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Using the SES framework for the study of large social-ecological systems: Introducing SESMAD

Workshop in Institutional Analysis of Social-Ecological Systems (WINS)

Inception Workshop

Berlin, 14-16 July, 2014

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Sustainable Development and Innovation

Questions, questions..

1. What analytical framework do you use for the analysis of social-ecological and social-technical systems?
   - What are the origins, main elements and applications of the analytical framework?
   - What are the associated heuristics, language and important discoveries
2. Is there a scientific community that has assembled around this framing, heuristic and terminology?
   - Are there major linkages or barriers regarding the interaction with other scientific communities, also doing research on institutional analysis of social-ecological systems?
3. What are the recommendations regarding future design and development of WINS?
   - What should be the main elements and priorities of WINS?
   - What is important regarding the concrete organization and implementation
   - What would be the next step

Introducing SESMAD

- (Presentation is losely based on M. Cox' editorial to the upcoming SESMAD special issue in IJC)
- Earlier research on small(er)-scale CPR systems:
  - Common Pool Resource Research Project (Ostrom, Schlager, Tang, etc.)
  - Nepal Irrigation Institutions Systems (NIIS) (Ostrom, Shivakoti, Lam, etc.)
  - International Forestry Resources and Institutions (IFRI) (Ostrom, etc.)
- Most important outputs:
  - *Theoretically:* Ostom's design principles for successful community-based CPR governance
  - *Methodologically*: establishing protocols for building data bases, and code information
- (Forget frameworks: All that solving problems and gaining insights requires is grammar & coding…)

Introducing SESMAD

- Social-Ecological Systems Meta-analysis Data base (SESMAD)

1. Do the theoretical insights apply to large-scale systems, also?
2. Are the methodological lessons-learned applicable, for us, too?

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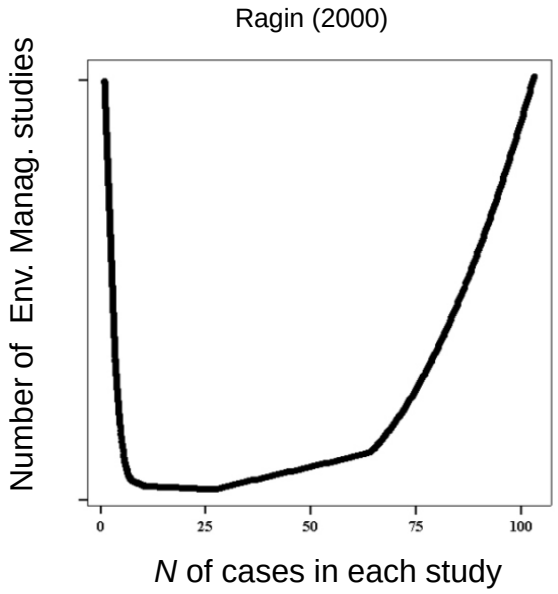
Introducing SESMAD

Michael Cox	Dartmouth College, USA
Mike Schoon	Arizona State University, USA
Natalie Ban	University of Victoria, Canada
Chanda Meek	University of Alaska Fairbanks, USA
Forrest Fleischman	Dartmouth College, USA
Gustavo Garcia-Lopez	Puerto Rico Government
Brent Loken	Simon Fraser University, Canada
Frank van Laerhoven	Utrecht University, Netherlands
Graham Epstein	Indiana University, USA
Irene Perez Ibarra	Arizona State University, USA
Louisa Evans	James Cook University, Australia
Mateja Nenadovic	Duke University, USA
Andreas Thiel	Humboldt University, Germany
Sergio Villamayor	Humboldt University, Germany

Introducing SESMAD

- Natural scientists & social scientists
- Ostrom Workshop tradition & Resilience Alliance tradition
  - Workshoppers trained to work with IAD
  - RAYS trained to work with SES framework
- Approaches to meta-analysis:
  - Statistical meta analyses which pool data on the same phenomenon gathered in multiple studies in order to test size effects
    - Powerful
    - Requires strict data collection and analysis protocols
  - Qualitatively oriented literature reviews which summarize and compare the findings of multiple studies
    - Meaningful comparison
    - Inherently non-systematic

