

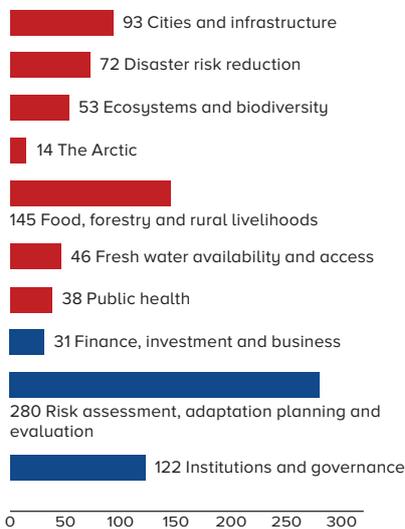
Adaptation Futures 2016: Practices and Solutions 2016

Adaptation Futures: The process and the conference

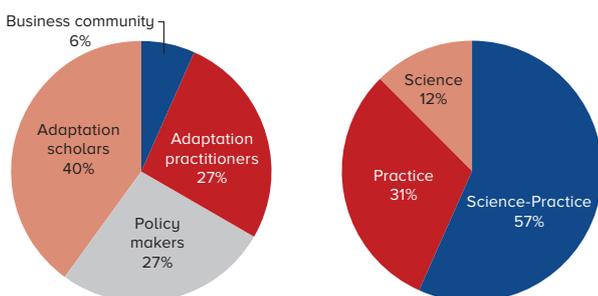
In the face of increasing climate risk, adaptation to climate change is becoming a key focus for research, policy and practice. Since 2010, adaptation experts have met every two years under the Adaptation Futures banner to take stock of progress, lessons learned and outstanding questions in adaptation research and action.

The most recent conference, Adaptation Futures 2016: Practices and Solutions, was held in Rotterdam, the Netherlands, on 10–13 May. It convened more than 1,700 experts from more than 100 countries, including more than 600 adaptation scholars, 400 policy-makers, 100 private-sector representatives, and 400 practitioners, making it the largest adaptation-specific gathering of experts to date.

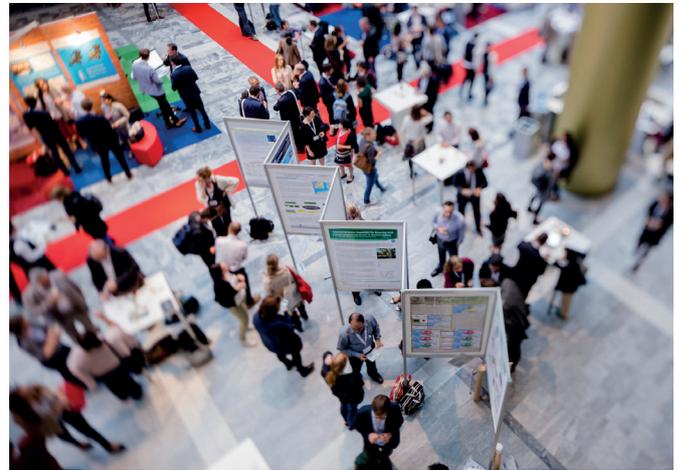
The broad range of actors and topics covered, from the Arctic to cities, from infrastructure to food, and from governance to investment to risk assessment, is indicative of the growing importance of adaptation, and the urgency with which it is being approached around the globe.



Presentation by theme (red) and cross-cutting issue (blue)



Participation by sector (left) and focus of conference sessions (right)



Conference participants look at the research poster exhibition at Adaptation Futures.

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The Adaptation Futures 2016 Steering Committee was guided by a Practice Advisory Committee and a Science Advisory Committee, comprising nearly 50 top experts. Given the widespread and diverse engagement from the adaptation community in the conference planning and content, the conference results can be seen as a good reflection of the broad scope of challenges and solutions on the climate adaptation agenda.

In other words, the conference results represent the “state of the art”, reflective of the latest advancements, methodologies, techniques and technologies employed in adaptation science and its interactions with other fields of policy and practice. Emphasising adaptation practices and solutions, the 2016 conference design coaxed participants to acknowledge challenges as the point of departure, but to focus on what can be done to *address* the challenges, and what further knowledge, tools or technologies are needed to pursue solutions.

