Scenario assessments for catastrophic environmental risks

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Background

- Risk assessment under high uncertainty
  - Post-conflict environmental health assessments
  - Rapid Impact Assessments
  - Vulnerability assessments (example: Bosnia)

- Dept of Energy / GlobalEESE project
  - Strategic foresight
  - Based on Shell Oil scenarios and emergent knowledge systems
  - Abrupt climate change project -> 2010 QDR
  - ‘Embracing the darkness’

- GlobalEESE -> GlobalInt

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Definition of surprise attack (from Kam 1988)

- Failure of advance warning
- Contrary to future expectations
- Indicates underlying unpreparedness
Cascading impacts

- Changes to one area may spread to others
- Relationships matter
- Intervention can make things worse
- Must look at complex systems as more than their discrete parts.

Network running normally

Graphic: WikiCommons:Stickulator
Scenario (Phase 0) planning

- Two-step process
- First: identification of potential, abrupt geophysical changes at a regional level.
  - Employment of multidimensional scenario boundary mapping
  - Most businesses assume a steady-state scenario
  - Wack developed a 2-axis, 4 scenario process
  - IPCC 4AR emissions scenario ~1500 scenarios
  - Complex ecosystem ~1000000

- (This can also be done as a training tool with only seven people.)
Mapping cascades

- Second: Assuming a major event (or combination), mapping first, second and third-order impacts and feedback loops (Horizon 0-3 events).
- Requires diverse group of experts with field knowledge.
  - For example, having vulcanologists, pilots and engineers at the same table.
  - But ideally should also include experts from outside ‘normally relevant’ areas.
- What are the redundant systems? How does the system adapt? What are critical intervention points?

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Application to military

- Horizon scanning for potential risks and vulnerabilities
- Uncertainty mapping for determining unknown risks
- Advanced planning for force investment
- Operational planning constraints
- Interactions between energy and environmental systems