Introducing SESMAD



- SES cases: complex data + complex theory = complex knowledge.
- How to structure it? How to convey it?
  - Combining across-case with within-case analysis
  - Typological/middle-range theories
  - Meta-analysis of case studies

(Combining across-case with within-case analysis)

- Data management strategies that depend solely on coding and sorting of data into units of meaning can strip much of this contextual richness away.
- To prevent this, one could treat individual accounts as whole cases or stories
- whole cases are difficult to compare with one another when the goal of the research is to develop generalizations that represent multiple accounts
- The SESMAD challenge is to meaningfully combine the obvious need for *across-case analysis*, with the necessity of *within-case analysis*

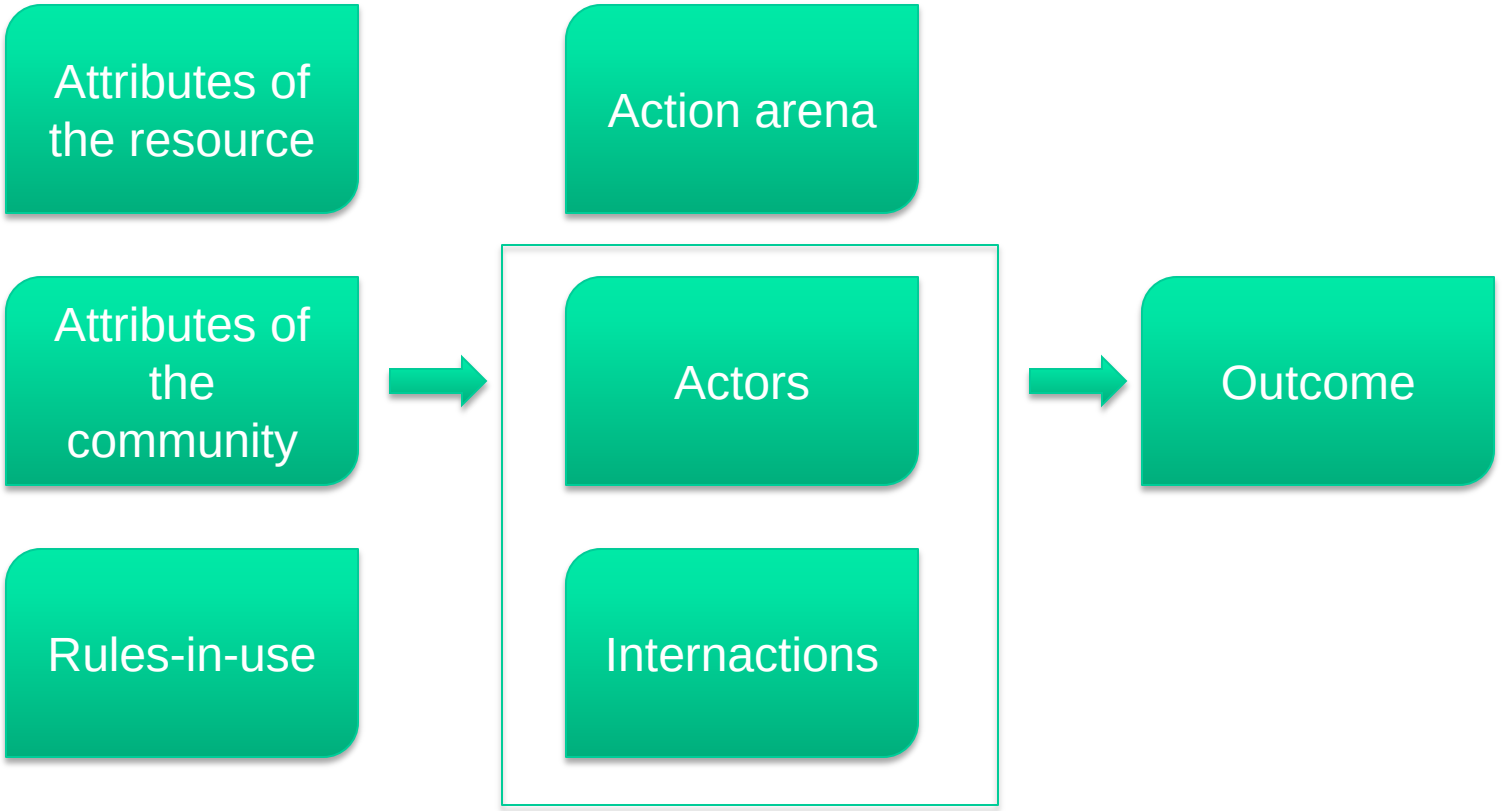
(middle range theory)

