



HAL
open science

Towards improved adaptation action in Europe

A. Gerger Swartling, K. André, M. Englund, K. Harris, C. Aall, L. Petutschnig, E. Rome, Julie Gobert, Saskia Reuschel, G. Jorda, et al.

► **To cite this version:**

A. Gerger Swartling, K. André, M. Englund, K. Harris, C. Aall, et al.. Towards improved adaptation action in Europe: Policy recommendations from the UNCHAIN project. SEI - Stockholm Environment Institute. 2023. hal-04191222

HAL Id: hal-04191222

<https://enpc.hal.science/hal-04191222>

Submitted on 31 Aug 2023

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Towards improved adaptation action in Europe

Policy recommendations from the UNCHAIN project



SEI policy brief June 2023

Åsa Gerger Swartling¹

Karin André¹

Mathilda Englund¹

Katy Harris¹

Carlo Aall²

and contributors from the
UNCHAIN Project³

¹ Stockholm Environment Institute, Sweden

² Western Norway Research Institute, Norway

³ For a complete list of authors, see the box at the end of this brief.

Key Messages

- Policymakers can make adaptation “smarter” by using the Impact Chain approach to analyse both conventional local climate risks and lesser well-known transboundary climate risks.
- Policymakers should embrace uncertainties by applying a reflect-then-act rather than the predict-then-act approach; by including socio-economic scenarios for a range of possible developments, from likely to unanticipated; and by ensuring transparency in communications.
- International actors can invest in method innovation, data collection and decision-support tools to identify and assess transboundary climate risks. They should also foster greater cooperation in adaptation planning and implementation across jurisdictions.
- Policymakers and relevant stakeholders should engage throughout the climate risk assessment process, to co-develop climate information and solutions that capture their needs, knowledge and perspectives and that account for social vulnerability and equitable adaptation.

As the impacts of climate change continue to intensify, the EU is transitioning to a more climate-resilient Europe. Four key policies drive this shift: the European Green Deal, the European Commission Adaptation Strategy launched in 2021, the 2022 Mission on Adaptation to Climate Change and the EU-wide Climate Risk Assessment (EUCRA) due in 2024 (see Box 1).

Against this background, the project Unpacking Climate Impact Chains (UNCHAIN) has been well placed to offer timely and relevant insights into the EU adaptation policy process (see Box 1). The UNCHAIN team has helped regions and communities contribute to the Mission on Adaptation and thereby accelerate their transformation to climate resilience by 2030. We explored how climate risk assessments can be improved and thereby lay the foundation for more effective decision-making and adaptation action in the EU, with wider lessons for the international research and policy communities.

The project focused on a specific approach to climate risk and vulnerability assessments: the Impact Chain framework (see Box 2 and Figure 1). The UNCHAIN project team built knowledge on how to implement climate risk assessments to support adaptation decision-making by introducing five methodological innovations to the Impact Chain approach, tested in 11 European case studies.

BOX 1. FOUR KEY POLICIES

The European Green Deal provides a roadmap for Europe to become the first climate-neutral continent by 2050, making the EU's economy sustainable by turning climate and environmental challenges into opportunities across policy areas and making the transition just and inclusive for all.

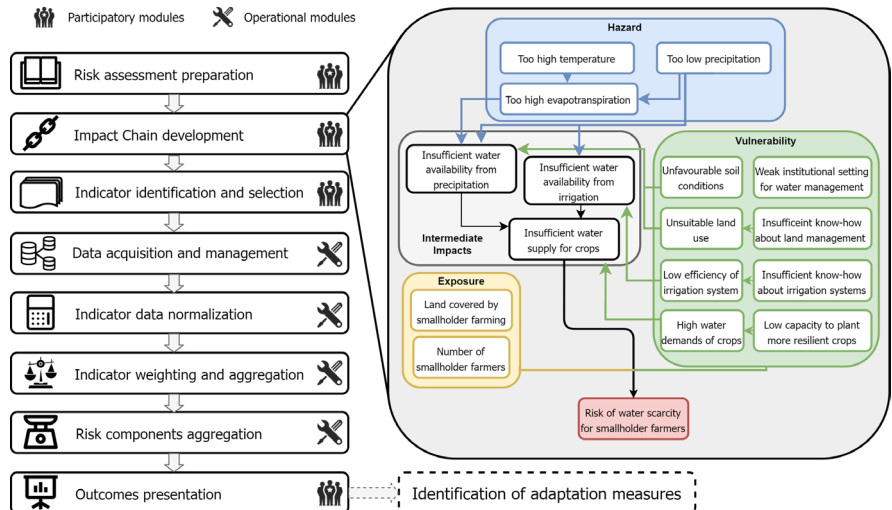
In 2021, the European Commission launched a new [adaptation strategy](#) to support member states in becoming climate resilient by 2050; by making adaptation smarter, faster, more systemic, and by stepping up international action. The strategy complements the efforts of Member States by taking a coherent approach to mainstream adaptation considerations across relevant EU policies and sectors.

