in Greece’s just transition to climate neutrality.

Within the scope of this report, Ms. Chrysanthi Kiskini, Head of the Department of European Union Projects at the Regional Development Fund of Central Macedonia (RDFCM) was contacted in July 2023, in order to identify regional practices that are being implemented in line with Greece’s NRRP and/or with regional adaptation approaches. The results of the validation call are presented in the table below, listing initiatives, consortia, and projects at the EU level fostered by RDFCM).

EU-level projects	Short description (in line with NRRP key measures)
Circular Cities and Regions Initiative (CCRI)⁵⁵	Part of the Circular Economy Action Plan, the CCRI focuses on implementing the circular economy across Europe’s cities and (climate neutrality in 2050). This project, among all, uses and exchanges knowledge at the international level on NbS tools (which can be linked back to adaptation) in circularity.
Bio-based Industries Consortium (BIC)⁵⁶	The BIC focuses on, among all: aquaculture and marine; chemicals and materials (including bioplastics); forestry, pulp and paper and technology providers; and waste management, treatment
Horizon Widera Programme - SolarHub⁵⁷	Co-develop solar energy innovation ecosystems across Greece and Turkey (energy infrastructure)

⁵¹ <https://www.oecd-forum.org/posts/greece-s-recovery-and-resilience-facility-rrf-a-plan-made-for-the-people-and-by-the-people>

⁵² <https://www.greenrecoverytracker.org/country-reports/greece>

⁵³ https://greece20.gov.gr/wp-content/uploads/2021/07/NRRP_Greece_2_0_English.pdf

⁵⁴ See reference above

⁵⁵ <https://circular-cities-and-regions.ec.europa.eu/>

⁵⁶ <https://biconsortium.eu/>

⁵⁷ <https://cordis.europa.eu/project/id/101086110>



Interreg Europe Programme 2021-2027 - <i>CITISYSTEM</i> ⁵⁸	Regional and interregional exchange of circularity experience and capacity building to support policy instruments for biobased systems in cities, at various stakeholders' levels (urban resilience)
Interreg Europe Programme 2014-2020 - <i>SinCE-AFC</i> ⁵⁹	SinCE-AFC aims at involving SMEs of the Agri-Food chain in circular economy through the promotion of the appropriate managing and financial horizontal mechanisms (facilitate urban renewal)
<i>CESME</i> ⁶⁰	The CESME partnership aims to introduce new circular initiatives targeted SMEs (facilitate urban renewal)
<i>BIOREGIO</i> ⁶¹	Regional circular economy models and best available technologies for biological streams (facilitate urban renewal)
Interreg Programme Greece – Bulgaria 2014-2020 - <i>Flood Protection</i> ⁶²	Cross Border Planning and Infrastructure Measures for Flood Protection. Intervention fields: adaptation to climate change measures and prevention and management of climate related risks e.g. erosion, fires, flooding, including awareness raising, civil protection and disaster management systems and infrastructures

Table 4: Regional Development Fund of Central Macedonia (RDFCM) EU-level projects

Despite not having a NRRP funds allocation to the below EU-level initiatives and synergies, the majority of their objectives appear to be fully in line with the newly identified measures in Greece's NRRP and in support of the EU Adaptation Strategy with the financial aid of other EU funds. For example, the RDFCM multi-stakeholders' approach and interregional engagement reflects the principles and measures of the NRRP (large industries, SMEs, regional and cities public authorities, etc.).

However, currently, these efforts are achieved via alternative funding routes such as Interreg Europe and Horizon programmes as well as international consortia for capacity building and good practices exchange. To date, the region remains uninvolved in the NRRP funding allocation. For this reason, the efforts of the RDFCM to financially support climate mitigation, adaptation and resilience pathways would be optimised with an improved managing and financial (vertical) mechanism from the central to the regional governments.

To conclude, the regional needs of Central Macedonia are not currently aligned with the NRRP fund allocation, and therefore this particular case does not include the table lining up the criteria for promising practices. Nevertheless, it is worth mentioning that the region displays promising efforts in climate change adaptation with the aid of other EU funds, specifically:

- The Region shows several examples of cross-sectoral synergies, which are at the core of interregional cooperation (see above EU project and initiatives supported by RDFCM).
- The Region supports competition dynamics in the circular economy field, in favour of innovative solutions and business models that advance the ambition of the Green Transition.
- Adaptation measures are financially supported (although not continuously, but on a project-basis) by the EU-funds, with the potential to generate a larger basis of exchangeable promising practices, concerning the implementation of both mitigation as well as adaptation in various industries (see *Table 4*).

In conclusion, having already an extensive series of bottom-up efforts for climate change adaptation, it is ever so relevant to align regional implementation actions with national policy-making decisions and funds under the Greek Recovery and Resilience Facility programme.

The case of Portugal (REGILIENCE region: Região Autónoma da Madeira, Autonomous Region of Madeira – RAM)

At the national level – The Environment and Climate Ministry oversees Portugal's NRRP investments in nature-based solutions. Based on our analysis, the country's NRRP includes a total of €615 millions of

⁵⁸ <https://www.interregeurope.eu/citisystem>

⁵⁹ <https://projects2014-2020.interregeurope.eu/SinCE-AFC/>

⁶⁰ <https://projects2014-2020.interregeurope.eu/CESME/>

⁶¹ <https://projects2014-2020.interregeurope.eu/BIOREGIO/>

⁶² <https://crossborderfloodprotection.eu> (in Greek); <https://old-2014-2020.greece-bulgaria.eu/approved-project/47/>



investments into forest management and cultivation⁶³. This measure combines both mitigation and resilience actions, with focus on rural areas⁶⁴. Additionally, further information on the climate and digital transition defined in the NRRP (Plano de Recuperação e Resiliência) can be found on the government webpage “Recuperar Portugal” (in Portuguese)⁶⁵. The newly identified key measures in NRRP, compared to Portugal’s NAS/NAP are as follows:

- Intervention in forest management to protect the country’s forests against rural fires, and to modernise the cadastral system, among others.
- Measures to address water scarcity in the worst affected regions and to adapt to climate change,
- Measures to protect marine resources.
- To foster research and skills for the implementation of more efficient energy and resources use for fisheries⁶⁶.

At the regional level – Since Madeira is an Autonomous Region, the objectives and key adaptation measures for recovery and resilience are adapted at the regional level. To this extent, the CLIMA-Madeira project was considered, focused on developing a Regional Strategy for Adaptation to Climate Change for the Autonomous Region of Madeira⁶⁷. The Regional Government of Madeira, through its Regional Secretariat for the Environment and Natural Resources, oversees the “Strategy for Adapting to Climate Change in the Autonomous Region of Madeira – CLIMA-Madeira Strategy⁶⁸”.

The Regional Government of Madeira developed their regional climate change strategy during the CLIMA-Madeira project consultations, to determine the vision, objectives, and approach aimed at promoting an economic recovery based on economic resilience, climate transition and digital transition. The strategy is implemented based on impacts and vulnerability assessment in the sectors: energy, biodiversity, agriculture and forestry, water resources, hydro-geomorphological risks, human health, and tourism, with subsequent evaluation and prioritisation of adaptation measures. The institution responsible for the project funding is the *Direcção Regional do Ordenamento do Território e Ambiente* (DROTA)⁶⁹. The “Estratégia CLIMA-Madeira” is made available by the Regional finance office (*Secretaria Regional das Finanças*)⁷⁰.

In alignment with the NRRP (see bullet points above), CLIMA-Madeira Strategy⁷¹ focuses on:

- The high vulnerability to (natural and planted) **forest** fires (p. 59), and the need to protect the marine biodiversity and habitats (p.64).
- **Water** scarcity as the main concern in the Region (based on the decision-making of the Former Director of the Environment, Domingos Abreu)⁷².
- **Energy** sector and energy-efficiency renovations, including studies on the constructive characteristics of buildings, the equipment installed; scenarios for the renovation rate of buildings and energy performance; simulation model of the entire water/hydroelectric system on the island of Madeira; implementation of smart grids and construction of high-altitude reservoirs.

In short, both NRRP and the regional CLIMA-Madeira Strategy focus on the following priorities: protection of (both forest and marine) biodiversity and ecosystems, water availability and quality, as well as implementation of energy efficiency solutions in the built environment. Based on the aforementioned focus-areas, more information to identify regional promising practices supported by NRRP funds was informed by Mr. Mario Miguel Ribeiro Goncalves Marques as the technical expert from the Regional Secretary Office for

⁶³ <https://www.greenrecoverytracker.org/country-reports/portugal>

⁶⁴ https://assets.website-files.com/602e4a891047f739eaf5dfad/609e2d5b2f548fc26f4e743b_Portugal_Green%20Recovery%20Tracker%20Report.pdf

⁶⁵ <https://recuperarportugal.gov.pt/candidaturas-prr/>

⁶⁶ https://commission.europa.eu/system/files/2021-06/portugal-recovery-resilience-factsheet_en.pdf

⁶⁷ *Enquadramento – Observatório Clima Madeira* (2023).

⁶⁸ <https://observatorioclima.madeira.gov.pt>

⁶⁹ *Direcção Regional do Ambiente e Alterações Climáticas* (madeira.gov.pt)

⁷⁰ <https://recuperarportugal.gov.pt/>

⁷¹ https://observatorioclima.madeira.gov.pt/wp-content/uploads/pdfs/estr_clima_web_yeyxxt.pdf

⁷² <https://www.dnoticias.pt/2021/8/11/272606-madeira-forcada-a-rever-estrategia-para-o-clima/>



Environment, Natural Resources and Climate Change in Madeira (*Gabinete Da Secretaria Regional De Ambiente, Recursos Naturais E Alterações Climáticas*).

Below a break-down of the NRRP financing and resources for the RAM's promising practices. A **total of €140 million** have been allocated from the NRRP fund for Madeira to the regional priority-areas of:

- Protection of (both forest and marine) biodiversity and ecosystems – **€1 million** allocated to Promote Florestar 4.0, within the plan for Digital Transition of Public Administration in RAM⁷³.
- Water quality and availability – **€70 million** allocated to Water efficiency and reinforcement plan for the supply and irrigation systems in RAM⁷⁴.
- Energy efficiency solutions – **€69 million** allocated to Boosting renewable electricity in the Madeira Archipelago⁷⁵. This last case has not been analysed in depth since it is not directly tackling climate adaptation, but rather the resilience of the energy system and how hydropower might possibly harm regional ecosystems.

These investments accounts for approximately 25% of the total fund for Madeira (€561 million). The above three priorities are in line with the Portuguese NRRP allocation to adaptation measures and are explained in more detail below, based on the validation call with Mr. Mário Marques (Technical expert) in July⁷⁶.

