A transatlantic dialogue:
Part 2 - Enhancing Interaction between Scientists & Practitioners

Climate Service Center Germany
Eine Einrichtung des Helmholtz-Zentrums Geesthacht

CONTEXT

As the impacts of climate change become more immediate, adaptation to these changes is becoming a greater area of interest and concern among resource managers, planners, and other stakeholders at all scales. However, in spite of advancements in the scientific understanding of climate change, much progress is needed in developing, translating, and disseminating usable knowledge to inform both individual and collective actions, especially at local levels of decision making. As part of this, increased emphasis has been placed on fostering sustained engagement between research communities and users of climate information. Additionally, the documentation of case studies as well as the development of networks that include researchers, practitioners, decision-makers and stakeholders has been identified as helpful mechanisms to support a growing number of communities developing climate change adaptation strategies.

PROJECT BACKGROUND

A diversity of climate change risks, physical, socioeconomic, and ecological contexts, available resources and response options, decision-making processes, and cultural norms shape the societal response to climate change across political and physical geographies. The resulting diversity of approaches makes it difficult to establish best practices and common ground for interaction between research and stakeholder communities.

Working under the hypothesis that comparing these significant differences can help to identify transferable lessons useful for improving strategies for climate change response (adapting to climate change impacts and reducing emissions), we compared experiences in mountain and coastal areas, in the United States and Europe.

A group of scientists and stakeholders from mountain and coastal areas join together in Aspen, CO (above) and Timmendorfer Strand, Germany (below).

In 2013, the Aspen Global Change Institute and the Climate Service Center in Hamburg, Germany, hosted two innovative workshops that brought together an international group of scientists and key stakeholders, resource managers, and elected officials from six specific case regions: Bay of Kiel, Germany; Grindelwald, Switzerland; Roaring Fork Valley, Colorado; Virgen, Austria; Chesapeake Bay, US; and Outer Banks, North Carolina, US (see case study at the end of the paper).

The objectives of the workshops were to: (1) better understand the information needs of practitioners; (2) integrate bottom-up and top-down approaches to climate adaptation; (3) facilitate knowledge exchange and learning across different situations; (4) identify “best practices“ or lessons about useful approaches in adaptation planning; (5) build and expand adaptation networks; and (6) identify barriers to adaptation and how actors overcome them. The results of the dialogues are summarized here and in two further briefs. For more information about the project see: www.climate-service-center.de.

KEY FINDINGS

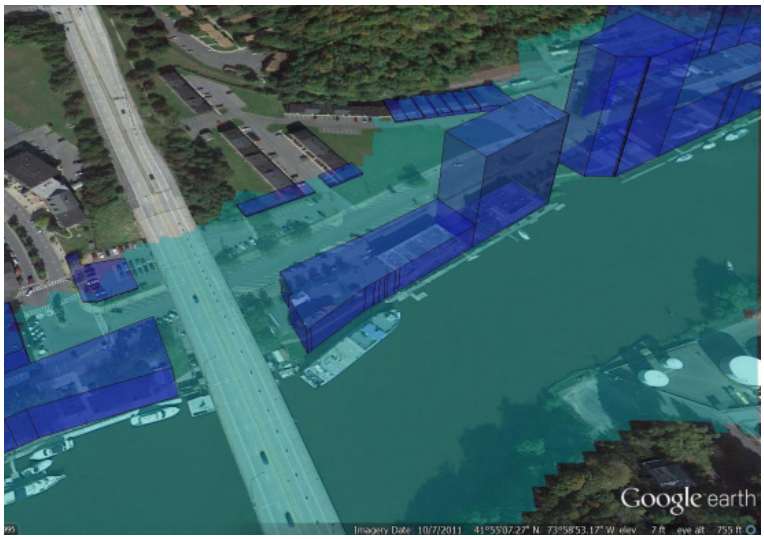
- Developing forums, networks, and institutional partnerships along with professional incentives for ongoing dialogue and mutual learning is crucial to create the joint production of practically useful knowledge and to increase its use in decision-making.
- The move toward integrative science (from reductionism to holistic systems perspectives) must be matched with more integrated planning and governance.
- Different kinds of tools serve different purposes such as supporting a dialogue among stakeholders, the decision-making process, and ongoing monitoring.
- There is a need for tools that are visually engaging, demonstrate possibilities and opportunities, inform about vulnerabilities, make the uncertainties clear, and broaden the use of scenarios.
- Tools are needed that compile and integrate local knowledge and scientific information about climate change and thus make it available for a wide range of users.