- Parson – Merton debate in sociology
- Approach to theory development
- Boudon: “"*it is hopeless and quixotic to try to determine the overarching independent variable that would operate in all social processes, or to determine the essential feature of social structure, or to find out the two, three, or four couples of concepts ... that would be sufficient to analyze all social phenomena*”
- SESMAD:
  - Embracing complexity of SESs
  - Looking for trends and patterns (*across cases*) while giving ample room to context (*within cases*)
  - Going beyond causal *relations;* understanding causal *mechanisms*
  - What conditions need to apply for an empirically proven causal relation to actually take effect?

(meta-analysis of case studies)

- Combining the rigor of formal statistical meta-analysis with the flexibility of literature review
- They do not require that the case studies are conducted in an identical fashion in order to produce comparable data
- Rely on standard coding protocols utilizing nominal, ordenal, interval and qualitative variable definitions
- “Cases” and “studies”
  - Study = published piece of work that describes one or more cases in depth (our unit of observation)
  - Case = Particular SES where a governance regime and a set of actors are affecting and/or affected by a particular resource (our unit of analysis)

1. What analytical framework do you use?



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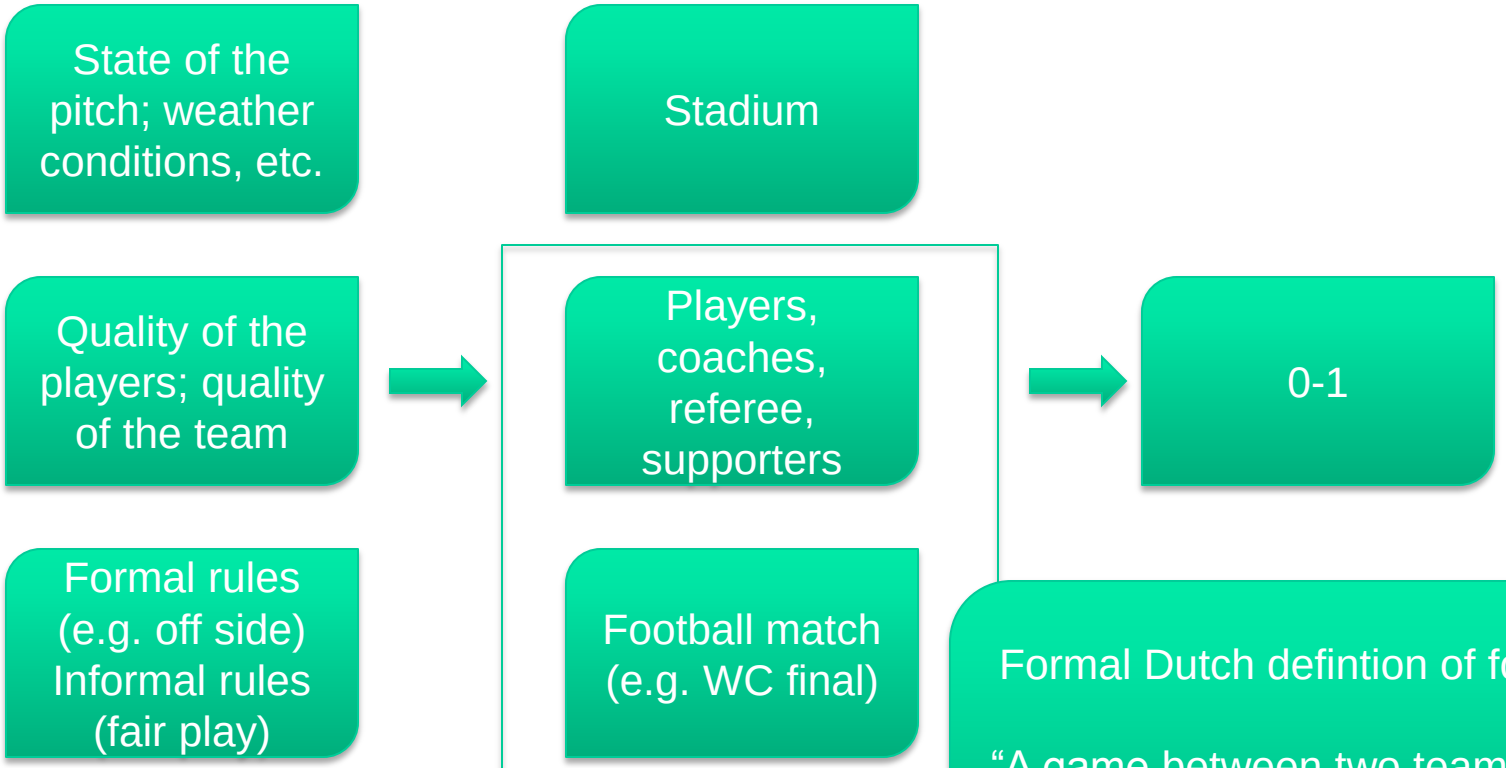
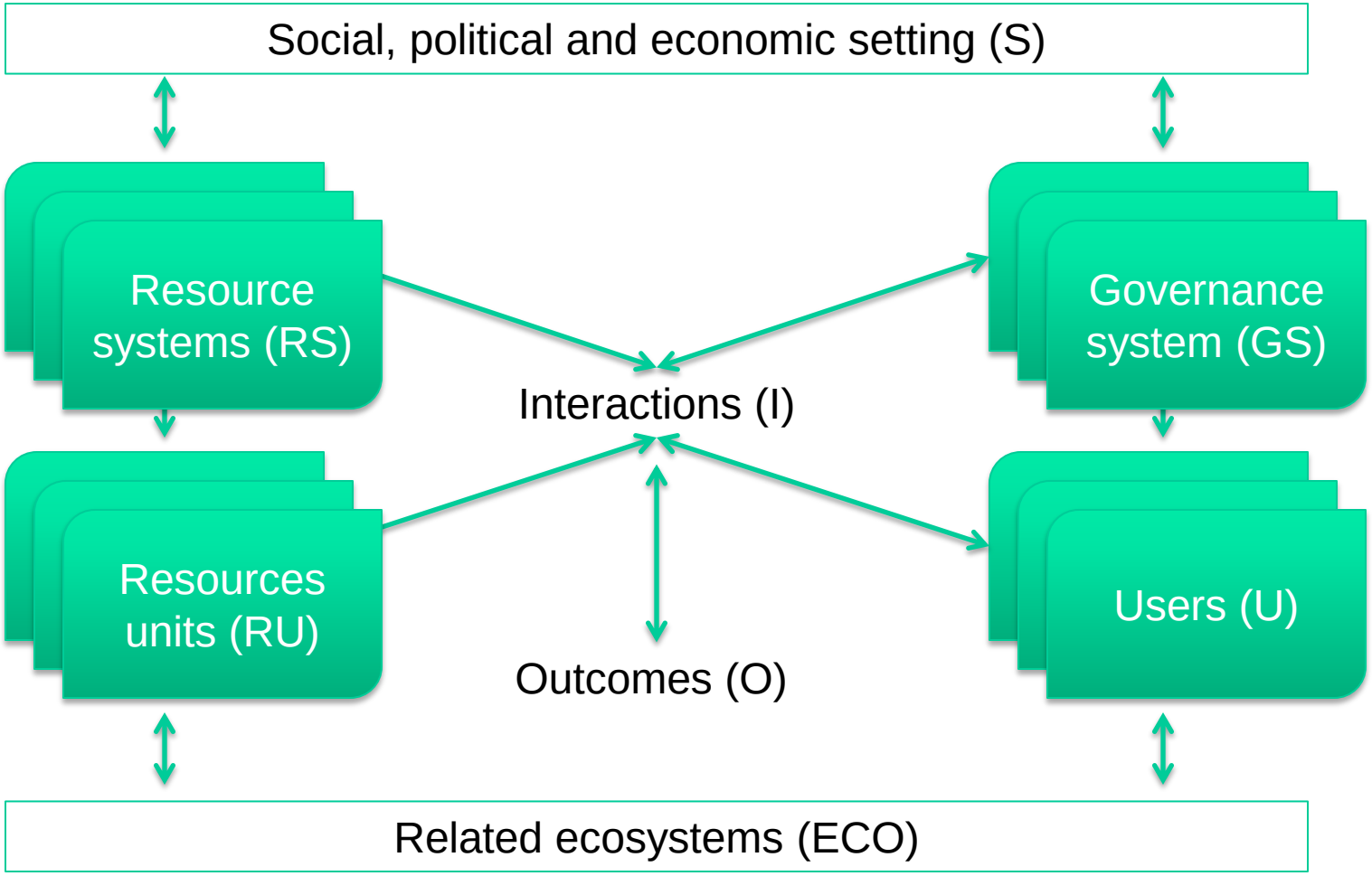


