

User-friendly climate science: communicating data for decision-making

About the ACCC Project

The Adapting to Climate Change in China Project (ACCC) is an innovative policy research project, supporting China's response to the impacts of climate change and evidence-based adaptation planning. ACCC provides decision-makers with the policy-relevant information they require, taking into account current and future climate change and variability. ACCC aims to improve understanding and assessment of impacts, vulnerability and risk in key sectors in China by bringing together policy and research, national and subnational planning, social and physical science for an integrated response. The project shares this experience and lessons learnt with other developing countries in order to reduce their vulnerability to the impacts of climate.

ACCC does this by:

- supporting evidence-based adaptation planning through access to relevant and robust data, tools and information.
- mainstreaming climate change adaptation policies into development planning.
- producing comprehensive impact, vulnerability and risk assessments at the national and subnational level.
- building capacity and providing technical support on adaptation responses at the subnational level.
- sharing China's experience with other developing countries to enhance their own resilience to the impacts of climate change.

For more information, please visit our website at www.ccadaptation.org.cn.

Key messages

- The end-users of climate data are growing in number and becoming more diverse as more countries commit to take action on climate change.
- To produce policy-relevant data, scientists have to understand decision-makers' needs for specific kinds of evidence — providing that data in an easy-to-use format.
- User-friendly climate science starts with an awareness of key policy questions, focuses on the data that will reveal relevant impacts, and interprets the results in terms of the decisions to be made.
- Governments not only need access to climate data, but technical support on how to apply it.
- This support should include clear statements of what is available, its scientific pedigree, its underlying assumptions and limitations, and guidance on how to use it — and how not to use it.

This briefing was prepared by Roger Street, UK Climate Impacts Programme (UKCIP) and Xu Hongmei, China Meteorological Administration (CMA) based on ongoing research as part of the Adapting to Climate Change in China project.

Getting the data right for risk assessment

Most climate science is done for climate scientists. Designed and presented with the needs of the research community in mind, projects often fall short of providing the information needed by policymakers.

The science-centred approach has built an invaluable global knowledge base about past, present, and projected future climate change. But to translate this knowledge into plans for adaptation, policymakers need data tailored to the decisions they have to make. Today, climate researchers face the challenge of producing and delivering this decision-relevant data — based on sound science as well as a grasp of who is using climate information and how.

The Adapting to Climate Change in China (ACCC) project has taken on this challenge. ACCC is working to provide climate scenarios that can better inform assessments of vulnerability and risk, and strategies for adaptation. The program builds on previous projects supported by the

UK Department for International Development (DFID) and Department for Environment, Food and Rural Affairs (DEFRA), and on existing efforts to model China's climate. Researchers in China have accumulated substantial experience and skill in regional climate modelling.

But in China as elsewhere, there is a gap between climate modellers and the risk-assessment and adaptation community. The 'end-users' of climate data are growing in number and becoming more diverse in terms of their needs worldwide, as countries confront the impacts of climate change and strengthen the political will to respond. To steer scientific work — and communicate the results effectively — researchers must be aware of these diverse users' requirements, know their key questions about climate threats, and evaluate what data and information is available to respond to their requirements. The uncertainties and complexities of climate change can make it an especially difficult leap from investigating Earth systems to informing policy decisions.

Elements of user-friendly climate science

During the Adapting to Climate Change in China project, lessons have been learnt which can now be built on. These lessons are based on experience working with policymakers and practitioners, drawing on the broader climate services community, as well as the discussions that ACCC held with representatives of its users community.

Decision-relevant climate research should:

- Start with an understanding of the decisions or policies that will be affected by the scientific evidence.
- Focus on the systems or processes governed by these policies — such as agriculture or public health. In a changing climate, what are their sensitivities, vulnerabilities and thresholds? Descriptions of the current and future climate are necessary, but often insufficient, to understand impacts on these systems.
- Provide relevant data and information, and also be ready to interpret the results in terms of the specific decisions to be made. Policymakers will need physical climate data in a manner (format, content and language) that can be integrated with other pertinent information, such as socio-economic statistics and scenarios.
- Give government staff access to the data — and technical support. This includes clear statements of what is available, its scientific pedigree, its underlying assumptions and limitations, and guidance on how to use it — and how not to use it. Users have a variety of knowledge, skills and needs, and as user communities grow and diversify, there is increasing potential for misuse or inaction due to confusion.
- Maintain an ongoing relationship between data providers and users that allows them to learn from each other and address problems over time. As users' needs, scientific understanding and technology evolve, the content and delivery of information products can be continually improved.

Shaping ACCC's information products

The ACCC project is producing regional climate change scenarios to help China plan for adaptation. Both the research design and the scenario outputs are being tailored to meet the needs of planners, risk analysts and other end-users. To make the results more user-friendly,

ACCC has engaged and communicated with end-users at all stages. Ongoing discussions about what is required for impact assessments have informed how scenarios are developed and disseminated.

