Wrap-Up: Key Action Oriented Messages and Possible Destinations

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Prelude

- When Rich asked me to give this talk months and months ago, I was humbled…

- And decided to ask for help

- So I did some consultation and decided to take a classical approach

So I Went to the Experts

And Waited for an Answer

They Pointed Out: Beware of Talking About Possible Destinations

- Helen and Paris left Menelaus and headed for Troy

- Agamemnon and Achilles left Greece and headed for Troy

- Odysseus left Troy and headed for home...slowly

- Aeneas left Troy and ended up in Carthage...

- Hannibal left Carthage and headed for Rome...the roundabout way...

- None of these journeys ended particularly well...

But Finally, They Said

- Gird your loins and try to do what Rich asked you...

User Perspectives

- Clearly there have been and will continue to be useful information from the various families of integrated assessment models
- But also true that they clearly do not and probably cannot fill all the critical needs of policy communities
  - More disaggregation
  - More attention to regional specificity, technological feasibility
  - More transparency about assumptions
  - Importance of understanding a second-best world
  - Inclusion of other factors, sectors, linkage to other issues – food security, habitat loss, interaction with other policies, water, and so on

User Perspectives

- Critical nature of portraying both the scale and the feasibility of the challenge to reach various mitigation targets

- This raises the challenge of communication with various policy communities, how to make lessons available to be learned, but also how to listen to what is needed or desired

Modeler Perspectives

- Models have provided some useful insights, largely for long-term strategic views of mitigation challenges, role of technologies, etc.
- Process works well when community is engaged, multiple groups working on similar problems and issues, taking advantage of different modeling approaches
- Need to be in space of informing policy dialogue, but also need to be clear about which policy questions and which policy audiences are the targets for the results

Modeler Perspectives

- Linking to water, land, biosphere use is incredibly important – many groups are working on this
- Co-benefits and dis-benefits, e.g. relating to air pollution and energy security
- Effects on urban metabolism and endogenous representation of development and economic growth
- Importance of identifying bad policy as well as bad outcomes
- Continued emphasis on how models are to be evaluated against the real world, against stylized trends, diagnosis of model outcomes, what constitutes a valid test

Scenarios and Uncertainties

- Scenarios a way to visualize a future and explore alternative futures in a structured way
- Careful that scenarios don't influence analysts to discount options, possibilities, pathways that are interesting and informative
- Parallel pathways to focus more attention on socioeconomic scenarios that are tailored to the interests and needs of researchers in impacts, adaptation, and vulnerability

Scenarios and Uncertainties

- Have focused scenario development for the most part on an intermediate audience – not directly on decision-makers, but at the analysts who advise them, or at the scientists who want to understand interactions
- Not just serving an IPCC need, but acknowledging it and trying to build a broader network of researchers and methods

Scenarios and Uncertainties

- Scenarios to understand uncertainties – trying to assess the robustness of options to a range of possible futures

- Just one of many approaches to characterizing uncertainty – e.g., models might be subjected to uncertainty quantification or error propagation

- Scenarios to inform decisions and communicate with stakeholders

Scenarios and Uncertainties

- Challenges of elicitation as a method of understanding uncertainties and confidence

- Group processes vs single expert estimates of uncertainties

- Tendency for group elicitation to compress the tails of the distribution of views on uncertainties, when what many decision-makers really need (want?) are some sense of those tails

Scenarios and Uncertainties

- Tension in scenario generation between the importance of the products for analysis and the importance of the process for facilitation of understanding and generation of new information and knowledge

- Ought to decide what it is we actually want to do with the scenarios, and then build them to those purposes, rather than the other way around

Priorities and the Value of Information

- A plethora of priorities and recommendations available from scientific community (NAS and others)

- Also a lot of local, state, regional action in the absence of decisive Federal guidance

- High on priority lists for the Obama Administration, but soft central leadership and a very difficult budget environment

Priorities and the Value of Information

- A portrait of governmental chaos with respect to adaptation: no clear guidance, every agency trying to do things on their own, etc.

- May have plenty of priorities, and actually know what we ought to do, but we lack a framework for implementation

- That framework certainly could be developed (or renewed), but it will take a lot of work and leadership

Priorities and the Value of Information

- Value of information
  - What decisions?
  - Possible outcomes and states of nature
  - Decision-makers' values and priors
  - Decision-makers' attitudes towards risk
- Lots of examples of how to think about this issue in the climate literature over the past 20 years – both mitigation and adaptation topics
- Priors matter (a lot) and it will be important to understand where they come from
- Timing of decisions also matters a lot

Communicating with Policy Makers

- Challenge of talking with policy analysts, decision-makers with very different mental models OR no mental model of how to think about models

- Need to know why the differences in models occur; a neutral discussion forum

- Without that, sending a very confusing message, not a clear message – politicians can cherry pick according to preconceived ideas and look for rhetorical advantage

- Importance of simple, intuitively appealing stories and figures that you can speak to

Communicating with Policy Makers

- Identifying possible mitigation paths forward
  - Being very clear about analyzing both intended outcomes and possible side-effects
  - Clear that interaction among different research communities is necessary to tell a consistent story
  - A goal for AR5
- On a very concrete level, there are some success stories – success in the sense of direct input and information to an ongoing policy process
- But do not believe that the "decision-maker" is naive

Communicating with Various Audiences

- Simple clear messages, repeated often, by a variety of trusted sources
- Simplify appropriately; we must interpret
- Team-building in communications
- Learn about your audience
- Creativity in presentation
- Acknowledge the emotion in the issue – be clear about language, the importance of metaphor
- Expect that all communication is at least potentially public

Tools for Communication?

