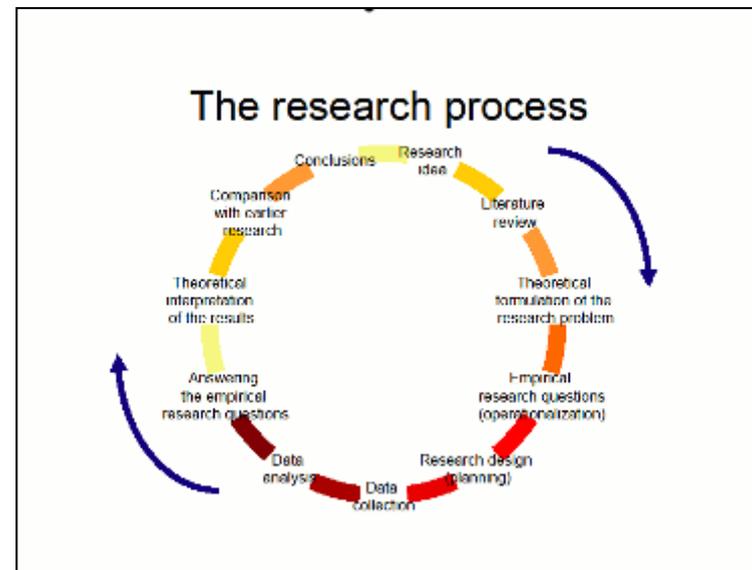
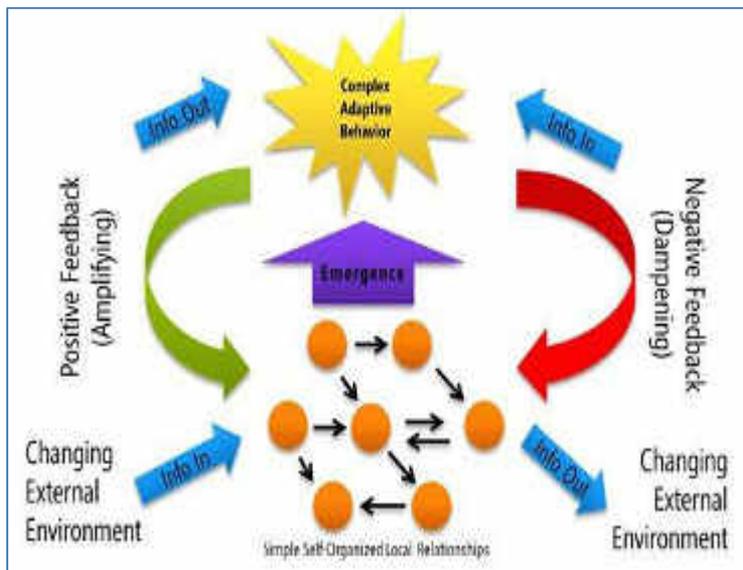


Causality and explanation (morning)

Research design (afternoon)



Peter Mollinga

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Today's motto & message

“methodologies are derivatives of ontologies”

“[t]he deep divide in social and political inquiry is ontological rather than technical or instrumental”
(Levi-Faur, 2005)

“[T]o suggest, like Przeworski and Teune, that generality and parsimony of theories should have primacy over their accuracy is to assume that social reality is driven by only a few *'shakers and movers'* that are responsible for most visible outcomes in the political and social world. Consequently we might end up with ontology of 'simple' theories for a 'simple' world. But if one adopts a more complex ontology, and perceives social reality as a product of conjectural causality, then accuracy and intimate knowledge of one's case might be elevated to the same importance as the search for generalization. (...) **Generalizations tend to fade when we look at the particular case (...) yet case analysis without an attempt at generalization is a mere anecdote.**” (Levi-Faur, 2006:371)



Ontology

Ontology is the philosophical study of the nature of *being*, *becoming*, *existence*, or *reality*, as well as the basic categories of being and their relations. (...) ontology deals with questions concerning what entities exist or may be said to exist, and how such entities may be grouped, related within a hierarchy, and subdivided according to similarities and differences.

Principal questions of ontology include:

- "What can be said to exist?"
- "What is a thing?"
- "Into what categories, if any, can we sort existing things?"
- "What are the meanings of being?"
- "What are the various modes of being of entities?"

<https://en.wikipedia.org/wiki/Ontology>



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Epistemology

Epistemology (...) describe[s] the branch of philosophy concerned with the nature and scope of knowledge and is also referred to as "theory of knowledge". Put concisely, it is the study of knowledge and justified belief. It questions what knowledge is and how it can be acquired, and the extent to which knowledge pertinent to any given subject or entity can be acquired. Much of the debate in this field has focused on the philosophical analysis of the nature of knowledge and how it relates to connected notions such as truth, belief, and justification.

<https://en.wikipedia.org/wiki/Epistemology>



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Worlds apart?

DISCUSSION

An exchange between Ben Crow and Yoram Eckstein on the global water crisis

Editors' note

The March 2014 (39/2) special issue of *Water International*, 'Towards Equitable Water Governance', included the Santa Cruz Declaration on the Global Water Crisis and a set of diverse comments on the declaration. One of the commentators was *Water International* Associate Editor Yoram Eckstein, Fulbright Professor of Hydrogeology at Tomsk Polytechnic University, Russian Federation, who objected to the central assertion that 'the global water crisis is fundamentally one of injustice and inequality', arguing that physical scarcity still rules. This sparked a lively exchange between Eckstein and Ben Crow, one of the Guest Editors of the special issue, and Professor of Sociology at the University of California, Santa Cruz. We reproduce the exchange in full here, with minor editing, as in our view it is an excellent example of what we aspire to in making *Water International* a forum for dialogue between physical and social sciences, in keeping with one of the key objectives of the International Water Resources Association. Despite our efforts, all too often this kind of honest exchange is rare across the two cultures. In the end, neither side was convinced by the other, but dialogue is to promote mutual understanding, not homogenization of views.

James E. Nickum and Philippus Wester

'An exchange between Ben Crow and Yoram Eckstein on the global water crisis'. 2014. *Water International* 39(5):774-784.