To accelerate progress, the 2022 [Mission on Adaptation to Climate Change](#) puts EU adaptation policy into practice by helping European regions and communities to better understand climate risks; develop their capacity to cope in a changing climate; and test on-the-ground innovative solutions needed to build resilience.

In its [Adaptation Strategy](#), the European Commission announced an EU-wide [Climate Risk Assessment \(EUCRA\)](#), due in 2024.

Below we summarize our policy-relevant insights and recommendations for the European Commission and EU member states.

Figure 1. Example of components of hazard, exposure and vulnerability, plus intermediate impacts related to drought and agriculture, illustrated as modular components in an Impact Chain-based climate risk and vulnerability assessment.



Source: Petutschnig et al. (2023)

Smarter adaptation using the Impact Chain approach

Innovative Impact Chain-based climate risk assessment approaches have the potential to assist regions in realizing the EU Adaptation Strategy and fulfilling the objectives of the Mission on Adaptation. Insights from UNCHAIN could contribute to more robust climate risk assessments related to the EU taxonomy for sustainable activities in the private sector and further enhance the guidelines on vulnerability, impacts and risk assessment outlined in the ISO Standard 14091:2021. Impact Chain-based climate risk assessments could be considered as an easy-to-use toolbox of methods and techniques that can be tailored to stakeholder needs and contexts and integrated with other risk management methods or specialized decision-support tools.

The Impact Chain method adds value by facilitating the production of robust scientific knowledge; providing a platform for stakeholder involvement; shedding light on how to act under uncertainty; improving the ability to connect climate change mitigation and adaptation efforts; and disentangling compound hazards and transboundary climate risks. For this reason, the EUCRA has adopted an Impact Chain-based approach. Member states and other adaptation actors in Europe could follow suit.

Embrace uncertainties for smarter adaptation

The European Commission and other adaptation decision-makers must emphasize the importance of addressing and communicating uncertainties to ensure that decisions are based on state-of-the-art science and model outputs, while recognizing and managing the limitations of scientific approaches. Climate risk and vulnerability can differ significantly across alternative socio-economic scenarios. Instead of focusing only on traditional climate scenario analyses in ex-ante assessments, future assessments should consider alternative socio-economic scenarios to capture the different risks and vulnerabilities that arise under each.

BOX 2. ABOUT UNCHAIN AND IMPACT CHAINS

Funded by JPI Climate and AXIS, the UNCHAIN project (2019–2023) developed a practical climate risk assessment framework based on the Impact Chain method (Zebisch et al., 2021). Impact Chain–based climate risk and vulnerability assessments offer a standardized but flexible approach that enables robust decision-making across thematic areas, sectors and governance levels. Impact chains identify and describe links between different components of climate risks by combining different methods and data sources, including participatory methods and stakeholder knowledge, quantitative modelling, and statistical analysis.

The stepwise approach is guided by eight modules: scoping, developing impact chains, identifying and selecting indicators, data acquisition and management, normalizing, aggregating indicators, aggregating vulnerability components, and presenting the outcomes. The approach is structured around the Intergovernmental Panel on Climate Change (IPCC) fifth assessment report’s conceptualization of risk.

The UNCHAIN project engaged a broad array of stakeholders. These included sub-national and national authorities, private sector actors, non-governmental organizations, and transnational organizations with stakes in adaptation across diverse regions, sectors and decision-making contexts and with exposure to different climate-related impacts and risks.

There will always be uncertainty around climate change. Our insights indicate that, rather than aiming to eliminate uncertainty, EU policymakers should build further tolerance to uncertainty by (a) shifting from the current “predict-then-act” paradigm towards a new “reflect-then-act” modus operandi that accommodates uncertainties; (b) performing a sensitivity analysis to pinpoint where uncertainties emerge; and (c) ensuring transparency when communicating climate risks and their uncertainties. Uncertainties do not justify inaction; instead, they should serve to highlight areas where the risks are so high that decisions can still be made in the face of considerable uncertainty, as the consequences of even a low risk are worth investing to avoid.

