

## Both research *for* adaptation and research *on* adaptation are needed to inform society's response to climate change impacts

Impacts of climate change are increasingly evident around the world. Aggressive efforts to mitigate climate change – by limiting the amount of greenhouse gases in the atmosphere – must now be accompanied by similarly strong adaptation efforts to address the impacts of climate change.

The growing need for adaptation action has created a burgeoning demand for adaptation research, from climate impact studies, to economic analysis, to the development of effective adaptation strategies and solutions. Researchers from around the world are working hard to meet this demand.

Adaptation research was not always as sought-after. In line with the adage that “an ounce of prevention is worth a pound of cure”, for many years, adaptation research was seen as a distraction from the immediate need for mitigation – and even as an admission of defeat.

In the meantime, the reality of climate change to many people, particularly in developing countries, became ever more apparent. In 2007, the Intergovernmental Panel on Climate Change concluded that even the most stringent mitigation efforts could no longer avoid further impacts of climate change in the next few decades, making adaptation a necessity, along with mitigation.

This scientific reality is now reflected in the outcomes of international policy negotiations on climate change. The Paris Agreement, adopted in December 2015 at the 21st session of the Conference of the Parties to the United Nations Framework Convention on Climate Change, puts adaptation on an equal footing with mitigation. As stated in Article 7.2:

Parties recognize that adaptation is a global challenge faced by all with local, subnational, national, regional and international dimensions, and that it is a key component of and makes a contribution to the long-term



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### Key messages

- Adaptation research is in high demand, as the need to adapt to unavoidable impacts of climate change is increasingly evident. However, this growing body of knowledge is not necessarily leading to better adaptation policies or actions.
- There are several known bottlenecks that hinder the uptake of adaptation research in policy and practice, such as a mismatch between the spatial and temporal scale of the data and information provided, and the scales at which most decision-makers operate.
- An even greater, more fundamental problem with adaptation research – and with the growing field of climate services, which aims to develop high-quality climate information and ensure it is applied effectively to policy and practice – is that it is based on a supplier–customer model that fails to account for the complexity of adaptation decision-making.
- To increase the effectiveness of research *for* adaptation, a strong effort is needed to fund and conduct research *on* adaptation, to explain how and why adaptation decisions are made or not made, and to determine what works and what does not work, and why.
- Adaptation researchers could also learn from medical research, which has matured into a range of well-defined disciplines. Medicine could serve as a model for how knowledge and information is effectively translated, used and transformed, and how academic, public and private actors all specialise to be complementary and synergetic.

global response to climate change to protect people, livelihoods and ecosystems, taking into account the urgent and immediate needs of those developing country Parties that are particularly vulnerable to the adverse effects of climate change.

As the growing urgency of adaptation spurs more research, can we be confident that this research actually informs adaptation action? During the opening plenary of Adaptation Futures 2016, Roger Pulwarty, Senior Science Advisor for Climate at the U.S. National Oceanic and Atmospheric Administration (NOAA), cautioned, “We should not help people do the wrong thing with better information.” According to Pulwarty, the mere availability of and even access to information are no guarantees that practitioners and policy-makers will put it to good use.

In other words, in addition to conducting research *for* adaptation, we should also aim to understand how adaptation can and does make a difference by conducting research *on* adaptation.

By analysing the ways in which people and organisations adapt, adaptation research then obtains a second purpose: to explain how and why adaptation decisions are made or not made, and to determine what works and what does not work, and why.

## The gap between knowledge and action

In spite of the rapid expansion in research for adaptation over the past decade, and illustrating Pulwarty's point, a gap remains between adaptation knowledge and action. Various studies have been conducted to explain the gap, both in developed and in developing countries. However, in the absence of consistent assessments of knowledge needs and whether and how these needs are met (for instance, as part of monitoring and evaluation systems), it is difficult to reach clear conclusions.

The work of the recently established Adaptation Tracking Collaborative may yield new insights. It aims to develop standards, methodologies, indicators and baselines for assessing progress towards adaptation goals, relying not only on project information but also on "big data" (Ford et al., 2016).

In the meantime, research has identified at least five bottlenecks to the uptake and use of adaptation research by practitioners and policy-makers (Klein and Juhola, 2014):

- Theoretical concepts and constructs developed and applied in adaptation research do not relate to the decision reality of stakeholders;
- Uncertainty surrounding the potential impacts of climate change makes stakeholders inclined to wait and see rather than act;
- There is a mismatch between the local scale at which many stakeholders operate and the degree of detail with which climate information is provided by models;
- There is a mismatch between stakeholders' primary concern to manage current climate variability, and the medium- to long-term perspective of much adaptation research;
- Adaptation research often ignores the fact that adaptation is not the only – and in many cases, not the highest – priority for many stakeholders.

Important as removing these bottlenecks might be, there is a more fundamental issue – the one noted by Pulwarty at Adaptation Futures 2016: As experience around the world has shown, even when practitioners and policy-makers have good information, they do not always use it (or use it well).

