



# **Beyond Markets and States: Polycentric Governance of Complex Economic Systems**

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# **Brief Overview of the Journey**

- **The Earlier World View of Simple Systems**
- **Efforts to Understand Complex Systems**
  - **Studies of Polycentric Water and Police Industries**
  - **Doubling the Types of Goods**
  - **Developing the Institutional Analysis and Development (IAD) Framework**



# **Are Rational Individuals Helplessly Trapped in Dilemmas?**

- **Earlier studies recorded settings where humans self-organized to cope with common-pool dilemmas**
  - **Little knowledge accumulation until a U.S. National Resource (NRC) Committee studied common-pool resources across disciplines, sectors, and countries**
  - **Meta-analysis discovered diversity of locally known property rights to control resource use**
- **Empirical Studies of Common-Pool Resource Dilemmas**
  - **In the experimental laboratory**
  - **Irrigation systems in Nepal**
  - **Forests around the world**



# **Current Theoretical Developments**

- **Many scholars now developing behavioral theories of individual choice**
- **Central role of trust in coping with dilemmas now seen for its importance**
- **Lessons from Studying Complex Systems**
  - **Rules need to fit social-ecological context**
  - **Polycentric systems may enable a fit between human action situations and nested ecological systems**
  - **Panaceas are potentially dysfunctional**
- **Now, let's review the journey – back to the 1960s**



# **Complex Human Systems Were Considered Chaotic in 1960s**

- **Scholars criticized the number of government agencies rather than trying to understand why created and how they performed**
- **Maps showing many governments in a metropolitan area were used as evidence for the need to consolidate**
- **V. Ostrom, Tiebout, and Warren developed concept of polycentric systems to *analyze* performance rather than *criticize* messy maps**



# Mechanisms Found to Improve Output in Polycentric Systems

- **Small- to medium-sized cities are more effective monitors of performance and costs**
- **Citizens who are dissatisfied with service provision can “vote with their feet” and move to jurisdictions that come closer to their preferred mix and costs of public services**
- **Local incorporated communities can contract with larger producers and change contracts if not satisfied with the services provided, while urban districts inside a large city have no voice**



# Police Industry Studies

- **In-depth studies of police served by multiple-sized departments in six metropolitan areas**
- **Not a *single* instance was found where a large centralized police department outperformed smaller departments serving similar neighborhoods in regard to multiple indicators**



# 80 Metropolitan Areas Study

- **Large number of direct service (e.g., patrol) producers found to be more efficient**
- **Small number of indirect service producers (e.g., radio dispatching and criminal laboratory analyses) also more efficient**
- **Thus, mix of large and small most efficient**
- **Rejected theory underlying metropolitan reform approach**
- **Demonstrated that complexity is not the same as chaos in regard to metropolitan governance**





# **Empirical Work Led to a Doubling of the Types of Goods**

- **Instead of private vs. public goods**
- **Added common-pool resources**
  - **Shares subtractability with private goods and difficulty of exclusion with public goods**
  - **Forests, water systems, fisheries, and the global atmosphere are of immense importance for the survival of humans**
- **Also added toll goods to build on earlier work of Buchanan on club goods**

# Four types of goods

		Subtractability of Use	
		High	Low
Difficulty of Excluding Potential Beneficiaries	High	<i>Common-pool resources:</i> groundwater basins, lakes, irrigation systems, fisheries, forests, etc.	<i>Public goods:</i> peace and security of a community, national defense, knowledge, fire protection, weather forecasts, etc.
	Low	<i>Private goods:</i> food, clothing, automobiles, etc.	<i>Toll goods:</i> theaters, private clubs, daycare centers