Address transboundary climate risks with international action

The European Commission and EU member states must account for transboundary climate risks in order to develop responses that adequately manage the full range of risks facing society in a globalized world. Transboundary climate risks cascade across political jurisdictions, supply chains and capital flows. The management of such risks requires strong international partnerships across governance levels and sectors to enable effective and systemic adaptation decision-making and action. Overlooking the transboundary nature of climate change means underestimating levels of risk exposure, failing to identify all relevant climate risks and vulnerable actors, and neglecting to motivate the necessary investments in, and cooperation on, adaptation.

Results from UNCHAIN show three arenas for action internationally. One arena is investments in method innovation and data collection, to be able to identify and assess the transboundary climate risks faced by the EU. Another is fostering greater cooperation in adaptation planning and implementation across jurisdictions, between member states and between the EU and international partners, to catalyse shared action to shared risks and avoid any unforeseen adverse effects of adaptation actions across borders. And third, the importance of exploring the links between transboundary climate risks and the climate security agenda could be further recognised, to develop societies that are resilient and secure to the geopolitical risks caused by transboundary climate impacts.

In light of the emphasis placed on managing trade-related transboundary climate risks in the EU Adaptation Strategy, the European Commission and EU member states could also make better use of decision-support tools, such as macroeconomic multi-region simulation models. These tools help assess future developments in trade-related transboundary risks and uncover direct, indirect and induced economic effects.

Collaborate more effectively with stakeholders to build knowledge

By collaborating and exchanging information, policymakers, researchers and citizens can work together to develop effective policies and solutions to build a climate-resilient Europe by 2050. Collaborative, iterative processes have the potential to create new arenas for dialogue and knowledge exchange and can empower stakeholders and citizens to engage in just and equitable transformative adaptation processes, working alongside policymakers. However, to engage effectively with stakeholders, it is important to acknowledge the financial and human resources, knowledge, and skills that are required to establish and implement collaborative processes. Consideration must also be taken for facilitating such processes to balance power dynamics and make sure that all involved can participate in a credible, salient and legitimate way (cf. Carter et al., 2019; Daniels et al., 2020).

The UNCHAIN case studies show that the Impact Chain approach provides a good structure for stakeholders to participate in co-produced climate risk assessments. At the same time, for regions and communities to engage stakeholders in co-producing actionable knowledge, UNCHAIN identifies the need to:

- engage stakeholders and citizens early to co-define joint objectives and visions of and maintain continuous engagement throughout the co-production process;
- engage “boundary organizations” to establish connections and to translate stakeholder needs and expectations and to promote knowledge co-production;
- monitor and evaluate stakeholder engagement to find opportunities for improvement and learning; and
- develop a plan for communication together with stakeholders and citizens to ensure appropriate timing and format.

If properly designed and facilitated, stakeholder collaborations can bridge the science-policy-practice interface by avoiding a mismatch between user needs and climate information, while enabling the production of actionable knowledge for adaptation.

Prompt equitable and just adaptation

To enable systemic adaptation, EU policymakers must go beyond technical and climatic factors and account for the varying adaptive capacities of regions and citizens to manage the effects of climate change. Social vulnerability assessments can enrich climate change adaptation decision-making by uncovering social injustices within and across member states; locating vulnerable communities and people; and avoiding producing or reproducing social vulnerabilities; ultimately, working towards just and equitable adaptation.

EUCRA should include social dimensions as part of the vulnerability assessment to identify and locate populations at risk, and thereby gain a better understanding of the unequal exposure and vulnerability to climate impacts. Disadvantaged communities and citizens should be engaged in social vulnerability assessments, to make their voices heard and so they can influence adaptation decision-making. Social vulnerability assessments can employ the Impact Chain framework to define measurable indicators; explain vulnerability pathways; and provide a robust knowledge base for adaptation decision-making.

Social vulnerability assessments should feed into targeted policies and interventions to increase resilience among the most vulnerable segments of the population. By doing so, policymakers can support just and equitable adaptation in which everyone, regardless of their socio-economic status, is equipped to handle the impacts of climate change.

