Elinor Ostrom:


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Ostrom was one of the foremost researchers on SES, common-pool resources management, and cooperation.

Awards and Honors

Honorary Doctorate, TERI University, New Delhi, India, 2009
Honorary Doctorate, Université Montpellier I, Montpellier, France, 2009
Foreign Member, Académie d’Agriculture de France, 2009
Honorary Professor, Beihang University, Beijing, China, 2008
Adam Smith Award, Association of Private Enterprise Education, Nassau, Bahamas, 2011
Honorary Professor, Beihang University, Beijing, China, 2011
Foreign Member, Académie d’Agriculture de France, Paris, France, 2011
Honorary Doctorate, Université Montpellier 1, Montpellier, France, 2011
Honorary Doctorate, TERI University, New Delhi, India, 2012
Herman B. Wells Visionary Award, Indiana University Foundation, Bloomington, IN, 2010
Distinguished Faculty Award, College of Arts and Sciences, Indiana University, Bloomington, IN, 2010
Honorary Doctorate, Michigan State University, East Lansing, 2010
UCLA Medal, University of California, Los Angeles, 2011
Adam Smith Award, Association of Private Enterprise Education, Nassau, Bahamas, 2011
Honorary Professor, Beihang University, Beijing, China, 2011

Personnel Analyst III, University of California, Los Angeles, 1957–61
Visiting Assistant Professor, Department of Government, Indiana University, 1965–66
Assistant Professor and Graduate Advisor, Department of Government, Indiana University, 1966–69
Visiting Assistant Professor, Department of Government, Indiana University, 1965–66
Personnel Analyst III, University of California, Los Angeles, 1957–61

Background
Ostrom synthesizes common-pool resources, SESs, & collaborative governance
Ostrom challenges Hardin’s widely-accepted “Tragedy of the Commons” with evidence of sustainability through cooperation.
Large, highly valuable, open access systems with diverse, non-communicating harvesters lacking management rules/norms will lead to collapse.
Self-organizing harvesters/leaders, effective management rules sustain their resource.
Ostrom uses Political Theory & Policy Analysis to address three key questions:

- When can cooperation be *expected* in common-pool natural resource situations?
- When can it *not* be expected?
- What are the *best policy mechanisms* accordingly?
Ostrom’s Sustainability Analysis Framework meets two needs for studying SESs:

- Studying SES sustainability
- Organizing studies of similar SESs

Common set of relevant variables
Fig. 1. The core subsystems in a framework for analyzing social-ecological systems.
Socio-Ecological System

1st Level Core Subsystems

Resource Systems
- Resource system (RS)
- Resource units (RU)
  - 2nd Level Variables
    - Deeper level variables

Governance System
- Governance system (GS)
  - 2nd Level Variables
    - Deeper level variables

Users
- Users (U)
  - 2nd Level Variables
    - Deeper level variables
Ten 2nd-level variables predict sustainability or collapse of an SES with common-pool resources.
• Size
• Productivity
• Predictability

• Number
• Leadership/Entrepreneurship
• Norms/Social Capital
• Knowledge of SES/Mental Models
• Resource Importance

• Collective Choice Rules

Resource system (RS)

Governance system (GS)

Resource units (RU)

Users (U)

Mobility
Policy prescriptions should be based on matching these 10 attributes locally-evaluated.

1. System Size
2. System Productivity
3. Dynamics Predictability
4. Resource Unit Mobility
5. Number of Users
6. Leadership
7. Social Capital (norms)
8. SES Knowledge
9. Importance of resource to user
10. Collective-choice Rules
Collective action and Self-Organizing is determined by **expected benefit & perceived cost.**

- **Expected Benefits > Perceived Cost**
  - $\uparrow$ Probability of Self-Organizing

- **Expected Benefits < Perceived Cost**
  - $\downarrow$ Probability of Self-Organizing
+/- Analysis? Methods? Interpretation?

+ Cross-disciplinary approach incorporates broader expertise & solutions than the average economist

+ Embrace complexity, don’t reduce it

+ Importance of understanding the “parts” to understand the “whole”

- Highly theoretical; few examples

- Doesn’t say WHICH empirical research

- Other characteristics that impact “self-organization?”
Ostrom’s recommendation for pinpointing measurements & creating a shared database for evaluating SESs is HAPPENING!

<table>
<thead>
<tr>
<th>State Variable</th>
<th>Modeling Logic</th>
<th>Metrics</th>
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</thead>
<tbody>
<tr>
<td>functional wetland area</td>
<td>What is the total acreage of designated wetland?</td>
<td>▪ Designated wetland</td>
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<tr>
<td></td>
<td>How much of designated wetland is functional (not lost to encroachment)?</td>
<td>▪ CWA Section 404 or other permitted loss</td>
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<tr>
<td></td>
<td>What is ration of actual to potentially restorable wetland?</td>
<td>▪ Artificial or mitigation wetland</td>
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<tr>
<td></td>
<td>How much net wetland in a year (permitted take vs mitigation)?</td>
<td></td>
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<tr>
<td>functional riparian area</td>
<td>What is the total acreage of designated riparian area?</td>
<td>▪ Total acreage, or percent of watershed</td>
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<tr>
<td></td>
<td></td>
<td>▪ Acreage lost to land use conversion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Acreage gained via restoration</td>
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<tr>
<td>functional restoration index</td>
<td>Some index of net improvement toward ideal functional state.</td>
<td>A weighted index of area restored X estimated delta in performance level</td>
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<td>Net functional change via restored riparian and headwater lands.</td>
<td>(e.g. 5000 acres modified from 20% or potential function to 60% of potential function; delta is a 40% improvement, which is 2X improvement over the prior condition level for 5000 AC)</td>
</tr>
</tbody>
</table>
Proposition:
Sub-basin provides resilient ecosystem service function

- Water supply function
  - Water quantity
  - Water quality
- Water demand function
  - Recreational function
  - Storage function
  - Reservoir storage
  - Snowpack storage
- Species life cycle support function
  - Protecting populations
  - Protected habitat
- Conservation function
  - Erosion control
  - Streambank stabilization
- Chemical cycling function
  - Nutrients
  - Dilution
  - Purification
- Transport function
  - Flow regulation
  - Drainage
  - Seasonal flushing
  - Sediment transport
Need to coordinate ecology & social sciences;

Diagram:
- Socio-economic changes of the population
  - Household agent
    - Household state (household profile + perceived spatial organization)
    - Specific decision-making sub-model
  - Other household agents
- Land-use related policies
  - Indicator of performance
- Bio-physical changes of the landscape (LUCC)
  - Landscape agent
    - Specific biophysical sub-models
    - Biophysical state (corresponding to GIS-raster layers)
- Interventions as policy levers
  - Perceptions
  - Benefits (yield)
  - Tenure relations
  - Actions (land uses)
- System of Human Population
- System of Landscape Environment

Co-evolution and co-adaptation
But also, Science & Policy.

**Academic**
- Long deadlines
- Self motivate
- Being novel
- Direction of effect
- Convince economists
- Find a question you can answer well
- Become an expert on one issue
- Find the optimal

**Policy**
- Short deadlines
- Good in teams
- Being right
- Magnitude of effect
- Convince noneconomists
- Answer the question as well as you can
- Apply your tools to many issues
- Optimize within constraints

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Berkes, Folke, Colding. 2003 Navigating social-ecological systems