This synthesis aims to make the conference results accessible, in a concise format, to a broad range of actors working in adaptation and related areas. It has a dual aim: to distil some high-level messages about the present state and future direction of adaptation research, policy and practice, and to provide a quick overview of the 159 conference sessions. Thus, it begins by presenting key messages from the conference, then summarises the relevant discussions, sorted by conference themes and cross-cutting issues.

This document complements the comprehensive summary of all conference sessions in a meeting report (De Pater and van Steenis, 2016) and the conference abstracts (Adaptation Futures, 2016). Further analysis of adaptation knowledge needs, challenges and opportunities, and the links between adaptation and other global policy processes, is available in an Adaptation Futures 2016: Practices and Solutions conference report.

Adaptation: who has the answer?

ADAPTATION FUTURES 2016

The infographic features silhouettes of people in conversation, with speech bubbles containing various perspectives on adaptation. Below the silhouettes is a grid titled 'ADAPTATION IS ABOUT...' listing various topics.

ADAPTATION IS ABOUT...

PEOPLE	PARTNERSHIPS	POWER	POVERTY	WOMEN	NATURE	KNOWLEDGE	POLITICS		
DISASTERS	WATER	JOB	FARMERS	INSTITUTIONS	CITIES	INFRASTRUCTURE	MONEY	TECHNOLOGY	VALUE CHAINS
LOSS AND DAMAGE	TRANSFORMATION	JUSTICE	CHAMPIONS	RISK	OPPORTUNITIES	HEALTH	LIVELIHOODS	PLANNING	

Speech bubbles:

- We should work with nature, not against it.
- Business needs metrics to understand costs and risks.
- Decision-makers must look beyond numbers.
- We need more research.
- We already know enough.
- We need to scale up and replicate what works.
- Agenda 2030 is a tool to link global, national and local actors.
- Every situation is unique.
- Narratives build the business case for action.
- Profit-seeking leads to social injustice.
- Adaptation is governed transnationally.
- It happens at the local and individual level.
- Who then has the money?
- Adaptation is about doing something better, not about doing something new.
- Effective adaptation for you can be maladaptation for me.
- If there's a business case, finance will flow.

Adaptation Futures 2016 demonstrated the breadth of the adaptation community and its approach to adaptation practices and solutions.

Adaptation's state of play: Key messages from Adaptation Futures 2016

The following messages of Adaptation Futures 2016 are offered to reflect current challenges and needs in climate change adaptation.

We are creating risks faster than we are reducing them.

While adaptation experts have made important progress in identifying challenges, collecting data and documenting lessons and successes, climate and other environmental changes are working faster. Adaptation needs to be more radical, bolder, more experimental and deliberately aligned with other agendas.

Diverse partnerships are vitally important. Bottom-up and top-down, business and communities, global and local policy – all layers and levels of actors must share information and experiences to develop a common vision for adaptation. Adaptation research and policy should not operate in silos, but connect with poverty eradication efforts, disaster risk reduction, and sectoral planning and development. In a globalising world, actors and issues increasingly depend on one another. At Adaptation Futures 2016, for instance, there were discussions of the need to recognise and adapt to transnational climate risks to supply chains, and of the potential of nature-based adaptation solutions in urban areas.

The private sector has a key role in advancing adaptation.

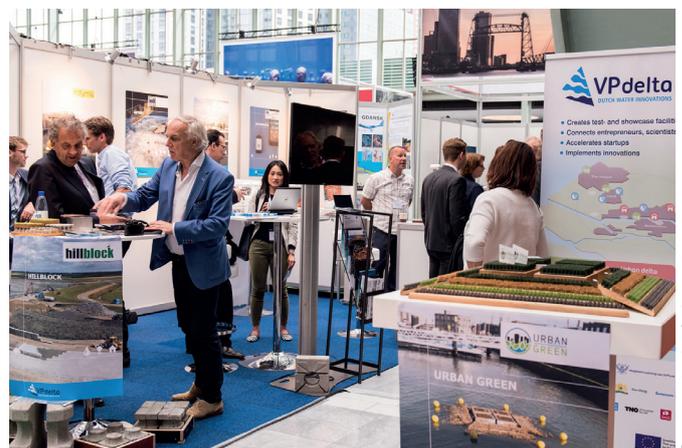
Companies develop new technologies and services to help people adapt to climate change, provide insurance to build resilience to climate-related shocks, and invest in adaptation measures of their own. The private sector is increasingly interested in contributing to adaptation, but it is important

to address key differences in the priorities and approaches of government, businesses and researchers. When infrastructure was discussed at Adaptation Futures 2016, for instance, the business community highlighted investment and development opportunities, while others emphasised the need for "climate-proofing" and the role of infrastructure in risk reduction.

