

Climate services for our critical decade for climate action

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During the Critical Decade for Climate Action Conference, hosted by the Tyndall Centre for Climate Change Research at the University of East Anglia (UEA), climate experts gathered to showcase evidence-based ideas and critically evaluate opportunities for climate action. This briefing note serves as a summary of Session 5 on Tuesday 9 September 2025.

The Director of the German Climate Service Center (GERICS) addresses what are the emergent and urgent transitions in the 2020s; what are the barriers and enablers to delivering climate action at scale; and what is needed for the transition to Climate Services. Prof. Jacobs is the coordinating lead author of the IPCC Special Report on the impacts of global warming of 1.5 °C; one of the lead authors of the IPCC FiAh Assessment Report (WG 2); and Chair of the Climate Council for the City of Hamburg and the German Committee for Future Earth.

- Climate services are tailored products that translate climate data into usable information for decision-making across sectors like water management, agriculture, health, and urban planning.
- **Co-production** is crucial for success: working directly with stakeholders from the outset to ensure services are fit-for-purpose and actually used.
- Climate services are not one-size-fits-all; they must be **context-specific** to be effective.
- The field has grown significantly, with providers now including national meteorological services, academia, and private consultancies.
- Future opportunities include scaling up services, integrating indigenous knowledge, harnessing AI, and enabling proactive (rather than reactive) adaptation planning.

Climate change is locked-in

Our children are growing up in a warming world. Signals of our changing climate are becoming ever louder and more pervasive across our planet's systems; record-breaking temperatures, increasing frequency of flooding and droughts, changing migratory patterns, rising sea levels etc. While mitigation remains crucial, we are already locked into significant changes that societies must prepare for. These changing patterns are global in nature but experienced locally, and all societies and sectors of business will need to adapt.

Climate science offers projections of these changes that, whilst not perfect, offer critical insights into the types of changes that can be expected and how these vary across sectors and regions. It was in recognition of the need to make such knowledge usable that the field of climate services emerged over the past 15 years. Climate services are intended to bridge the gap between climate science and the sectors and societies that must adapt, much as our weather services utilise the projections from meteorology to provide daily forecasts. The purpose of climate services is not only to convey climate projections but to translate them into decision-facilitating knowledge: information that enables pro-active, risk-informed adaptation rather than reactive response.

Climate Services translate projections to sector-specific decisions

Climate services are sector specific and the information requirements for differing sectors are as diverse as the sectors themselves. The implications of a changing climate manifest differently for energy, health, transport, water, tourism, agriculture, etc. All have different adaptation challenges, all require purpose-built services. There are some efforts in the field to create panoramic climate services, a single service that offers insights to a range of stakeholder perspectives. Whilst the idea is attractive, this is challenging to implement as making outputs more general to reach wider audiences typically makes the information less relevant for any one specific audience: a trade-off between generalisation and utility.

From their beginnings in early European initiatives such as the Roadmap for Climate Services, the field has grown into a diverse landscape. Publicly funded research institutes, national meteorological services, universities, and private consultancies now provide a wide range of services, numbering more than 400 providers across Europe alone. These services rely heavily on climate observations and modelling, and progress in modelling capability – such as the move from coarse global grids to high-resolution city-scale simulations – has been essential to make them more relevant to local realities. This shift demonstrates why granularity matters: a city such as Hamburg will appear uniform on a global model grid, but local-scale modelling reveals the urban heat island effect in detail, allowing policy makers to plan accordingly.

Adaptation is inherently context specific. A universal, one-size-fits-all approach is neither possible nor desirable. The risks that societies face, and the opportunities they have to respond to, depend heavily on local geography, governance, culture, and lived experience.

Context specific co-production is key

There is a risk that climate services become overly technocratic, producing outputs that are scientifically robust but divorced from the requirements of users; thus, creating useful, impactful services relies on co-production. Good

services are emergent from an iterative dialogue between scientists and stakeholders, combining empathy to understand user needs with subject knowledge and creativity to craft intuitive and engaging outputs. This has been demonstrated in case studies presented during this keynote presentation.

In Sicily, for example, downscaled models have been combined with hazard scenarios to assess the risks of extreme rainfall in urban areas, providing the evidence base for adaptation planning. In another example, simulations of rooftop greening showed the extent to which simple measures can reduce damaging heat stress in industrial storage facilities, highlighting the practical consequences of climate change for working conditions and material losses. In coastal regions, co-production has supported tourism and beach management, with scientists and stakeholders working together to design adaptive pathways. There are many more local case studies, historic and current and planned.

Incorporating knowledges

There is an opportunity to broaden the knowledge base that informs climate services. At present, they are primarily grounded in observational data and modelling, but there is much to gain from incorporating social science perspectives and indigenous or traditional knowledge. Communities across the world have long histories of coping with environmental extremes and adapting their livelihoods in response to change. While climate services have only tentatively engaged with this dimension so far, the inclusion of such perspectives could enrich both the design and uptake of services, grounding them more firmly in the realities of those most directly affected.

The field is still young but growing rapidly. As climate change continues and sectoral understanding of adaptation requirements increases, the demand for such services will also expand. The continued development will require continued advances in science, greater interdisciplinarity, and deeper partnerships with stakeholders. Done well, they provide the knowledge base for societies to adapt wisely, equitably, and in ways that anticipate change rather than chase it.