Conclusion

We recommend the widespread adoption and continued evolution of the Impact Chain-based approach to harmonize existing climate risk assessment strategies across EU member states and levels of governance as well as sectors, and to further strengthen cross-border collaboration and knowledge exchange. This approach can help speed up more effective adaptation in Europe by improving comparability between countries and regions and transferability of knowledge and good practices, reducing terminological and methodological ambiguity, and enabling knowledge exchange and joint learning.

In summary we propose the following recommendations for the European Commission and EU member states:

- Consider the Impact Chain-based climate risk assessments as an easy-to-use toolbox of methods and techniques that can be tailored to stakeholder needs and contexts and integrated with other risk management methods or specialized decision-support tools.
- Emphasize the importance of addressing and communicating uncertainties to ensure that decisions are based on state-of-the-art science and model outputs while recognizing and managing the scientific limitations, thus applying a “reflect-then-act” approach to act under uncertain conditions, rather than the conventional and action-limiting “predict-then-act” approach.
- Account for transboundary climate risks to develop responses that adequately manage the full range of climate risks facing society in a globalized world.
- Engage with researchers, the private sector and citizens in a collaborative, iterative process to co-develop climate information and solutions to accelerate adaptation.
- Enable systemic adaptation by going beyond technical and climatic factors, and accounting for the varying adaptive capacities of regions and citizens to manage the effects of climate change.

CONTRIBUTORS FROM THE UNCHAIN PROJECT:

Linda Petutschnig¹, Erich Rome², Julie Gobert³, Saskia Reuschel⁴, Gabriel Jordá⁵, Daniel Lückerath², Katarina Milde², Stefan Kienberger¹, Brigit Dale⁶, Adeline Cauchy⁷, Florence Rudolf³, Emmanuel M. N. A. N. Attoh⁸, Magnus Benzie⁹, Frida Lager⁹ and Karina Barquet⁹.

1. Paris-Lodron University of Salzburg, Austria
 2. Fraunhofer Institute for Intelligent Analysis and Information Systems, Germany
 3. Institut National de Sciences Appliquées Strasbourg, France
 4. Gesellschaft Für Wirtschaftliche Strukturforschung, Germany
 5. Centre Oceanogràfic de Balears, Instituto Español de Oceanografía, Spain
 6. Nordland Research Institute, Norway
 7. Ramboll, France
 8. Wageningen University and Research, Netherlands
 9. Stockholm Environment Institute, Sweden
-

ACKNOWLEDGEMENTS

The UNCHAIN project is funded through a collaboration between the EU funding mechanisms "Joint Programming Initiative" (JPI) and "Assessment of Cross (X)-sectoral climate impacts and pathways for Sustainable transformation" (AXIS), Grant No. 776608.



WESTERN NORWAY RESEARCH INSTITUTE
VESTLANDSFORSKING



eurac
research

UNCHAIN publications (several are forthcoming)