Different worldviews and paradigms

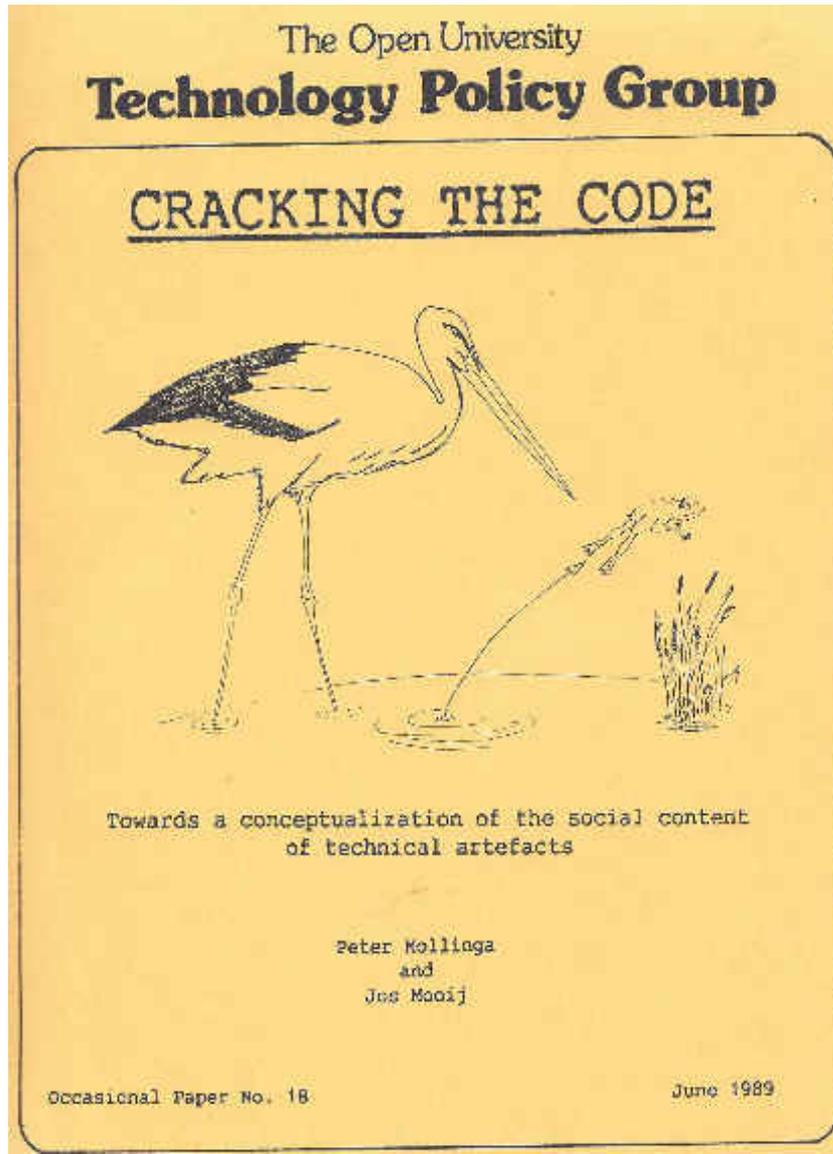
- Separation between nature and society as different ‘things’, or co-constructed, or even one ‘hybrid’ thing
- Different understandings of ‘scarcity’
- The question of scale: what is local and what is global?
- The question of primacy: what comes first/what is more ‘fundamental’?
- Crow in Crow&Eckstein:

There are differences about how (natural science and social science) knowledge is generated, its scope and validity, but these differences do not lend themselves to simple summary.



Causality and explanation:

what do
we mean by
these terms?



Peter Mollinga

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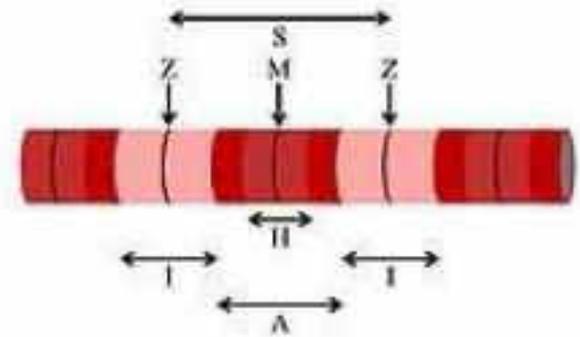
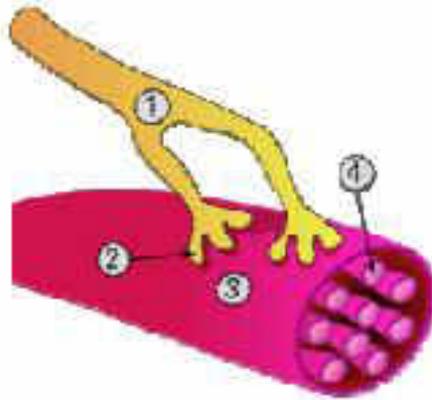
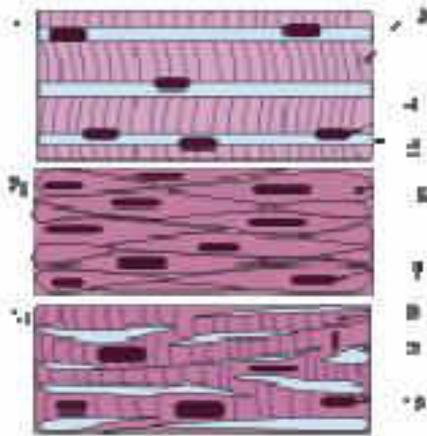
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A muscle

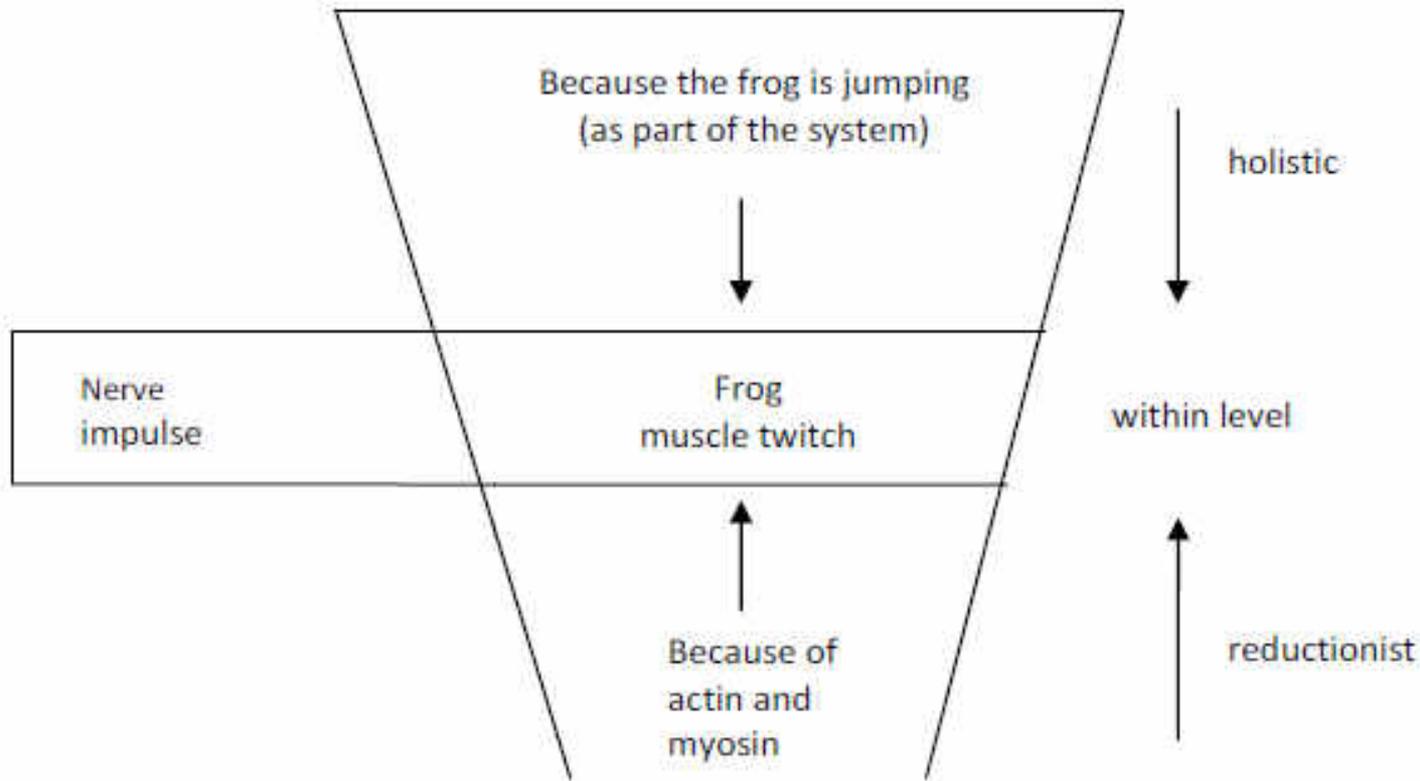


https://en.wikipedia.org/wiki/Muscle_tissue, <https://en.wikipedia.org/wiki/Myocyte>