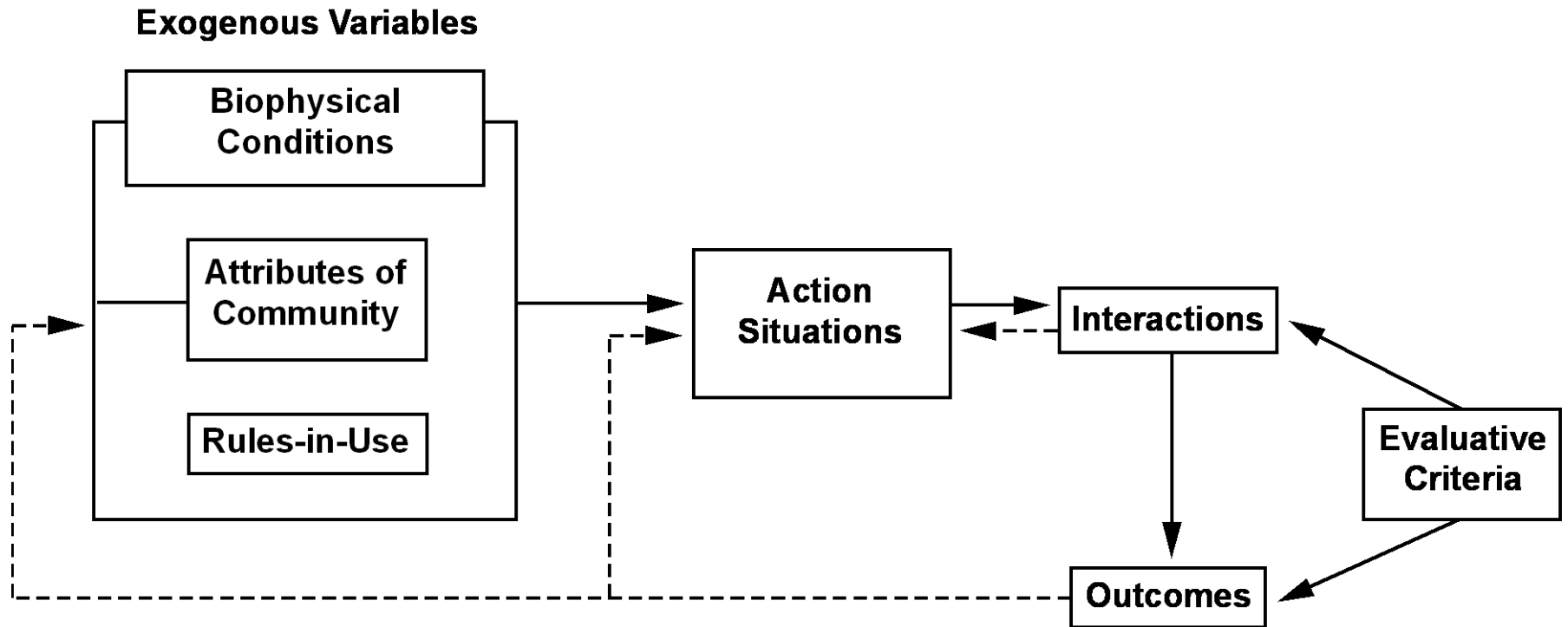
*Source:* Adapted from E. Ostrom (2005: 24).



# Developing a Framework

- **The Institutional Analysis and Development (IAD) framework**
- **The work of many colleagues over time**
- **Contains a nested set of building blocks that social scientists can use in efforts to understand human interactions and outcomes across diverse settings**
- **Exogenous variables affect the internal working parts of an action situation that in turn affect interactions and outcomes**