- Aall, C., Wanvik, T., & Dale, B. (2022). Climate Risks of the Transition to a Renewable Energy Society: The Need for Extending the Research Agenda. *Weather, Climate, and Society*, 14(2), 387–397. <https://doi.org/10.1175/WCAS-D-21-0055.1>
- Agulles, M., Melo-Aguilar, C., & Jordà, G. (2022). Risk of loss of tourism attractiveness in the Western Mediterranean under climate change. *Frontiers in Climate*, 4. <https://doi.org/10.3389/fclim.2022.1019892>
- André, K., Gerger Swartling, Å., Englund, M., Petutschnig, L., Nyadzi, E. M. N. A. N., Milde, K., Lückerath, D., Cauchy, A., Botnen Holm, T., Hanssen Korsbrekke, M., Bour, M., & Rome, E. (2023). Improving stakeholder engagement in climate change risk assessments: Insights from six case studies in Europe. *Frontiers in Climate*, 5. <https://doi.org/10.3389/fclim.2023.1120421>
- Attoh, E. M. N. A. N., de Bruin, K., Goosen, H., van Veldhoven, F., & Ludwig, F. (2022). Making physical climate risk assessments relevant to the financial sector – Lessons learned from real estate cases in the Netherlands. *Climate Risk Management*, 37, 100447. <https://doi.org/10.1016/j.crm.2022.100447>
- Attoh, E. M. N. A. N., Goosen, H., van Selm, M., Boon, E., & Ludwig, F. (2022). Climate services for the railway sector: A synthesis of adaptation information needs in Europe. *Frontiers in Climate*. <https://doi.org/10.3389/fclim.2022.968298>
- Englund, M., Vieira Passos, M., André, K., Gerger Swartling, Å., Segnestam, L., & Barquet, K. (2023). Constructing a social vulnerability index for flooding: Insights from a municipality in Sweden. *Frontiers in Climate*, 5. <https://doi.org/10.3389/fclim.2023.1038883>
- Gobert, J., & Rudolf, F. (2023). Rhine low water crisis: From individual adaptation possibilities to strategical pathways. *Frontiers in Climate*, 4. <https://doi.org/10.3389/fclim.2022.1045466>
- Harris, K., Lager, F., Jansen, M. K., & Benzie, M. (2022). Rising to a New Challenge: A Protocol for Case-Study Research on Transboundary Climate Risk. *Weather, Climate, and Society*, 14(3), 755–768. <https://doi.org/10.1175/WCAS-D-21-0022.1>
- Lückerath, D., Rome, E., & Milde, K. (2023). Using impact chains for assessing local climate risk—A case study on impacts of extended periods of fluvial low waters and drought on a metropolitan region. *Frontiers in Climate*, 5. <https://doi.org/10.3389/fclim.2023.1037117>
- Melo-Aguilar, C., Agulles, M., & Jordà, G. (2022). Introducing uncertainties in composite indicators. The case of the Impact Chain risk assessment framework. *Frontiers in Climate*, 4. <https://doi.org/10.3389/fclim.2022.1019888>
- Petutschnig, L., Rome, E., Lückerath, D., Milde, K., Aall, C., Gerger Swartling, Å., Englund, M., André, K., Meyer, M., Reuschel, S., Renner, K., Jordà, G., Gobert, J., Cauchy, A., Bour, M., Attoh, E. M. N. A. N., Dale, B., Rudolf, F., Kienberger, S., ... Melo-Aguilar, C. (2023). Research advancements for Impact Chain based Climate Risk and Vulnerability Assessments. *Frontiers in Climate*, 5. <https://doi.org/10.3389/fclim.2023.1095631>

**Published by**

Stockholm Environment Institute
Linnégatan 87D, Box 24218
104 51 Stockholm, Sweden
Tel: +46 8 30 80 44

DOI:

<https://doi.org/10.51414/sei2023.035>

Author contact

asa.swartling@sei.org

Media contact

ulrika.lamberth@sei.org

Visit us: sei.org

Twitter: [@SEIresearch](https://twitter.com/SEIresearch)
[@SEIclimate](https://twitter.com/SEIclimate)

Editor: Naomi Lubick

Layout: Olesia Polishchuk

Stockholm Environment Institute is an international non-profit research and policy organization that tackles environment and development challenges. We connect science and decision-making to develop solutions for a sustainable future for all.

Our approach is highly collaborative: stakeholder involvement is at the heart of our efforts to build capacity, strengthen institutions, and equip partners for the long term.

Our work spans climate, water, air, and land-use issues, and integrates evidence and perspectives on governance, the economy, gender and human health.

Across our eight centres in Europe, Asia, Africa and the Americas, we engage with policy processes, development action and business practice throughout the world.

ABOUT THIS POLICY BRIEF:

This policy brief supports the European Commission and European Union (EU) member states in their actions to promote climate resilience. It highlights policy-oriented findings and recommendations for improving climate risk assessment that informs adaptation decision-making in European regions, communities and local jurisdictions.

Further reading

Carter, S., Steynor, A., Vincent, K., Visman, E., & Waagsaether, K. (2019). *Co-production of African weather and climate services. Manual*. Future Climate for Africa and Weather and Climate Information Services for Africa. <https://futureclimateafrica.org/coproduction-manual>

Daniels, E., Bharwani, S., Gerger Swartling, Å., Vulturius, G., & Brandon, K. (2020). Refocusing the climate services lens: Introducing a framework for co-designing “transdisciplinary knowledge integration processes” to build climate resilience. *Climate Services*, 19, 1–15. <https://doi.org/10.1016/j.cliser.2020.100181>

Zebisch, M., Schneiderbauer, S., Fritzsche, K., Bubeck, P., Kienberger, S., Kahlenborn, W., Schwan, S., & Below, T. (2021). The vulnerability sourcebook and climate impact chains – a standardised framework for a climate vulnerability and risk assessment. *International Journal of Climate Change Strategies and Management*, 13(1), 35–59. <https://doi.org/10.1108/IJCCSM-07-2019-0042>

Correction (12 June 2023): A contributing author’s last name was incorrectly spelled. It is Reuschel, not Reuchel.