Types of explanation

Figure 1: relationship between different types of explanation (adapted from Rose, 1987:18)



Rose, S. P. (1987). *Molecules and minds: essays on biology and the social order*. Milton Keynes
Also see: Levins, R., & Lewontin, R. C. (1985). *The dialectical biologist*. Harvard University Press.

Primacy arguments & reductionism

In the natural sciences the third, bottom-up type of explanation is mostly considered as the best type of explanation. It is associated with the conventional hierarchy of the sciences that looks something like this (Rose, 1987:20)

Sociological
Social psychological
Psychological (mentalist)
Physiological (systems)
Physiological (units)
Anatomical-biochemical
Chemical
Physical



Five types of explanation	Substance of the explanation	Main disciplinary perspective(s)
<p>No.1: within-level time steps</p> <p>Process/practice focused analysis</p>	<p>Mapping of the sequence of water management events in one agricultural year, notably implementation of rules and distribution conflicts. Documenting of the actors involved (members of the irrigation bureaucracy, elected politicians, different categories of farmers) and how they concretely interact/struggle over water.</p>	<p>(Actor-oriented) sociology to 'follow the actors'</p> <p>(Agrarian) political economy to name the social relations of water distribution</p>
<p>No.2: top-down (holistic) explanation</p> <p>Theory-based case study analysis and interpretation</p>	<p>Interpretation of the series of water distribution events as part of the broader agrarian political economy/process of (agricultural) development:</p> <ul style="list-style-type: none"> - An example of the social differentiation of the peasantry - An example of state-citizen relations as competitive populism 	<p>Neo-marxist agrarian political economy</p> <p>Critical (mostly political economy) theory on the Indian state</p>
<p>No.3: bottom-up explanation</p> <p>Analysis of one or a limited number of dimensions of the phenomenon (possibly taking reductionist form)</p>	<p>Showing limitations (while acknowledging contributions) of several bottom-up explanations:</p> <ul style="list-style-type: none"> - Neo-classical/ institutional economics' 'homo economicus'-based explanations of 'utility maximisation' (i.e., greed) of individual farmers; similarly for irrigation bureaucrats and politicians - Technical explanations focused on location + poor maintenance of technical infrastructure 	<p>(Critiques of):</p> <ul style="list-style-type: none"> - Neo-classical/neo-institutional economics - Irrigation engineering
<p>No.4: developmental explanation</p> <p>Social construction focused analysis</p>	<p>Studying of the socio-technical evolution of the irrigation system (design: 1860s-1940s); building: 1940s-1960s); use: 1960s-...) to identify shaping of socially significant technical design characteristics</p>	<p>Social construction of technology (SCOT) perspective (now known as part of: STS = Science & Technology Studies)</p>
<p>No.5: evolutionary explanation</p> <p>Historical analysis</p>	<p>Situating of the irrigation system in colonial and post-independence development (emergence of notions of 'protective' and 'productive' irrigation; irrigation as a technology of rule in imperialism and planned development)</p>	<p>History (particular colonial history of India); Wittfogel + follow-up debate on 'hydraulic societies'.</p>

Within these different types of explanation, what do we mean exactly by 'cause' ?

Answer:

**That would depend on the paradigm
(i.e. the ontology and epistemology)
that informs your research**

Key research paradigms

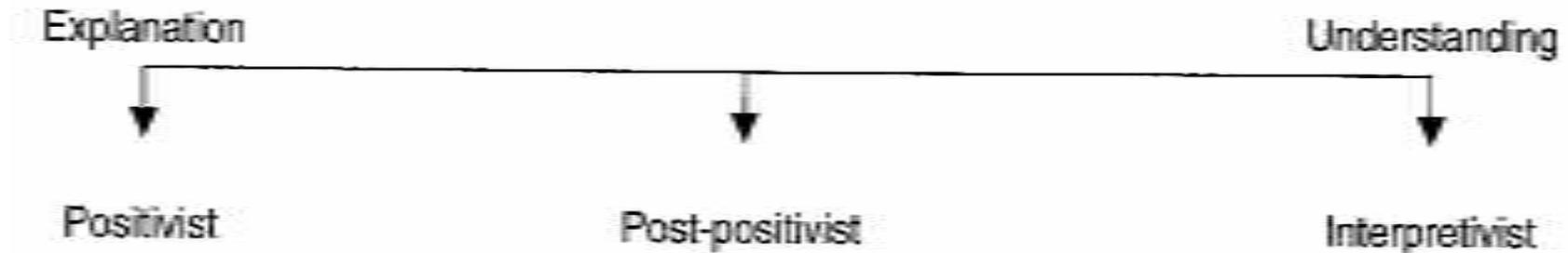


FIGURE 2 THE KEY RESEARCH PARADIGMS

Grix, Jonathan. 2004. 'Introducing the key research paradigms.' In: *The Foundations of research*. Houndmills: Palgrave Macmillan, pp.76-99



Example of positivism

Table 3 ECONOMICS: NEOCLASSICAL ECONOMICS

Key assumptions:

- Generally focuses on market mechanisms and the allocation of resources made through markets
- Independently minded individuals are free to choose what they want and what action to take, decisions which can be rationalised in terms of aims and means (see Boland 2001: 567)
- State intervention ought to be kept to a minimum or research focuses on the correct level of state intervention
- Positive economics can be 'objective' like any of the physical sciences (Friedman 1953: 4).

Key themes:

- Highlights the role of the 'market' as the key mechanism to allocate resources
- Focused on limiting state intervention in the process of market allocation
- Sees the control of inflation as paramount to the functioning of the market economy

Key concepts:

- Predictive hypotheses
- The market
- Supply and demand; game theory
- Resource allocation and equilibrium

Limitations:

- The neoclassical approach tends to overemphasise the role of agents and play down the role of context
- In the search for scientific rigour, there is a tendency to explain human society using mathematical models

Key advocates and seminal works:

- P. A. Samuelson, *Foundations of Economic Analysis* (1947)
- Alfred Marshall, *Principles of Economics* (1890)
- Milton Friedman, *Essays in Positive Economics* (1953)



Differences between positivism and interpretivism

Assumptions

Positivism

Interpretivism

Nature of reality

Objective, tangible, single

Socially constructed, multiple

Goal of research

Explanation, strong prediction

Understanding, weak prediction

Focus of interest

What is general, average and representative

What is specific, unique, and deviant

Knowledge generated

Laws, Absolute (time, context, and value free)

Meanings, Relative (time, context, culture, value bound)

Subject/Researcher relationship

Rigid separation

Interactive, cooperative, participative

Desired information

How many people think and do a specific thing, or have a specific problem

What some people think and do, what kind of problems they are confronted with, and how they deal with them

Verstehen (*German pronunciation: [fɛɐ̯ˈʃtɛːən], literally: "to understand"*) in the context of German philosophy and social sciences in general, has been used since the late 19th century – in English as in German – with the particular sense of the "interpretive or participatory" examination of social phenomena.[1] The term is closely associated with the work of the German sociologist, Max Weber, whose antipositivism established an alternative to prior sociological positivism and economic determinism, rooted in the analysis of social action.[2] In anthropology, Verstehen has come to mean a systematic interpretive process in which an outside observer of a culture attempts to relate to it and understand others.