# A framework for institutional analysis



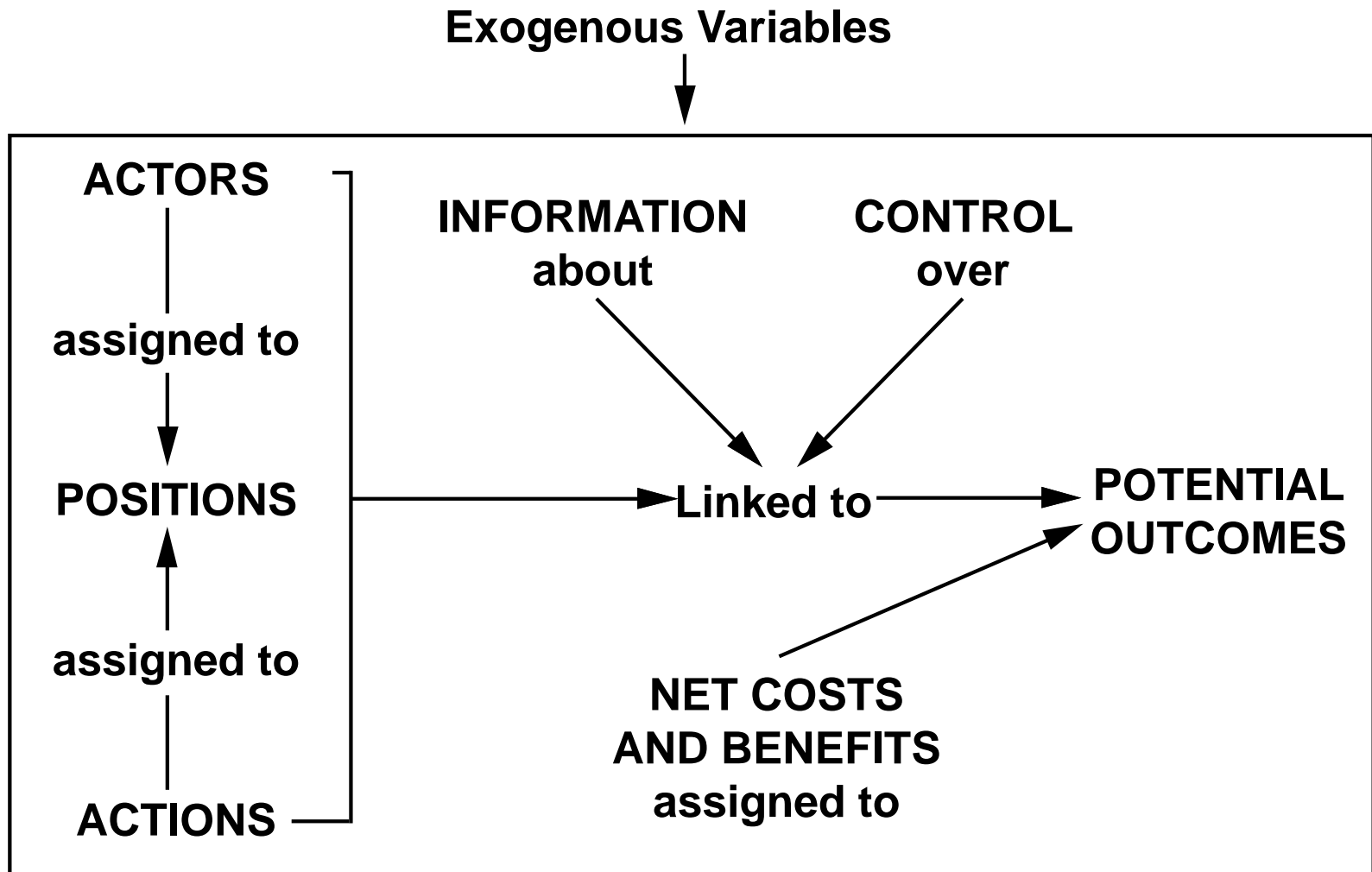
Source: Adapted from E. Ostrom (2005: 15).



# Internal Parts of Action Situations

- **Similar to the working parts of a game so that IAD can be used to organize game-theoretical analysis, agent-based models, design of laboratory experiments, and for collecting, coding, and analyzing extensive data from field research**

# The internal structure of an action situation



Source: Adapted from E. Ostrom (2005: 33).



