

Securing Australia's Future: Reimagining Climate Adaptation



Setting a reimagined adaptation agenda for the National Climate Change Adaptation Summit 2021—Roundtable synthesis

Future Earth Australia at the Australian Academy of Science is leading a process to consolidate and extend a broader agenda of proactive and productive reform of climate adaptation, alongside accepting the urgent need to reduce greenhouse gas emissions. After the devastating bushfires, droughts, floods and hailstorms of the past year, an evidence-based policy response is needed to secure Australia's future in the face of the range of emerging threats posed by environmental change.

To this end, we welcome the Prime Minister's comments earlier in 2020 on the need to focus on resilience and adaptation for all Australians—and argue it must be done in a substantive, inclusive, community-based manner. Adaptation and resilience must be framed with respect to enabling a just transition for all Australians. Future Earth Australia recently consulted with a range of sectors across Australia through a series of on-line roundtables to help frame a National Adaptation Summit planned for early 2021.

In summary, roundtable participants told us:

Rethinking adaptation requires

- Understanding and engaging climate change as a real and growing risk, including how governments and the private sector are managing this risk and can improve.
- Recognition that communicating climate adaptation across different sectors, communities and groups must be engaging and targeted.
- Commitment to a clear role for top-down leadership from the federal and state/territory governments, in conjunction with well-supported and financed local or regional 'bottom-up' council and community initiatives.
- A strong policy framework from governments at all levels, to enable multi-scalar responses and broader societal engagement.
- Recognition of a variety of knowledge types necessary to build adaptation pathways and the role of different sectors—economic, social, environmental and cultural—in developing and implementing policy and action.

Strength and weaknesses in adaptation policy include

- Understanding the exclusion of community and Indigenous knowledges in much adaptation policy and planning.
- Recognising that local government cannot do it all and that local government are not 'the community'.
- Recognising the complex and systemic nature of climate risk, and therefore climate adaptation, and designing governance structures for systems and sustainability.
- Understanding the inequity in adaptation; some jurisdictions are resilient and well-adapted to some shocks, others are not.
- Understanding that while there has been a long focus on climate science and emissions mitigation, adaptation and resilience demand a focus on social and cultural needs (e.g. housing quality and habitat loss).
- There is a strong foundation and capacity across our communities and sectors to adapt proactively, but this capacity is not being seized upon. Expertise is not 'joined up' vertically between government levels nor horizontally between entities facing similar adaptive challenges.
- We have good capacity and a number of adaptation planning activities but see barriers to full implementation and action.

How to bring community knowledge into adaptation planning?

- Community members need and want to engage with how their values and vulnerabilities interact with adaptation and resilience.
- Use place-based approaches (regional or local) to integrate across siloes and to work with locals towards a tangible and actionable agenda that benefits communities.
- The knowledge and history of First Nations Australians, and their long experience with adaptation, must be centred in and thoughtfully engaged throughout a process of reimagining and 'Securing Australia's Future' so that it is representative of First Nations values and worldviews.

The body of this report details the discussions undertaken in the roundtables. These highlighted a variety of tensions and challenges in advancing the issues mentioned above, leading to a series of themes that require continued discussion and elaboration in re-vitalising adaptation in Australia:

1. Coordinating across levels of organisation

What balance of roles and responsibilities should rest with each level of government from national to state to local, and level of other organisations in the private sector or community sector? And how can coordination between these levels and sectors be best facilitated? What structures (if any) needed to help with this?

2. Achieving integrated, place-based action

How can place-based action that integrates across sectoral and disciplinary silos be promoted in terms of local relevance, appropriate resources and effective motivation? What will support a systems approach to adaptation even where systems language and thinking are poorly understood, and yet avoid paralysis in decision-making due to complexity of impacts?

3. Integrating First Nations knowledge and worldviews

How do we validly integrate traditional knowledge with ‘western’ science in ways that are both equitable and

value-adding? What are the opportunities to build joint community adaptation programs that bring First Nations systems thinking in to managing country?

4. Establishing a federated adaptation knowledge system

Could/should a federated form of knowledge system help link place-based adaptation activities in ways that speed up learning about what works in what context and that reduce duplication and reinvention of wheels? If so, what information should such a knowledge system support, such as costs and benefits of interventions, and consistently integrated future scenarios that include impacts and adaptation responses; and how?