Promising practice #1: Promote Florestar 4.0 (NRRP allocation: €1 million)	
Criteria	Explanation (based on the EU Adaptation Strategy core principles):
Cover relevant thematic areas and basic elements	<p>For the first time, Portugal has one organisation that brings together various stakeholders, from private agents, universities to public administration for a single objective: the integrated management of the forest and two rural fires. On the eve of the IV International Forestry and Health Potential Congress⁷⁷, organised by iNature⁷⁸ in the town of Luso, Carlos Fonseca, Technical and Scientific Director of ForestWISE – Collaborative Laboratory for Integrated Forest and Fire Management⁷⁹, and one of the two Congress speakers, explains the work that this association is doing to change the way of managing the forest and mitigate the risks of forest fires in the country. The NRRP investments foreseen in the plan for forests will support the action of ForestWISE: "this TransForm project, or ForestWISE, identifies the main business players and industrialists and these, in turn, identified the great needs of the sector and, from here, went to look for other partners to complete this consortium", says Carlos Fonseca.⁸⁰</p> <p>This practice is also included within the plan for the "C19: Digital Transition of Public Administration in RAM" (€78 million), and in relation to the application of solutions with transformative potential such as drones to survey forest resources to monitor risks at a larger and more automated scale within (terrestrial) RAM (more systemic adaptation).</p>
Show good potential	<p>The proposed NRRP investment for "Promote Florestar 4.0" encompasses:</p> <ul style="list-style-type: none"> • 3rd RAM Forestry Inventory with the support and acquisition of Drones equipped with multispectral cameras and LiDAR sensors. • Monitoring the flow of vehicles on the Forest Road Network, through the installation of sensors associated with bus mechanisms. • Pilot project for installing an artificial intelligence system to support the production process in forest nurseries in the Madeira Autonomous Region (RAM).

⁷³ <https://recuperarportugal.gov.pt/2021/06/13/investimento-td-c19-i05-ram/>

⁷⁴ <https://recuperarportugal.gov.pt/2021/06/13/investimento-re-c09-i03/>

⁷⁵ <https://recuperarportugal.gov.pt/2021/06/13/investimento-tc-c14-02/>

⁷⁶ Validation call (online) conducted by IEECP with Mr. Mario Marques as representative of the "Gabinete Da Secretária Regional De Ambiente, Recursos Naturais E Alterações Climáticas" on July 05, 2023.

⁷⁷ <https://congress2022.inature.pt>

⁷⁸ <https://www.inature.pt>

⁷⁹ <https://www.forestwise.pt>

⁸⁰ <https://www.forestwise.pt/en/transform-project-coordinators-meet-to-discuss-the-agendas-ambitions-and-challenges/>



	RAM aims to provide the region with high-capacity broadband digital networks that will support a new digital and technological environment , enhancing the digitization of services and companies, innovation, knowledge society and entrepreneurship, promoting the establishment of the new telecom trends, such as 5G networks, IoT ecosystems and the development of smart cities, which could be associated with the smarter adaptation criteria outlined on page 19, “pushing the frontiers of knowledge to gather more and better data”. Detailed actions are listed in English ⁸¹ and in Portuguese ⁸² .
Not exist for long enough for a meaningful assessment (<2 years)	Concrete actions were planned on the eve of the IV International Forestry and Health Potential Congress in April 2022. ⁸³

Another project drafted in the regional plan for Madeira is the “**Water efficiency and reinforcement plan for the supply and irrigation systems**”. This project is not assessed based on the criteria table as in the case above. This is because, to date (August 2023), it is not possible to assess the promising potential of the foreseen measures without a better and in-depth evaluation of the effects of its implementation on water availability or changes in ecosystems or of its trade-offs with climate risks and vulnerabilities. Nevertheless, based on the scope of this report, it is mentioned since it is directly financed with RRF funds (NRRP allocation: €70 million).

In short, the planned initiative aims to increase the resilience of water resources on the island of Madeira, through the investment RE-C09-i03-RAM – Water Efficiency and Reinforcement Plan for the RAM Supply and Irrigation Systems, framed in Component 9 – Water Management of the Recovery and Resilience Plan. This Specific Technical Guidance was negotiated between Portugal and the European Commission and approved on 16 June 2021, published in 2022⁸⁴. The planned investment includes:

- Implementation of optimisation projects for the use of existing resources;
- Capture of surplus water without any impact on ecosystems;
- Establishment and expansion of strategic reserves and the interconnection of the various water sources, which are essential to safeguard uninterrupted supply;
- In the context of adaptation to climate change, ensure that the needs of all users and the population in general as well as the economic and agricultural activities are satisfied. The detailed list of proposed investments and projects is available in English⁸⁵ and in Portuguese⁸⁶.

The coordination is ensured by the ‘Adaptation Community’, which oversees the contribution of various actors into decision-making processes, and communication of relevant information in an accessible way to various target audiences⁸⁷.

The case of Spain (REGILIENCE regions: Región de Murcia, Region of Murcia, and Comunidad Valenciana, Valencian Community)

This sub-chapter presents the results of the investigation of NRRP funds allocation to regional climate adaptation measures in the Region of Murcia and the Valencian Community, both part of the focus regions of the REGILIENCE project.

Based on the national-level NRRP analysis within the scope of this report, the newly identified key measures in the Spanish national NRRP compared to Spain’s NAS/NAP are as follows:

⁸¹ <https://recuperarportugal.gov.pt/2021/06/13/investment-td-c19-i05-ram/?lang=en>

⁸² <https://recuperarportugal.gov.pt/2021/06/13/investimento-td-c19-i05-ram/>

⁸³ <https://congress2022.inature.pt>

⁸⁴ https://recuperarportugal.gov.pt/wp-content/uploads/2022/03/OTE_C9i03-_ARM_RM_03_03_2022_RAM.pdf

⁸⁵ <https://recuperarportugal.gov.pt/2021/06/13/investment-re-c09-i03/?lang=en>

⁸⁶ <https://recuperarportugal.gov.pt/2021/06/13/investimento-re-c09-i03/>

⁸⁷ Principles of CLIMA-Madeira Observatory: <https://observatorioclima.madeira.gov.pt/adaptacao/>



- Measures to improve the waste management legislation and is accompanied by investments fostering the circular economy;
- Measures in line with the new EU Biodiversity Strategy, for instance, to preserve the valuable forest carbon sinks through fire prevention actions and strengthened fire protection, and by increasing carbon absorption through enhanced sustainable forest management actions.

Región de Murcia

Within REGILIENCE, the Region of Murcia focuses on the following resilience topics: water management and coastal areas, buildings and energy, as well as health issues related to high temperatures⁸⁸.

The validation call with the General Directorate of Territory and Architecture Ministry of Development and Infrastructures (Dirección General de Territorio y Arquitectura Consejería de Fomento e Infraestructuras) have **not yet identified promising practices** strictly related to the above key measures and supported by NRRP-funds. Nevertheless, the Region of Murcia is active in Spain's RRF specific projects, with interventions at the local and regional levels. Although not strictly bound to climate adaptation solely, instead including mitigation actions as well, the authors have identified two RRF-funded projects in Murcia:

- 1) This region is one of the 12 beneficiaries of the project to reactivate cultural tourism in Spain. The project focuses on the renovation and conservation of sites and historical buildings (reference C1.I2 in the Spanish Recovery and Resilience Plan)⁸⁹. The total amount of NRRP fundings allocated to the project is €84.1 million, as published by the Ministry of Industry, trade and tourism⁹⁰.
- 2) Innovation in electromobility and charging points (reference C1.I2 in the Spanish Recovery and Resilience Plan). The MOVES III project is managed by regions with a budget of €626 million. More information is available on the region portal⁹¹.

Similar to the region of Central Macedonia, Murcia is also actively involved in non-NRRP-related regional financial support and participation within the following plans:

- Subsidies to Local Authorities for the implementation of Nature-based solutions (NbS) in urban public spaces, e.g., enclosures, roofs and facades (start date: October 2021)⁹². Some highlights and additional information are listed below:
 - Execution of works documents⁹³;
 - Reference framework⁹⁴.
- Sustainable Construction Strategy (Estrategia de Arquitectura y Construcción Sostenible – EACS) since 2020 and ongoing⁹⁵. More details are available in Spanish⁹⁶. Some highlights and additional information are listed below:
 - Multi-stakeholder collaboration to create the necessary change in the construction process: Region of Murcia in cooperation with the EACS Technical Board, an advisory body that includes representatives of regional and local administrations, the teaching and research fabric, the business sector, professionals and technicians, and representatives of citizens and users.
 - EACS – Composition of the Technical Committee⁹⁷ (in Spanish).

⁸⁸ <https://regilience.eu/the-project/>

⁸⁹ https://commission.europa.eu/business-economy-euro/economic-recovery/recovery-and-resilience-facility/spains-recovery-and-resilience-plan/spains-recovery-and-resilience-supported-projects-specific-projects_en

⁹⁰ <https://www.mincotur.gob.es/es-es/GabinetePrensa/NotasPrensa/2022/Paginas/El-Gobierno-invierte-81-millones-de-euros-en-el-patrimonio-histórico-de-Paradores.aspx>

⁹¹ <https://mui.carm.es/ayudas-moves-iii>

⁹² <https://eacs.carm.es/en/acciones/subvenciones-a-corporaciones-locales-para-la-implementacion-de-sbn-en-el-espacio-publico-urbano/>

⁹³ : https://eacs.carm.es/wp-content/uploads/2022/01/A-Subvenciones_SBN_2021-Ejecucion_de_obras.pdf

⁹⁴ <https://eacs.carm.es/en/enlaces-de-consulta/>

⁹⁵ <https://eacs.carm.es/wp-content/uploads/2020/11/D-eacs.pdf>

⁹⁶ <https://eacs.carm.es/estrategia-de-arquitectura/>

⁹⁷ <https://eacs.carm.es/estrategia-de-arquitectura/>



- o EACS Annex – Methodology for the preparation of the diagnosis⁹⁸ (in Spanish).

The Valencian Community – Comunidad Valenciana

Within REGILIENCE, the Valencian Community focuses on the following resilience topics: disaster risk reduction, especially in relation to flood and fires, protection of biodiversity and silviculture coastal management⁹⁹. During the identification of promising practices, a validation call was held with Beatriu Femena Ferrer, working at the Regional Ministry (Conselleria) of Agriculture, Rural Development, Climate Emergency and Ecological Transition, Valencian Community¹⁰⁰. The information provided below refers to the official dissemination platform of the Generalitat Valenciana, where information is compiled regarding the proposed strategy, follow-up reports, with details of the progress in the most relevant sectors¹⁰¹.

Based on the validation call, the Valencian Government and specifically the Minister of Agriculture, Rural Development, Climate Emergency and Ecological Transition (Conselleria d’Agricultura, Desenvolupament Rural, Emergència Climàtica i Transició Ecològica), has launched four calls for a total of **€60.95 million** from NRRP funds and dedicated to the regional development as well as implementation of climate adaptation measures. Of four calls, the first and the last one address the same subject but in different years (2022 and 2023).