Verstehen is now seen as a concept and a method central to a rejection of positivistic social science (although Weber appeared to think that the two could be united).

Verstehen refers to understanding the meaning of action from the actor's point of view. It is entering into the shoes of the other, and adopting this research stance requires treating the actor as a subject, rather than an object of your observations. It also implies that unlike objects in the natural world human actors are not simply the product of the pulls and pushes of external forces. Individuals are seen to create the world by organizing their own understanding of it and giving it meaning. To do research on actors without taking into account the meanings they attribute to their actions or environment is to treat them like objects.

<https://en.wikipedia.org/wiki/Verstehen>



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Key research paradigms-2

Table 2 KEY DISCIPLINARY PERSPECTIVES (ALIGNED ACCORDING TO RESEARCH PARADIGM POSITIONS)

Discipline	Positivism	Critical realism	Interpretivism
Economics	Neoclassical economics ('positivist economics')	Marxist economics	Interpretivist economics
Sociology	Functionalism	Critical realist	Symbolic interactionism
History	Empiricist	Critical realist	Life history
Politics	Rational choice theory (but also behaviouralism, rational choice institutionalism)	Critical realist	Sociological institutionalism
International relations	Realism, neorealism and neoliberalism		Reflectivist theories

← Social constructivism →



Theories of causation

According to Harré there are two:

*“In the **generative** theory the cause is supposed to have the power to generate the effect and is connected to it. In the **successionist** theory a cause is just what usually comes before an event or state, and which comes to be called its cause because we acquire a psychological propensity to expect that kind of effect after the cause.”*

Harré, R. 1985. *The philosophies of science*. Oxford University Press, Oxford; New York, 2nd ed., p.116

To add:

a **configurational** theory of causation for ‘set-theoretic combinatorial explanation’ (*as in Rihoux and Ragin’s QCA*)

→ Example: a glowing light bulb



Positivist ontology

- David Hume: 'constant conjunctions'
<http://www.ucl.ac.uk/~uctytho/dfwCauseHume.htm>
- Successionist and configurational causation
- Events/outcomes + (dependent and independent) variables

Paper by Pranay Ranjan

Which institutional factors explain successful collective action for agricultural drainage in Ohio, USA?

Dependent variable: collective action

V1: Group size

V2: Capability to choose to enter or exit from a group

V3: Heterogeneity in benefits and costs

V4: Security of contributions



WHAT AFFECTS ORGANIZATION AND COLLECTIVE ACTION FOR MANAGING
RESOURCES?
EVIDENCE FROM CANAL IRRIGATION SYSTEMS IN INDIA

Ruth Meinzen-Dick¹, K. V. Raju,² and Ashok Gulati³

Paper presented at 8th Biennial Meeting of the
International Association for the Study of Common Property,
Bloomington, Indiana, May 31-June 4, 2000

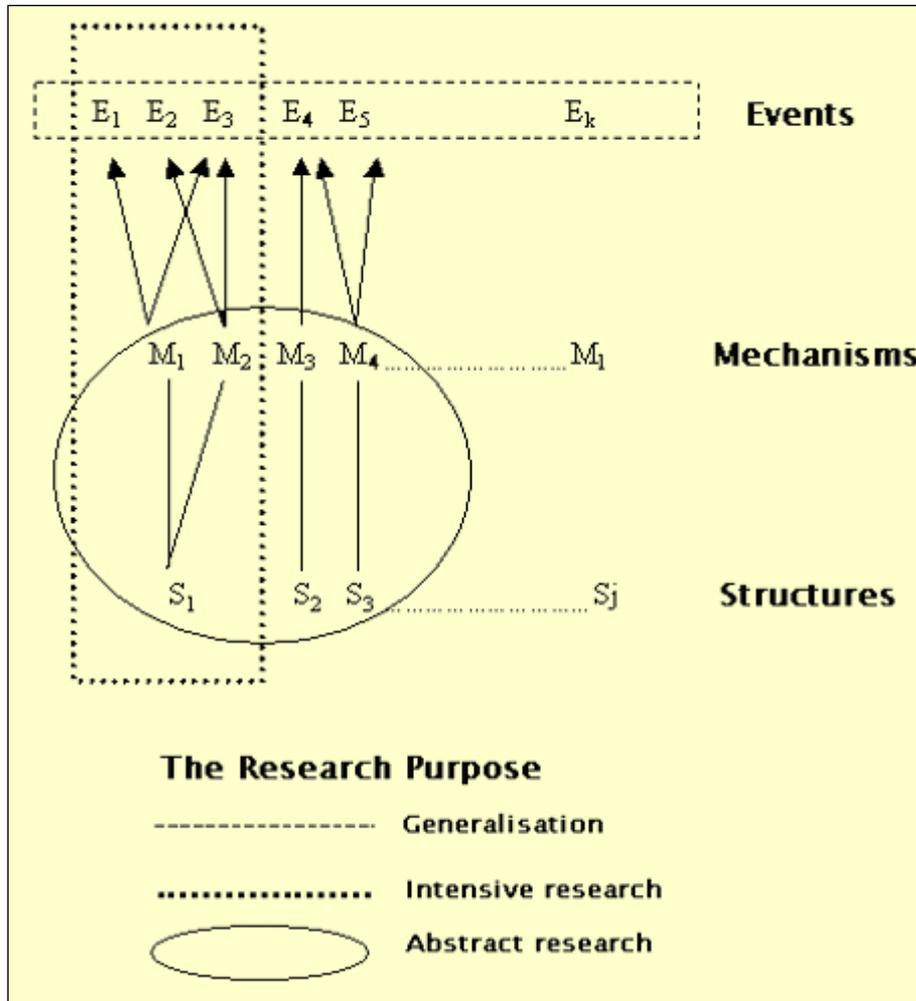
ABSTRACT

Policies of devolving management of resources from the state to user groups are premised upon the assumption that users will organize and take on the necessary management tasks. While experience has shown that in many places users do so and are very capable, expansion of comanagement programs beyond initial pilot sites often shows that this does not happen everywhere. Yet much is at stake in this, with more widespread adoption of irrigation management transfers and other forms of community-based resource management. It is therefore important to move beyond isolated case studies to comparative analysis of the conditions for collective action.