Research for adaptation and research on adaptation are mutually reinforcing. Adaptation research is largely applied, but it also relies on theoretical framings and underpinnings. Better understanding of the process of adaptation – including what works and what doesn't – leads to better support for adaptation planning and decision-making. Adaptation Futures 2016 showed the importance of social science approaches in creating this reinforcing dynamic of adaptation research, as it helps to bridge the gap between problem-oriented research and decision support. A research agenda promoting successful adaptation practices and solutions must include research

both on and for adaptation, and encourage interactions among researchers, policy-makers and practitioners, including business as a prominent and comparatively new adaptation actor (see Klein, 2017).

There needs to be a shift from measuring process to measuring progress. Adaptation metrics are crucial for evaluating the cost, risk and benefits of adaptation, but various sessions at Adaptation Futures 2016 showed that such metrics are not sufficient. We need to understand what matters most to people, communities and other intended beneficiaries. Monitoring and evaluation frameworks should encompass both numbers and narratives, and shift from "monitoring and reporting" – which tends to emphasise process – to "monitoring and learning." This shift requires a stronger focus on the nature of outcomes and on the development of actionable knowledge.



Many businesses had booths at Adaptation Futures, including several focused on urban infrastructure to manage flood risks.

Conference outcomes by theme and cross-cutting issues

Adaptation Futures 2016 was organised around 10 themes and cross-cutting issues chosen by the Adaptation Futures 2016 Practice and Science Advisory Committees. Drawing on more than 200 session proposals and 1,100 individual abstract submissions, a programme of 159 sessions was developed. What follows is a synthesis by theme.

1. Cities and infrastructure

This theme covered a broad suite of urban issues, including urban flood management; critical, green and highway infrastructure; urban resilience strategies; climate risk management in ports; and adaptation mainstreaming in cities.

Urban adaptation faces multiple challenges, many of which are not unique to urban areas but which demand urban-specific solutions due to the specific characteristics of cities, such as high population density, hard infrastructure, and interdependent economies.

Scientific research is important for urban adaptation. Both researchers and practitioners said more effort is required to match urban research with on-the-ground needs for adaptation and urban resilience. In addition, academics could better target and communicate their work to practitioners. At the same time, there was agreement that how well research informs practice ultimately depends on the receptivity of policy-makers.

A climate risk unique to cities is the urban heat island effect, which makes urban environments warmer than their surrounding areas and exacerbates heat-related health hazards. The effectiveness of green infrastructure, such as public gardens and parks, in mitigating the urban heat island effect has varied. Other adaptation solutions, such as campaigns to inform citizens to drink and rest, have proven effective in the short term. In the longer term, as extreme heat becomes more common, a suite of approaches – spatial measures including green and conventional infrastructure, information campaigns, policies and procedures for rapid medical response, etc. – will be necessary.

Sustainable cities are often presumed also to be resilient to climate change, but this is not always the case. Local governments should integrate disaster risk reduction and climate change adaptation into their development plans, and not (only) produce standalone plans that target particular issues or sectors.

Climate risk assessment and adaptation are also on the agenda for the operations and asset management of ports around the world. Ports are economically critical, but they are highly vulnerable to climate change because they are directly on the coast; substantial long-term infrastructure investments will be needed. Challenges to preventative and anticipatory adaptation in ports include involving the right stakeholders, capturing the wide range of relevant climate variables (beyond flooding), and costing climate change impacts in order to make the business case for investing in adaptation.

New ideas:

The underrepresentation of construction companies in urban adaptation was identified. More generally, helping relevant professions to understand adaptation challenges and opportunities will allow them to be catalysts, or even champions, for better adaptation and for avoiding maladaptation.