# **Are Rational Individuals Helplessly Trapped in Social Dilemmas?**

- **Theory presented humans in commons dilemmas as unable to extract themselves**
- **They were “trapped”**
- **But other humans – public officials – were supposed to impose optimal policies devised by scholars on resource users**
- **Government or private ownership presumed to be optimal**



# **Earlier Knowledge of Self-Organization did not Cumulate**

- **Many studies conducted by**
  - **Scholars from multiple disciplines about**
  - **Diverse sectors in**
  - **Different regions**
- **More attention paid to news reports of resource destruction**
- **NRC committee in mid-1980s brought scholars from all traditions together to present an overview of the empirical studies**





# Meta-Analysis of Common-Pool Resource Studies

- **IAD framework used to develop coding manual**
- **Difficult due to lack of agreement of earlier scholars about what should be reported**
- **47 irrigation systems and 44 fisheries analyzed**
- **Over 72% of farmer-managed systems had high performance – crops grown, benefit-cost ratio**
- **42% of governmental irrigation systems had high performance even with fancy engineering**
- **Informal fishery groups allocated space, time, and technology to try to reduce overharvesting**
- **Groups that did not communicate were more likely to overuse their resource**



# Clarifying Concepts

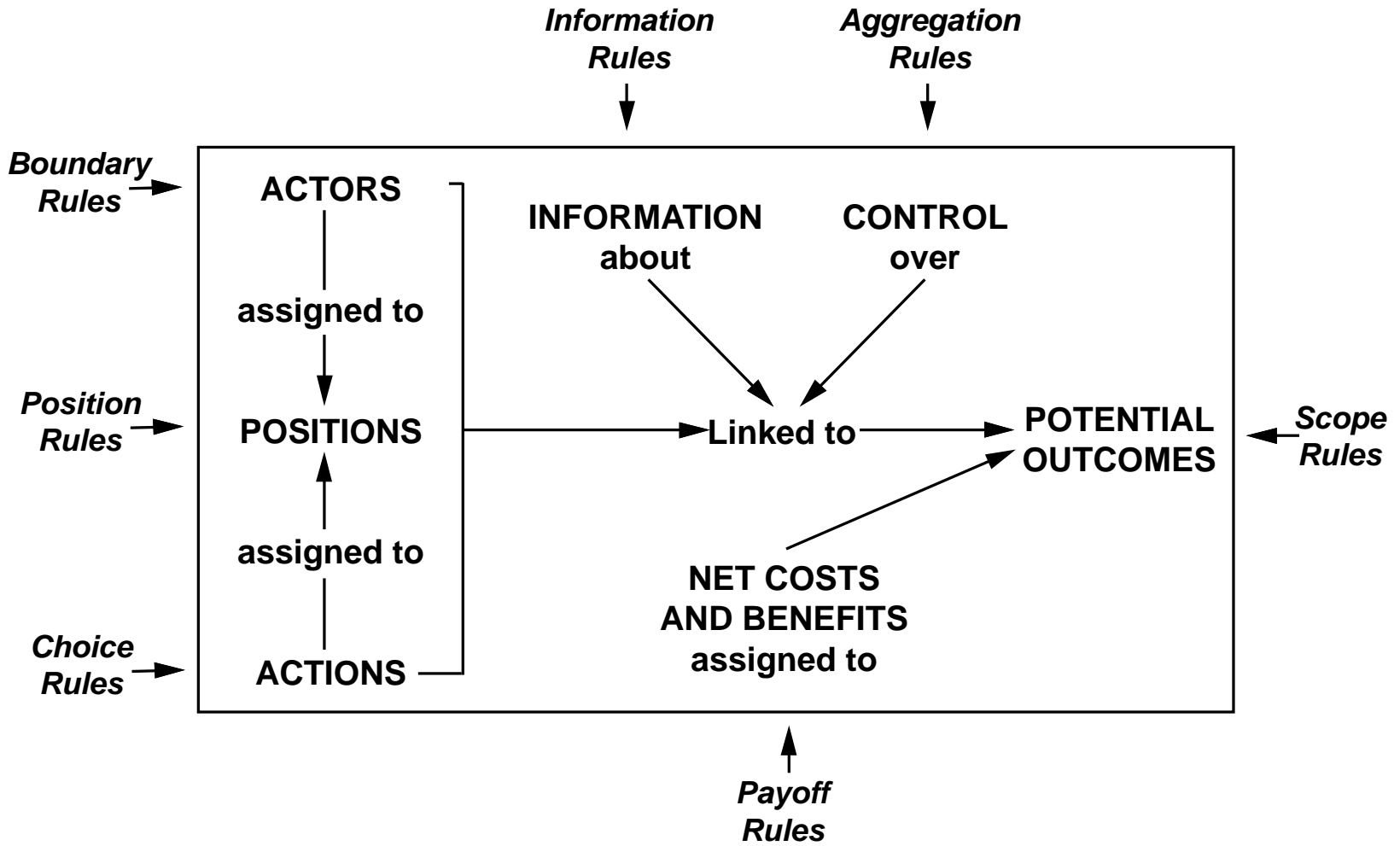
- **“Common-property resource” widely used**
- **Confused the concept of property and that of resource**
- **Need to switch to “common-pool resources” and “common-property regimes”**
- **Found five types of property rights rather than just one**
- **Access, withdrawal, management, exclusion, and alienation rights were all real rights**
- **Property-rights systems are composed of mixtures of the five, not just alienation rights**