Formal Dutch defintion of football:

"A game between two teams of 11, where in the end Germany always wins"

1. What analytical framework do you use?



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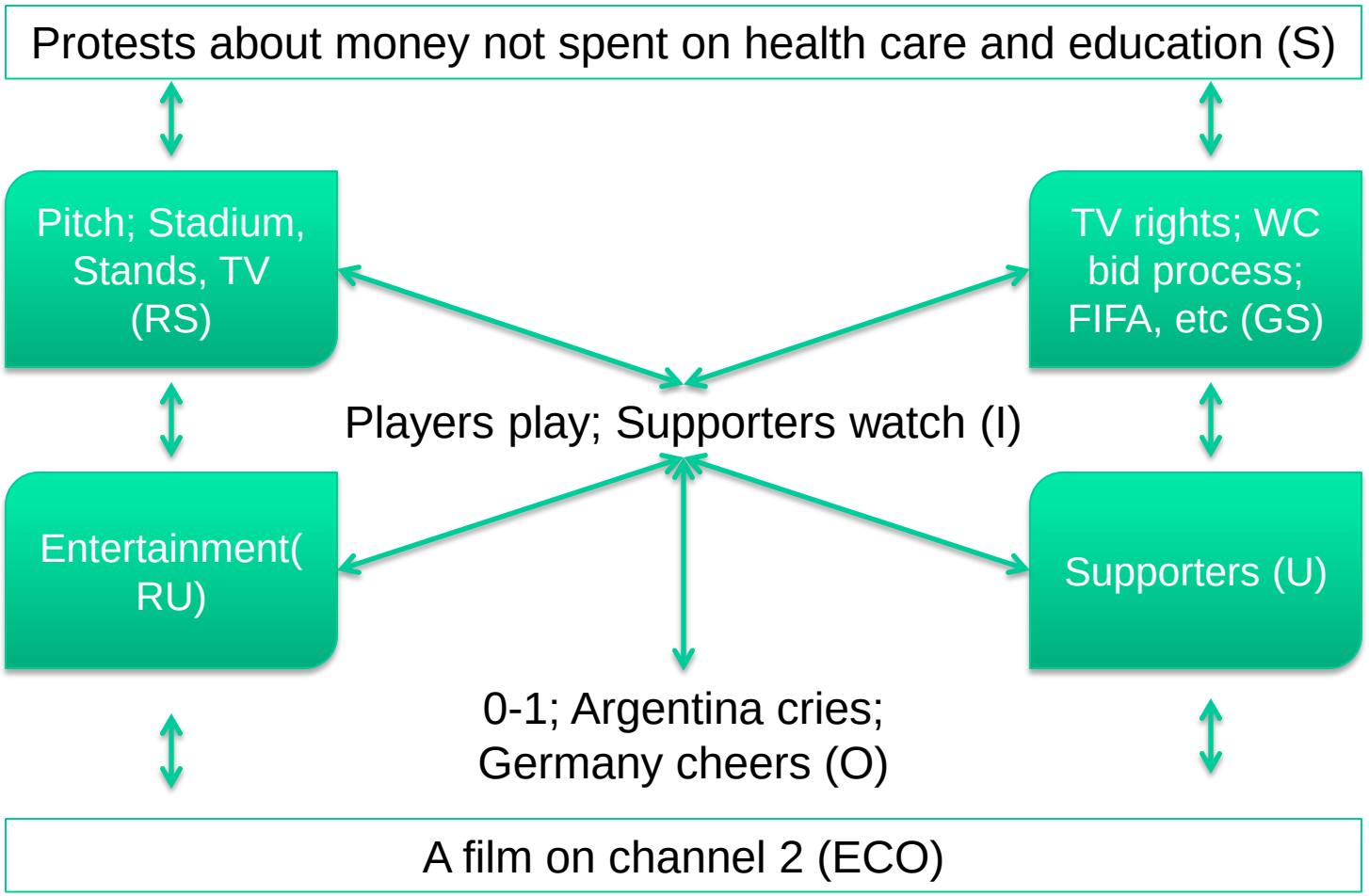