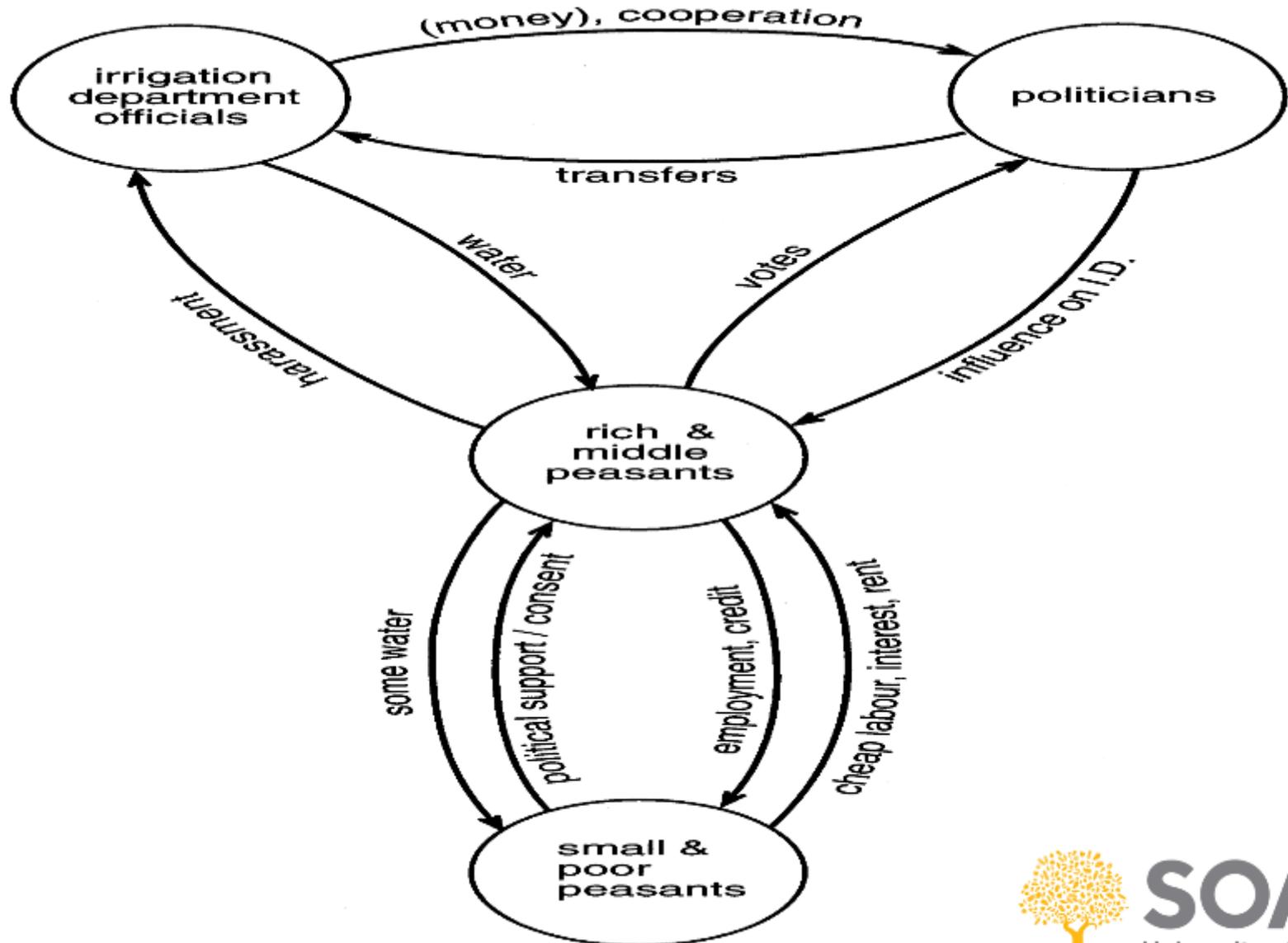
This paper identifies factors affecting organization of water users' associations, and collective action by farmers in major canal irrigation systems in India, based on quantitative and qualitative analysis of a stratified sample of 48 minors in four irrigation systems (two each in Rajasthan and Kamataka). Using key variables suggested by the theoretical and case study literature, the study first examines the conditions under which farmers are likely to form formal or informal associations at the level of the minor (serving several watercourses, and one or more villages). Results indicate that organizations are more likely to be formed in larger commands, closer to market towns, and in sites with religious centers and potential leadership from college graduates and influential persons, but head/tail location does not have a major effect. We then examine factors affecting two different forms of collective action related to irrigation systems: collective representation and maintenance of the minors. Lobbying activities are not more likely where there are organizations, but organizations do increase the likelihood of collective maintenance work.

Such studies can assist policymakers by identifying whether there is likely to be a rapid response to management transfer, or if more effort (such as community organizers) is required. For program implementers, this type of analysis can help identify the most "fertile ground" for starting programs to achieve impact, and to expect to devote extra attention in other areas, if devolution programs are expected to achieve high levels of farmer involvement in resource management.

Critical realist ontology: *Mechanisms as generative causes*



Structure 1: Political economy of irrigation



**What are the types of inference
(analytical reasoning) associated with
these different ontologies and
theories of causation?**