5. Reframing economic approaches to better suit the needs of adaptation

What economic approaches are best suited to adaptation and resilience where simple financial metrics cannot capture social capital and adaptive capacity at a community scale? How do we better value the benefits of longer-term planning decisions in an economic paradigm driven by short-term outcomes and discounting of the future?

These themes will contribute to topics to be elaborated at the 2021 adaptation summit. Further updates on this initiative can be found at www.futureearth.org.au

These roundtables are just the start of a longer conversation and national agenda-setting strategy being led by Future Earth Australia at the Australian Academy of Science. Further updates on this initiative can be found at www.futureearth.org.au

Cite: Future Earth Australia (2020), Reimagining Climate Adaptation—Roundtable Synthesis. Published by the Australian Academy of Science

ISBN: 978-0-85847-721-6

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Adaptation roundtables July 2020

Future Earth Australia (FEA) established with its members, and in partnership with the University of Sydney and Western Sydney University, a working group to explore and frame the coming decade of adaptation science, innovation and action. This working group is developing a range of materials in support of a National Adaptation Summit, occurring 19–23 April 2021, including this community consultation process. FEA facilitated virtual workshops across the country, inviting a carefully selected group of experts and ensuring diversity of attendees and cross-sectoral representation. Workshops included:

- NSW/ACT (13 July 2020)
- Vic/Tas (14 July 2020)
- SA/WA (15 July 2020)
- QLD/NT (16 July 2020).

A high-level summary of these workshops, list of attendees, and media statement was released in August, [available here](#). This document reports a fuller synthesis of these discussions.

Each comment in the full transcripts of each workshop was coded against a set of topics, then sorted into these topics across all workshops and synthesised into the following narrative by a small steering group. Unattributed quotes from the sessions have been retained to illustrate input directly.

1. Background and framing perspectives

The roundtables were taking place in the midst of the COVID19 pandemic which itself followed the disastrous fire season of summer 2019/20, itself following on drought and floods in the previous year. In framing responses about climate adaptation, some participants were optimistic as a result, suggesting that “Australia is really ready to put in place deep, shifting, fundamental changes” thanks to the fires and COVID: “I am so used to having resistance, having to persuade people, and now everyone is on board”. Most importantly, COVID “has provided a bigger role for government, and an understanding that in major crises government is critical.” Some saw COVID as a bit of a metaphor for climate change adaptation, except that it is unfolding much more rapidly than changes in the impacts from a warming climate.

Notwithstanding a general mistrust of experts, COVID has also shown a way in through health. “People respect medical experts more than any other scientists, that’s the reality, so there is strategy in framing climate response via health” – “climate and health is the last frontier”. Though it was also noted that experts and governments alike may be too busy with COVID just now.

COVID and the fires have also highlighted the importance of local, on-ground work, which is achieving more integrated approaches. Thus “the Murrumbidgee community is wanting to take control of their own country, now working

with Bruce Pascoe”. At the same time, the “bushfires and COVID each showed the best and worst in people”, highlighting the importance of social infrastructure including linkers, of issues such as maintaining peoples’ memories, and the need for generational change. Thus participants put much more emphasis on social and institutional than technical issues.

There was a strong sense that we were passing a social tipping point where people are realising that they are experiencing more extremes, including completely new ones. However, mental models have not yet caught up – “we are looking at overall increase of crises...but as a community we think crises are not preventable and we must just recover, rather than thinking that these will increase in frequency and severity”. We are also recognising more and more indirect, linked up impacts, such as climate-induced rural gentrification in Tasmania leading to housing shortages.

Conversely there was frustration with the “failure to implement a lot of that adaptation planning work over the years”, and the sense that “the point with adaptation is that it is hard to move from talking to doing something”. There was a general desire to get away from the climate vs economy framing, more towards resilience to disruption. However, framing raised the wider issue of our mainstream economics model, with some feeling that “we need a real conversation about degrowth”: “our focus on neoliberalism and a single set of financial metrics means we are doomed to fail” because “it’s in [what they see as] inefficiencies that resilience resides”. Yet, perversely, we need to document a better economic rationale for adaptation.

Another core framing issue was the sense “we are a society that looks backwards to assess risk – but we need to change our lens to the future”. We need a stronger value proposition for investing in adaptation that goes beyond just economics, and this will only come if we ask more positively what an Australia designed for sustainability would look like.