- 1) **Resolution of May 5, 2022**, which establishes the regulatory bases and calls for aid for the implementation of new separate collections, especially bio-waste, and improvement of existing, financed by the Recovery and Resilience Plan.
- 2) **Resolution of May 30, 2022**, of the Minister of Agriculture, Rural Development, Climate Emergency and Ecological Transition, by which the regulatory bases are established and aid is called for waste treatment facilities, financed by the Recovery, transformation Plan and resilience.
- 3) **Resolution of July 1, 2022**, of the Minister of Agriculture, Rural Development, Climate Emergency and Ecological Transition, establishing the regulatory bases and calling for aid for preparation facilities for the reuse and recycling of waste, financed by the Recovery, transformation and resilience plan.
- 4) **Resolution of May 25, 2023**, of the Minister of Agriculture, Rural Development, Climate Emergency and Ecological Transition, which establishes the regulatory bases and calls for aid for the implementation of new separate collections, especially bio-waste, and improvement of existing, financed by the Recovery, Transformation and Resilience Plan.

Promising practice #1: Circular Economy planned tenders	
Criteria	Explanation (based on the EU Adaptation Strategy core principles):
Cover relevant thematic areas and basic elements	<p>Valencia will be one of the pilot regions for the Regional Data Center for the potential to secure nature in Marjal wetland¹⁰², and how nature-based solutions (NbS) can help reduce damage through its natural insurance value, thus reducing the potential economic damage caused to people, economic activity, facilities, equipment and infrastructure (more systemic adaptation). Maintaining the quality of ecosystems in protected areas such as the is considered one of the main pillars of the regional adaptation strategy, since they provide great resilience and capacity to provide environmental services in the context of climate change.</p> <p>In terms of replicability, the ecosystem of Marjal wetland is widely distributed on the coast of the Valencian Community and Spanish and European coastal areas, holding the potential to serve as a good practice for improving the conservation actions of an ecosystem (coastal wetlands) to implement its the risk-reduction potential by increasing its buffer/absorption capacity in extreme events (faster adaptation).</p>

⁹⁸ <https://eacs.carm.es/wp-content/uploads/2020/12/Q-EACS-Anexo.pdf>

⁹⁹ <https://regilience.eu/the-project/>

¹⁰⁰ The ‘Conselleria de Agricultura, Desarrollo Rural, Emergencia Climática y Transición Ecológica’ is a department of the Generalitat Valenciana (GVA) – regional government of the Valencian Community. Within the Ministry of Agriculture, Rural Development, Climate Emergency and Ecological Transition, the General Directorate of Climate Change and more specifically the Climate Agenda 2030 service (with Patricia Callaghan as head of the service), is promoting participation in European projects of the different departments.

¹⁰¹ <https://presidencia.gva.es/es/web/gvanext/comunitat-valenciana>

¹⁰² i.e., secure green assets for their ecosystem functions, in line with the new natural capital accounting for ecosystem services



<p>Show good potential</p>	<p>In terms of international engagement and dissemination, the Valencian Community has actively participated and/or will participate as partner in the field of climate adaptation and with a broader spectrum of partners:</p> <ul style="list-style-type: none"> • LIFE TECMINE project (focus on Ademuz, Valencia) – improving mine restoration activities in Mediterranean forest areas by testing innovative and highly transferable restoration techniques¹⁰³. The projects contributed to the EU Biodiversity Strategy for 2030^{EN•••} and the Nature Restoration Law. EN (executed 2017 – 2022). • DesirMED project (planned) – addressing the prevention of large forest fires, aggravated by droughts and increasingly frequent heat waves, which generate additional pressure on the agricultural sector and the rural environment. The full explanation and project partners description are available on the official website¹⁰⁴ (planned). • ‘SOTERIA’, HORIZON Research and Innovation project (planned 2023 – 2026) – testing innovative ecosystem insurance schemes and solutions. Solutions will be based on the results of the NAIAD project on insurance and insurance value of ecosystems and the role of insurance as a lever to increase resilience and profound transformative change¹⁰⁵. <p>These projects foster interregional actions that promote awareness and knowledge exchange, in order to foster individual and societal behavioural changes to address the altered conditions under climate change and to promote both mitigation and adaptation measures.</p>
<p>Not exist for long enough for a meaningful assessment (<2 years)</p>	<p>Provided that the current open calls cannot yet be considered measures, nevertheless, they are promising in the sense that they aspire to the objectives set by Next Generation EU and provide an overview of the funds allocated in accordance with the Recovery and Resilience program. All calls relevant to this report have been identified during the external consultation with Generalitat Valenciana (the Valencian Government) are published between 2022 and 2023.</p>

<p>Promising practice #2: Biodiversity and ecosystems</p>									
<p>Criteria</p>	<p>Explanation (based on the EU Adaptation Strategy core principles):</p>								
<p>Cover relevant thematic areas and basic elements</p>	<p>In the field of biodiversity and ecosystems, NRRP Investments have been allocated for the following objectives (including NbS as one of the criteria for more systemic adaptation): i) improvement of terrestrial and marine biodiversity; ii) ecosystem restoration, iii) rehabilitation of old mining sites, and iv) sustainable forest management¹⁰⁶</p>								
<p>Show good potential</p>	<p>Within the improvement of terrestrial and marine biodiversity, the following NRRP financing has been reported by the Valencian Government. However, the information collected within the scope of this report is not indicative of elements reflecting the criteria of smarter adaptation nor opportunities for international action yet.</p> <table border="1" data-bbox="470 1601 1380 1859"> <thead> <tr> <th data-bbox="470 1601 614 1668"> <p>Investment (Millions €)</p> </th> <th data-bbox="614 1601 1380 1668"> <p>Performance</p> </th> </tr> </thead> <tbody> <tr> <td data-bbox="470 1668 614 1736"> <p>12</p> </td> <td data-bbox="614 1668 1380 1736"> <p>Programs for the reintroduction of extinct or endangered species in the Natura 2000 Network of the Valencian Community.</p> </td> </tr> <tr> <td data-bbox="470 1736 614 1792"> <p>12</p> </td> <td data-bbox="614 1736 1380 1792"> <p>Ex situ conservation actions of threatened fauna and flora.</p> </td> </tr> <tr> <td data-bbox="470 1792 614 1859"> <p>12</p> </td> <td data-bbox="614 1792 1380 1859"> <p>Actions for the conservation of endangered species, control of wild boars and eradication of barbary sheep ('arruis') in protected natural areas: Marjal de Pego-Oliva, Prat de Cabanes-Torreblanca, Desert de Les Palmes, Font Roja and Serra</p> </td> </tr> </tbody> </table>	<p>Investment (Millions €)</p>	<p>Performance</p>	<p>12</p>	<p>Programs for the reintroduction of extinct or endangered species in the Natura 2000 Network of the Valencian Community.</p>	<p>12</p>	<p>Ex situ conservation actions of threatened fauna and flora.</p>	<p>12</p>	<p>Actions for the conservation of endangered species, control of wild boars and eradication of barbary sheep ('arruis') in protected natural areas: Marjal de Pego-Oliva, Prat de Cabanes-Torreblanca, Desert de Les Palmes, Font Roja and Serra</p>
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¹⁰³ <https://www.lifeawards.eu/project/life-tecmine/>

¹⁰⁴ <https://comunica.gva.es/es/detalle?id=373105818&site=174859734>

¹⁰⁵ [NAture Insurance value: Assessment and Demonstration | NAIAD | Project | Fact sheet | H2020 | CORDIS | European Commission \(europa.eu\)](https://natureinsurancerecovery.eu/)

¹⁰⁶ <https://agroambient.gva.es/es/web/cambio-climatico/costa-valenciana-enfront-emergencia-climatica>



	de Mariola. Additional details on the plan and challenges can be found in this article ¹⁰⁷ (in Spanish).
12	Monitoring of the state of conservation of wetlands. ecological bases.
12	Start-up of a marine surveillance service for the improvement of biodiversity and acquisition of boats.
	<p>The project proposals and plan at the regional level are supported by an implementation system with appropriate coordination between the national-level Recovery and Resilience Plan and the programs proposed by the 'Conselleria d'Agricultura, Desenvolupament Rural, Emergència Climàtica i Transició Ecològica' of the Valencian Government.</p> <p>Relevant data is collected and monitored within the virtual maps¹⁰⁸: Figure 15 and Figure 16. The maps are fed with spatial data from, among all, the collaboration of the Valencian Spatial Data Infrastructure (IDEV), and the Institut Cartogràfic Valencià, which can be regarded as an ex-ante practice to the NRRP funds¹⁰⁹. The IDEV includes, among its components, the official geoportal of the Spatial Data Infrastructure (IDE) of the Valencian Government, which guarantees access, reuse, and interoperability of the Geographical Information of the Valencian Community in a simple and effective way, in terms of dangers, risks and impacts. The study behind the spatial data maps includes the analysis of, e.g., risks of flooding and erosion with consequences on the population, cultural heritage, agriculture, industry, critical infrastructures, tourism, and housing.</p>
Not exist for long enough for a meaningful assessment (<2 years)	<p>Transició Ecològica announced the creation of a Posidonia monitoring service from June 2022¹¹⁰. However, it is worth mentioning that early efforts have been pursued at the regional level since 2007 in combating climate change: the Commission for the Coordination of Climate Change Policies of the Valencian Community (<i>Comisión de Coordinación de Políticas de Cambio Climático de la Comunitat Valenciana</i>) provides the opportunity for various departments of the Generalitat to participate in the coordination of climate change policies¹¹¹. The Commission already approved two Strategies: the Valencian Strategy for Climate Change 2008-2012 and its successor, the Valencian Strategy for Climate Change 2013-2020. They are drafted as the core instrument in the fight against climate change. More information on the actions that are carried out under the concept of Adaptation Mission is available on the Ministry website¹¹² (in Spanish).</p>

¹⁰⁷ https://www.valenciaextra.com/es/politica/transicion-ecologica-reforzara-control-jabalis-arruis-en-parques-naturales-mejorar-conservacion-especies-amenazadas_514018_102.html

¹⁰⁸ <https://visor.gva.es/visor/>

¹⁰⁹ <https://idev.gva.es/va/inicio>

¹¹⁰ <https://www.informacion.es/alicante/2021/07/21/transicion-ecologica-crea-servicio-vigilancia-55292214.html>

¹¹¹ <https://agroambient.gva.es/es/web/cambio-climatico/comissio-de-politiques-de-coordinacio-de-politiques-de-canvi-climatic-de-la-comunitat-valenciana>

¹¹² <https://agroambient.gva.es/es/web/cambio-climatico/missio-adaptacio-%20canvi-climatic>