INTRODUCTION

The 2013 transatlantic dialogues involved resource managers, planners, elected officials, researchers from various disciplines, and a number of individuals working at the science-policy-practice interface. The intent was to better understand the information needs practitioners have in adaptation planning and implementation and how science can help meet these needs within the constraints of what is scientifically credible and feasible. Inevitably, the deliberations unearthed the challenges of working together productively at the science-practice interface, the possibilities and limits of using tools to support deliberation and decision-making, and the political and cultural contexts of responding to climate change in Europe and the United States at this time. Lessons learned about effective interaction and appropriate use of tools are summarized here.

DIALOGUE AND DECISION SUPPORT TOOLS

To address the growing need for resources designed to help decision-makers, resource managers, planners, and other stakeholders make sense of climate change impacts and adaptation options, there has been a proliferation of "tools" that help guide planning discussions, translate and visualize scientific information, and enable tool users to explore future scenarios and the impacts of considered responses within their region or community. Tools comprise one important type of instrument for making scientific information usable for climate adaptation planning, though careful attention to their design, development, and use is imperative.



Visualizations, such as those that explore scenarios of coastal inundation, can serve as the basis for community discussion and decision-making. Credit: Catalysis Adaptation Partners

CONTEXT AND RESOURCES

At the initial dialogue in Hamburg, the participants examined and discussed tools for illustrating climate change impacts on local communities. Examples of presentation included *a systems model designed for a mountain watershed in British Columbia*, an *early warning forecast tool designed for the Chesapeake Bay*, and a multi-criteria *assessment for development of adaptation paths in the Elbe River Basin*. Group discussions focused on the perspectives of both developers and users of tools to support decision-making for adaptation to climate change.

At the Aspen Workshop, participants were provided with more detailed information on four specific tools and discussed their experiences with these tools in a plenary session. The four tools were:

- ***Baltic Climate Toolkit*** (http://toolkit.balticclimate.org/) – an empowering knowledge transfer instrument for actors on the local and regional level, who have an important role to play in the preparation, financing and decision-making related to the implementation of climate change measures.
- ***COAST*** (http://catalysisadaptationpartners.com/the-coast-approach.html) – a decision-support tool that predicts damages from varying amounts of sea level rise and storm surge of various heights and evaluates relative benefits and costs of response strategies. It allows users to connect the technical aspects of sea-level rise, with an accounting of the economic assets and costs of adaptation given their preferences and values.

- ***ORTIS*** (http://www.alp-s.at/cms/en/consulting/history/ortis/) – as a community-based risk assessment tool, ORTIS identifies and assesses risks and their impacts and probabilities, illustrates the effects of implementing certain strategic, technical and organizational measures, and offers users the opportunity to monitor and evaluate the effectiveness of the measures as well as emerging risks. This is embedded in a process of facilitated workshops to bring in local knowledge and engage stakeholders.
- ***CLIMSAVE*** (www.climsave.eu) – the CLIMSAVE Integrated Assessment Platform allows the user to explore the complex issues surrounding impacts, adaptation and vulnerability to climate change at regional to EU scales. Impacts of climate and socio-economic change are visualized using maps and vulnerability to climate change is shown for 6 sectoral indicators.