These topics framed more specific discussion points that emerged from the questions asked of the participants:

1. How might we rethink adaptation in light of the deep transformation required in Australia’s society and economy?
2. What are the strengths, weaknesses and range of adaptation policies over the years?
3. How can we bring community knowledge and preferences into adaptation planning?

2. Roles and responsibilities

There was extensive discussion about the roles of different levels of government, and how they should interact. At all levels, government can provide leadership, though it is best doing this in partnerships; it can provide examples of good practice, for example through managing its own assets or carrying out its own risk management procedures; and it can help provide resources where the net effect is in the public interest; but it also “doesn’t have to do everything”. On the one hand, higher levels of government have more resources; on the other, greater diversity at state and even more so at local levels helps to avoid ideological and bureaucratic barriers to progress. Clearly action on climate change has been stymied at the federal level in recent years; but this also occurs if a state takes over building planning but has no interest in passive heating, cooling, solar, or insulation and prevents councils from advising on climate friendly buildings. **A pathway must be found through these conundrums that balances the (erratic) benefits of consistent leadership top down with the benefits of local relevance and experimentation bottom up.**

There was a strong view that the Commonwealth must “recognise that they need to lead”, to achieve “coordination and leadership across the board”, “to rethink our frameworks”, and “build the ecosystem”. There were mixed views on how much this was being achieved, but most felt more federal leadership was needed. For example in the past, the Commonwealth’s “CAP [Coastal Adaptation Pathways] program allowed practitioners at different scales to pilot and test ideas...so many pieces of work came off the back of that funding”.

At the state level, very different approaches are being taken in different states, providing a natural experiment from which we should be learning (and a national perspective from the federal level could help with this too). Some states, such as Queensland, allow local government to play a larger role in driving policy and subsequently enacting it; in South Australia there has been a strong regional planning process but this is struggling to translate into action; whereas in Western Australia adaptation has only come back on the state government agenda relatively recently, and there has been a hiatus in supporting local government activities.

Whilst local government has a vital, locally-aware role to play, it will “fail outright unless we factor in local capacity and considerations of what’s going on at that level”, which often means adequate resources. Given that local government is a function of the states, if climate change risks to local assets and finances are not being managed well, this “could affect the credit worthiness of the state”. States need to assist local governments with resources, including a good understanding and mapping of risks, to manage their own liabilities. Local government also needs support to prevent people from developing in high risk areas. But also, “communities can often be way more agile than governments”.

It was felt that there are **some good practice examples of Federal-State-local government integration, but that there are also systemic challenges in this relationship as regards embedding adaptation.** For example, Landcare and Coastcare are great examples cooperation across the three levels of government, aimed at the regional level, which have included some adaptation planning. Similarly, South Australia more generally has carried out a good regional adaptation planning process across the state, with good partnerships and an on-ground project focus, but implementation has suffered due to lack of funding from all parties because each finds other priorities: “the need to invest now for the long-term needs to be better understood”. In Western Australia, coastal planning was seen as the highlight, where state government policy has driven a good response by local government; however, “the hazard mapping was easy, but the adaptation part is much harder – it is easy to fall back on defence, and much harder to talk retreat”. A “resettlement strategy”, whether for fire or sea level rise or inland flooding, is a state responsibility but could be greatly helped by consistent national leadership, and local government certainly needs support. A final example where a cross-level approach is not active is climate change and health, with no national strategy despite “exciting work at a local level, especially around protecting communities from heatwaves”. The Victorian State health strategy was seen as good in this regard, but nationally the approach is inconsistent, leading to failures in places like western NSW. **“So how do we get a more systemic approach to adaptation happening?” remains an issue.**

Supporting decision-makers and the need to learn adaptively is the issue of **knowledge systems, which participants felt were often fragmented and inconsistent, and as a result undermining learning.** Many people felt there was a need for a federated (rather than centralised) approach to coordinate knowledge and to connect people with relevant experiences. On the one hand “having good information at a regional level is really important”, as exemplified by Tasmania’s record since having relevant regional climate projections which have been embraced by the community. On the other hand, the commonwealth should have a role to help set up a framework which would enable “communities to talk to each other more” and coordinate responses; this could be “a system that is flexible enough for communities to phase into and out of in an appropriate way”, beyond state boundaries. Such a knowledge system could help to upscale good local information such as fire or marine mapping consistently.