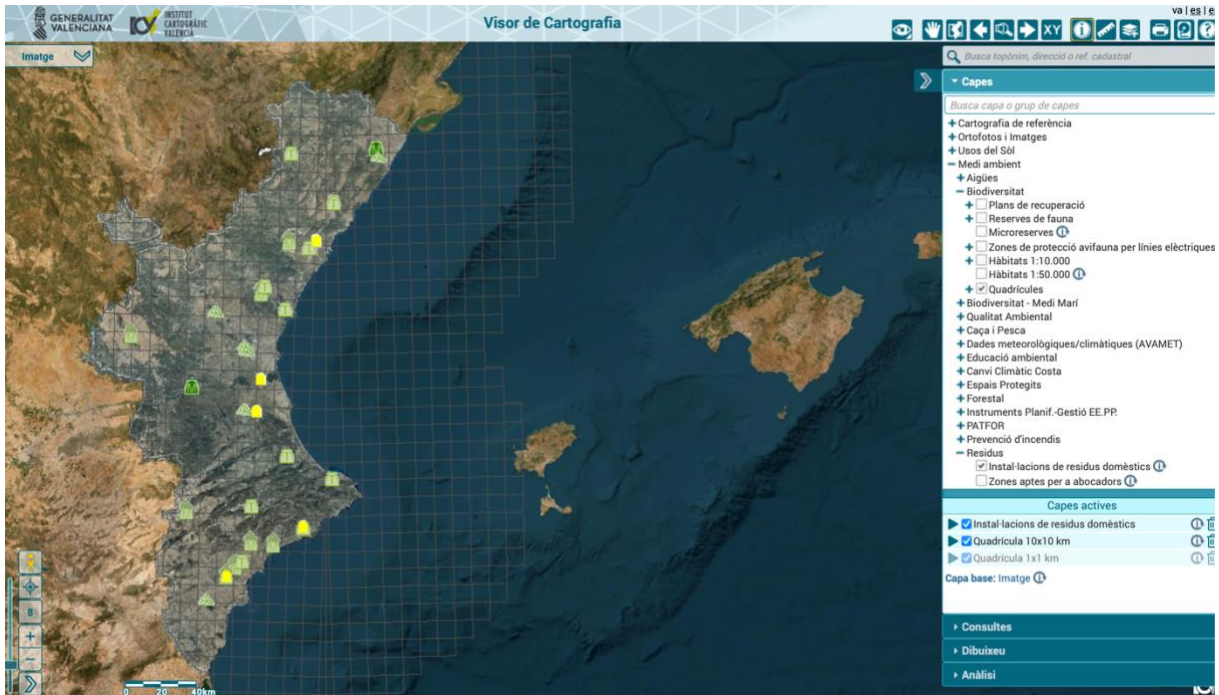


Figure 15: Snapshot of the online map ("Visor de cartografia") of the Valencian Community
Source: The Institut Cartogràfic Valencià (2023)



Figure 16: Snapshot of the online map for coastline climate adaptation of the Valencian community (Visor per a l'adaptació al canvi climàtic de la costa). Source: The Institut Cartogràfic Valencià, Ministry of Territorial Policy, Public Works and Mobility (2023) (<https://geoadaptacostes.gva.es>)



4. Lessons learned and recommendations

4.1 Adaptation Policies and Priorities: key messages from the analysis of the EU Recovery and Resilience Facility

The present chapter outlines the key messages in relation to Climate Change Adaptation policies and priorities from the comparative analysis and alignment of the Recovery and Resilience Plans with the national Adaptation Strategies and/or Plans in the European Union. The authors have found evidence for the following statements, at least applying to one of the assessed case studies, regions, or countries:

1. The RRF has facilitated a coherent reform package to meet the 37% climate expenditure target and six environmental objectives, among all, **placing adaptation on the agendas of EU Member States**, both at the national and regional levels¹¹³. Nowadays, measures that favour adaptation to climate change occupy their own priority seat alongside mitigation in different policies at various governance levels (see section 3.2.6 Regional promising practices). The RRF has become a reference in several MS for incipient policies on adaptation, providing a series of new key measures. However, as it will be detailed in the recommendations section below (4.3), the report highlighted the **need for policy coherence** as one of the main challenges when **aligning adaptation measures in NRRP, compared to** previously drafted adaptation strategies and plans (NAS/NAP). This recommendation is limited to the scope of this report, aligning the information drafted by MS in NRRP and NAS/NAP, and it is not reflective of the RRF actual execution phase, nor of NAS/NAP implementation.
2. The RRF is intended to support economic and social recovery, enabling **the channelling of financial support towards six resilience objectives, including climate change adaptation**, making it possible to create and strengthen i) the provision of resources, ii) the mobilisation of stakeholders, iii) the capacity-building and knowledge generation, and iv) the progressive awareness that there is an urgent need to adapt economic and social development to the climate crisis. At the regional level, different calls for grants are identified which have proved to be promising and favourable instruments for mobilising resources and actors to pursue impact-led and purpose-driven research on climate risks and vulnerability (e.g., the case of the Valencian Community).
3. This analysis shows that, out of 27 Member States, **15 allocated funds for climate adaptation in their Recovery and Resilience Plans**. New NRRP key measures concern each country's economic, social and territorial health, education and capacity-building, jobs and skills creation, research and innovation abiding to the European Commission guiding principles for the Facility¹¹⁴. As of July 2023, this report considers the **total NRRP funds allocated to climate adaptation amounting to €34,073 million**, as the sum of resources allocated by all 15 Member States. The allocation is based on each country's population, the inverse of its Gross Domestic Product (GDP) per capita, as well as its average unemployment rate over the past five years (2015 – 2019) against the European average¹¹⁵.
4. The RRF has enabled adaptation to be included into **public investment projects**, generating **high-quality knowledge on the risks and vulnerability to climate change for spatial planning**. This is the case of the IN-PLAN project supported, among all, by the North-West Croatia Regional Energy and Climate Agency and knowledge centre, REGEA (see the case of Adriatic Croatia promising practices). Through the development of a new climate proofing documentation for projects in the tourism sector, the NRRP funds aid in Croatia's efforts to address the need to include relevant and suitable adaptation responses in regional and local projects for integrated sustainable energy,

¹¹³ https://commission.europa.eu/system/files/2021-06/nextgenerationeu_questions_and_answers_on_the_recovery_and_resilience_facility_en.pdf

¹¹⁴ https://ec.europa.eu/commission/presscorner/detail/en/qanda_20_1659

¹¹⁵ [https://www.europarl.europa.eu/RegData/etudes/ATAG/2020/659268/EPRS_ATA\(2020\)659268_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/ATAG/2020/659268/EPRS_ATA(2020)659268_EN.pdf)



climate, and spatial planning. The climatology data and models used for the emergency response are drawn from the NRRP, to select which area is the most vulnerable to flooding, fires, earthquakes, and so forth. The outcomes of IN-PLAN have the potential to become a long-lasting support structure outside the sector in which it is being implemented, advancing the generation of knowledge on climate-resilient spatial planning.

5. While considering the new key measures identified in the national NRRP of 15 MS, **measures for climate change adaptation are integrated in various sectors and areas of work**, to a greater or lesser extent. The Croatian case of promising practices, as presented in this report, has the potential to show how the allocation of NRRP funds could motivate certain sectors to pursue the integration adaptation measures. Their design, planning and execution could serve to educate about climate risks and vulnerabilities and impacts that until only a few years ago were completely disregarded or unknown in areas such as spatial planning.
6. Based on the analysis of regional promising practices, NRRP funds are allocated in favour of the **European Adaptation Strategy**, for **faster, smarter, more systemic adaptation and international action**, especially in those areas most impacted by the effects of the climate crisis: water resources, biodiversity, coasts, etc. (for example, see the case of the Autonomous Region of Madeira). For instance, a growing number of multi-stakeholder regional and national consortia, industrial symbiosis collaborations, and interregional cooperation efforts are including climate change adaptation challenges among their policies and projects. It is the case of the Commission for the Coordination of Climate Change Policies of the Valencian Community (Spain), and of the NRRP investments allocated to the *Florestar 4.0* projects, aimed to manage forests and mitigate the risks of forest fires in Madeira (Portugal). To a large degree, such initiatives are due to the either direct or indirect influence created by the RRF as its measures and actions are implemented. In terms of international action, the EU Member States NRRP, and the RRF overall, have aided in the alignment of adaptation priorities particularly with the United Nations Framework Convention on Climate Change¹¹⁶ and the IPCC assessments¹¹⁷, whilst in line with the European Union Strategy on Adaptation to Climate Change and Climate Action¹¹⁸.
7. Investments stemming from the RRF are enabling the creation of **web-based and GIS-based real-time platforms on climate risks, vulnerabilities, and impacts on adaptation**, as useful tools for awareness raising in society, information, dissemination, consultation on climate data, resilience risks, priorities areas, and so forth. These platforms could provide relevant and suitable information to the European platform Climate-ADAPT, with additional content on its EU funding for adaptation at the national and regional levels¹¹⁹. The Regional promising practices section provides examples in detail, for example, the online map for coastline climate adaptation (*Visor per a l'adaptació al canvi climàtic de la costa*) of the Valencian Community (Spain). Another example is the Ecomap developed for the City of Zagreb (Croatia) for urban planning and citizens' health quality control.
8. The implementation of the adaptation priorities and key measures identified in countries' NRRP has contributed towards **promising administrative coordination on adaptation such as the vertical and horizontal integration**. One example of horizontal integration (of various stakeholders from different expertise fields) refers to the public representatives of the City of Zagreb and the Andrija Štampar Teaching Institute of Public Health (project initiator): through their coordinated actions, the Ekokarta has been drawn up and implemented, with the participation and guidance of several regional stakeholders, including the Institute for Medical Research and Occupational Health and the Meteorological and Hydrological Service.

¹¹⁶ https://unfccc.int/sites/default/files/convention_text_with_annexes_english_for_posting.pdf

¹¹⁷ <https://www.ipcc.ch/assessment-report/ar6/>

¹¹⁸ https://climate.ec.europa.eu/eu-action/adaptation-climate-change/eu-adaptation-strategy_en

¹¹⁹ <https://climate-adapt.eea.europa.eu/en/eu-adaptation-policy/funding>



4.2 Pending challenges

Below are the main challenges from the analysis of national and regional key adaptation measures:.

1. To achieve the ambitions of the EU Mission on Adaptation specific allocation of climate adaptation expenditures is needed. One key component which presents risks in the Green Transition is **the absence of detailed reporting on expenditures**. It may potentially be that investments in adaptation and mitigation measures are not split, considering adaptation measures are not in complementarity with mitigation but integrated. It is one of the many challenges to align strategic finance needed for the NAP/NAS process in the development and implementation phases with available sources of financing. Additionally, each MS should align its strategies with their financial readiness and capacity. Future research stemming from this report may seek an update on the NAS/NAP financial breakdown per MS, providing further recommendations on the transparency and evaluation of the allocation of investments to climate change adaptation measures.
2. There are common areas of alignment when it comes to barriers to the implementation of coordinated adaptation measures, and this is especially the case for multi-level governance: the **lack of coordination mechanisms** prevents NRRP resources from flowing **from national to sub-national public bodies**. Based on the analysis presented in this report, these instances would hint at a limited vertical coordination between funds disbursement at the national level and regional level, hence, posing a risk for the future continuity of current long-term measures, as in the case of the Regional Development Fund of Central Macedonia.
3. In other cases, the continuity of current adaptation efforts is threatened by **shortage of staff**, or lack of a dedicated regional-level representative fully invested in (inter-)regional and national action, aligning adaptation priorities with international objectives. In some instances, the analysis in this report found that financial and stakeholders' engagement as well as awareness-raising activities are **project-based**. Similarly, obligations for reporting on climate adaptation work are currently project-based too (as identified in section 3.2.6 Regional promising practices). This is a key aspect stemming from the performed analysis, as it reveals that, when building resilience, local and regional authorities would need to be able to have ownership/control of the long-term programme planning for adaptation actions and resilience; nevertheless, they are constrained by a project-based system, which controls financial flows with a short-term perspective to achieve objectives.
4. Linked to the previous challenge, other regional experts have indicated that the **length of the mandatory RRF monitoring, evaluation and reporting mechanism is insufficient** for MS to account for the progress made on regional climate adaptation initiatives and actions, since regional initiatives are also bound to time- and project-based constraints. A longer mandatory reporting period would aid in the identification of evidence-based challenges as well as opportunities to solve emerging issues that may not arise and/or are being insufficiently addressed within the timeline of a European project funding. Further, if most countries continue to rely on non-legally binding pledges, a voluntary monitoring and evaluation process may no longer reflect recent work on adaptation measures. This limitation is also addressed in section 4.3 "Governance for monitoring and evaluation".
5. There is **limited information available on the financial resources to mobilise local and regional actors**. For instance, the analysis found that capacity building and exchange sessions to explore adaptation plans in Greek regions are supported by the Green European Foundation, nevertheless, the outreach of such events may not always include interested parties and decision-makers to implement practices at the city and regional level. Based on the analysed policy documents and RRF adaptation expenditures (as of July 2023), limited information is provided on the estimated costs specific for training activities of local and regional (public) bodies to carry out planning, implementation, and monitoring of climate adaptation key measures of NRRP. This challenge makes it difficult to assess whether such bottom-up efforts are receiving sufficient support from the NRRP packages.