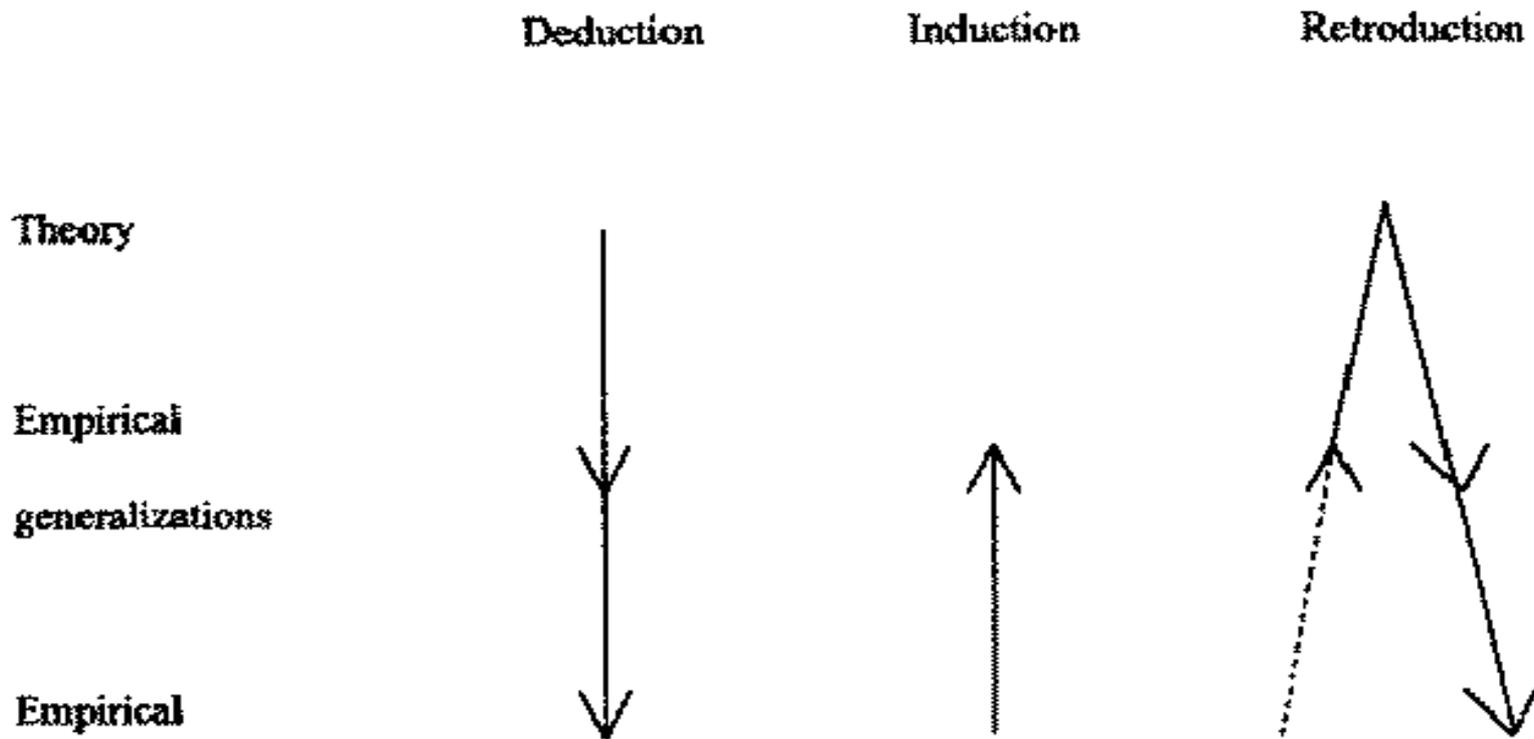


Figure 1. Deduction, induction and retroduction. (Based on Alvesson and Sköldbberg 1994.)

Source: Saether, 1998:246

Table 4.1 The logic of four research strategies

	Inductive	Deductive	Retroductive	Abductive
Aim:	To establish descriptions of characteristics and patterns	To test theories, to eliminate false ones and corroborate the survivor	To discover underlying mechanisms to explain observed regularities	To describe and understand social life in terms of social actors' meanings and motives
Ontology:	Cautious, depth or subtle realist	Cautious or subtle realist	Depth or subtle realist	Idealist or subtle realist
Epistemology:	Conventionalism	Falsificationism Conventionalism	Neo-realism	Constructionism
Start:	Collect data on characteristics and/or patterns Produce descriptions	Identify a regularity that needs to be explained Construct a theory and deduce hypotheses	Document and model a regularity Describe the context and possible mechanisms	Discover everyday lay concepts, meanings and motives Produce a technical account from lay accounts
Finish:	Relate these to the research questions	Test hypotheses by matching them with data explanation in that context	Establish which mechanism(s) provide(s) the best	Develop a theory and elaborate it iteratively



Yeung, H. W. 1997. "Critical realism and realist research in human geography: a method or a philosophy in search of a method?" *Progress in Human Geography*, (21:1), pp.51-74.