One aspect of a knowledge system that came up often was **the need for integrated scenarios of the future that are aimed at supporting decision-making,** that go beyond climate to other mega-trends, that are consistent when used at a national level but can be regionally tailored, and that are aimed at getting “resilience and adaptation into longer-term planning for communities”. The Australian National Outlook was noted as a future-oriented example that explored scenarios that included aspects of adaptation up to 2050 or so, with higher population. Climate change is often an exacerbator of other trends, so, for example, areas of rural Queensland are losing

population as agricultural economies fail for multiple reasons exacerbated by climate change. To connect with people and make good decisions, we have to talk about these linked effects, and we need to action appropriate responses.

3. Institutional arrangements to support integration across sectors and levels

This all led to discussion about institutional arrangements that could support place-based activity but also interlink with the tiers of governance effectively to facilitate consistency and efficiencies when appropriate. It was noted that “there’s a lot of advocacy work that needs to be done between the layers of government”.

At a national level, the possible need for an AFAC (the National Council for Fire and Emergency Services) but for climate adaptation responses was discussed as “a central place that brings together community, research and policy”. One highlighted model was the National Water Commission, which brought all levels together including the Commonwealth. “What was important was that it didn’t just focus on knowledge or implementation but also monitoring and response to the knowledge.” **“We need a joined up process” – acting like a clearing house with a benchmarking rather than a regulatory role – for climate adaptation information but also for responses.** This differs from a more research-oriented national model, like the old National Climate Change Adaptation Research Facility (NCCARF); participants agreed that the more recent NESP funding process does not sufficiently replace this, and some mode of coordinating research efforts is also important.

At the regional level, participants pointed to the **La Trobe Authority**, set up to assist a regional transition post coal. This has taken a place-based approach to identifying “at the assets of the community, jobs, where the strengths are, but also being conscious of and testing the confronting conditions that will stay with us, including climate”. One of its benefits is being part of the community, so it can “identify the opportunities for innovation and collaboration that really lead to good outcomes for the community”, yet draw on experts to get evidence as needed. Another regional example is Resilient Sydney which has the benefit of working across different communities. A third is the National Resource Management (NRM) regional bodies and LandCare. In general there was a sense that **the regional level is “good for driving adaptation innovation policy”**, and that some form of regional board be used as a facilitator to reflect the vision for the region whilst “linking to grassroots movements driving forward”.

4. Place-based integration, drawing on community knowledges

“Think big, act locally”: there was a strong sentiment that **integration happens on the ground, whether in a community, on a farm or in local government, so a key way to achieve better integration across siloes is to take**

a place-based focus. This leads to a theme that is framed locally, and can take account of the diversity of conditions across Australia and can work within smaller jurisdictions.

Local government has a specific role and obligations, with capacity, resources and roles that vary between and within jurisdictions, partly related to the support and coherence from state-level activities. For example, LGAQ plays a strong leadership role in state government adaptation planning, which then helps to drive policy and the flow of resources; some other states facilitate this role of local government less. However, this needs to “keep focussed on where local government can get traction” or where communities can act, differentiating this from the responsibilities of other levels of government or non-government organisation, since local government struggles to focus on both practical responses and policy development. This enables interventions to be more realistic about what adaptation is important for specific sectors in a specific locality, for example as regards business investment. It is worth noting that local government can slip into silos too, with language that is not shared among professions, internal departments with other agencies; supporting multi-disciplinary teamwork is vital.

Thinking locally, it is also important to recognise that **local government is different to the community.** A systematic approach to encouraging informed grassroots action is essential, for which “things that matter to them in their everyday lives will get traction”. But communities are not homogeneous. Often asking the simplest of questions (e.g. “what is the one thing about this area that you would preserve?”) and generating discussion in various forums can help to facilitate understanding and to manage differences, driving peer-to-peer education, using but localising the platforms we have available. This can help to drive local ownership, networking and planning to build the adaptive capacity of the community, and ensure the local community context is connected with relevant evidence.