- C-ROADS as a communications tool – fast penetration in some very influential places
- Importance of transparency on what is in and what is not in the model – essential for credibility as a communications tool
- How to make models of every sort as transparent as possible?
- How do we talk about limitations of any model, qualified by its intended use?

Paths Forward: Synthesis Thoughts

The Altar of Modeling

Synthesis Thoughts: Models

- Had an interesting convergence between our panels of users of research output and the perceptions of the IAM modelers
  - Generally helpful so far
  - But many particular issues and questions where the models need further development or sharpening
- Have we cherry-picked our user communities?
  - My sense is probably not, but it is worthwhile to note that the questions and therefore the communities of users have been changing, and are changing
- And this drives change not only in the models themselves, but in the problems that they are structured to address, and in the ways they are evaluated

Synthesis Thoughts: Models

- Tension between complexity and clarity?
  - Maybe, but there were always be a place for the relatively simple reduced-form models
- But trend is clearly towards greater sophistication
  - See no reason to believe that this will inherently limit our ability to be clear about what we are doing
- But does raise the bar for evaluation and clarity of description of assumptions

The Sirens of Scenarios and Uncertainties

Synthesis Thoughts: Scenarios and Uncertainties

- Parallel process is a paradigm shift away from scenarios being pre-determined in complexity and outcome

- But still struggling with how scenarios are to be used overall

  - Investigation of uncertainties?

  - Clarifying underlying drivers of change?

  - Exploration of alternative futures?

Synthesis Thoughts: Scenarios and Uncertainties

- Process has already stimulated discussion on what socioeconomic scenarios ought to look like, what should be included, and how might they relate to RCP's

- This is progress, but much more progress needed

- Must both have a literature for IPCC to assess, and lay the foundation for broader and deeper thought about the formation and uses of scenarios

Synthesis Thoughts: Scenarios and Uncertainties

- Only at Snowmass: Back bench suggestion that scientists should be taxed for increasing uncertainty

- This would ensure that we will never understand either the aerosol indirect effects in the climate system, or where all the missing carbon really is in the biosphere

- Would probably also mean that we'll never really know whether we can combine biofuels and CCS to scrub the atmosphere of excess CO_2

Synthesis Thoughts: Scenarios and Uncertainties

- While it was a fascinating discussion of various ways to characterize uncertainty in knowledge, in models, or to characterize our confidence in what we know…

- My observation is that the major features of that discussion have not changed particularly much over the past five or so years

  - We still hope to be transparent in assessments about our confidence, but struggle to do so

  - We have a few more mathematical tools to evaluate models, but they've not yet been successfully applied to such a difficult problem

  - We still have reluctance on the part of many participants in assessments to engage fully in characterizing much beyond the effects of parameter choices in models, differences in baselines, or measurement uncertainties

Synthesis Thoughts: Scenarios and Uncertainties

- Not quite sure what we should do about this
- Is there a way to reframe the problem we face?
  - Interventions that are robust in the face of uncertainties?
  - Locating where uncertainties in a causal chain really appear?
  - Summit on uncertainty characterization?

The Value of Information and Keeping Your Priorities Straight

Synthesis Thoughts: Information and Priorities

- Should we (Could we) formalize a VOI approach to thinking about research and budget priorities?
  - Not sure we could identify the metric we were trying to maximize (or the risk we were trying to minimize) very easily
- No shortage of recommendations, though
- At a minimum, we should help tie research topics to the potential for decisions to be made at different levels
- Argue that part of the justification for programs ought to be the degree to which they can enable decisions of different sorts

Synthesis Thoughts: Information and Priorities

- There are examples where either NAS or the Federal Government has tried to move in this direction
  - Decadal Survey
  - US GEO and GEOSS
  - Using IAMs to investigate technology portfolios
- But this is a prime case of the devil being in the details
- If we were to succeed in convincing USGCRP to move in this direction, we had better be prepared to help

Communication is a Two Way Street: Cassandra's Dilemma

- Cassandra was a Trojan princess, whom the god Apollo saw and fell in love with
- She promised to marry him, but broke her promise
- Apollo cursed her – gave her the gift of prophecy, but ensured that no one would believe her
- She told the Trojans about the Trojan Horse, the death of Agamemnon, etc.
- And we all know how that turned out…

Synthesis Thoughts: Communication

- Are we any damn good at this?
- Well, maybe with our peers and with technical analysts
- But if decision-making is also ultimately dependent on public support, we'd better pick up our game
- Maybe there's an app for that
- While this is clearly important in framing and participating in the debate, there are risks and opportunity costs

Closing Thoughts 1

- We are awash in opportunities
- Must continue to respond to changing policy dialogue – inevitably means that models will need to be reformulated, but the simple forms must be held in reserve
- We still don't have a robust framework to discuss uncertainties of different sorts in a clear way
- Our Federal sponsors need help articulating the story of why particular investments might be helpful – and we need to make sure that decision-making begins to accompany scientific curiosity; and we need to help
- We are like many other scientific communities with respect to communication, and we can improve – but the stakes are far higher for us and the issues we care about than for many – we MUST improve

Closing Thoughts 2

- Implications for the next Snowmass?
- A number of processes in the community that address the issues we raised:
  - Model intercomparisons and diagnostics
  - Regional implementations of IAMs
  - Overall model development (e.g. links with ESM's)
- Any news on international policy (REDD? REDD+?)
- Have coordinated communication efforts evolved?
- Status of USGCRP and funding picture
- Status of IPCC efforts

Thank You