2. Food, forestry and rural livelihoods

These sessions focused on a range of interconnected social, policy and technical issues relevant to ensuring food security and livelihoods: adaptation in agriculture and food production to address food and water insecurity, poor labour regulations and exploitation as limits to adaptation through livelihood diversification, adaptation and mitigation co-benefits in forests, and the potential of large-scale integrated models to support better adaptation in policy, crop yields and food security.

Among subsistence and small-scale producers, food insecurity and economic factors are primary motivators for behaviour change, including adaptation to climate change. Individual actions can include modifying aspects of existing routines – for instance, diversifying crop types and techniques – or diversifying livelihoods beyond agriculture. Adaptation, in turn, can create new vulnerabilities, such as when farmers aiming to diversify their livelihoods are exploited in informal sectors due to poor labour standards.

In the category of modifying existing practices, conference participants discussed the potential to adapt plants to increased carbon dioxide concentrations, as well as knowledge gaps in this field. Seed diversification to help farmers spread risk was also discussed. The example of “Sowing Diversity equals Harvesting Security” was used to demonstrate that researchers and small-scale farmers cooperate to develop climate-resilient crops. A key component is Farmer Field Schools – outside classrooms – where farmers learn on site to adapt their crop, thereby gaining the knowledge, understanding, skills and confidence to adapt individually and collectively, and even to engage with policy reform. A challenge is in combining traditional knowledge and science about weather and climate into local planning for collective action on food and nutrition security.



Women rice farmers participate in a Climate Field School in Maros, South Sulawesi, Indonesia.

With regard to agroforestry, which is often acclaimed as an effective means to achieve mitigation and adaptation co-benefits, concerns were raised about inadequate policy and institutional support, as policies for agriculture and forestry are in most cases completely separate.

At the policy level, modelling is an important tool for decision-making, and both challenges and solutions lie in combining model results across scales and purposes in order to better assess climate change impacts on food security. In light of sundry recent examples where model results fail to reflect reality, increased collaboration between experimentalists and modellers was called for.

New ideas:

Of interest are various methods presented to provide more accurate projections of current and future climate change impacts and to support the identification of priority areas for adaptation. For instance, participants discussed an approach that combines flood modelling techniques and participatory methods to support adaptation in rice production.

3. Freshwater availability and access

Climate change is already affecting water supplies in many parts of the world, and these impacts are expected to worsen over time. Droughts, combined with warming temperatures that increase evaporation, threaten water supplies for human consumption, agriculture, energy production, industrial uses and healthy ecosystems functioning. Inadequate water resource management and inequitable access to water exacerbate the effects of climate change.

The Adaptation Futures sessions examined water scarcity as a driver of conflict, challenges in improving freshwater availability, climate services in the water sector, and the benefits of climate-resilient water management, among other topics.

Water scarcity due to climate change can lead to or compound conflict among individual water users and among neighbouring countries. The importance of global data in areas with limited data, combined with engaging local stakeholders, was discussed as means to develop small-scale water buffering measures and interventions. As with many pursuits at the juncture of adaptation and development, improving water availability is not just a technical issue, but comes up against other obstacles such as competition for finite resources, mismanagement and corruption.

New ideas:

A decision-making tool to map water conflict risks was discussed, with an objective to help funders focus development aid for conflict prevention. There are also new and innovative solutions for freshwater retention and for improving efficiency in use and distribution. These include high- and low-tech solutions such as subsoil irrigation, tile drainage and sub-surface storage.

4. Public health

Climate change is increasingly recognised as a threat to human health, in several different ways. Topics discussed at the conference included the impacts of climate-related

disasters or heat waves on quantifiable outcomes such as mortality, as well as impacts that are less easily measured, such as climate impacts on the propagation of infectious diseases.

The potential limits to adaptation in human health and health systems, as well as ways to combine data sets (e.g. environmental, climatic, epidemiological) to enable early warning systems and preparedness for infectious disease, are also part of the adaptation and health discourse.

The need for different metrics to measure and inform adaptation progress was identified in the health discussion. Specifically, more nuanced and more-difficult-to-quantify metrics for health impacts are necessary. Rather than "just" quantifiable health impacts focused on outcomes (e.g. mortality), a broader and compound range of impacts must be considered, such as the impact of thermal extremes on worker productivity or on the spread of infectious diseases.