DIFFERENT TOOLS FOR DIFFERENT PURPOSES

While noting that the development of any "tools" must be accompanied by clarification of values, beliefs and assumptions, so that they are clear to the users, the presentations and discussions during the two meetings highlighted three important uses of tools within adaptation processes:

Supporting the dialogue among stakeholders: Tools can provide a focal point for a controversial or value-laden discussion and stimulate learning processes. Through providing a way to represent the knowledge of all stakeholders and finding a common language, tools can assist in the joint reframing of problems and in finding acceptable solutions. Tools can increase awareness about an issue and facilitate increased understanding about what needs to be done or about the level of complexity and possible trade-offs that will have to be addressed. However, tools do not provide an unbiased focus for dialogue: when, for example, tools visualize impacts, they can have a powerful impact on the direction of the conversation.

Supporting the deliberation and decision-making process: By organizing available knowledge, structuring decision processes into step-by-step menus, and showing "what happens if x happens" or "what are the costs and benefits of y choice". Tools can show the options available to deal with a problem and the results they might produce, thus aiding the users to find a solution. The tools do not make the decision, but provide a basis for reaching one.

Tools to support adaptation planning can help in a variety of ways, such as visualizing possible future impacts from climate change, exploring the costs and benefits of possible response options, or supporting dialogue during a community's planning process. Credit: Aleksander Kosev/fotolia

Monitoring effectiveness: Tools can be used to keep track of the impacts of measures taken and thus become part of a process of experimenting and learning.

WHAT IS NEEDED?

Tools cannot stand alone, their value lies in the process in which they are embedded. No tool can replace the dialogue and reflection that are needed in reaching a decision to do something. However, tools can trigger a desire to deal with climate change and point out specific possible adaptations to it. Much therefore depends on the process design itself, not just on the credibility and usefulness of the tool. The process could also involve stakeholder engagement in the development of the tool itself. Using tools within a process requires good facilitation and training so people can use tools appropriately. For instance, once a part of a decision-making process about the future of a community, tools can raise fear of loss or even anger about proposed responses and, therefore, this dialogue must be constructively facilitated.

In both Hamburg and Aspen, there were calls for tools that are ***visually engaging***, for example using pictures or maps that are easily understandable and thus support communication. Links to online sources of

information are also useful. Other ideas for needs covered: online support tools that do not show concrete outcomes but ***demonstrate possibilities and opportunities***; tools to inform decision makers about what vulnerabilities are and give them an idea about what they want to change; tools that make the ***uncertainties*** clear and broaden the use of scenarios. Overall, there was a call for tools that are ***logical, transparent, interesting, and reliable***.

The discussions at both meetings highlighted some particular needs for tools to be used in processes to develop strategies for adaptation to climate change:

Climate change impacts and the adaptive responses to them lead to financial costs and benefits for a community, but consideration of non-financial factors, such as quality of life and love of place, can also play a prominent role in shaping community dialogue and preferences on response options. Credit: emillau/fotolia

Dealing with the costs and benefits of climate change

While it appears that many stakeholders would like to have tools that calculate the costs and benefits of adaptive measures, others point to the need for extending tools to look at subjective/non-market values, such as quality of life or love of place. While tools calculating costs and benefits could engage the business community in the dialogue about climate change, mitigation and adaptation, the issue of "cost" speaks to more than the business community. However, for many people cost is not the central issue, or at least often not the one driving their acceptance or resistance to proposed measures. Participants from the USA in particular felt that economic tools need to be embedded in robust deliberative processes so that as agreement are made on the need to address climate change impacts, the question of how to fund the measures (mitigation and adaptation) can be addressed. Otherwise, the question of costs will be a significant barrier that some will try to exploit to prevent any action.