4.3 Recommendations

Resources

The RRF ought to address the financial and human resources needed to implement adaptation policies, priorities, and key measures in terms of generation of knowledge and experience exchange, mobilisation of public authorities and other stakeholders, citizens' awareness raising, and so forth. Additionally, NRRP ought to continue with the promising support of cross-sectoral collaboration with technical and scientific experts as detailed in the report. Regional-level resources ought to be complemented with EU funding and interregional collaboration efforts (as highlighted in section 3.2.6 Regional promising practices of this report). These have the potential to lead to coordinated actions to develop and maintain close collaboration at regional and EU level, potentially lead to a series of benefits. The latter include, among all, improved regulatory framework that could aid in those instances where budget allocation for adaptation key measures could not be discerned from mitigation. This refers to challenges number 1, 2 and 3.

In relation to challenges 5 also, the role of national governments in decentralising public funding is critical, in conjunction with the need for more national allocation of funds for resilience and adaptation on top of the EU funding schema and support. Such recommendation is specifically directed to regional case where EU funding can hardly reach all regions and communities that are need of financial support. The RRF would therefore benefit from detailing the financial resources foreseen to be necessary for the implementation of the proposed adaptation measures and actions at the local and regional level. The reporting by MS should include an update of the reached progress in the implementation of key measures, including the detailed breakdown of mitigation and adaptation actions, with an overview of related stakeholders (public/private).

Governance for monitoring and evaluation

The NRRP documentation drafted by each MS is grounded on climate risks modelling scenarios and related data. This analysis revealed that at the international, EU, national, and regional levels, various stakeholders are jointly working on designing, implementing, and disseminating useful tools to monitor and evaluate climate and adaptation risks (for inspiration, these the REGILIENCE **Self-assessment Tool on Maladaptation**¹²⁰). These tools can introduce improvements on an ongoing basis, with accounts for successes and failures in developing an effective and efficient system in terms of impacts, vulnerability, and adaptation. In response to challenge number 4, opportunities for improvement have been identified:

- On a voluntary basis, only few countries resubmit the reported information to the online platform. The monitoring and evaluation process on the allocation of funds should rely on a **mandatory reporting process for all MS** Such process would be more effective in enforcing as well as documenting climate adaptation policies, preventing to some extent irregular monitoring and reporting, and also ensuring a certain degree of accountability, whilst supporting stricter climate laws at the national level, which could in turn impact implementation at the regional level¹²¹.
- Based on the case studies for promising practices presented in this report, the monitoring process at the national level would benefit from: i) a bottom-up approach to data collection and flow, and ii) the knowledge and experience of **additional monitors**: i.e., regional, and local stakeholders, including but not limited to public authorities, civil society organizations and business, aiding the data collection. In doing so, not only would countries have a clearer and more complete overview of budget expenditures for adaptation in their recovery strategy, but they would also contribute to the scrutiny of the progress for the work of existing monitoring bodies, whose current focus is the fiscal and economic implications of the RRF package, as reported in section 1.1.
- **monitoring and evaluation to identify emerging future adaptation actions should be linked to the uniqueness of a region's ecosystem**, natural resources, and its morphological features, as it was highlighted during the regional expert's validation call on the promising practices in the Autonomous

¹²⁰ <https://regilience.eu/self-assessment-tool-for-maladaptation/>

¹²¹ Ulibarri, N., Ajibade, I., Galappaththi, E. K., Joe, E. T., Lesnikowski, A., Mach, K. J., ... & Global Adaptation Mapping Initiative Team. (2022). A global assessment of policy tools to support climate adaptation. *Climate policy*, 22(1), 77-96.



Region of Madeira. The essential aspect here is that CLIMA-Madeira combines efforts from various stakeholders and scientific knowledge on impacts and vulnerability aspects to draft its local Regional Strategy for Adaptation to Climate Change. While it is important to stress the responsibility of national governments in coordinating and planning for funding (in this instance, Portugal's NRRP), Madeira is also valuing the role of regional and sub-regional parties (e.g., metropolitan areas and municipalities) in implementing adaptation, as impacts and vulnerabilities are specific to each place¹²². For instance, the region is an insular and ultraperipheral territory, visited by 2.5 million tourists each year, whose tourism sector is highly vulnerable to e.g., wind patterns that are impacting in-/out-bound connection to/from the airport¹²³.

Coherence in policy planning and RRF Structure

This analysis has attempted to assess the alignment of NRRP and NAS/NAP, highlighting challenges in identifying whether the RRF adaptation planning has considered measures that were already included/existing in NAS/NAP. One recommendation stemming from this report is thus focused on the EU funding schema demanding coherence in policy planning from MS and regional actors when drafting their strategies and plans that address (at least) the same priority areas of intervention. In the case of the RRF, several analysed NRRP in this report had different general and/or specific objectives, key measures, and climate adaptation indicators, compared to their NAS/NAP, drafted solely a few years prior. This report aims to stress that, as far as possible, NRRP should have prioritised the inclusion of pre-existing NAS/NAP measures and actions, to then be implemented in the RRF execution phase. In general terms, policy coherence would improve the clarity of new documents structure, facilitating new funding, and the monitoring and evaluation of achievements of a MS and its regional and sub-regional governance elements (in reference to challenge number 5).

Final considerations on transformational pathways

Where countries adopt diverse approaches to adaptation actions – including regional risk-based approaches – the RRF structure should ensure that these approaches are not mutually exclusive but complementary, generating synergies that foster (regional) transformative pathways to resilience. The NRRP key adaptation measures should be defined within a multi-level governance approach, incorporating decision-makers and other stakeholders into the implementation, monitoring and evaluation, and should also contribute to the global climate change governance framework. In addition, while referring to adaptation measures, it is important to draw more attention to the transformational aspect of resilience, in terms of the need for an integrated strategy for resilient transformation, which is not only limited to incremental adaptation¹²⁴. This concept would need to be addressed in-depth in future research and policy dialogues with local and regional experts, to better assess which key elements are involved (or ought to be involved) in the implementation of planned adaptation measures, as part of the foundations for an integrated pathway for climate resilience and a multi-governance approach¹²⁵. To conclude, as mentioned in the Methodology section, the data used in this report was collected and analysed from September 2022 to April 2023, but as MS progress with their planned initiatives and expenditures, new data is available, e.g., on Reportnet¹²⁶, and can thus be used in future research to progress the findings of this report.

¹²² https://ar5-syr.ipcc.ch/topic_adaptation.php

¹²³ Leon et al (2021). Downscaling climate change impacts, socio-economic implications and alternative adaptation pathways for islands and outermost regions. Madrid: McGraw-Hill. <https://doi.org/10.5281/zenodo.5141549>.

¹²⁴ <https://www.cambridge.org/core/journals/global-sustainability/article/incremental-transitional-and-transformational-adaptation-to-climate-change-in-resource-extraction-regions/4DE54B44B1BF5C88F597E76A0521F5BB>

¹²⁵

https://www.researchgate.net/publication/343112086_Sustainability_resilience_adaptation_and_transformation_Tensions_and_plural_approaches

¹²⁶ <https://reportnet.europa.eu/public/dataflow/895>



Conclusions

The adoption of the European Adaptation Strategies and Plans (NAS/NAP), including elements of governance, has provided the impetus for EU MS, especially those still lacking a national vision on the matter and/or would have not drafted such documents without obligation to do so, to implement climate change adaptation measures and develop sectoral strategies on different governance levels for resilience. Nevertheless, the fact that EU MS have developed such plans does not imply that they have established a structural process for climate and energy planning (for both adaptation and mitigation measures), implementation of plans, monitoring, and verification of results, and so forth. It takes time for such a paradigm shift: from creating a single document to creating a robust, structured process. Without sufficient long-term investment, countries will be unable or struggle to meet the necessary green and just transition for limiting warming to 1.5°C and fostering Europe's climate adaptation efforts. Subsequently, the establishment of the Recovery and Resilience Facility (RRF) in February 2021 has become the cornerstone for the Next Generation EU social, economic, and environmental recovery package in the aftermath of the Covid-19 crisis. To receive financial aid, MS set NRRP, lining up reforms and investments to boost inclusivity and sustainable growth, especially supporting the acceleration of the Green and Digital Transition pillars.

This report aimed to align climate adaptation measures in the NRRP of 27 EU MS with their NAS/NAP, in terms of key measures and planned expenditures, by means of a comparative analysis reviewing 158 policy documents. Core findings are as follows:

- Out of 27 MS, 15 were found – to the best of this analysis – to allocate RRF fundings to climate adaptation measures (Belgium, Croatia, Cyprus, Czechia, France, Greece, Italy, Latvia, Lithuania, the Netherlands, Portugal, Romania, Slovakia, Slovenia, and Spain);
- Climate mitigation measures still constitute a significant share of the total NRRP funds allocated to the Green Transition Pillar, specifically in Denmark, Estonia, Germany, Ireland, Poland. This means that more EU countries other than the 15 identified above may have allocated RRF funds to adaptation but in synergy with existing mitigation measures and without a clear break-down of expenditures between adaptation and mitigation;
- Finally, the analysis shows that Greece, Portugal, and Slovenia (as of July 2023) allocate an amount that is higher than the one required in the respective country's NAS/NAP. Other countries, as shown in Figure 9 and Figure 10, such as Lithuania, Latvia and France allocate a NRRP amount that is lower than the one in their NAS/NAP, whereas no country allocate equal amount.
- Overall, the results below seem to suggest that – in line with the recommendations section – RRF lack a certain degree of policy coherence when planning for adaptation in NRRP, compared to pre-existing measures and action included in their NAS and/or NAP.

