

Science-Stakeholder Exchange on Climate Extremes for Disaster Risk Reduction

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Background

Interactions between scientists and stakeholders are crucial for addressing knowledge needs for climate change adaptation in general and specifically for storm, drought/heat and flood preparedness.

ClimXchange explored the question **how can existing climate research knowledge best be disseminated, taking into account the expectations, perceptions and needs of various stakeholders?**

1) Toolbox and training for science-stakeholder interaction Disaster Research Unit

In order to support researchers to engage with stakeholders, the DRU

- published a **working paper** on interaction levels, potentials, pitfalls, and good examples of interactions between climate scientists and stakeholders,
- developed a **toolbox** for science-stakeholder interaction (see figure)
- tested the toolbox within a **training workshop for scientists**.

Overview of the ClimXchange Toolbox

Basics of science communication & science-stakeholder interaction	Communication of research results	Methods for science-stakeholder interaction	Documentation & reflection
Dimensions of science communication	Presentation	Storytelling	Documentation of stakeholder interactions
(Overcoming) challenges of science communication	Written communication	(Semi-structured) interviews	
Who are stakeholders?	Media communication	Moderating	External feedback
Forms of science-stakeholder interaction	Dealing with false information	Discussion formats	Internal feedback and evaluation
The social context of interaction		Workshops	Further guidance
Self-reflection		Scenario planning	Knowledge platforms and toolkits
Successful climate communication		Design Thinking	
		Conferences	
		Living labs	
		Digital tools for online interaction	