Incorporating local knowledge and values

Tools to support decision-making are not one-size-fits-all. Matching tools to community needs and incorporating local knowledge and values into the process of using the tool is required for effective decision support. Credit: Michael Kranewitte

Participants emphasized the need for more entry points for local experiences to inform local, provincial and national planning. That is, tools are needed that compile and integrate local knowledge and values, as well as scientific information about climate change, and thus make it available for a wider range of users. The possibility to update this material regularly would add further value. Qualitative information is also very useful. Through incorporating local knowledge, the tool becomes open to "other ways of knowing" and can build trust in the user community through the use of stories. Furthermore, the elicitation of values and their use in tools require both special skills and disciplinary knowledge from the social sciences and humanities. It was also noted that keeping tools – and the data they use – locally relevant and updated is time consuming, and is rarely taken into account in the development and the propagation of the tool.

Outreach and tool selection

The discussions showed that there is already a wide range of tools, with different aims, level of detail and focus. Outreach is rarely included in tool development project budgets, so the availability of many tools is not widely advertised. Since it is clear that different tools will be needed in different situations, the participants not directly involved in tool development and use expressed the need for a platform that provides recommendations for tools or indeed some kind of decision tree that can be used to find a tool to fit specific requirements. While such platforms are available, e.g. CLIMATE-ADAPT (http://climate-adapt.eea.europa.eu/), weADAPT (http://weadapt.org/), ICLEI's adaptation toolkit (http://www.icleiusa.org/tools/adapt), or compilations of case studies such as CAKEX (http://www.cakex.org/), potential users do not yet know about them.

Overall, the two dialogues showed a wide availability of tools serving a variety of purposes. At the same time, explicit needs for tool development were expressed and the participants clearly felt that information about available tools was hard to find.

INTERACTION AND DIALOGUE AT THE SCIENCE-POLICY-PRACTICE-PUBLIC INTERFACE

There is a long history – both in science and in practice – to ask how best to work together at the science-policy-practice-public interface: What are the differences in language, professional norms, cultures and institutional (dis)incentives between science and the world of practice, and how can they be overcome? Should they be overcome? How close should the interaction be? What should be the role of science in decision-making, and what is the role of potential information users in influencing what research gets done?

One goal throughout the transatlantic dialogues was to identify more effective approaches to science-practice interaction. Participants identified a range of approaches including the use of “boundary organizations“ as intermediaries between science and practice communities as well as techniques for co-production where stakeholders work alongside researchers in accomplishing outcomes of mutual interest to both groups. Credit: Climate Service

The Hamburg and Aspen dialogues confirmed common barriers in that interaction and found them to be as prevalent in the U.S. as in the EU, in coastal as well as in mountain environments: the attitudes of those involved, the lack of mutual understanding between scientists and stakeholders/decision-makers, language differences, professional norms and incentives, limited capacity for self-reflection, and lack of time (on all sides) for building a well-functioning connection. To overcome them, they re-affirmed the need for a robust (effective and ongoing) social process, and in fact emphasized that such a process is more important than any science or any law to making progress on adaptation.

A RANGE OF MODELS OF SCIENCE-PRACTICE INTERACTIONS

There is far from an agreement about how and how closely scientists and decision-makers should work together. While many scientists have developed significant experience and skill in doing so, among some there still is considerable hesitancy about a close and ongoing interaction.

While few would insist that there should be a tight “firewall“ separating scientists from practitioners (model 1), many would prefer a type of institutional arrangement whereby a designated “boundary organization“ serves as a meeting space, convening individuals – periodically or an a more permanent basis – to explore information needs and scientific feasibility, managing the interactions among participants, and ensuring mutual accountability, but leaving both scientists and decision-makers to do what each does best alone, except for the encounter at the “boundary“ (model 2). Over recent decades, experience has shown that direct and frequent dialogue in both formal and informal settings between scientists and decision-makers without a convening institution constitutes another often highly effective form of science-practice interactions (model 3). Finally, on the extreme opposite end from the firewall model is the complete merger of those doing research and those making decisions where lines of distinct responsibilities have been extinguished (model 4).

