Climate Adaptation in a Changing World

Adaptation pathways and costing climate adaptation in Europe

Flexible adaptation pathways are vital for addressing intensifying climate hazards and their wide-ranging impacts across Europe. A 2024 World Bank and European Commission report provides insights how countries can identify the needs and costs of adaptation strategies.

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Europe is warming faster than any other continent in the world, with 2024 being the hottest year on record (European Environment Agency 2024; IPCC 2022; World Meteorological Organization/Copernicus 2022). Projections indicate that the costs of climate inaction for 2031–2050 could reach €2.4 trillion (European Commission 2024). Rising temperatures and climate impacts demand urgent, systemic approaches to build resilience. Despite evidence of the benefits of addressing climate impacts, there is limited knowledge on effective measures and the costs of implementing climate change adaptation (CCA) interventions. Among other reasons, this knowledge gap hinders timely actions and investment decisions to scale up CCA and to abide by commitments at local, national and European levels [1].

The need for costing climate adaptation interventions

Effective, resilient and transformative adaptation pathways can be developed in Europe by combining current and future climate risk information with multidisciplinary expertise. This requires notably to fill the knowledge gap on national CCA needs and expenditures, ideally with similar timelines and methodologies when undertaking national adaptation assessments, as cross-country comparisons are challenging without global or EU objectives for CCA. Existing national studies show significant disparities in estimated CCA costs, reflecting large differences in coverage of risks and sectors.

Current evidence on climate adaptation costs

CCA costing assessments in Europe have ranged from systematic studies building on complex scientific assessments to more ad hoc or partial assessments as initial basis for further debates and studies. It is possible to compare existing estimates from national studies with similar approaches and timelines, namely short-term, policy-first national assessments focusing on the needs through the 2030s: CCA costs at national level vary across countries between €3.96 million and €11.6 billion per year in absolute terms – or in per capita terms and excluding extreme values from €34 in France to €110 in Slovakia.

Lessons from various European countries provide invaluable insights on approaches to estimating costs depending on adaptation policy needs. A menu of approaches, frameworks, and methodologies is available to cost CCA measures according to different needs, objectives, available resources, and information. An important lesson learned is that setting the objective of adaptation, including expected and desired residual climate impacts, is not only a technical choice. At national level, it requires multi-stakeholder dialogues to tailor the selection of adaptation measures to needs, societal context, effectiveness or feasibility. For instance, measures to reduce coastal or river flooding risk can range from maintaining existing protection infrastructure, protecting up to an acceptable risk level or to an expected economic optimal level of adaptation.

Comprehensive adaptation packages

At the national level, a portfolio of adaptation actions is needed for most risks. The adaptation economics literature identifies three types of early adaptation measures that are likely to pass a cost-benefit test: 1) measures to address the current adaptation gap (no- and low-regret), 2) early interventions to ensure adaptation is considered in near-term decisions with long lifetimes (climate-smart design), and 3) fast-tracking of more complex decisions with long lead times (early adaptation activities) (Watkiss/Betts 2021).

Developing such portfolios aids in tackling multiple climate risks. For example, in Bulgaria, national-level planning for wildfires and extreme heat has an estimated lower bound cost of €7 billion over five years, with a net present cost of €22.9 billion for 2023–2050. Effective measures identified include developing a national heat health action plan, improving healthcare facilities, developing a labor force heat protection strategy, enhancing wildfire emergency preparedness, and forestry management. In Romania, climate-proofing the transport sector for flood resilience is estimated to cost between €123 million and €491 million, involving both engineering and nature-based solutions. Other measures to tackle impacts of extreme heat on labor productivity identified in the literature (shifting working

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hours and installing shading and air circulation systems) could potentially have significant benefits.

Scaling up climate adaptation action

Adaptation studies covering selected hazards and sectors can help identify packages of adaptation measures. These can then be combined into national programs for adaptation and depending on the timelines of analysis can serve for more longer term, strategic advocacy and planning or to inform national adaptation plans and serve as a basis for budgeting in the next 5–10 years. Currently, limited evidence on adaptation expenditure tagging prevents a clear identification of the adaptation finance gap and progress on implementation of CCA in Europe. There are some countries, however, that have advanced in this area so far.

In Germany, adaptation studies highlighted the national-level benefits of reducing climate damage, synergies between climate mitigation and adaptation and improving green spending efficiency by analyzing financial flows (IÖW 2021). Studies in France led to the identification of 18 budgetary measures, forming the foundation for the next national financial budget strategy, with an estimated lower bound adaptation financing need of € 2.3 billion per year (Depoues et al. 2022). These studies contributed to a national debate on preparing for a possible 4 °C world, enhancing adaptation assessments and informing adaptation finance as part of green budgeting (Alexandre et al. 2019). In Austria, annual costs of CCA were estimated to be € 421–€ 573 million and used to inform national budgeting (Knittel et al. 2017). These studies led to a new system to track adaptation expenditures and CCA implementation, improving information collection, including at local level.

Even though knowledge is still limited on the adaptation finance gap, current evidence at national level suggests a large gap between finance needed to implement CCA and current adaptation expenditures. While CCA costs may burden public budgets, as private sector financing is still limited, a simple comparison to costs of impacts of climate events puts this in context. France's costs of simple initial adaptation measures (€ 2.3 billion per year) can be compared for example to the 2022 estimated costs of natural hazards impact alone (€ 10 billion) (Climate Change Resource Centre 2023).

To fill the adaptation gap, a major scale-up is needed of public, private, and blended adaptation finance, involving new actors, models, and financial instruments. Several challenges are posed by barriers and constraints to adaptation that include information gaps, market failures, and obstacles in bankability, policy, and regulation, as well as broader social and cultural conditions. Adaptation costing studies provide an essential initial information needed to resolve some of these constraints and can be further applied to adaptation investment planning and financing. This needs to be accompanied by a clear identification of adaptation finance gaps at national level informed by dedicated tagging of CCA in planned and actual budgets.

Annotation

[1] This article builds on content from: World Bank (2024): Climate Adaptation Costing in a Changing World: Valuing Climate Adaptation Helps Us Orient Our Compass Toward Effective and Resilient Pathways. Washington/D. C., World Bank Group. http://documents.worldbank.org/curated/en/099050224072021662/P179070140a07209a1b5d012d978862b4ff. Key external references are included in the bibliography. The authors named below are focal point contacts for this article, although numerous authors developed the content and are acknowledged in the report.

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