The issue here is not necessarily the quality or relevance of the information, or even how it is communicated. As was argued in various sessions at Adaptation Futures 2016, effective communication is very important for motivating

adaptation action. Yet no matter how pertinent and targeted the communication, it cannot overcome a key barrier: the reliance – by both researchers and practitioners – on an outdated and flawed mental model of decision-making and a limited understanding of the contexts in which those decisions are made (Pulwarty et al., 2009).

## Beyond the linear knowledge–action model

Historically, both providers and users of scientific knowledge have tended to operate from the assumption that responsibilities are clear and distinct: Scientists identify a problem and test possible solutions, and practitioners and policy-makers then use this information to decide on the best course of action. But reality does not follow this linear knowledge–action model.

In practice, decision-making is a much more complex and at times unpredictable process, involving different types of actors, often with conflicting interests and overlapping responsibilities. This has been understood for decades in other research and policy fields; in climate adaptation, however, the linear knowledge–action model still underpins the design of many research projects and stakeholder dialogues. Reliance on the linear model diminishes the value of much of the research that is conducted to inform adaptation action, as this research does not consider how it can be put to best use.

An example of research for adaptation that has not yet lived up to its practical potential is the development and provision of so-called climate services. World Climate Conference–3, held in Geneva in 2009, had as its theme "Climate Prediction and Information for Decision Making". It established a Global Framework for Climate Services (GFCS) to strengthen production, availability, delivery and application of science-based climate prediction and services.

The GFCS is meant to respond to the urgent need for enhanced global cooperation to develop accurate and timely climate information, and to the equally urgent need to ensure that this information is put to good use. The stated goal of the GFCS is "to enable better management of the risks of climate variability and change and adaptation to climate change at all levels, through development and incorporation of science-based climate information and prediction into planning, policy and practice."

The GFCS is hosted by the World Meteorological Organization, which has inspired national meteorological offices to assume a lead role in developing and providing climate services. These national offices specialise in meeting the first need – developing high-quality climate information – but are less adept at meeting the second one. The online portals set up by many national meteorological offices to give users access to climate information are a case in point.

Encouraged by the User Interface Platform of the GFCS and by the growing recognition that a one-way flow of climate information is of limited value, providers have begun to actively engage with potential users of the information. For example, user engagement is a key feature of international initiatives such as Climate Services for Resilient Development, the Climate Services Partnership, the European Research Area for Climate Services, and the Copernicus Climate Change Service.



The linear model is flawed: knowledge does not automatically lead to action.



Sukaina Bharwani / SEI

Members of a fishing community in Cambodia discuss their livelihoods with researchers working to help them identify adaptation needs and options.

But being user-driven is not necessarily a solution if it maintains the supplier–customer relationship reflecting the assumed linear knowledge–action model. To a great extent, providers of climate services have taken “user-driven” to mean “user-informed” – that is, providers are taking the time to learn what kinds of materials users want, what delivery methods might be most convenient, etc. That can be valuable, as it might reveal unrecognised knowledge needs. However, if that is all the shift entails, it will not be enough to bridge the gap between knowledge and action.

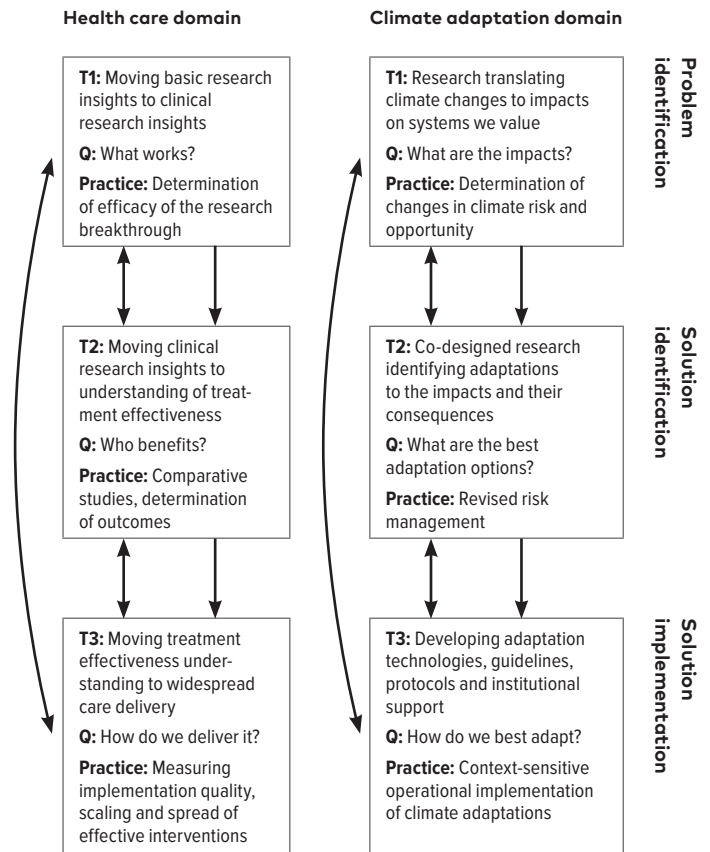
If the goal is to ensure that climate information is fully integrated into planning, policy and practice, what is needed is a shift from data-driven to *decision-driven* climate services, turning the supplier–customer relationship on its head.