Oxfam staff distribute disposable toilet kits to people affected by Typhoon Haiyan in the Philippines in 2013, aiming to protect public health.

© Jane Beesley, Oxfam / Flickr

Separate sessions on adapting to extreme heat in countries in the Organisation for Economic Co-operation and Development (OECD) on the one hand, and in South Asia on the other, illustrate a common problem. Despite the potentially large health and economic impacts and potential for loss of life associated with heat waves, they are not classified as "disasters". Heat waves are thus often under-emphasised in planning, financing, community preparedness efforts and communication. A second common problem is that heat impacts are conventionally studied independently, while in reality they overlap with other health challenges (e.g. diarrheal disease) and exacerbate other conditions that have secondary effects on health (e.g. water access).

The idea that health policies are developed and maintained under the assumption of a stable climate was also addressed. To address this shortcoming, a role was proposed for the private sector to encourage enhanced climate awareness and resilience in hospitals.

New ideas:

A strong message was that in order to contribute to better adaptation, the health sector should re-examine its conventional use of historical trends to anticipate future scenarios, move towards systems-based approaches and more actively pursue cross-sectoral cooperation. This is imperative for health planning, policy and practice in the context of a variable and changing climate, as historical data implicitly omit climate change as a variable.

5. Ecosystems and ecosystem-based adaptation

Ecosystem services for climate change adaptation are generally approached from two angles: through the role of ecosystem services in assisting with adaptation, and through the likely impacts of climate change on the provision of ecosystem services. The conference sessions focused mainly on the first angle.

A key challenge in appraising ecosystems and their role in adaptation lies not in using economic metrics for optimisation alone, but also ecological and social aspects. Using human well-being metrics was presented as an option. Trade-offs and conflicts between different types of ecosystem services and users of natural resources is a clear theme.

Ecosystem management for nature protection and adaptation may seem like a classic case of co-benefits, or a "win-win" situation. However, challenges occur when nature conservation and human adaptation practices compete in the context of rural livelihoods. For instance, farmers who can no longer reliably grow crops might turn to livestock production as an adaptation, but animal grazing could affect grassland ecosystems, or even result in deforestation. Another type of conflict in applying ecosystem-based adaptation is that of time horizon: long-term public gains versus shorter-term private costs (or sometimes the opposite).

Limits to ecosystem-based adaptation were also addressed. Cost-benefit analysis suggests that that ecosystem-based adaptation is most appropriate for high-frequency and low-intensity events, and that it may not be sufficient to address higher-intensity events. For instance, restoring mangroves might protect a coastal area from smaller storm surges, but not from a major typhoon.

New ideas:

The design and development of adaptation options by engaging (all) relevant stakeholders remains a challenge for adaptation generally. In the context of ecosystem-based adaptation in coastal systems, methods were discussed that employ game theory and Bayesian belief network modelling to develop adaptation options together with stakeholders.

6. Disaster risk reduction

Adaptation and disaster risk reduction (DRR) are separate but closely intertwined, particularly amid growing concerns about climate change-related disasters. Conference sessions on this topic examined everything from megacities transitioning to being resilient cities, to integrated risk management, to flood risk governance in Europe. Practical ways to strengthen DRR and adaptation methods were a theme throughout the presentations. While this need is widely discussed in theory and policy, it is insufficiently addressed in practice.

For cities there is scope for collaboration and learning, as many cities face similar challenges, in both developed and developing countries. For instance, a large-scale coastal urbanisation project on transformation and resilience emphasised that not all urban adaptation plans are equal. While there are multiple paths to achieve the same goals, some plans are more sustainable and lead to greater reduction of losses and impacts due to flooding or other climate (and non-climate) related events.



The Red Cross rescues people caught in a flood in Tudela, Navarre, in northern Spain in 2015..

(c) Carlos Twose / Flickr

The role of insurance was also discussed. When flood defences fail, for instance, insurance can step in. As flood impacts worsen, however, the insurance market is put under pressure and must reform to achieve the "best" (sustainable in the long term, while still fulfilling its role as insurer) market structure. In a changing climate context, this most likely includes mandatory insurance, an active link (reward) for the insured to engage in risk reduction, and cross-subsidisation. In sum, insurance companies are important actors in DRR. By adapting and increasing the resilience of their own business models, they can promulgate better adaptation in society generally.

