

# **Use of Scenarios in Decision-Making**

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

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“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

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## 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

# 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

# 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

# Challenges to Decision-Making

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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

# Use of Scenarios Can Help

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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

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

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?

# 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?"

## **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

**It might rain tomorrow, but ...  
what do you have planned?**

# It might rain tomorrow, but ... what do you have planned?



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# 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

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