Use of Scenarios in Decision-Making

Chris Weaver

Workshop on U.S. Land Use/Land Cover Scenarios and Projections

25 June 2014
Use of Scenarios in Decision-Making

Rob Lempert  Chris Weaver

Workshop on U.S. Land Use/Land Cover Scenarios and Projections

25 June 2014
“The ability to create and share scenarios represents a key difference between humans and other animals.”

-R. Lempert
Why do we need scenarios in decision-making?

Predicting the future accurately (and convincingly) is hard
Why do we need scenarios in decision-making?

Decision-making is also hard
Elements of Decision-Making
Elements of Decision-Making

Decision-Structuring Task:
1. Defining the problem in a way that opens it up to thoughtful consideration
2. Defining the objectives to be achieved
3. Laying out the alternative actions that might be taken in an attempt to achieve the objectives

NRC (2009)
Elements of Decision-Making

Decision-Structuring Task:
1. Defining the problem in a way that opens it up to thoughtful consideration
2. Defining the objectives to be achieved
3. Laying out the alternative actions that might be taken in an attempt to achieve the objectives

Choice Task:
4. Estimating the consequences of each alternative
5. Evaluating the tradeoffs among the options in terms of their ability to meet the objectives

NRC (2009)
Elements of Decision-Making

Within these elements, effective decision support should seek to achieve social values in the decision environment - i.e., to improve:

- Credibility, salience, legitimacy
- Usability: making information actionable
- Mutual understanding, respect, and trust among parties
- Quality of the decision

NRC (2009)
Challenges to Decision-Making
Challenges to Decision-Making

Human decision-making has well-understood biases - both individual cognitive and group dynamical:

- Overconfidence
- Focus on easy-to-quantify risks
- Neglect of risks you believe you can’t control
- Strategic use of uncertainty to sway opinion

These factors inhibit full consideration of the consequences of alternative actions

Lempert (2013)
Use of Scenarios Can Help
Use of Scenarios Can Help

Scenarios-based approaches employ various cognitive mechanisms to overcome these barriers:

- Systematize consideration of key factors in a decision
- Force reorganization of mental models by challenging assumptions
- Present set of plausible and contrasting futures without likelihood claims - less psychologically threatening
- Facilitate communication and collaboration among those with different worldviews

Lempert (2013)
Scenarios have a role as both **products** and **processes**:

- View scenarios as productive: emphasizes their tangibility, with value unrelated to processes of creation
- View scenarios as procedural: emphasizes modes of formation, with benefits independent of value of products

Constructive tension among the two framings
Relate to different elements of the decision task

Hulme and Dessai (2008)
These framings yield different expectations about how one might evaluate the “success” or “failure” of scenarios - for example:

- **Predictive success**: Has the future turned out as envisioned?
- **Decision success**: Have good decisions been made?
- **Learning success**: Have the scenarios proved engaging and enabled communication and learning?

Hulme and Dessai (2008)
Scenarios and Real Decisions

When considering scenario use in real decisions, it’s clear that at least two aspects of any given decision process matter a lot for how we might wish to view, develop, and apply scenarios:

- The rich contextual details of an individual decision
- The choice of decision analytic framework
Paradigm 1: "Predict Then Act"

- Figure out your best-guess future and design the best policy you can for that future
- Conceptual framework: Maximize expected utility
- Question: "What is most likely to happen?"

Paradigm 2: "Robust Decision-Making"

- Identify greatest vulnerabilities across full range of futures and identify the suite of policies that perform reasonably well across this range
- Conceptual framework: Minimize regret
- Question: "When might my policies fail?"

Weaver et al. (2013)
Paradigm 1: "Predict Then Act"

- Top-down
- Start with scenarios
- Use within choice task
- Attach probabilities to scenarios

Paradigm 2: "Robust Decision-Making"

- Bottom-up
- Start with decision context - “discover” scenarios later
- Use within decision-structuring task
- Scenarios as special and bounding cases

Weaver et al. (2013)
It might rain tomorrow, but … what do you have planned?
It might rain tomorrow, but ... what do you have planned?
Challenges and Limitations

Scenarios have problems too:

- Ambiguity and bias
- Illusion of communication
- Failure to account for the possibility of surprise
- Insufficient relevance and context
- Tradeoffs among credibility, salience, and legitimacy
- Lack of compelling detail vs. lack of sufficient breadth and scope
- Probabilities vs. plausibilities vs. possibilities

Most of these have to do with tradeoffs ...
Challenges and Limitations

For example:

“Global change scenarios may also fail to provide effective decision support because they are only weakly connected to potential users’ concerns and worldviews. For instance, climate scenarios may focus on long-term trends with little apparent relevance to users’ near term decisions. They may lack the spatial and temporal details needed by decision makers who are concerned with local impacts and adaptation” (Lempert, 2013)
Challenges and Limitations

But:

“The more detail that one adds to the story line of a scenario, the more probable it will appear to most people, and the greater the difficulty they likely will have in imagining other, equally or more likely, ways in which the same outcome could be reached.” (Morgan and Keith, 2008)
Summary

Use of scenarios (as either products or processes) helps us overcome twin challenges of future uncertainty and intrinsic cognitive and behavioral barriers to good decision-making.

Value for the decision-structuring task, the choice task, and/or the achievement of desirable social outcomes within decision-making settings - distinguish between these.

Tradeoffs and dynamic tensions among the different uses of and lenses for scenarios - selection of scenario products, framings, and uses is itself often a key part of the overall decision to be informed.
References