Decreasing coastal vulnerability through a "building with nature" approach was also discussed. This emphasises inclusive planning and combining built infrastructure and engineering with ecosystem restoration. This kind of approach demands new governance frameworks that combine expertise from engineering, environmental and socio-economic traditions, and which acknowledges the value of natural resources. While "building with nature" was presented the context of tropical coasts and Dutch rivers, it has broader relevance.

Tools and approaches to assess adaptation and DRR strategies to support decision-making in the context of uncertainty include risk assessment tools, safety and evacuation plans, social protection systems, and tools to assess disaster risk reduction including forecast information. To create and implement these, increased collaboration between government and non-governmental organisations is obvious, yet often overlooked. Actors working with DRR or adaptation could communicate more readily, to identify synergies given constrained resources and overlapping mandates. A particular challenge to enhancing resilience, which is so important to both DRR and adaptation objectives, is that more effort and money are spent on preparedness and less on "good" recovery (e.g. "build back better").

As more attention within and at the margins of climate adaptation turns to loss and damage, further work is needed on relating loss and damage to climate change adaptation and DRR – particularly in identifying and collecting non-economic data for loss and damage.

New ideas:

Integrating social protection programmes with disaster risk management was presented as a new approach to increasing resilience of people to disasters. Social protection provides a safety net to help people meet immediate needs in crisis situations, so their potential is likely to increase in context of increased climate-related disaster events.

Weather information is an underutilised and underestimated tool for DRR. It can be used to enhance decision-making and action prior to a disaster, and furthermore, there is potential for forecast-based financing to increase effectiveness in humanitarian, development and adaptation interventions. Forecast-based financing, which has been tried in the humanitarian and development sectors, uses forecast data to determine funding allocation for activities that reduce risk and enhance disaster preparedness and response. It was proposed as a way to bridge the gap between climate change adaptation and DRR.

7. The Arctic

As the only theme of the conference with a regional focus, the Arctic sessions made clear both the region's "canary in the coal mine" status vis-à-vis climate change impacts, and the unique challenges posed by its remoteness and diffuse population. The sessions also clearly articulated the perception that the Arctic is becoming more accessible due to climate change.

Due perhaps to strong oral traditions in many indigenous Arctic communities, narrative appears to have particular weight in relaying information. Although this is true of local-level adaptation pursuits almost everywhere, community knowledge, engagement and ownership of adaptation issues and their implementation are particularly strong in the Arctic.

As the opening up of the Arctic through ice melt has been linked to expanding private interests, "social license to operate" features as a significant topic for collaboration between business and other stakeholders. The Arctic sessions also acknowledged the region's connection to the rest of the globe, noting, for instance, that increased shipping in the Arctic due to ice melt will lead to climatic and secondary impacts elsewhere, notably in Africa.

New ideas:

The commonly accepted idea that women are more vulnerable than men was questioned in the Arctic context where, according to the research presented, it is less clear that Inuit women are disproportionately vulnerable to climate change and its impacts. It was not discussed whether this is due an elevated level of vulnerability across the entire Arctic population, difference in division of livelihood roles among genders, or other factors.

8. Risk assessment, adaptation planning and evaluation

Risk perception, vulnerability assessment, participatory processes, the usability of climate information for adaptation planning, resilience measurement, and the policy-planning method of pathways to explore alternative

futures are among the broad and technical set of issues covered in this session.

Risk perception, knowledge, and knowledge gaps are influencers of action in the context of managing risk. It is shown in vulnerability and risk assessments that the individual stakeholders, notably researchers, have a strong influence on risk assessment outcomes. This makes risk assessment tools all the more necessary to eliminate bias and deliver comparable results.

Multi-sectoral integrated assessments are important analytical tools for forecasting changes in climate in order to support unknown future needs. Examples were given of multi-sectoral tools that can integrate complex climate scenario forecasting tools to support and improve governance. For instance, multi-sectoral adaptation forecasts can be used to create macroeconomic models that anticipate future scenarios. By calculating supply and demand drivers for a given industry, this assessment model can reveal nuances for adaptation interventions. There is also a strong call for more cross-sectoral modelling, while a critique of said models questions the relative absence of relevant human dimensions, such as behavioural capacities and limitations.