# Finding Diversity of Rules

- **Resource users had devised immense number of different rules fitting their local resource system**
- **Again, IAD helped us identify order from this initially chaotic morass**
- **We asked: What part of an action situation does a rule affect?**

# Rules as exogenous variables directly affecting the elements of an action situation



Source: Adapted from E. Ostrom (2005: 189).



# Long-Surviving Institutions

- **Once studies were coded, I had hoped it would be feasible to find an optimal set of rules used by robust, long-surviving institutions and not used in the fragile ones**
- **After a long struggle – realized this was not feasible and turned to the analysis of underlying practices of successful systems (design principles) not present in failures**



# A Quick Overview

- **Boundaries of users and resource are clear**
- **Congruence between benefits and costs**
- **Users had procedures for making own rules**
- **Regular monitoring of users and resource conditions**
- **Graduated sanctions**
- **Conflict-resolution mechanisms**
- **Minimal recognition of rights by government**
- **Nested enterprises**



# Empirical Studies in the Lab

- **Laboratory provides the capability to design a CPR experiment and slowly change one factor at a time to assess the impact on outcomes**
- **When subjects make decisions anonymously with no communication – overharvesting even worse than predicted!**
- **Face-to-face communication (cheap talk) enables them to increase cooperation**
- **If they design own sanctioning system, achieve close to full optimality**
- **Field experiments testing how resource users themselves act in different structures**



# **Irrigation Systems in Nepal**

- **Compared systems designed by engineers and run by government with those built and run by farmers**
- **Farmer systems were quite “primitive” in terms of construction, but they were able to:**
  - **grow more crops,**
  - **run their systems more efficiently, and**
  - **get more water to the tail end**





# Forests around the World

- **International Forestry Resources and Institutions (IFRI) research program**
- **IFRI is unique – the only interdisciplinary, long-term research program studying forests owned by governments, by private organizations, and by communities in multiple countries**
- **Collaborating with centers in Africa, Asia, Latin America, and United States**
- **All use same research protocols to carefully measure forests (e.g., species diversity, basal area)**
- **Measure if and how users are organized, their activities, and living conditions**