Furthermore, in a coordinated effort with consortium members of the REGILIENCE project and regional representatives from selected focus regions in Croatia, Greece, Spain and Portugal, this report provided shows a first attempt in bridging the knowledge gap on how EU MS can more optimally integrate key adaptation measures into their national and regional policies. The identified regional climate change adaptation promising practices constitute the initial basis for research on the status of NRRP financing. The regions taken into consideration vary on several matters, among all: i) the extent of stakeholders' engagement on multiple governance levels, ii) the mainstreaming of climate adaptation into current workstreams/projects at the national and regional level, as well as iii) the tools developed and implemented to reflect climate adaptation risks, vulnerabilities, and impacts, plus, emergency response capacities. Finally, this research resulted into 5 pending challenges and 4 overall recommendations, highlighted in sections 4 and 5 of this report.

The REGILIENCE project will continue its mission to make progress in mobilising the most relevant actors at various governance levels around climate change adaptation and resilience, incorporating them into public debates, and providing spaces for knowledge and experience exchange, peer-to-peer learning, and collaboration on adaptation practices. Finally, the work developed in this report will be subject of thematic (online) webinars pertinent the project overall objectives.



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Annexes

Annex I – Results from the comparison of NRRP and NAS/NAP: new NRRP adaptation key measures in 27 Member States

The table below reports the comparative analysis of the overall objectives and key measures (not only climate adaptation-bound, but inclusive of mitigation actions) between NRRP and NAS/NAP for 27 Member States. The table also reports the 15 EU States allocating funds to climate adaptation in both NRRP and NAS/NAP.

MS	RRP new adaptation key measures	NAS/ NAP Key Measures
Austria (NRRP funds for adaptation)	<ul style="list-style-type: none"> • Investments in the preservation of biodiversity, restoration of degraded ecosystems, and a new biodiversity monitoring system. • Investment in recycling, reuse, repair and better waste management. • Retrofitting of old and construction of new waste sorting facilities to reduce waste pollution. • Support for municipalities and businesses for their investment in building renovation, façade greening, high-efficiency district heating, and rehabilitation of brownfield sites. 	<ul style="list-style-type: none"> • Securing a sustainable, resource-conserving and climate-friendly (agricultural) production, as well as the maintenance and improvement of the ecosystem services of agriculture under changed climatic conditions. • Maintenance of the multifunctional effects of the forest through sustainable cultivation adapted to climatic changes. • Sustainably securing water resources as the basis of life and habitat, as well as ensuring the provision of high quality drinking water, environmentally friendly cleaning of waste water and strengthening the protection of the population against natural hazards as a result of climatic change. • Safeguarding Austria as an attractive and sustainable location for tourism through the use of potentials arising from climatic change and supporting environmentally friendly adaptation measures. • Ensuring quality of living through implementation of planning, building and use-related adaptation measures for buildings and their surroundings. • Strengthening the precautionary principle through areal precautions, personal precautions and behavioural precautions, in order to reduce the negative consequences of natural hazards resulting from climatic changes. • Fast and professional management of disasters through better linkages and preparation of all concerned actors, in particular with regard to changing climatic conditions. • Maintenance and support of biodiversity and ecosystems and their functions through protection of species that are vulnerable to climatic change, interlinking habitats, sustainable land use and adaptation of nature protection plans to changes resulting from climatic change.



<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Belgium (NRRP funds for adaptation)</p>	<ul style="list-style-type: none"> • The conservation, restoration and sustainable use of biodiversity and ecosystem services and improve resilience to climate change as a buffer against floods, droughts and heat effects. • Investments to accelerate the realisation of a coherent network of protected areas for nature and climate-resilient forests, for the re-meandering of rivers in Wallonia and the creation of wetlands in Flanders. • The Blue Deal measure of Flanders will address the drought problems in a structural way with a strong focus on integrated and nature-based solutions. • Actions includes circular water use projects, better water retention and infiltration through the creation and restoration of wet nature and valleys and increased water conservation in open spaces. 	<ul style="list-style-type: none"> • Created the Adaptation Working Group under the CCIIP monitors and discusses European and international decisions in relation to adaptation which provide clear information about Belgian adaptation policies and the implementation as well as identify national adaptation measures that strengthen cooperation and develop synergies between the various governments. • Development of high resolution climate scenarios to be used as the national reference for future impact and vulnerability assessments. • Define the process/ a roadmap for the development of a centre of excellence on climate. • Development of a national online platform for climate adaptation (research projects, best practices, guidance, plans and programmes). • Strengthening sectoral coordination by creating an integrated vertical and horizontal coordination structure. • Adaptation responses for forestry and agriculture management for invasive alien species. • Take climate change impacts and adaptation needs into account in the framework of the future National Environmental Health Action Plan (NEHAP). • Education and awareness-raising among health professionals on the subject of climate change impacts. • Promote transnational cooperation on adaptation. • Coordination of preventative, planning and management measures in the event of emergency climate change situations. • Safeguarding urban quality of life under changed climatic conditions through conservation and improvement of the multiple functions of urban open and green spaces. • Maintenance and support of biodiversity and ecosystems and their functions through protection of species that are vulnerable to climatic change, interlinking habitats, sustainable land use and adaptation of nature protection plans to changes resulting from climatic change.
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Bulgaria (NRRP funds for adaptation)</p>	<ul style="list-style-type: none"> • Reform the strategic framework in the field of biodiversity and ensure effective management of the National Ecological Network in order to protect and restore ecosystems, natural habitats and species of European and national importance. • The reforms and investments are expected to contribute to building effective Natura 2000 management protecting and restoring ecosystems and natural habitats and species of European and national importance. • The component contributes to addressing the country-specific recommendations on focusing investment on environmental infrastructure. 	<ul style="list-style-type: none"> • reduce soil erosion and improve soil health, measures for conserving soil moisture, and improving and optimizing crop rotations by choices of species or varieties. • incorporating practices such as organic farming and sustainable land management, which increase resilience while lowering emissions. • enhancing adaptive capacity through both breeding and water management, while improving production practices. • carbon sequestration and prevention of soil degradation, increased biodiversity preservation, increased resource productivity, as well as forestry as an economic activity and potentially important source of income. • Afforestation and reforestation programmes reducing the risk of floods and landslides.
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Croatia (NRRP funds for adaptation)</p>	<p>National plan for adaptation does not exist yet and is currently being prepared. Some of the NRRP is based on the existing NAS: there are general connections with the adaptation strategy and some measures of the NRRP are based on the existing NAS, mainly in terms of increasing resilience in several sectors. There was a call for projects in the tourism sector in Q4 2022, financed from the NRRP, with the obligatory requirement to develop climate adaptation documentation for each project. Such requirement obliged each individual project to present a climate risk and vulnerabilities assessment. The above call brought about real novelty in the sector, as projects needed to be designed in a way that all buildings will be climate change resilient, which has never been targeted before.</p>	<ul style="list-style-type: none"> • Introduction of a new model of green urban renewal strategies and implementation of a pilot project for the development of green infrastructure and circular management of space and buildings. • The construction of protective structures to prevent flood risks, prioritising investments into nature-based solutions and green infrastructure to the greatest extent. • Dedicated measures to support biodiversity protection and restoration Investments to restore rivers, floodplains and lakes (e.g. Vransko lake and Trakošćan lake), as well as eliminate invasive species in sensitive area of Neretva within the Disaster Risk Reduction Program in the Water Management Sector.



<p>Cyprus (NRRP funds for adaptation)</p>	<ul style="list-style-type: none"> • Focusing on the protection of the marine ecosystem from hazards. • Measures in protecting biodiversity such as building collaborative marine aquaculture infrastructure, developing touristic routes, extension of the Cyprus Green Points Network for improving waste collection and recycling. • Measures in public warning system for supporting emergency operation through SMS due to forests fire, flooding and for water collection measures as well as enhancing water security for Nicosia and Lamaca regions. 	<ul style="list-style-type: none"> • Improve compliance with the environmental legislation on matters of pollution control and waste management by implementing system permits and inspections in protected areas. • Protection and management of the Natura 2000 network, including the mapping of species and habitats, preparation of management plans for the Natura 2000 sites, monitoring and supervision of the designated sites and the implementation of protection measures. • Assessment of the impacts on the environment from plans/ programmes/ projects and other actions. • Raising awareness and informing communities on the Natura 2000 Network. • The implementation of the laws on the control of water and soil pollution and the management of waste, including the functioning of the Technical Committees and the preparation of compliance reports. • Involvement of the stakeholders in assessment of current and future impacts, adaptation and vulnerability assessment, identification and assessment of the adaptation measures the development of the NAS.
<p>Czechia (NRRP funds for adaptation)</p>	<ul style="list-style-type: none"> • Fostering climate adaptation through increasing the resilience of forests against climate change and enhancing the water retention of forests. • Implementing a system change to provide for a creation of multigenerational forests with special composition. • Adapting small water courses and constructing small water reservoirs, retaining water in the landscape and forests. • Implementing anti-erosion measures to flood protection measures of the city of Brno, rain-water management in urban areas and biodiversity protection. 	<ul style="list-style-type: none"> • The restoration of small water reservoirs or the revitalisation of watercourses in line with the initial habitat area. • Avoiding the possibility of forest deterioration habitats and species habitats by planting geographically non-native species. • The New Green Savings Programme is primarily focused on energy savings and mitigation, where, among other activities, construction of green roofs is supported. • Support education programmes and awareness raising campaigns aimed at implementing adaptation measures (in the area of flood protection, and preparation for dry and hot periods, rainwater harvesting and use, night cooling and daytime shading, building green infrastructure in villages, care of greenery around buildings, etc.).
<p>Denmark (NRRP funds for adaptation)</p>	<ul style="list-style-type: none"> • Measures contributing to the improvement of the ecological status of water bodies in the targeted areas and further support biodiversity. • Taking carbon-rich soils out of production and promoting the transition to organic farming are expected to lead to significant reductions of nitrogen emissions in agriculture. • Rehabilitating industrial sites and contaminated lands, thereby removing dangerous substances and hazardous waste from natural ecosystems. 	<ul style="list-style-type: none"> • Establishing a task force which is to prepare an action plan for climate change adaptation and ensure rapid implementation of the EU Floods Directive. • Modernise the legislation on watercourses and water supply. • Prioritisation of strategic research funds on adaptation, for example, "Future climate and climate change adaptation" (Fremtidens klima og klimatilpasning). • Breeding programmes, seed production and plant supplies, the Ministry of the Environment aims to ensure large genetic diversity. • The Ministry of the Environment prepared guidelines to the municipalities for use when preparing climate change adaptation plans. • The Ministry of Transport published a handbook in 2012, in the preparation of the municipal climate change adaptation plans in coastal areas. • The Ministry of Housing, Urban and Rural Affairs created an online tool to enables property owners and municipalities to map vulnerability to climate change of local areas and buildings.