Besides models, many other adaptation assessment and support tools exist to inform risk and vulnerability analysis, planning, implementation and monitoring. There is concern about the generous availability of these tools and the lack of common methodologies and approaches. There is scope for greater coordination among tool designers (academics, donors, policy-makers and all levels) to assess, hone and use what is there, and not waste efforts and resources on proliferating tools.

Participatory processes are accepted as important if not imperative for effective adaptation. Participatory processes are also implicitly challenging due to the broad interests, priorities, needs and perceptions represented.

Adaptation tracking was presented as an effective way of looking into what adaptation is, and what it looks like over time and across contexts. A conceptual challenge to developing indicators for adaptation tracking is the definition (or lack thereof) of adaptation itself. In the absence of a consistent definition, it is difficult to identify the dependent variable to be tracked.

New ideas:

When it comes to climate information, there is abundant data, and what is needed is to communicate and apply this in more relevant ways, so that the information can be acted upon. Another introspective observation is that adaptation research should draw more extensively on findings from other sectors – adaptation challenges and research to address these are not entirely unique and could benefit more from analogous cases and context.

9. Institutions and governance

Adaptation governance spans the local to the global, and engages with everything from municipal councils to territorial and national governments, from international scientific and political institutions to the private sector and individuals.

Governance challenges for adaptation involve clarifying institutional responsibilities, including between different levels of government. Involving local stakeholders in the policy design process, as well as the implementation process, makes these local stakeholders an unwitting bridge of governance gaps.

Local laws, policies, actors and institutions drive adaptive capacity. Cases that studied the adaptive capacity of farmers in river basins found that the degree of leadership, institutional learning, fairness and autonomous change affected whether rural water users were able to withstand water scarcity and drought. In one case study, strong central government prevented fair governance and institutional memory in rural areas.

By contrast, governance can improve adaptive capacity by providing instruments, resources and access to equitable institutions. In another example of governing coastal disaster risk reduction, nature-based (as opposed to engineered) solutions were found in this instance to be more effective. The analysis attributes the effectiveness of "soft" interventions not to superiority or better design fit, but rather that "soft" governance approaches tend to be more inclusive processes. These examples all suggest that policy approaches that ensure representation of communities and inclusiveness in adaptation policies, plans and programmes are more effective than top-down measures.

A particular challenge lies in ensuring coherence between national development strategies and local adaptation pathways, where national policies often conflict with local priorities. This dynamic can play out in national development priorities trumping climate adaptation interests, and even lead to local maladaptation.

New ideas:

A "policy proportionality conundrum" was identified as a challenge for climate adaptation: the many uncertainties and long time horizon of adaptation make adaptation policy prone to over- and under-reaction. To address government institutions' inability to cope with uncertainty, policy-makers can turn to domains that do well in anticipating risk, such as surgery and insurance.

10. Finance, investment and business

The increased interest and presence of the private sector, including investors, pension funds, banks, (re)insurers, and small and large companies, was palpable at Adaptation Futures 2016. Throughout the conference, it was apparent that private-sector actors see multiple entry points to adaptation: by adapting their own business models and supply chains, identifying and delivering products and services that enable adaptation, and using investment leverage (financing) to influence pro-adaptation regulation and policy reform.

A tension exists between the recognition of the role and opportunity for business in adaptation, and the difficulty of "making the business case" for adaptation. A concrete challenge appears to be a mismatch of time horizon – that is, the fact that adaptation benefits are long-term, going beyond the horizon of conventional investment returns planning. Consciously adjusting for this misalignment in time



Contractors for the U.S. Army Corps of Engineers pump sand dredged from the bottom of the Chesapeake Bay up to Norfolk, Virginia's Ocean View Beach. The sand is part of a \$34.5 million project to reduce storm damage risk.

© U.S. Army Corps of Engineers / Flickr

horizon might make calculations for adaptation investment more favourable ("bankable").

Making the business case for natural infrastructure is another challenge. Part of the solution is to involve governments in the valuation of ecosystems, and to focus on the avoided costs that arise from investments in adaptation. One way to help identify opportunities and develop methods to measure the expected commercial return for climate resilience is to engage with professions that bring useful if unconventional tools, such as engineers and accountants. Accountants, it was suggested, can enable organisational adaptation by applying audit techniques to identify and mitigate risks of adapting, and of not adapting.