“There’s a lot of discussion in the national realm about things needing to be locally led, that’s already done in Queensland.” Drawing on local knowledge helps to make issues salient to people within their communities, so “research is needed on community knowledge and engagement”. One example of this raised during the discussions is the Kurilpa Climate Strategy, developed by a community group in Brisbane, which is harnessing community interest around adaptation in local urban design, local business practices, and managing wellbeing and vulnerability within the community. If we **“empower communities to buy into the projects and engage, then we don’t need the top down all the time”** and we can “catalyse transformative adaptive capacity”. We need to “learn why some examples are better than others, how they’ve worked and why, and then send it to the top to enable better communication and leadership”. A local focus opens other opportunities – engaging First Nations’ knowledge meaningfully, drawing on a community-based labour force for projects on the ground, and building the next generation of leaders. And supporting people to retain hopefulness, even through burnout.

Every roundtable highlighted the growing recognition that “First Nations’ cultures know how to manage this country”. There were multiple reports of Aboriginal and Torres Strait Islander peoples actively offering to share this knowledge, particularly in the light of the bushfires. It was noted that this was not a foregone conclusion, since we could see (and have seen) “the Aboriginal community go down many burrows and have no outcome, and then disenchantment comes” and that science has tended “to sideline First Nations’ knowledge for centuries”. This raised the question of **how to validly engage with First Nations**, “what sort of platform will they come on board with?” as well as whether “that process will be accepted the local community, including the authorities managing fire risk and the safety of that community”. “Issues of who has what power” remain in this as many other aspects of adaptation.

In general, the view was that this had to happen at a local community level, both because much of the knowledge was locally relevant and because this was where the relationships had to be played out. People could see some approach like the Caring for Country program enabling this, however, indicating that there was also “a federal role to help set up a framework to enable this to happen”. It is worth noting that there is both a local management aspect to this where details will vary across the country, and a wider cultural attitude to caring for country with a systems thinking perspective that could be embraced more universally in Australia, so that the engagement is “not political but genuine”. Discussions are needed with the aboriginal leadership at federal and state levels about this. But overall, the opportunity to **“use this moment in time to address the reality that science and policy making haven’t engaged appropriately” with First Nations knowledges** should be grasped, as “the fires have helped to entice Aboriginal people to come out of the shadows and be right out front”.

5. Valuing action, not more planning

There was a strong emphasis on the need to get past planning to action, and how this meant appealing to or making the business case to the relevant actors.

Local government and local communities were seen as having a keen interest in social issues, for example focusing in the pandemic now on the recovery of communities as a whole, and of their most vulnerable people, contrasting with more of an economic angle from state and federal government levels. This is **“a people-centred approach, focussing on engaging people by showing what is relevant to them, with a focus on hopefulness”**; it has to be non-judgmental, as “people feeling judged does not help”. Given that there remains divergent views on climate change among local councillors, incorporating community views to get councillors on board is important, because there often remains “a huge gap in how local government is engaging or communicating with their communities”. Notwithstanding divergent views, “the indemnity issue” remains a concern for local government, requiring good information that can give certainty to councils about good decision making.

Issues like housing affordability are important locally, so, for example, retrofitting buildings for climate requires a change of perspective to explain the benefits and how local communities can respond for these to make action appealing. But issues are increasingly more systemic – the example was given of regions where a housing crisis is being exacerbated because retirees are moving in, “creating climate gentrification as a consequence of climate change that impacts rental availability for young people”. Engaging with these issues helps to **connect with what people are living now and with their values, creating a social or cultural value proposition**.

In other contexts, the value proposition may need to be more economic or business-oriented. For many decision-makers, the “economic justification for investing now in adaptation issues is a missing part of the story”, and **more documentation of costs and benefits of action is required**; this can be compared to mitigation where the business case is often much clearer. Part of this is that many financial assessments still do not incorporate future change, being based on historical data, inevitably failing to accurately value the benefits of action; thus, for example, the Australian rainfall and runoff manual, used in widely in engineering and town planning, has now incorporated climate change, but many other practical procedures need work. Importantly there are other fast-moving ways of influencing business investment, with financial climate risk disclosure (e.g. the Financial Stability Board’s Taskforce on Climate-related Financial Disclosure – “TCFD”) and legal liability becoming front and centre, which need support; **though “no government seems to be doing the same with disclosure of their climate risk” and should be**. A key issue here is “understanding interdependencies across what may conventionally be seen as independent assets”, whether due to supply chains, other activities on the same precinct or wider infrastructure interactions; these all drive **systemic risk which remains weakly appreciated**.