1. What analytical framework do you use?

- Governance system
  - An institutional arrangement (e.g. rules, policy, governance activities)
  - Used by one or more actor groups
  - To interact with, and govern an environmental commons
  - E.g. Montreal Protocol Regime, The Great Barrier Reef Marine Park Act, International Convention for the Conservation of Atlantic Tunas, etc.
- Actor group
  - A group of actors (i.e. Individuals, organizations of nations)
  - Which have developed a set of institutional arrangements
  - In order to interact with an environmental commons
  - Groups that actually interact (e.g. A mgmt agency)
  - Groups that may not interact very often (fishermen catching Bluefin Tuna, farmers polluting the Rhine)

1. What analytical framework do you use?

- Resource units & Resource systems collapsed into Environmental Commons
  - It proved very difficult to clearly delineate two types of resources consistently across multiple types of systems
  - Relevant indicators for resource units and systems tend to overlap
  - Also, we wanted to be able to deal with pollutants, also
- Environmental commons
  - An environmental phenomenon
  - Associated with important benefits to certain groups
  - The presence of which is also associated with negative extraction or emission-based externalities
  - Subject to governance
  - E.g. Atlantic Bluefin Tuna; Indonesian forests, Ozone layer; Rhine river system; Great Barrier Reef

1. What analytical framework do you use?

- Population of cases:

1. Have at least a governance system, an actor group, and a resource interacting with each other
2. 'Sufficient' geographical and organizational scale
   - Exceeding 10,000 km2, and/or
   - including more than 100,000 individuals

1. What analytical framework do you use?

1. Every case in the SESMAD database has an entry in a Case Table
   - Represents the SES under study
   - Stores variables relevant to the SES, itself
2. Each case can have one or more components contained in a Components Table
   - Components include the first-tier components from the SES framework (i.e. Governance system, Actor group, Environmental commons)
3. Components are linked to each other via interactions recorded in Interaction Tables
   - Reclects the Action Situation from the IAD framework
4. All-in all, the data base contains well over 200 variables