Insurers are more widely recognised as key players in the adaptation space. "Inclusive insurance" specifically was discussed as a way to facilitate adaptation. It combines insurance, credit, saving, and DRR to help poor communities to better manage their risk. For instance, the R4 Rural Resilience Initiative uses "insurance-for-work", allowing farmers who cannot afford to pay cash for insurance to do so through labour with community-identified, long-term risk reduction projects. This nests with a broader message about tailoring climate science for a business audience – specifically providing information and the related uncertainties about what climate change can mean for a particular actor, industry or market.

In terms of adapting value chains to be less vulnerable to climate change, a challenge was issued to researchers to better "package" and communicate knowledge, so that decision-makers can navigate the many options and understand the trade-offs. Business and public perception of soft approaches to adaptation requires extra efforts in communication. In the Maldives, for instance, beach nourishment and increased coral reef protection have been identified as the best solutions to coastal erosion and thus important for risk management in the tourism industry. However, investors often perceive hard measures (e.g. building a sea wall) as more viable and are thus reluctant to invest in the more effective, soft option.

As compared to large national and transnational corporations, small and medium enterprises (SMEs) struggle

to understand and manage climate-related risk, and in practice they often adapt to climate change and variability unknowingly and unsystematically. This makes them more vulnerable to further future changes. Projects by GIZ and others are designed to assist SMEs with planning and acting on adaptation needs, to improve competitiveness and realise new business opportunities through and for adaptation. It has proven especially important to provide examples from the businesses' own sector(s) in order to make adaptation tangible and relevant.

New ideas:

A Canadian knowledge-sharing initiative between the private sector and government has established working groups to exchange information on challenges and solutions for adaptation. This is a low-cost, high-return option that could be easily replicated elsewhere. Work on defining loss and damage, and distinguishing it from the areas covered by climate change adaptation, was presented. The inclusive insurance scheme mentioned above is promising for insuring those who would not otherwise have been able to afford insurance. Finally, addressing fiduciary concerns through village-level "social audits" when making climate finance available at the local level could provide an accountability mechanism.

The future of Adaptation Futures

Adaptation Futures is growing from a biennial conference on climate adaptation to a community, a process and a movement, gathering more actors and issues within its ambit. To take on some of the challenges and solutions addressed at Adaptation Futures 2016, the Dutch government announced a conference legacy in the form of a Global Centre of Excellence on Climate Change Adaptation.

This synthesis is part of an initiative of the Government of the Netherlands to analyse the outcomes of Adaptation Futures 2016 and develop a research agenda to better understand the state of adaptation.

The Adaptation Futures baton has been passed on to the hosts of the 2018 conference. At the closing session in Rotterdam, it was announced that the University of Cape

Town, South Africa, will host Adaptation Futures 2018, on 11–14 June of that year. More information on the Cape Town conference as well as the Adaptation Futures journey from Rotterdam to Cape Town is available on the two conference websites.

Acknowledgements

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Other Adaptation Futures 2016 outputs

Adaptation Futures (2016) *Adaptation Futures 2016: Practices and Solutions Science Abstracts*. Available at <http://edepot.wur.nl/379671>.

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Kehler Siebert, C. (2017) *Broader, Ubiquitous, Ambiguous: What Does Mainstreaming Adaptation Mean, and When Is It Appropriate?* Adaptation Futures Discussion Brief 2. Available at <https://www.sei-international.org/publications?pid=3087>.

Klein, R.J.T. (2017) *Both Research for Adaptation and Research on Adaptation Are Needed to Inform Society's Response to Climate Change Impacts*. Adaptation Futures Discussion Brief 1. Available at <https://www.sei-international.org/publications?pid=3086>.



Government of the Netherlands

Disclaimer

Adaptation Futures 2016 was co-hosted by the Global Programme of Research on Climate Change Vulnerability, Impacts and Adaptation (PROVIA), the European Commission, and the Government of the Netherlands. The views and opinions expressed in this document do not necessarily reflect the official policy or position of the conference co-hosts.

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