The extreme models have few subscribers among those who are serious about use-inspired research and useable science. Experience gained from collaborative work along the lines of the other two models suggests the following key lessons (see also the resources at the end):

- ***Effective co-production – and use – of science typically involves changes on both the science and the governance sides:*** scientists overcome institutional disincentives to meet with practitioners to understand information needs and decision contexts, help – step-by-step – to decentralize the provision of information and build capacity to understand and correctly interpret information; meanwhile practitioners ensure political authority and create a policy context in which climate change information can be used. Together, they build a culture of partnership and leadership capacity at all relevant levels. Both sides stay in the social negotiation of decisions to not just find the decision-analytically "optimal" solution, but the socially acceptable and morally "right" one.
- ***Several favorable baseline conditions facilitate effective science-policy/practice interactions***, including the involvement of scientists with long-term research experience and established credibility, established close cooperation with planning authorities, graduates from a local/regional university who have moved into public planning or private sector institutions (social and human capital), strong scientific allies in neighboring disciplines, and a network of experts to draw on so as to be able to respond to changing information requests over time.
- ***Skills and capacities – among scientists and practitioners – needed for effective interaction*** include the ability to:
  - ***Communicate, translate and facilitate dialogues by***
    - Listening first, speaking second
    - Learning how to address the audience before addressing it
    - Understanding the concerns and viewpoints of all involved, trying to "stand in their shoes"
    - Aiming for personal connection, not for persuasion
    - Linking science to people's experiences
    - Being honest but polite, without having to accept the other's point of view or beliefs
    - Balancing the need to raise awareness, assist understanding and be clear about the implications of scientific understanding
    - Facilitating constructive conversations about solutions
    - Connecting different types of knowledge
  - ***Build trust and confidence by***
    - Being non-condescending
    - Being interested in the other
    - Involving stakeholders from the start
    - Being aware of and directly dealing with any legacies of distrust
    - Illustrating to stakeholders that they share common problems and that there are opportunities and common interests in solving them
    - Showing linkages between problems/risks and solutions
    - Understanding that you won't "get them to do something," but that all involved need to get to "us doing something difficult together"
    - Understanding that trust will take time to build; undoing distrust will take even longer
  - ***Improve the interaction by***
    - Being observant, self-reflective and willing to change
    - Building alliances of interest and ensuring that all voices are heard
    - Sharing successes

- Pooling resources to help overcome institutional and financial barriers
- Scientists and practitioners being in constant and personal interaction
- Identifying and strengthening ties to strong allies at the political level
- Adjusting attitudes and perspectives by understanding that people may feel as threatened by climate change as by the proposed response to it, especially if they are being told what to do
- Not telling the community what is right or wrong, but helping people determine how much risk they want to tolerate and what solution they find acceptable

LESSONS ON EFFECTIVE SCIENCE-PRACTICE INTERACTIONS ON ADAPTATION

There are opportunity costs, risks and opportunities involved in each of the above models of science-practice interaction, suggesting that different circumstances may require different arrangements. Regardless of these specifics, several overarching messages emerged:

- ***For practitioners, science is an "enabling capacity" for adaptation***. It is needed for modeling, analysis, reasonable projections, assessment of uncertainties, and for ongoing monitoring of environmental changes and of the effectiveness of employed solutions.
- ***For scientists, engaging in specific adaptation contexts offers a way of "on-the-ground" testing of scientific knowledge*** in applications to make it more robust over time. It offers a real-life opportunity to evaluate and transition tools and information products into operation.
- To ensure the lessons go beyond the specific context, ***the mutual learning from specific pilot projects must be shared*** and thus help build a community of practice.
- Importantly, the ***transfer of information from science to practice is not enough***. As one put it, it is important to avoid "helping people do the wrong thing more precisely", but to provide help with applying information, assessing its use, adjusting and sharing better practice on a continual basis.
- There is a ***risk of "inconsequential" science-practice interaction***, with perpetual "paralysis by analysis" on the part of scientists, matched with "conspicuous consumption of information" on the part of decision-makers, who might busily search for relevant information but never do anything (different) with it. Thus, using science-policy dialogues to clarify the implications of scientific findings, exploring action alternatives, and getting to a commitment to action are key to avoiding this risk.