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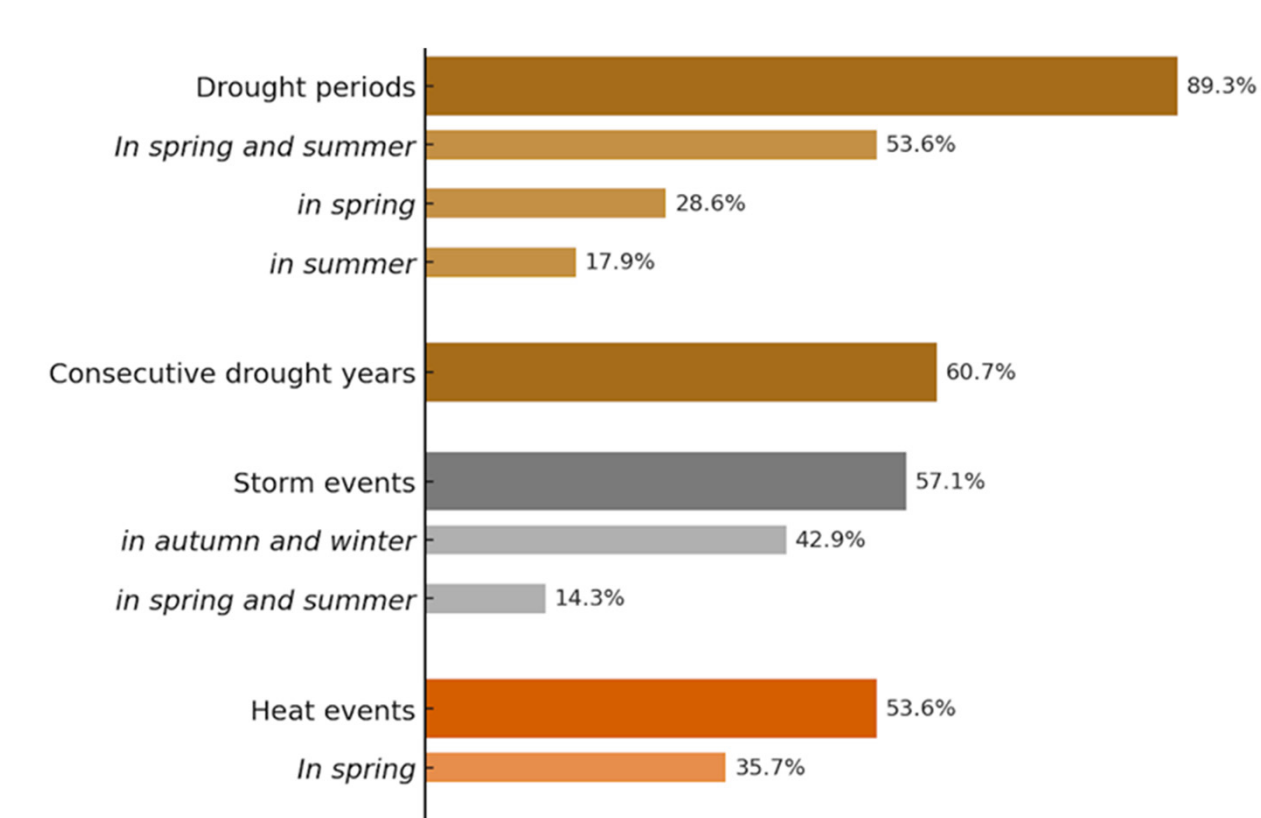
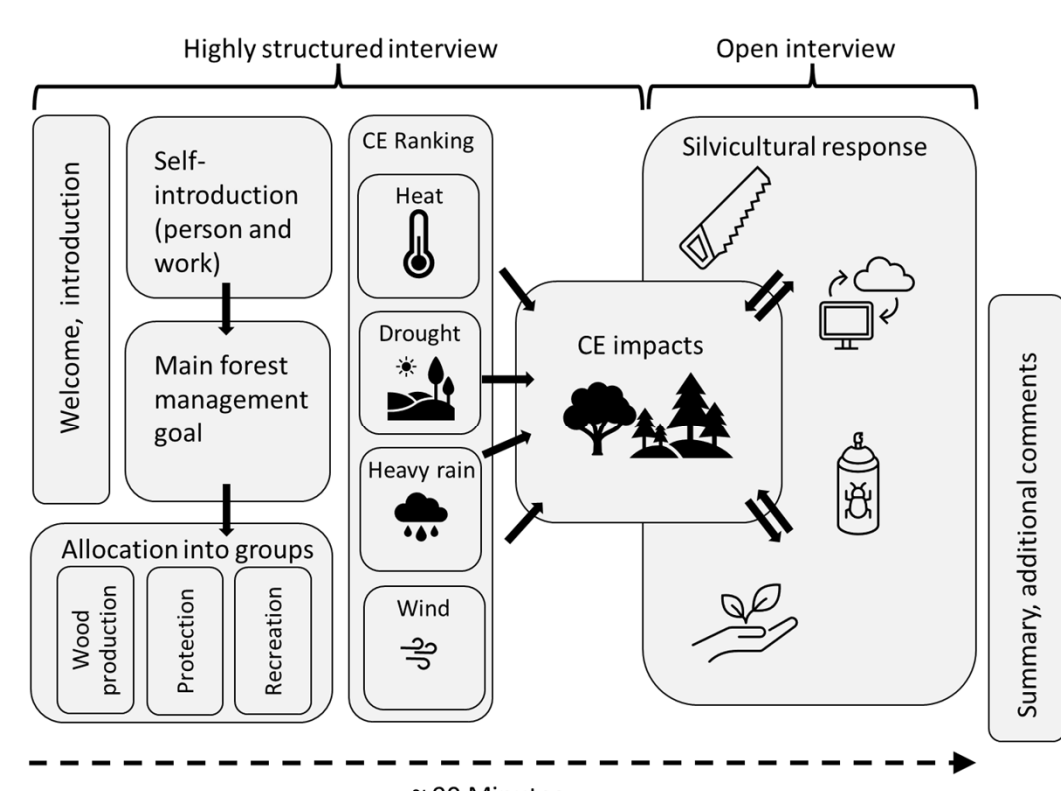
The DRU applies a differentiation into three intensity levels of science-stakeholder interactions:

- Science communication** (e. g. blog posts, media interviews, publications)
- Knowledge exchange** (e. g. workshops to identify & integrate stakeholder needs)
- Transdisciplinary co-creation of knowledge** (throughout the research process)

2) Case study on forest practitioners' perspectives on climate extremes Climate Service Center Germany (GERICS)

In order to fill the research gap on how forest practitioners themselves perceive climate extremes, GERICS carried out a trans- and interdisciplinary case study exploring practitioner viewpoints and analyze consensus and conflicts, based on

- 28 semi-structured qualitative** online and in-person **interviews**,
- two workshops** (one online, one in person) as part of the **tdAcademy initiative**, also reflecting on the science-practice dialogue.



Most important climate extremes in percentages (Knutzen et al. 2025)

Key results

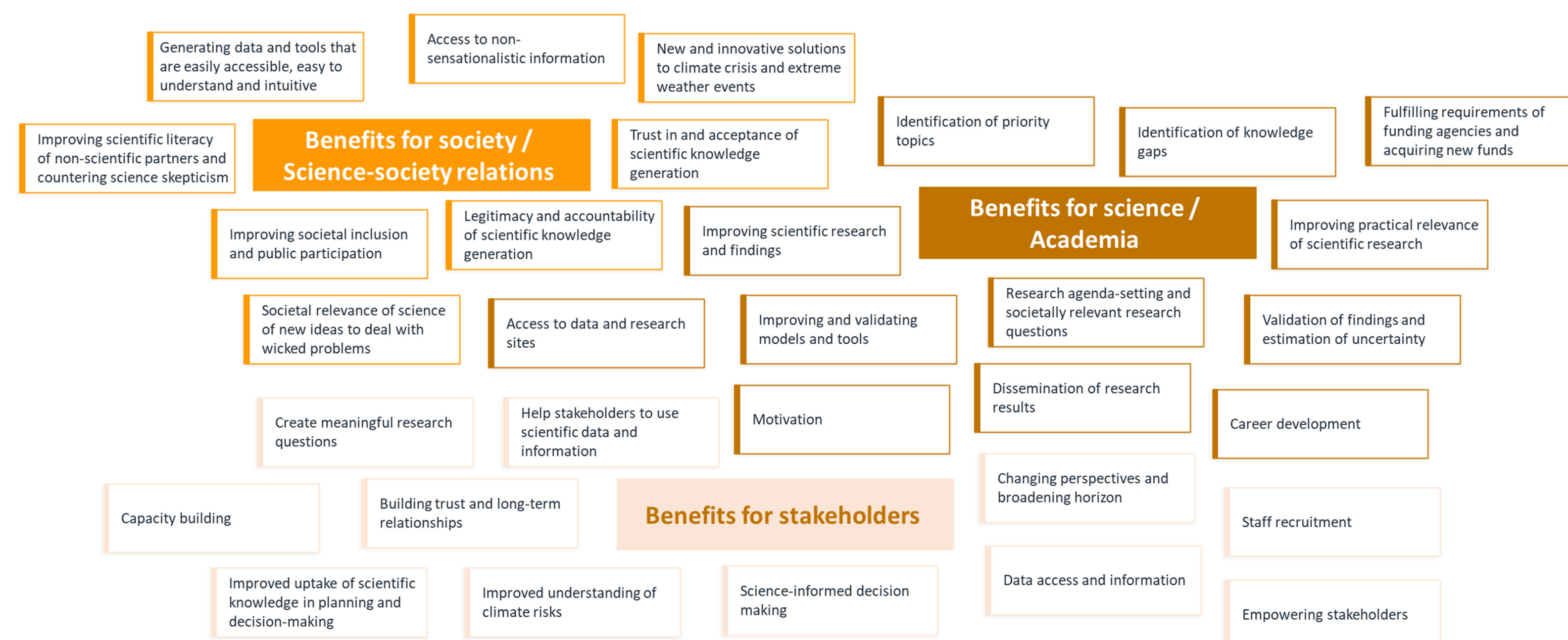
- Drought** is the dominant climate extreme to forests
- Norway spruce mortality and bark beetle infestations** have the highest impact
- Broad consensus on the impacts** of climate change but **divergent adaptation management philosophies and practices** bases on **different management goals** (economic optimization vs. ecological integrity focus)
- Practice-science cooperation** is essential for robust, widely supported strategies
- Overall goals:** long-term multifunctionality, resilience, and improved societal support of forests