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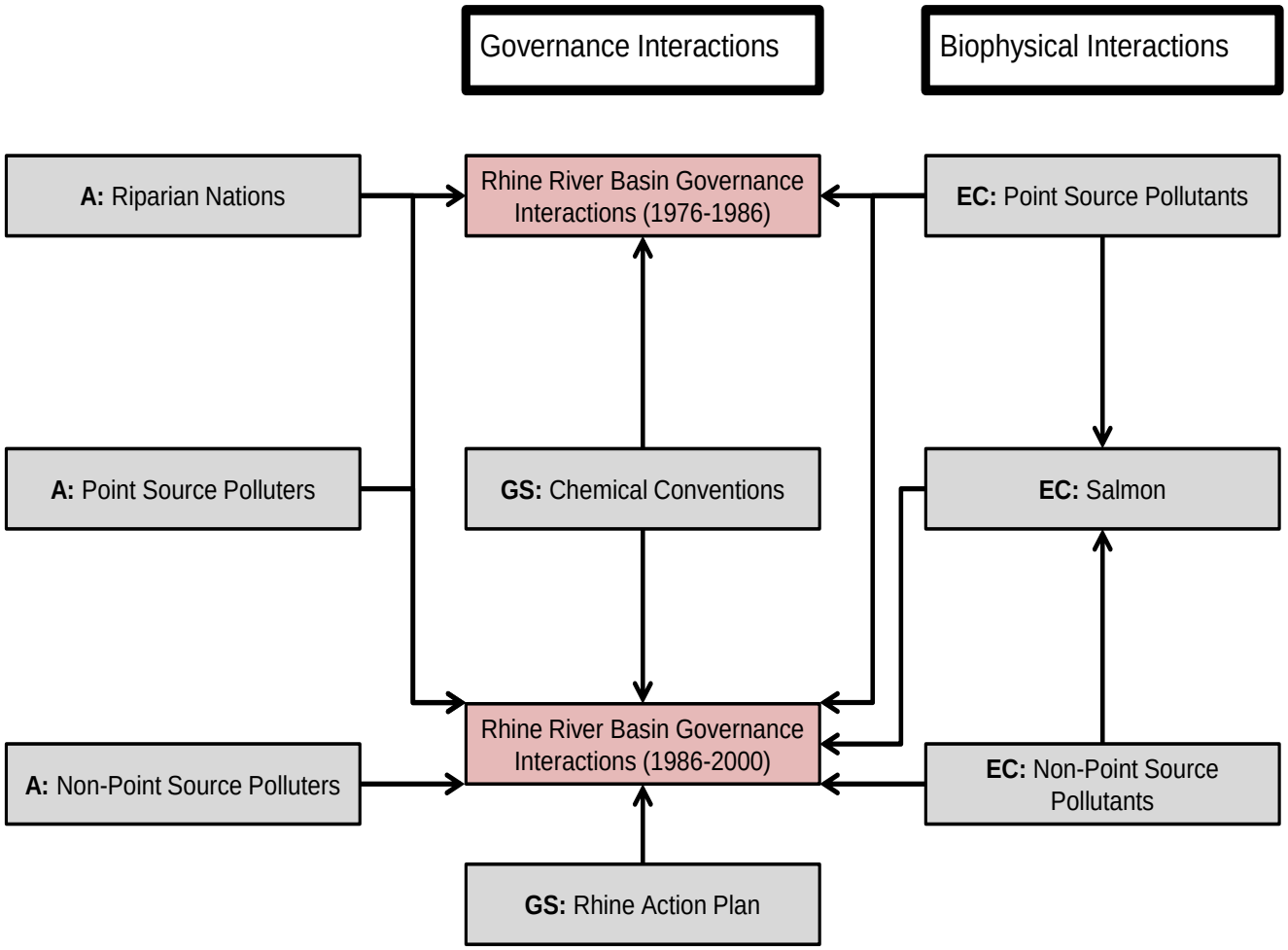
An example:



1. What analytical framework do you use?

- Buidling the data base
- Populating it
- Extra incentive: Write papers while doing this…
  - Incentive to populate the data base
  - Incentive to keep everyone on board (publish or perish)
  - Test the data base architecture
- International Journal of the Commons (IJC) Special Issue (August/September)
  - Rhine
  - Bluefin tuna
  - Great Barrier Reef
  - Ozone
  - Indonesian Forests

2. Is there a scientific community that assembled around SES, etc.?

- Sure enough…
- SES framework has been embraced by Resilience Alliance affiliates
- IAD framework has proven it's worth, and continues to be used as a guideline for inquiry

3. Recommendations for WINS?

- Give center stage to the puzzle – frameworks are nothing but tools
- Project groups
  - Reserve time to allow members to become bilingual, or polyglots
  - Establish group rules
  - Facilitate face-to-face time (retreats, during conferences, etc.)
- Funding
  - Funders do not think that what we do is sufficiently ‘sexy’ – hard to impossible to find money
  - “we want to build this database” generally doesn’t raise a lot of attention..