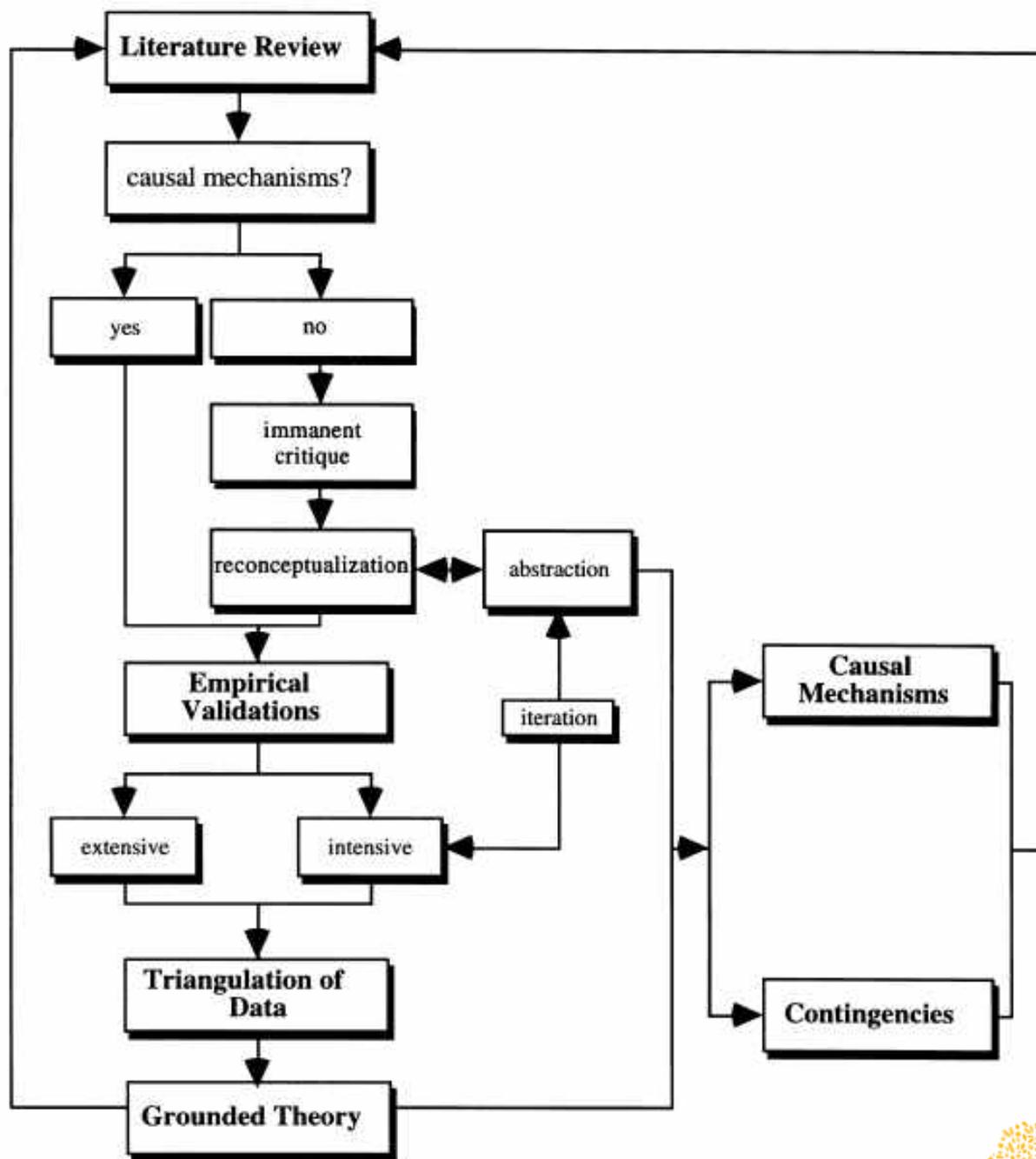


Figure 1 Realist research in practice

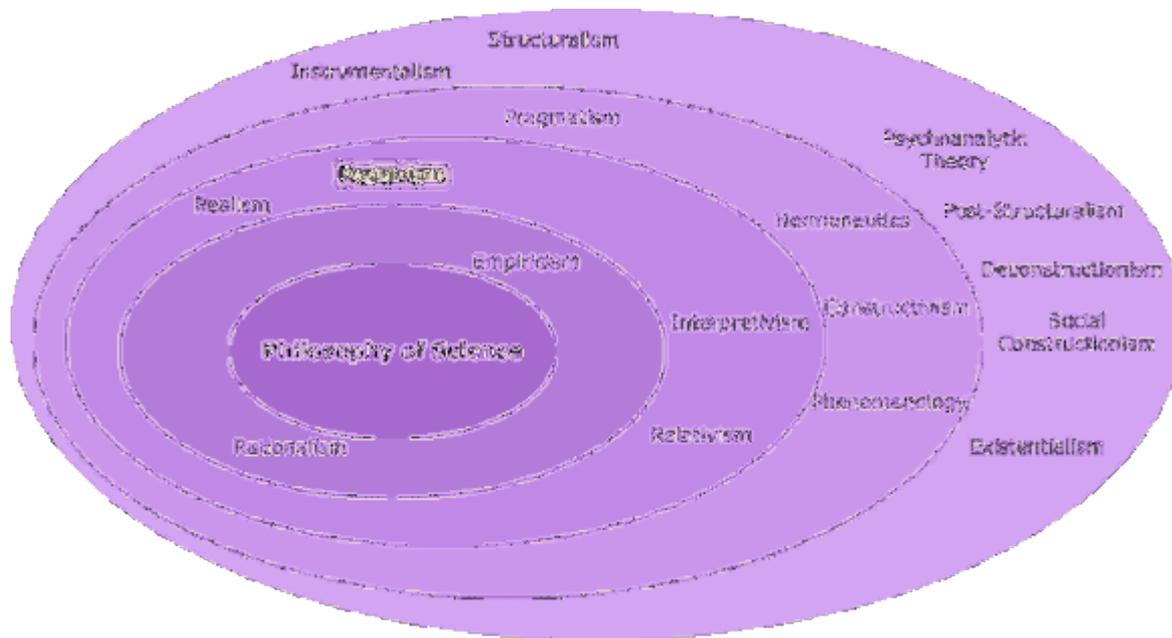


End of part 1

Part 2:

Comparison by paradigm

https://koppa.iyu.fi/avoimet/hum/metelmapolkuja/en/methodmap/philosophy-of-science/images/circle_phil_pos.gif



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Comparison in interpretivism

The Wet and the Dry: Traditional Irrigation in Bali and Morocco

Clifford Geertz¹

Received April 14, 1971; revised September 10, 1971

The comparative perspective is of central importance to effective analysis in human ecology. The present paper compares “traditional” irrigation systems in two quite disparate settings: east central Morocco and southeastern Bali. Bali, which has a tropical climate and a plentiful water supply, displays a highly collective approach to the organization of irrigation facilities. Morocco, which is essentially an arid country, displays, on the contrary, a much more individual, property-based approach to water regulation. The internal organization of these two regimes is described and their connection with more general cultural and ecological factors is traced, in an attempt to demonstrate that patterns of adaptation are susceptible to the same pattern of analysis as other aspects of social and cultural life. The contrast between the strongly group-oriented Balinese approach to water control and distribution and the highly individualistic Moroccan one is said to extend in an overall way to the two societies as a whole.

Geertz, C. (1972). The wet and the dry: Traditional irrigation in Bali and Morocco. *Human Ecology*, 1(1), 23-39.



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Comparison in positivism-1

Water-Related Intrastate Conflict and Cooperation (WARICC): A New Event Dataset

Thomas Bernauer, Tobias Böhmelt, Halvard Buhaug, Nils Petter Gleditsch, Theresa Tribaldos, Eivind Berg Weibust, and Gerdis Wischnath

Abstract

Water scarcity is widely regarded as a key factor linking climate variability and change with conflict. However, existing research on the water-conflict nexus is hampered by poor data that inhibits drawing firm conclusions on the role of water in shaping societal stability and security. This article reports on the construction of a new dataset on sub-national and geo-referenced events over domestic water-related cooperation and conflict for 35 countries in the Mediterranean, the Middle East, and the Sahel for 1997–2009. The main value of this dataset is in its precision. Its key component, the Water Events Scale (WES), records the exact time, location, and intensity of water-related conflictive and cooperative events, as well as the actors involved. A few descriptive statistics and illustrations serve to demonstrate the usefulness of the new dataset for quantitative analyses of intrastate conflict and cooperation over water resources.

Bernauer, T., Böhmelt, T., Buhaug, H., Gleditsch, N. P., Tribaldos, T., Weibust, E. B., & Wischnath, G. (2012). Water-related intrastate conflict and cooperation (WARICC): A new event dataset. *International Interactions*, 38(4), 529-545.

Comparison in positivism-2

JOURNAL OF ANTHROPOLOGICAL RESEARCH

(Formerly Southwestern Journal of Anthropology)

VOLUME 44 • NUMBER 4 • WINTER • 1988



SIZE AND THE STRUCTURE OF AUTHORITY IN CANAL IRRIGATION SYSTEMS

Robert C. Hunt

Department of Anthropology, Brandeis University, Waltham, MA 02254

It is widely assumed that all irrigation systems must have constituted authority and that all large irrigation systems must have centralized authority. The small literature which tests these beliefs is reviewed, and the results of a systematic comparative study are presented. The concepts of "irrigation system," "irrigation system size," and "irrigation system structure of authority" are defined. Variables which measure these concepts are constructed, and measurements from a purposive sample are displayed. A handful of small irrigation systems without authority structures was found. An inspection of the data reveals no relationship between size and the structure of authority in systems ranging from 700 to 458,000 ha. Furthermore, an irrigation system of 458,000 ha is managed by farmers. Conclusions: (1) irrigation systems without constituted authority exist and (2) large systems do not require central authority.

Hunt, R. C. (1988). Size and the structure of authority in canal irrigation systems. *Journal of Anthropological Research* 44(4):335-355.



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Comparison in positivism-3?

CCM = configurational comparative methods

“Simply said, a configuration is a specific combination of factors (or stimuli, causal variables, ingredients, determinants etc. – we call these *conditions* in CCM terminology) that produces a given *outcome* of interest” (Rihoux and Ragin, 2009:xix).

“[w]hich conditions (or combinations thereof) are ‘necessary’ or ‘sufficient’ (or possibly both necessary *and* sufficient) to produce the outcome?” (ibid.:xix)

Rihoux, B. and C.C. Ragin (eds.). 2009. *Configurational comparative methods; Qualitative Comparative Analysis (QCA) and related techniques*. Applied Social Research Methods Series, vol.51. Thousand Oaks: Sage.

Goes beyond positivism:

- acknowledges empirical diversity of outcomes, and tries to grasp that by qualifying the ‘law’ type of explanation by developing ‘set-theoretic combinatorial’ explanation

Stays within positivism:

- has a ‘flat ontology’ in which all ‘conditions’ have the same stature
- has no concept of structure and structural diversity; all events/outcomes as regards a particular issue/phenomenon are of the same kind (no apples or pears, only fruit)
- does not account for the ‘why’ of occurrence of certain combinations
- the combinatorial explanation is, in a final analysis, a sophisticated way of looking for ‘constant conjunctions’

Comparison in critical realism

	Mill's Method of Difference	Mill's Method of Agreement
Most-Similar System Research Design	MSSD+MMD (dealing with differences in Similar Cases) Minimize variance of the control variables, maximize variance in the dependent variable	MSSD+MMA (dealing with similarities in Similar Cases) Minimize variance of the control and dependent variables
Most-Different System Research Design	MDSD+MMD (dealing with differences in Different Cases) Maximize variance of the control and dependent variables	MSSD+MMA (dealing with similarities in Different Cases) Maximize variance of the control, minimize variance in the dependent variable

Source: Levi-Faur (2005)

Note: 'Variance' is to be read here as 'variation' or 'diversity in the values of', not as a technical statistical term.