MOVING FORWARD

Visions of functional interactions between scientists and practitioners exist and necessity may create greater pressure to work together in the future (e.g., planning for different climate futures, growing crises from impacts and extreme events). While some degree of "on-the-ground" learning for all involved is unavoidable, wider sharing of common lessons is important, as is mentoring and training of academics and professionals in relevant skills during graduate education. Seeing better outcomes of such interactions over time may also foster normalization of science-policy-practice interactions.

Most important, however, is to create space for such interactions and to enable interactions between scientists and practitioners through creating physical spaces, providing funding and training, and continually working against engrained institutional disincentives. As the participants in the Transatlantic dialogues confirmed, those seeking each other out are motivated to do so because they wish to have greater impact and do the best possible job in a very challenging situation. Learning from others is both enabled and limited by the differences in context and personalities involved. Beyond those lessons, however, they look to each other for inspiration to work together and do so well.

SUMMARY

Hamburg and Aspen workshop participants engaged in an exchange of ideas and experiences with climate change science and adaptation that stimulated joint learning and mutual inspiration, understanding and respect. Despite language barriers and cultural differences stemming from different mother tongues and professional backgrounds, the involved academics and practitioners recognized each other as experts in different realms. A sense of possibility emerged that scientists, decision-makers and stakeholders could find acceptable solutions to climate change together if they engaged, remained open-minded, and used sophisticated tools and robust processes, including clear, respectful two-way communication, to understand the difficult choices society faces. There is hope and opportunity in further dialogues across the Atlantic, across the science-policy-society interface, and across different physical and socioeconomic environments such as coasts and mountains. In short, there is a continued hunger for more "***TIDAL & ROCKS***": Transformative, Interactive Dialogues on Adaptation and Learning & Reflective, Open Climate Knowledge Systems.

RESOURCES

The following selected resources are valuable starting points for more information on effective science-policy-practice interactions on climate and sustainability issues.

- Gardner, J., Dowd, A.-M., Mason, C. and Ashworth, P. (2009). A framework for stakeholder engagement on climate adaptation. CSIRO Climate Adaptation Flagship Working paper No.3. http://www.csiro.au/resources/CAF-working-papers.html.
- Pathways through Participation Project. Various useful reviews and reports available from: http://pathwaysthroughparticipation.org.uk/
- Participation & Sustainability in Europe: http://www.partizipation.at/index.php?english
- Kasemir, B., J. Jäger, C. C. Jaeger, and M.T. Gardner (2003). Public Participation in Sustainability Science: A Handbook. Cambridge, UK: Cambridge University Press. Available at: www.amazon.com
- Moser, S.C. (2009). Making a difference on the ground: The challenge of demonstrating decision support effectiveness. Climatic Change 95(1): 11-21. Open access article, available at: http://escholarship.org/uc/item/3bc7655d
- National Research Council (2009). Informing Decisions in a Changing Climate. Washington, DC: national Academies Press. Available for free download from: http://www.nap.edu/catalog.php?record_id=12626

Acknowledgements

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Workshop Hosts: Climate Service Center & Aspen Global Change Institute

Funding Provided by: NASA, NOAA, Oak Foundation, and Climate Service Center

Workshop Organizing Committee: James Arnott (AGCI), Guy Brasseur (Climate Service Center), Jill Jäger (SERI), John Katzenberger (AGCI), Grit Martinez (Ecologic), Susanne Moser (Susanne Moser Research & Consulting), Michael K. Orbach (Duke University)and Michaela Schaller (Climate Service Center).

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