Another framing issue is developing **a mindset that recognises that “adaptation is about learning from mistakes”**; this challenges a lack of investment in scenario planning, then monitoring responses and learning from the results, and is “where the academic community can really help”. On the one hand, adaptation needs to be iterative and many are not ready, but major shocks like COVID19 can create opportunities for which “we need back pocket adaptation responses, as we learned from adaptation pathways”, ready to be mainstreamed into government. On the other hand, “practitioners are doing this all the time, so we need to not reinvent the wheel”.

At a general level, it was felt there are some areas that are ripe for more action, such as “hip pockets and health, as twin key drivers”. Clearly there is also strong action in the financial and legal sectors too, as current models break down and the consequences are becoming obvious; the TCFD process in particular is driving practical change rapidly, and starting to influence the public sector as well as companies. And action on resilience to disasters is another place where people and communities are ready to adapt. Some focus on these areas of opportunity will pay rewards.

6. Understanding why it is not so easy

Participants highlighted challenges related to managing risk, complexity and resilience, recognising that these are genuinely hard concepts to operationalise in the context of 'wicked problems' and long term trends of rapid change. The question of how we communicate about adaptation was a strong theme throughout, including recognising the need to meet people where they are.

On the one hand this leads to questions about language and the relationships among these concepts. It can be inappropriate to transfer the meaning of resilience in an ecosystem context too simplistically to human adaptiveness, especially if people assume resilience is normatively good or interpret it as "striving for the status quo" when really change is needed. This speaks to taking care with language, and understanding what will communicate effectively. **Policy-related messaging on risk and resilience needs to be "coherent, humanised and conveyed simply to connect with people, remembering that everyone has a different world view"**. "Language matters and 'transformation' doesn't gel with any stakeholders"; words like resilience may have some useful ambiguity but can also become meaningless. What does adaptation mean for people, and who can act as boundary riders to interpret and translate to make responses accessible? Where and how have we done well with other issues like recycling and municipal water conservation in droughts?

Consistency really matters. The **communication issues are often deeply systemic**, and the same people on the ground (often wearing multiple hats) get "hit over and over again by all these new things coming out to address a multitude of issues" – 'adaptation', then 'risk', then 'resilience', next 'endurance'?! Agencies in Queensland have standardised on an 'Adapt, Manage and Avoid' lexicon (rather than 'mitigate, transition, retreat'), to have everyone is on the same page when talking about forms of adaptation.

Related to this is the framing of the discussion. Several people suggested that focusing on an emissions goal or avoiding damage is negative, and **a better dynamic comes from "envisioning an end state of vibrant connected communities with regions connected to cities", thus "helping communities have positive value propositions"**. Recovery can be framed as "resetting for the future, rather than replacing", changing parameters and conversations. "Better to talk about what we want – a better future – to avoid fighting about what we have today."

On the other hand, accepting some consistent theoretical understanding of concepts like resilience and complexity, what implications are there for the forms of governance and information needed? Governance structures "can be obstacles to progress or be designed for complex systems". **We need institutional and policy tools to deal with the reality of wicked problems, recognising that most people are not trained in systems thinking** and "we don't have a good handle on systems risk". To "mainstream resilience and adaptation across the board",

a wider connection to decision-makers is needed, building on past thinking and progress, including advocacy across layers of government and recognising local context (e.g. different jurisdictional developments or roles of the private sector). However, we do not need to obtain uniform agreement – we want "street-wise progress rather than perfect structure".

This discussion leads to some key ideas relevant to research. In the past adaptation has tended to consider single stressors, with less emphasis on multiple or pre-existing stressors that affect adaptation, and how they interact or compound or accumulate over time (e.g. a run of hot days and nights rather than the same number of individual days). This single stressor idea, often encouraged by research funding models, can also create a barrier to mainstreaming adaptation because adaptation as a separate sector rather than an issue across portfolios. **We need more integrated scenarios, but also the tools to interpret their complexity**. There also needs to be a more sophisticated approach to complex *responses*, that may include a suite of interacting specific actions, combining building adaptive capacity with reducing risks through (e.g.) land use planning, and developing technology options. These can be **"evidence-based end state scenarios, embedding adaptation, to enable the prioritisation of investment in the future"**. A greater emphasis on social science is needed as the glue among these responses, helping to understand "what's in it for" those who need to act. There was also a view that "resilience comes from many places, and there is still an academic task to clarify the different conceptualisations (e.g. diversity, modulatory, strength, robustness)".