Consistently linking global to regional scenarios for IAV

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The AACA scenario challenge

- We want to develop scenarios useful for assessment....
- by extending and enriching the global SSP boundary conditions from the top down...
- and developing regional scenarios from the bottom up. . .
- while maintaining “consistency “ across different spatial scales.
What do we mean by “consistency”?

**Scenario Processes**
- **Joint** – pursued at the same time by the same group
- **Parallel** – pursued at the same time by different groups
- **Iterative** – one process is started, but only finalized after another process is started
- **Consecutive** – one process is completed before another begins
- **Independent** – no linkage

**Scenario Elements**
- **Equivalent** – downscaling
- **Consistent** – same boundary conditions
- **Coherent** – same logical framework
- **Comparable** – same focal issue
- **Complementary** – mutually informative

Based on Zurek and Henrichs (2007)
Experience with the *Special Report on Emissions Scenarios*

- Incorporate explicit assumptions regarding global socioeconomic development pathways

- Additional work has been done to disaggregate SRES scenario elements to sub-global scales
  - ATEAM – EU land use, vulnerability & adaptive capacity
  - CIESIN – National GDP & population
  - ICLUS – U.S. population/land use
Integrated Climate and Land Use Scenarios

- Model representation of population and housing density
  - “Consistent”/”coherent” with SRES families (A2, A1, B1, B2)
  - Enables local, regional, national quantification and aggregation

http://www.epa.gov/ncea/global/iclus/
Using the SSPs for sub-global scenario development

- Some challenges lie ahead. . .
  - Maintaining consistency adds complexity
  - Many desired elements are not specified in the SSPs
  - Some scenarios already exist for some regions or sectors
  - Global trajectories may differ from those at other scales
Approaches to nesting storylines

See also Biggs et al. (2007)

Tight Coupling

Loose Coupling
Approaches to using the SSPs as boundary conditions for AACA scenarios

- **Top down**
  - Quantitative scenarios
    - Scaling of global elements
  - Qualitative storylines/narratives
    - Nesting of national, regional storylines in global SSPs

- **Bottom up**
  - Mapping of independent regional storylines/scenarios to SSPs
    - Qualitative and/or quantitative

Disconnect? Socioeconomic? Climate?
Example: *RIAM Project* - regional SSP extensions for the U.S. Southeast

- Using the SSP storylines as boundary conditions
- Nesting national and regional storylines
Factor, Actor, Sector (FAS) Framework

- A **factor** represents an aspect of a social or natural system around which there are broad policy issues of particular interest.
- An **actor** represents an individual or organization with the capacity to affect or influence change.
- A **sector** represents a subcomponent of a natural or social system.

Kok et al. (2007)
## Synthesis of nested storyline elements

Absar and Preston (in preparation)

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<th>REGIONAL</th>
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### LEGEND
- **Strong Growth**
- **Moderate Growth**
- **Static**
- **Moderate Decline**
- **Decline**
- **Strong Contribution to Adaptive Capacity**
- **Moderate Contribution to Adaptive Capacity**
- **Neutral**
- **Low Contribution to Adaptive Capacity**
- **No Contribution to Adaptive Capacity**
- **Not Applicable**
Downscaling of SSP population and GDP

- Disaggregated U.S. GDP and population scenarios in the IIASA SSP scenario database to the state level

EPA’s ICLUS Scenarios (Bierwagen et al., 2010)
IIASA SSP Database (https://secure.iiasa.ac.at/web-apps/ene/SspDb/dsd?Action=htmlpage&page=series)
Summary

- Consistency comes in several flavors

- A robust scenario framework will build on prior work while enabling new directions

- Linking top down and bottom up development processes can be powerful – provided they can be linked
Thank You

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