<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Estonia (NRRP funds for adaptation)</p>	<ul style="list-style-type: none"> • Construct (or rehabilitate) a rail link and related infrastructure, a new tramline, as well as new bicycle- and walk-ways, which is expected to contribute to the Estonian 2035 strategy. • The Tallinn capital region common transport system will be implemented and the railway between the two biggest towns Tallinn and Tartu will be electrified. 	<ul style="list-style-type: none"> • Development of information, monitoring and support systems and preparation of action plans for improving the efficiency and managing the health risks arising from climate change. • Increasing rescue capacity. • Increasing awareness about the effects of climate change and risks in land use, urban arrangement and planning, development of planning methods of risk areas and organisation of the legal framework. • Management of flood risks and the development of green areas and urban landscapes for managing climate risks. • Preservation of biodiversity under the changing weather conditions. • Prevention of invasive alien species from getting into nature, the extermination and control thereof in the changing climate. • Ensuring favourable conditions for natural communities and landscapes and organising nature conservation in the changing climate. • Ensuring the stability, favourable conditions, functions, resources and the diversity of land ecosystems and habitats in the changing climate. • Monitoring of the status of surface water bodies, the structure of biota communities, external and internal load of substances caused by the changes in the temperature and the hydrological regime, and minimising climate risks. • Minimisation of the negative effects of climate change for achieving the good status of the marine environment and the preservation of biodiversity. • Ensuring the productivity and viability of forests and the diverse and effective use thereof in the changing climate. • Participation in the international climate change mitigation and adaptation cooperation and in the development of international climate policy. • Supporting the adaptation of preschool child care institutions, general education and hobby schools, environmental education centres and vocational schools to the effects of climate change. • Ensuring the durability of buildings, more energy-efficient heating and cooling and a comfortable indoor climate for people in the changing weather conditions.
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Finland (NRRP funds for adaptation)</p>	<ul style="list-style-type: none"> • Combat eutrophication of the Baltic Sea by treating fields with gypsum. By re-using industrial by-products. • A transition to precision forestry can safeguard biodiversity, and reduce the load on water bodies, focusing on nutrient recycling and forest management. 	<ul style="list-style-type: none"> • Studies are conducted on climate resilience on the national level. • Action plans for specific administrative branches are drawn up and implemented, taking account of the international repercussions of climate change. • Drafting of regional and local adaptation studies is promoted. • Adaptation is promoted in international cooperation. • Adaptation is included in EU policies and international region-based cooperation projects. • Climate risk assessment and management is improved. • Instruments applicable to the management of financial risks caused by climate change are developed. • Adaptation research is reinforced. • Business opportunities related to adaptation are developed. • Tools are developed in support of regional adaptation work. • Communication on adaptation is developed. • Education and training content on adaptation is developed.
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">France (NRRP funds for adaptation)</p>	<ul style="list-style-type: none"> • Measures adapting and improving the resilience of vulnerable forest stands to the impact of climate change, measures to reduce vulnerability in areas impacted by natural disaster. • Investments in clean water and sewage networks also contribute to the preservation of water resources and prevent scarcity during drought periods. • Fight against artificial conversion of soil, with measures dedicated to the reduction of the environmental impact of urbanisation (through densification of housing in tensed urban areas) and to the reconversion of brownfields. • Integrate biodiversity-related criteria in legal forest management plans by 2021. • The development of the national production of vegetable proteins aims to contribute to the fight against global warming by developing a national supply source of vegetable plant proteins for animal and human consumption, thus making it possible to reduce the imports of proteins and contributing to the fight against imported deforestation. 	<p>The 58 measures included in the NAP-2 are divided into 6 major areas of action that take into account all the issues involved by the current and expected impacts of climate change:</p> <ul style="list-style-type: none"> - governance: territorialization of the NAP-2 and evolution of standards and regulations to take into account the future climate; - prevention and resilience: improving prevention and strengthening resilience to the expected increase in extreme events; - Nature and environment: adapting and preserving environments to ensure the favourable evolution of biodiversity and our environmental heritage; - Economic sectors: adapting the major economic sectors impacted by climate change, including tourism, agriculture, fishing and aquaculture, forestry and its wood sector, as well as the finance and insurance sector; - knowledge and information: improving knowledge and the means of training and informing stakeholders and the general public in order to accelerate France's adaptation and consolidate the basis on which decisions are made; - international dimension: development and export of French know-how in this area and the influence of French diplomacy in climate negotiations.



Germany (NRRP funds for adaptation)	<ul style="list-style-type: none"> • Promoting circularity in the renovation measure and by improving air quality standards through the measures in the climate-friendly mobility component indirectly beneficial to biodiversity. 	<ul style="list-style-type: none"> • promote cross-sectoral and cross-stakeholder discussion on the German Adaptation Strategy. • make the risks associated with climate change for Germany transparent and categorise and estimate potential damage. • contribute to making adaptation an integral part of planning and decision-making processes in all relevant fields of action. • create suitable framework conditions to develop and strengthen adaptation capacities (ecological, technological, social). • Creation of KLIMZUG "Shaping Climate Change in Regions for the Future", to integrate the expected climate changes and the associated extreme weather conditions into regional planning and development processes and thus make a region fit for life and business under the conditions of climate change. • Creation of Medium-term climate forecast which can be linked to certain probabilities, are possible for ten-year periods. • The development of guidelines or checklists that can help planners and decision-makers in companies, organisations and administrations to recognise their affectedness or vulnerability and to derive suitable adaptation measures.
Greece (NRRP funds for adaptation)	<ul style="list-style-type: none"> • measures related to the environmental protection ranging from reforestation and biodiversity protection to improving the irrigation network and wastewater management. • Measures on water supply and urban wastewater are linked with specific targets to reduce water leakage and energy consumption. • A new system for permanent monitoring of species and habitat types, and the support to the reforestation of 16,500ha of degraded forest ecosystems, mainly through native species. • Investments in strengthening key electricity infrastructure, flood mitigation projects and emergency response address concerns around forest fires and extreme weather conditions that could increase in coming years. • Preparation of local urban plans aiming to facilitate urban renewal and make the cities more climate resilient. 	<ul style="list-style-type: none"> • Support of various institutions to include environmental education courses on climate change, the atmosphere and the environment in general and bring awareness. • Build the adaptation capacities of professionals, government agencies, and other stakeholders in early warning systems, disseminating information and accessibility to climate data, partnerships between the academic scientific community of universities and private sector, as well as training and lifelong learning.
Hungary (NRRP funds)	<ul style="list-style-type: none"> • Conservation development related to the water recharge of the Rábaköz-Tököz, securing of the ecological water supply of the Hanság Natura 2000 site. • Investment in water management and conservation (including river basin management, specific measures related to climate change adaptation, reuse, leakage reduction). 	<ul style="list-style-type: none"> • Budapest's climate change strategy had been elaborated and they had been adopted by county assemblies and the local level. • Cooperation of cities and local companies for climate change adaptation. • The DEEPWATER-CE transnational cooperation project in cooperation with 5 countries (Slovakia, Poland, Germany, Croatia, and Hungary) to promote the use of Managed Aquifer Recharge (MAR) and water storage technologies. • Municipalities as integrators and coordinators in adaptation to climate change (LIFE-MICACC).
Ireland (NRRP funds)	<ul style="list-style-type: none"> • The rehabilitation of peatlands is expected to promote biodiversity and eco-systems, water quality improvements, increased carbon storage and reduced carbon emissions. • Invests in the development and upgrade of smaller wastewater treatment plants contributing to the sustainable use and protection of water and marine resources, pollution prevention and control. 	<ul style="list-style-type: none"> • Ireland's review and updates to subnational adaptation plans, policies, strategies and measures involve significant public engagement and consultation processes. • Integrating the views of the Irish population into national policies, strategies and planning by developing the National Dialogue on Climate Action. • Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning by hosting a series of climate conversations which feeds into the Local and Community level.
Italy (NRRP funds)	<p>Seismic resilience, Protection of land and water resources, plus biodiversity protection - Reduction in drinking water leakage on water networks (wastewater management); Waste recycling enhancement and circular economy; Support for research on the use of hydrogen in industry and transport and also use of renewables in transport and heating; other Energy efficiency measures (building renovations).</p>	<ul style="list-style-type: none"> • Implementation of the NSDS interlink the national programming documents, namely the National Reform Programme and the Economy and Financial Document. • Developed 2 guidelines for adaptation at regional and local level which will be used to update adaptation policies strategies plan and measure in line with national planning.



Latvia (NRRP funds)	<ul style="list-style-type: none"> The rehabilitation of polder pumping stations, the restoration of protective dikes and of regulated sections of rivers. 	<ul style="list-style-type: none"> The midterm evaluation report of implementation of adaptation measures of NAP is planned and to be submitted to Cabinet of Ministers by December 2026. The strategic goals and adaptation measures of Latvian National Plan for Adaptation to Climate Change until 2030 are in line with the Paris Agreement on Climate Change, the Sustainable Development Goals and Sendai Framework for Disaster Risk Reduction.
Lithuania (NRRP funds)	<ul style="list-style-type: none"> Increasing the generation and storage of renewable energy, sustainable mobility, renovation of buildings, restoration of degraded peatlands and circular economy. Reviewing the current tax system with a view to identifying and phasing out tax breaks and exemptions that are most harmful to the environment. 	<ul style="list-style-type: none"> Paris Agreement on Climate Change, the 2030 Agenda for Sustainable Development and the Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR) have synergies with adaptation actions. Renewable energy generation and storage, reduction of transport emissions through clean mobility, buildings renovation, circular economy and degraded peatlands restoration).
Luxembourg (NRRP funds)	<ul style="list-style-type: none"> The component Environment and biodiversity protection includes the establishment of a legislative framework for a financial and advisory support to municipalities in protecting nature and preventing biodiversity loss. 	<ul style="list-style-type: none"> The usage of existing regional platforms in order to discuss and align its climate strategy with its neighbouring countries, notably the Pentilateral Energy Forum and the North Seas Energy Cooperation. As part of the implementation of the NAS and NAP, each ministry has also designated a person responsible for inter-ministerial coordination.
Malta (NRRP funds)	<ul style="list-style-type: none"> The proposed investments in the promotion of use of renewable energy technologies. These are complemented by reforms in the waste sector to improve the circular economy and reduce the environmental impact of waste. 	<ul style="list-style-type: none"> Investments in the water sector are linked to efficient water supply waste-water treatment and water reuse as well as the implementation of River Basin Management Plan to ensure integrated water management at the river basin scale. An active engagement with the population specifically focusing on water conservation and its efficient use is currently being undertaken through a National Water Conservation Campaign.
Netherlands (NRRP funds adaptation)	<ul style="list-style-type: none"> One of the main reforms included in the component, the Energy Law, is of particular relevance for the Netherlands to be able to move to a greener economy, accompanied by fiscal reforms in the fields of energy taxation, car taxation, industrial CO2 emission taxation and air travel taxation. Investments to move towards more sustainable transport, by supporting the transition towards cleaner technology in both air and water transport which contributes to reducing nitrogen emissions by investing in nature restoration and supporting the rehabilitation of pig farms. 	<ul style="list-style-type: none"> Development of actions and products of NAS team (including progress reports in accordance with Chapter 4 of NAS 2016). Advice and recommendations from the sector concerning policy, research and possible action. Action-oriented climate adaptation dialogues have been set up to address a number of urgent climate risks. Several projects have been initiated where climate adaptation is one of a series of objectives (such as social cohesion, economy, wellbeing and biodiversity). Projects such as "green in cities" and "building with green" have a focus on nature-based solutions and also a link with the UN decade of ecosystem restoration.
Poland (NRRP funds)	<ul style="list-style-type: none"> The reforms and investments create a framework for a more efficient management of water resources and increase the landscape's water retention capacity in rural areas. Investments improving water retention within agricultural or forest land should improve the water balance and increase the availability of water for agriculture and forestry. 	<ul style="list-style-type: none"> The Government Center for Security serves as the United Nations National Contact Point for the implementation of the Sendai Agenda for Action which is a platform attended not only by representatives of government and self-government administration, but also research institutes, universities, non-governmental organizations and the private sector. The creation of National Crisis Management Plan 2018 which enables the implementation of a risk management system in Poland. Regular reviews on "Strategic Adaptation Plan for Climate Vulnerable Sectors and Areas up to 2020 with an Outlook to 2030" (SPA 2020) has been prepared by the Ministry of the Environment.
Portugal (NRRP funds for adaptation)	<ul style="list-style-type: none"> intervention in forest management to protect the country's forests against rural fires, and to modernise the cadastral system, among others. Measures to address water scarcity in the worst affected regions and to adapt to climate change. Measures to protect marine resources and to foster research and skills in the sector, together with the implementation of more efficient energy and resource use solutions for fisheries. 	<ul style="list-style-type: none"> The National Programme for Spatial Planning Policies identifies guidelines for territorial management instruments that promote adaptation. Regional plans must develop integrated sustainability strategies and approaches at a regional scale, namely in risk and adaptation to climate change. Promote the integration and monitoring of biodiversity adaptation measures to climate change in the various sectoral policies, plans and programmes". The process of reconfiguring the Protected Areas Management Plans to Special Programmes incorporates structural changes that consider the increase in coastal erosion, the occurrence of extreme weather events or flooding. Measures in the plan are aligned with the Portuguese National Energy and Climate Plan (NECP) for 2021-2030 and the roadmap for carbon neutrality in 2050.