ACCC used this approach to create two flagship products for delivering user-friendly climate science: a website presenting climate scenarios and preliminary user guidance, and a brochure highlighting the available scenarios.

Early in the website development, users' needs were assessed via online interactions, questionnaires, a survey and workshop sessions. Government officials and analysts told ACCC they wanted climate scenarios to support assessment and decisions about impacts, vulnerabilities, risks and adaptation strategies. They asked for scenarios

that are easy to read, understand and access. Users also considered it important that scenarios be relevant — linked to user requirements, and not merely description of the climate and what was available - and credible, including being available from a recognised and respected source. They recommended that the website have an interactive interface; present scenarios in a variety of formats, such as raw data, indices, maps, graphs and images; provide supportive information including metadata, guidance and examples of use; and clearly state assumptions, uncertainties and limitations.



Figure 1: CMA Regional Climate Change Scenario Dataset for China.

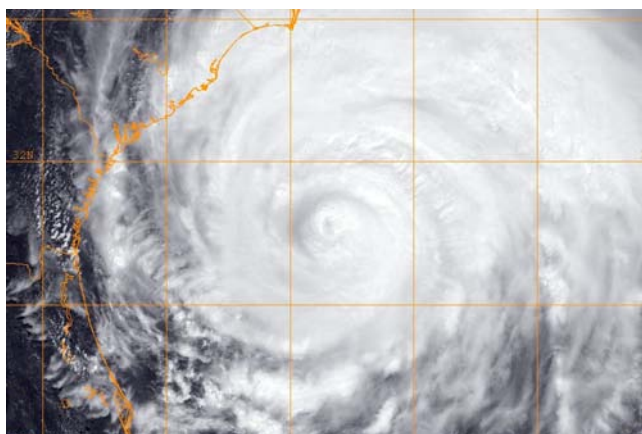
Accordingly, the website for ACCC climate change scenarios (<http://www.climatechange-data.cn/>) offers interactive data browsing and downloading, allowing users to customize the information in multiple ways:

- **Type of user:** There are information products for three different groups — regular users, advanced users, and ACCC researchers — with custom-designed datasets, maps and graphics based on our understanding of each group's needs.
- **Province:** Provincial officials can see regional climate scenarios for any province in China.
- **Climate data:** Users can view climate variables such as temperature or precipitation data, and see either the absolute projected values or the projected changes compared with a baseline from the past. When displaying changes, there is a choice of three different baseline time periods.
- **Timeline:** Users choose the time period shown, the temporal resolution, and the time of year — with both monthly and seasonal data available.

- **Format:** Data can be obtained in a format compatible with geographic information systems (GIS), and graphics can be saved as Portable Network Graphics (PNG).

To meet users' requests for additional information and guidance, ACCC created a user guide for the website. As well as introducing the available climate scenarios and providing advice on accessing and using them, the guide presents case studies showing how climate scenarios have been applied to assess impacts and vulnerabilities in agriculture, water resources, ecosystems, animal husbandry, forestry, and human health at national and subnational scales.

ACCC's brochure on climate change scenarios in China complements the website. The brochure introduces the scenarios available online, summarizes their results, and describes how they can be used for impact and risk assessments — including example applications in the agriculture and water sectors. A comparison of climate projections from different models highlights the level of uncertainty that decision-makers must cope with. The brochure has been distributed to ACCC researchers and project partners by email and at workshops and trainings.



Learning from a training

ACCC has also run a training session for analysts and decision-makers at various levels of government. The session covered the mechanics of accessing climate scenarios on the ACCC website, as well as the more complex issue of selecting the right scenarios to guide policy. At the training session, programme staff came face to face with website users — the most direct and effective way to get feedback on how we can keep making the site more user-friendly and policy-relevant.

One lesson learnt is that prior to the training, policymakers desired a single 'accurate' climate projection — as opposed to the multiple uncertain models that climate scientists prefer to discuss. But after learning how multiple models are used to quantify uncertainty in climate data — and hence to assess risks — these policy experts attached more importance to multi-model scenarios as a tool for decision-making. To go deeper on this issue, ACCC have produced a brief on multi-model projections, available on the ACCC website, www.ccadaptation.org.cn.

Taking it forward

As ACCC continues work on developing and delivering climate change scenarios for China, we'll be taking forward these observations and feedback. Based on user comments, we can improve the presentation of scenario data and the user guide — providing more information about uncertainty, for example. We'll also be adding new case studies from ACCC research partners. We will help policymakers build their capacity to access and apply climate data. And we will keep in touch with both providers and users of climate data in order to keep pace with new needs and possible solutions as they evolve.