# Surprising Findings

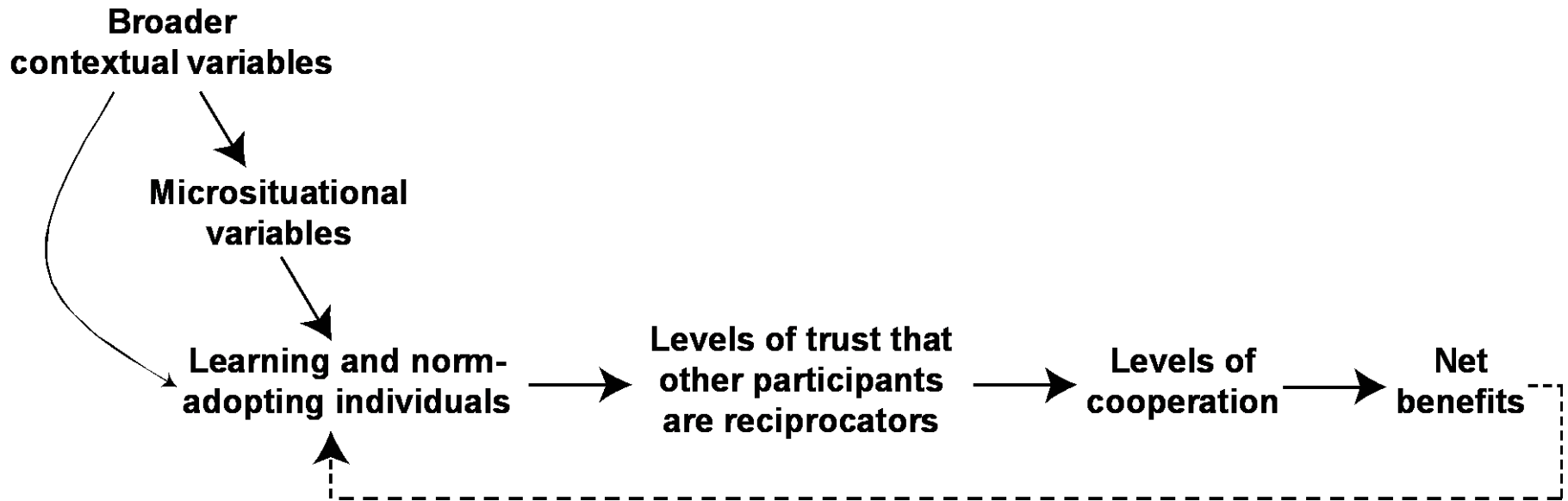
- **In sustainable forests around the world, users are active monitors of the level of harvesting occurring in their forests**
- **Users monitoring forests is more important than type of forest ownership!!!**
- **Recent analyses examine tradeoffs and synergies between level of carbon storage in forests and their contributions to livelihoods**
- **Larger forests more effective in enhancing carbon *and* livelihoods**
- **Even stronger when local communities have strong rule-making autonomy and incentives to monitor**



# Current Developments

- **Theory of rational but helpless individuals not supported**
- **Many theorists now working on behavioral theories of the individual**
  - **Boundedly rational, but learn through experience**
  - **Use heuristics, but update over time**
  - **Learn norms and potentially value benefits to others**
- **Learning to trust others is central to cooperation**

# Microsituational and broader context of social dilemmas affects levels of trust and cooperation



Source: Poteete, Janssen, and Ostrom (2010: chap. 9).



# **Microsituational Level of Analysis (Labs and Field)**

- **Factors that affect cooperation in CPRs**
  - **Communication among participants**
  - **Reputation of participants known**
  - **High marginal return**
  - **Entry and exit capability**
  - **Longer time horizon**
  - **Agreed-upon sanctioning mechanism**
  - **All factors that increase likelihood that participants gain trust in others and reduce the probability of being a sucker**



# **The Broader Context: Social-Ecological Systems**

- **A network of colleagues in Europe and across the United States working on identifying aspects of the broader context that affects microsituations and likelihood of resource sustainability across water, forests, and fishery resources**
- **More to do in future work!**



# Reform?

- **Resources in good condition have users with long-term interests who invest in monitoring and building trust**
- **Many policy analysts and public officials have not yet absorbed the central lessons**
  - **Government-protected areas or private rights are still recommended by some as THE way to solve these problems.**
- **Must learn how to deal with complexity rather than rejecting it**
- **Polycentric systems can cope with complexity**
- **Panaceas are not to be recommended!**



**Thank you!**