<p>Romania (NRRP funds for adaptation)</p>	<ul style="list-style-type: none"> • Forests and Biodiversity protection includes important reforms and investments on reforestation (EUR 1.17 billion) to increase the forest coverage in the country that has been subject to illegal logging, and to further develop measures in favour of biodiversity, such as restoration measures and designation of strict protection areas. • Water management reforms and investments (EUR 1.46 billion in total) are expected to improve water and wastewater systems, including drinking water, and also develop flood protection measures, such as the extension of the coverage of water and wastewater collection systems in municipalities of more than 2 000 inhabitants. 	<p>Enhance forest management to improve their capacity to adapt to climate change adaptation; Adapting Forest regeneration practices to needs imposed by climate change; Minimize the risk of climate change for forests and through forests for the environment in general. Improve / develop knowledge and understanding about the role and contribution of biodiversity to adaptation to climate change;</p>
<p>Slovakia (NRRP funds for adaptation)</p>	<ul style="list-style-type: none"> • The construction of new green buildings, in particular hospitals and schools, and the renovation of existing buildings at low emission standards. • More efficient management of water courses and increasing the landscape's water retention capacity. • Ensure more resilient forest ecosystems, also contributing to greater biodiversity and climate change mitigation. • Adaptation to adverse consequences of climate change with a focus on flood protection. • Support for risk management, management of extraordinary events and resistance to extraordinary events influenced by climate change. 	<ul style="list-style-type: none"> • Improve the communication and the inclusivity of indigenous, traditional and local knowledge into climate adaptation and stakeholder engagement. • Maintain the structure and promoting the stability and resilience of biodiversity (ecosystems, habitats, species of organisms and their communities) which will increase the adaptive capacity of the natural environment, helping biodiversity to survive and adapt to new conditions. • Ensure sustainable forest management, including the cultivation of close-to-nature forests, the sustainable management of permanent grasslands, the use of stabilising landscape structures, green infrastructure, nature conservation.
<p>Slovenia (NRRP funds)</p>	<ul style="list-style-type: none"> • Promoting nature-based solutions for climate change adaptation measures, and by prioritising wastewater investments with positive impacts on Natura 2000 sites. • Investment in flood prevention and measures on energy-efficient wastewater and drinking water systems focusing in circular economy. • Increasing the efficiency of public environmental protection services. 	<ul style="list-style-type: none"> • Climate change impacts are comprehensively incorporated the development and implementation of all policies, measures, and activities. • Broader cooperation, integration, and the exchange of experience and examples of good practice. • The continuous improvement of knowledge about climate change impacts and climate change adaptation methods. • An appropriate level and quality of education, competence, awareness, information, and broader communication about climate change impacts are achieved.



<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Spain (NRRP funds for adaptation)</p>	<ul style="list-style-type: none"> • Measures to improve the waste management legislation and is accompanied by investments fostering the circular economy. • Measures in line with the new EU Biodiversity Strategy, for instance, to preserve the valuable forest carbon sinks through fire prevention actions and strengthened fire protection, and by increasing carbon absorption through enhanced sustainable forest management actions. 	<ul style="list-style-type: none"> • Foster the coordination of observation activities in Spain, adapt operating protocols, standardize data dissemination formats, incorporate satellite information and promote citizen science climate observation initiatives. • Provide the most detailed and up-to-date information possible on adverse atmospheric phenomena that may affect Spain and to coordinate between the meteorological observation systems associated with warnings of adverse meteorological phenomena and the disaster risk preparedness system. • Make the regionalised climate scenarios (PNACC-Scenarios) available to all interested parties through appropriate and versatile tools, such as scenario viewers or user-oriented data download tools. • Promote the development of climate services oriented towards decision-making through the preparation and delivery of meteorological and climatic information useful for the planning and sustainable management of resources in institutional and economic sectors sensitive to the weather and climatic conditions. • The dissemination of information on the available tools and training for the proper use of the tools and climate data, through the development of methodological guidelines, examples of good practices and training actions. • Integration of climate change into the national health and environment plan. • Identify preventive actions and provide information on the temperature thresholds that trigger mortality due to heat in different areas of Spain. • Prepare and respond to infectious diseases, atmospheric pollution and the wellbeing caused by climate change. • Integration of adaptation to climate change in hydrological planning and the management of the integral water cycle, drought, and flood risks. • Provide actions to improve the state of water bodies and aquatic ecosystems, with impact on groundwaters. • Planning and management of protected areas with adaptive criteria and improve the adaptive capacity for green infrastructure. • Integration of climate change in planning instruments with implications for the maintenance and improvement of forest resources, forest fires prevention, inland hunting, illegal fishing, desertification, and for the food agriculture sectors.
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Sweden (NRRP funds for adaptation)</p>	<ul style="list-style-type: none"> • Decreasing emissions in industry and providing support to sustainable transport with measures such as the 'Industry Leap' and the investment in railways which indirectly benefit air quality. • Establishing nature reserves for the protection of valuable natural habitats, including forests as part of the 'Protection of Valuable Nature'. 	<ul style="list-style-type: none"> • Investigate the issue of responsibility for adapting agricultural land to a changed climate with increasing flows. • Encourage municipalities to begin work on assessing risks, developing strategies, and initiating dialogue with local residents. • Strengthen coordination increases the possibility of making available data that is relevant for new and existing buildings and analysing how buildings can be adapted to a changing climate. • Finance the Housing Agency's management grant to be increased by five million kroner from the year 2019. • Promote dialogue between six county administrative boards and 15 municipalities in each county. • A five-year national policy cycle for the Swedish climate adaptation work should be established to ensure efficiency and continuity. • The costs for the protection of property fall on the owner of the property as to prevent and restore damage due to extreme weather events is no different from the responsibility for other risk management in society. • The protection of areas of national interest or extensive measures that exceed the municipality's ability to pay within a reasonable period of time, which means that state partial financing may be possible in exceptional cases. • The grant for greener cities by municipalities and must promote the increase or development of urban greenery or ecosystem services in urban environments. • The National Knowledge Center for Climate Adaptation has on the website www.klimatäsningen.se reported on various possibilities to obtain financing for adaptation measures in various areas, both from Swedish financiers and from the larger EU programmes. • The climate adaptation proposes measures to make planning documentation for the municipalities more relevant and that it should be provided free of charge. • Initiate and run a ten-year national program for climate research, and a ten-year national research program for sustainable community building. • The municipality may decide in a detailed plan that a land permit is required for land measures that may impair the permeability of the land.



Annex II – Allocation of RRF and NAS/NAP funds to climate adaptation

Country	RRF Funds allocated to adaptation (€ million)	NAS/NAP funds allocated to adaptation (€ million/year)
Lithuania	€ 40,00	€ 343,00
Latvia	€ 90,00	€ 155,24
Cyprus	€ 110,00	unknown
Slovakia	€ 315,00	€ 430,89
Croatia	€ 315,00	€ 3,13
Netherlands	€ 376,00	unknown
Belgium	€ 649,00	unknown
Slovenia	€ 730,00	€ 472,80
Czechia	€ 840,00	€ 0,00
Portugal	€ 1.660,00	€ 208,34
Spain	€ 2.085,00	unknown
Romania	€ 2.328,00	€ 2,98
Greece	€ 3.355,00	€ 169,99
France	€ 3.940,00	€ 8.700,00
Italy	€ 17.240,00	unknown *
Total amount allocated to climate adaptation (€ million)	€ 34.073,00	€ 10.486,37

*In the case of Italy, its NAP envisions € 2.080,00 million allocated for both adaptation and mitigation, without a defined separation of funds allocated to adaptation. Thus, this amount was not considered (unknown) within the scope of this analysis as it focuses on adaptation measures only¹²⁷.

¹²⁷ Ministry of Environment, Land and Sea, Italy (MEIT). (2015). National Adaptation Strategy to Climate Change https://www.mase.gov.it/sites/default/files/archivio/allegati/clima/documento_SNAC.pdf



Annex III – Allocation of RRF and NAS/NAP funds per million inhabitants

The table below shows the results of the comparative analysis between NRRP and NAS/NAP, in terms of funds allocation (in million Euros) to climate adaptation per million inhabitants. The table solely shows the 15 Member States that do allocate funds to both NRRP and NAS/NAP until April 2023, in ascending order based on the share of NRRP funds/million inhabitant.

Country	Number of inhabitants in millions (World Bank, 2021) ¹²⁸	Share of RRF funds to adaptation measures (€ million/million inhabitants)	Share of NAS/NAP funds to adaptation measures (€ million/million inhabitants)
Lithuania	2,795	€ 14	€ 123
Netherlands	17,533	€ 21	NA
Spain	47,326	€ 44	NA
Latvia	1,883	€ 48	€ 82
Belgium	11,59	€ 56	NA
Slovakia	5,447	€ 58	€ 79
France	67,40	€ 58	€ 129
Czechia	10,70	€ 78	NA
Croatia	3,90	€ 81	€ 1
Cyprus	1,22	€ 91	NA
Romania	19,115	€ 122	€ 0,2
Portugal	10,299	€ 161	€ 20
Italy	59,066	€ 292	€ 35
Greece	10,664	€ 315	€ 16
Slovenia	2,107	€ 346	€ 224

¹²⁸ <https://databank.worldbank.org/source/population-estimates-and-projections>