In a decision-driven model, the starting point of climate services is not the production of data and information on climate change and its impacts, but engagement with decision-makers, to understand not only their knowledge needs, but how they perceive climate risk and how they make decisions, cognizant of the conflicts and opportunities within the decision-making environment. This kind of engagement and analysis requires network-building, analytical methods and problem-solving approaches central to the role of social scientists.

## Creating synergies between disciplines and value for society

Paraphrasing Pulwarty, to help people do the *right* thing with better information requires a combination of research for adaptation (to provide better information) and research on adaptation (to understand decision-making, including how and why information is – or is not – used). This is consistent with the argument made by Swart et al. (2014): Practice-oriented adaptation research is essential, but it has to be complemented by and connected to fundamental inquiry and concept development, taking into account knowledge that has been developed in disciplinary sciences and on issues other than climate adaptation.

Helping people do the right thing with better information also requires engagement with stakeholders in ways that do not reinforce the supplier–customer relationship and the assumed linear knowledge–action model. The adaptation decision process involves many more roles and responsibilities, and it is useful to be explicit about this.



In both health care and climate adaptation, the transformation of research into operational practice follows the same stages of identifying problems, identifying solutions, and implementing those solutions.

Adapted from Lacey et al., 2015.

A recent study by Lacey et al. (2015) compared the roles and responsibilities as defined in the field of public health with those in the climate adaptation domain. In both domains, they distinguished between the stages of problem identification, solution identification, and solution implementation. Each stage is characterised by a “research transition” activity (indicated in the figure above as T1, T2 and T3, respectively).

The analogy between the health care domain and the climate adaptation domain allowed Lacey et al. (2015) to develop interesting insights in how research is translated or transformed into operational practice. They devote less attention to the actors involved in each of the three stages, but here there are stark differences between the medical profession and climate adaptation.

Medical research – like adaptation research – is very diverse. But in its diversity, medical research has matured into a range of well-defined disciplines: epidemiology, immunology, pharmacology, and many more. Each includes various specialisations – for example, based on disease types or health issues (e.g. toxicology, geriatrics), parts of the human anatomy or physiology (e.g. neurology, endocrinology), or world regions (e.g. tropical medicine).

It is this diversity of research, and the rigour with which it is conducted, that enables health professionals to diagnose and treat patients, and pharmaceutical companies to develop vaccinations and other drugs. In addition, relevant research on economic, legal, political, sociological and other aspects of public health contributes to the development of health policy and the provision of health insurance and other services.

## Recommendations

- Climate adaptation researchers, practitioners and policy-makers should abandon the assumed linear model whereby researchers develop knowledge and hand it over to decision-makers, and then these decision-makers are responsible for transforming the knowledge into sensible actions.
- Researchers wishing to inform adaptation decisions should engage with decision-makers with the aim of understanding not only their knowledge needs, but how they perceive climate risk and how they make decisions. This kind of engagement and analysis should not reinforce the supplier–customer relationship or the assumed linear knowledge–action model.
- Rather than tread outside their areas of expertise in a desire or requirement to be relevant to stakeholders and have impact on society, researchers should collaborate with – and embrace the expertise of – other scientific disciplines, in particular the social sciences. Sustained mechanisms for support and coordination are central to the success of such collaborations.

Roles and responsibilities in the medical profession are well defined and complement one another throughout the complex chain connecting basic academic research to local health centres, and everything in between. It is unlikely that a researcher in molecular virology would attend the same meeting as nurses specialising in palliative care, or that the researcher would be called upon to offer advice to those nurses. Yet in climate adaptation this is often exactly what happens. A desire or requirement to be relevant to stakeholders and to have impact on society may make climate impact modellers and other researchers feel tempted or forced to tread outside their areas of expertise.

Climate adaptation therefore could benefit from experience in health care and other domains. In particular, there are important insights to be gained about how knowledge and information are effectively translated, used and transformed, and how academic, public and private actors all specialise to be complementary and synergetic.

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## Adaptation Futures Discussion Briefs

Drawing on insights from Adaptation Futures 2016: Practices and Solutions, these discussion briefs examine unresolved or evolving issues in adaptation research, policy and practice. In the spirit of the conference, they aim help policy-makers, practitioners and researchers, international processes, projects and initiatives to digest and act upon state-of-the-art adaptation research.

The series is also intended as input into the agenda of the Global Centre of Excellence on Climate Change Adaptation, announced by the Government of the Netherlands at the Marrakech Climate Change Conference (COP22), as a legacy of Adaptation Futures 2016.

## Disclaimer

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