Figure 1 in Mollinga and Gondhalekar (2014)

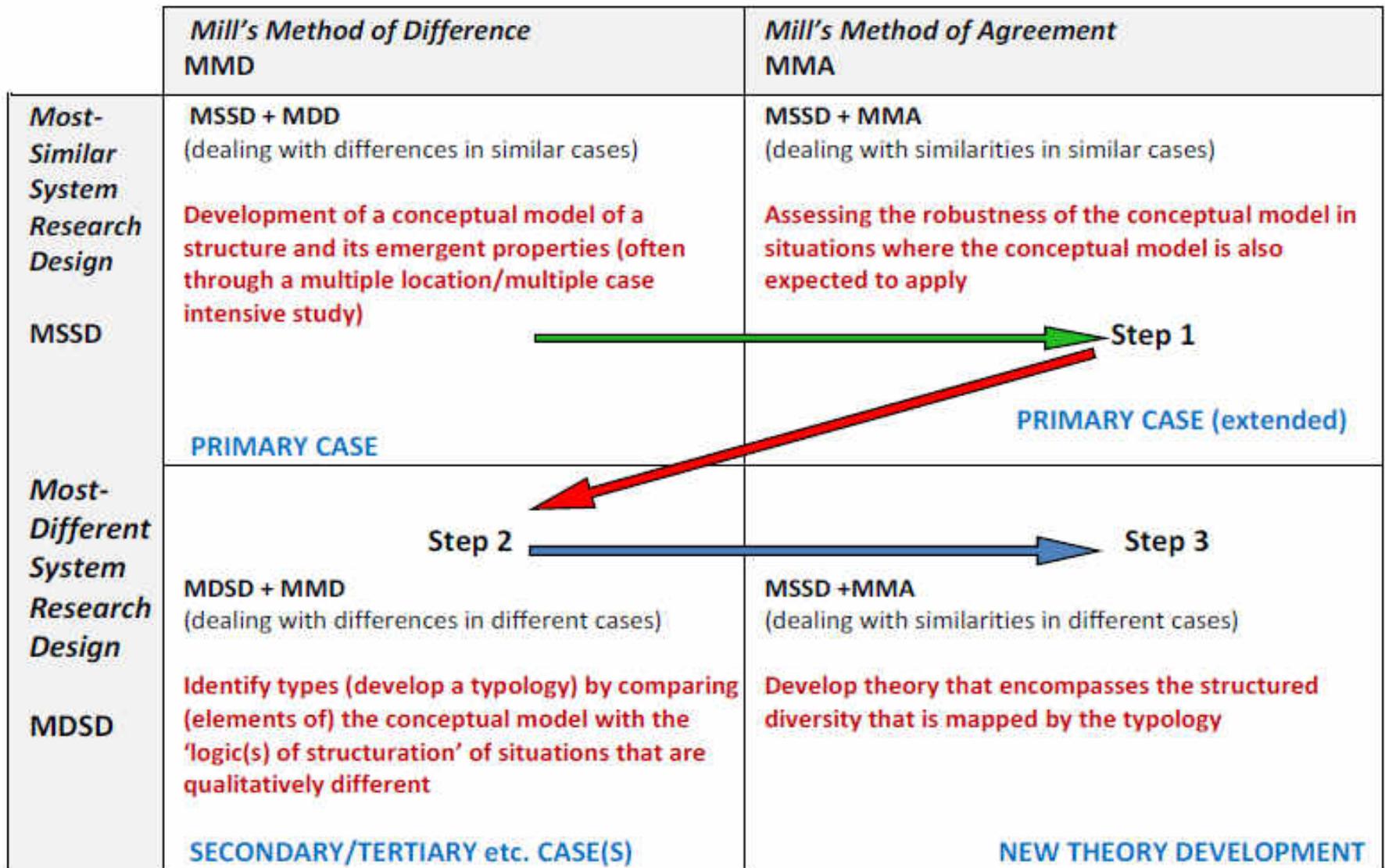
Comparison in critical realism

internal validity ----->

external validity <-----

	<i>Mill's Method of Difference</i> MMD	<i>Mill's Method of Agreement</i> MMA
Most-Similar System Research Design	MSSD + MDD (dealing with differences in similar cases)	MSSD + MMA (dealing with similarities in similar cases)
MSSD	<p><u>Unequal water distribution</u>: three secondary canals from one South Indian system, one water-abundant (head), two water-scarce (tail), exhibiting different spatial patterns of unequal water distribution.</p> <p><u>Economic reform</u>: Anglo Saxon countries, opting for either liberalisation or nationalisation, with assumedly different outcomes.</p> <p>PRIMARY CASE</p>	<p><u>Unequal water distribution</u>: additional canals, across degrees of scarcity, from the same and similar South Indian systems, exhibiting similar variation in the spatial pattern of unequal water distribution.</p> <p><u>Economic reform</u>: Anglo Saxon countries, all liberalising, with assumedly similar outcomes.</p> <p>PRIMARY CASE - extended</p>
Most-Different System Research Design	MDSD + MMD (dealing with differences in different cases)	MSSD + MMA (dealing with similarities in different cases)
MDSD	<p><u>Unequal water distribution</u>:</p> <ol style="list-style-type: none"> secondary canals from a South Indian, a North Indian system, and a Western Indian system with different water rationing rules, and different attempts at irrigation reform,, with different patterns of inequality/differential access; secondary canals from a South Indian and a Khorezmian (Uzbekistan) system, with different infrastructure designs and different governance regimes, with different patterns of inequality/differential access. <p><u>Economic reform</u>: Anglo-Saxon and continental European countries, with dissimilar educational policies, having assumedly different outcomes.</p> <p>SECONDARY/TERTIARY etc. CASES</p>	<p><u>Unequal water distribution</u>:</p> <ol style="list-style-type: none"> secondary canals from an Indian and a Mexican system, with similar time-share based rationing rules, with similar patterns of inequality/differential access; secondary canals from a water-scarce system (Pakistan) and from a water abundant system (Indonesia, Philippines), with similar irrigation reform programmes implemented, reproducing similar patterns of inequality/differential access. <p><u>Economic reform</u>: Anglo-Saxon and continental European countries, with similar monetary policies, having assumedly similar outcomes.</p> <p>SECONDARY/TERTIARY etc. CASES</p>

Figure 4: Stepwise comparative analysis for theorising structured diversity¹



End of part 2

Group discussion

- Groups of 4-5 participants
- Have a conversation on:
 1. Which paradigm/ontology is informing your own research projects? (15min)
 2. Were you conscious of this or not before this Autumn School? (10 min)
 3. What kind of comparative analysis does your research attempt to do? Specify characteristics? (20 min)
 4. Which **questions** has this conversation led to? (10 min)

These questions will be presented in a plenary discussion