Methods and outputs

ClimXchange conducted surveys, a case study, interviews, and workshops to assess perspectives and requirements of scientists and stakeholders regarding knowledge exchange.

Based on the insights, ClimXchange created the following outputs:

- a **toolbox and training** for science-stakeholder interaction (DRU)
- a **case study** to learn about forest practitioners' perspectives on climate extremes and to provide recommendations for policy and practice (GERICS)
- a **knowledge base** to synthesize and transfer climate knowledge towards stakeholders asynchronously (DWD).

Benefits of science-stakeholder interaction

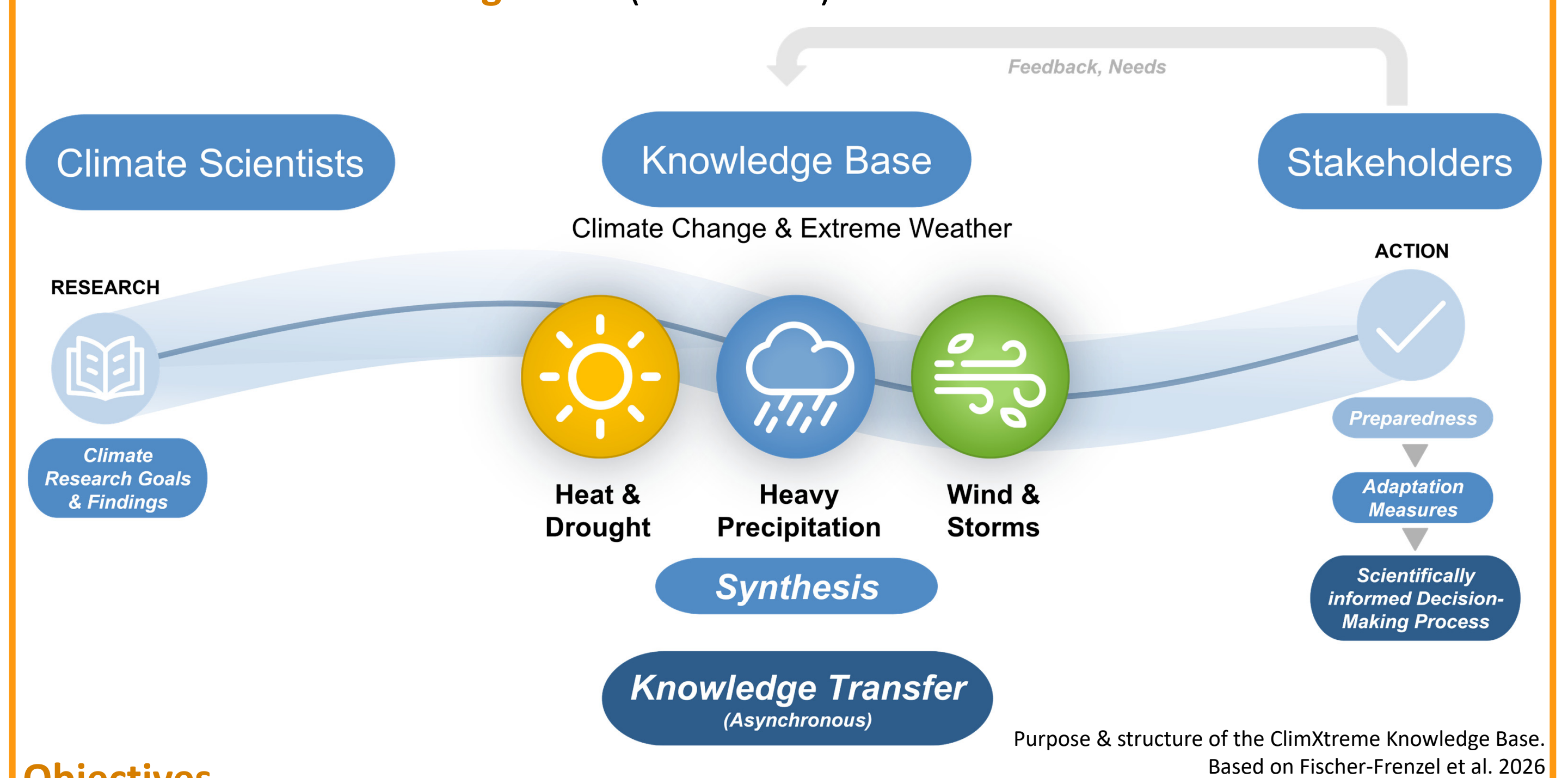
Based on Zimmermann et al. 2025

3) Knowledge base for science transfer towards stakeholders and the public Deutscher Wetterdienst

In order to increase public understanding of the complex climate knowledge generated by ClimXtreme-scientists, Johanna Knauf and Paulina Fischer-Frenzel built a basis on which climate science can be implemented into practice.

Therefore, the DWD

- held a workshop and conducted **several surveys** to identify stakeholder needs,
- conducted an **international study on uncertainty communication** containing interviews with different media outlets and meteorological services worldwide
- and created a **knowledge base** (see below).

**Objectives**

- Compile, synthesize and communicate the ClimXtreme research goals and results
- Facilitate the dialogue between climate research and society
- Provide a tool for scientifically informed decision-making processes

Publications:

- Fischer-Frenzel, Paulina; Wagner-Jacht, Miriam; Grieger, Jens; Lorenz, Philip and Kreienkamp, Frank (2026): Climate change communication from an inter- and transdisciplinary perspective. An example from ClimXtreme. EGU General Assembly 2026. Vienna, Austria. 3–8 May 2026. EGU26-12649. DOI: <https://doi.org/10.5194/egusphere-egu26-12649>
- Knutzen, Florian; Averbeck, Paul; Hausteine, Karsten; Frör, Oliver and Growth, Markus (2025): A case study on forest practitioners' perspectives on climate extremes: Consensus on impacts and conflicts in responses. In: Annals of Forest Research 68(1): 155-184. <https://doi.org/10.15287/afr2025.3981>
- Lemburg, Alexander; Buschow, Sebastian; Dietz, Victoria; Dillerup, Ines; Fischer-Frenzel, Paulina; Friederichs, Petra; Grieger, Jens; Kraulich, Florian; Pfeleiderer, Peter; Pinto, Joaquim G.; Reuter, Leonie; Schröter, Jonas; Szmekus, Svenja; Ulbrich, Uwe and Vlachopoulos, Odysseas (2026): Analyse des europäischen Sommers 2025 mit Fokus auf Hitzeereignisse: Charakterisierung, Auswirkungen und Einfluss der Klimaerwärmung. Bericht des Forschungsnetzwerkes ClimXtreme. DOI: <http://dx.doi.org/10.17169/refubium-51330>
- Zimmermann, Theresa; Fischer-Frenzel, Paulina; Merkes, Sara Talitha and Voss, Martin (2025): Climate research and practice in dialogue: Potentials and pitfalls of transdisciplinary interaction between climate scientists and practice stakeholders to reduce the risks of extreme events. KFS Working Paper Nr. 34. Berlin: KFS. DOI: <http://dx.doi.org/10.17169/refubium-49232>

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