

Interactive comment on “Endogenous change: on cooperation and water in ancient history” by S. Pande and M. Ertsen

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This comparative analysis of climactic adaptation of two ancient river-based civilizations offers an interesting perspective on policy and scholarly debates about adaptation and resilience to environmental change. As it stands, however, the paper is methodologically weak and lacks clarity of exposition.

The authors argue that cooperation (broadly conceived as economic interconnectivity and integrated water management) between regions within a river basin is significantly determined by the magnitude and the uneven distribution of water scarcity across space. The authors posit a non-linear relationship between cooperation and scarcity. So while basin-wide cooperation is positively related to increasing scarcity

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and spatial unevenness of water scarcity, under conditions of “extreme scarcity” basin-wide cooperation breaks down. The authors conduct a comparative analysis of two ancient river civilizations – the Hohokam in North America and Indus Valley Civilization (IVC) in South Asia. Their theoretical contribution is to demonstrate the limits of rationalist game-theoretical approaches to river cooperation by drawing on endogenous institutional change (EIC) theory and the approach of historical institutionalism.

Van der Zaad and Varady have correctly identified the paper’s major issues. Van der Zaag commented on issues of climactic determinism, inappropriate ascription of causality between climate change and social organization in both case studies, numerous methodological issues with the Hohokam case, and the problems that arise from comparing cases with very different spatial and temporal scales. Varady questioned the match of the theoretical engagement with the case study as well as a lack of balance between social and climactic data in the overall argument. As a political and historical geographer of the modern Indus Basin who is not well acquainted with the literatures and methods deployed by the authors, I focus my suggestions on improving the general analytical clarity and rigor of the argument.

First, the basic social variable under study, “cooperation”, is not clearly defined. It is true the authors attempt a definition on pp. 4832-4833. Cooperation “can be in the form of upstream-downstream trade, sophisticated irrigation network, a centrally planned state or a loosely held state with a common cultural identity”. But this is an overly expansive understanding of cooperation, and it is not quite clear what indicators the researcher should seek out to determine whether cooperation is increasing or decreasing. The vagueness of one of the main concepts of the paper becomes evident in the case studies. In the cases, periods of “cooperation” are identified based solely on unspecific references to the secondary literature. I suggest narrowing the definition of “cooperation” to something more specific – perhaps just “economic interconnectivity”, indicated by the spatial range of trade relations. It is important that the authors present data (even if gathered from secondary sources) to convince us of the validity of their

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interpretation of some time periods as “cooperative”. I understand there may be data limitations that would make operationalization of such a narrow understanding of cooperation frustrating. The way the paper is written now, however, the reader is forced to put an unreasonable amount of faith on the authors’ interpretation of the secondary literature.

Second, as Van der Zaad noted with respect to the authors’ emphasis on quickly alternating wet/dry periods in the Hohokam case, the case studies are discussed and set up in a somewhat arbitrary fashion. Too much of the information provided does not seem to have any bearing on the authors’ argument. While a few sentences to “set the scene” is appropriate in qualitative analysis, too much information is distracting. I suggest the authors clarify the objective of their comparative analysis. What point is being made through the comparative analysis that could not have been made with a single case study?

The objective of any comparative historical analysis must be specified in relation to theory (cf. Skocpol and Somers 1980). Comparisons can A) support claims for the validity of a theory by documenting similar outcomes from very different cases, B) demonstrate the limits of a theory by documenting divergent outcomes in cases with similar conditions, or C) construct a theory by identifying causal factors for a given process, by parsing variances between cases as significant or insignificant in determining outcomes. The paper hovers between type “A” (demonstrating the validity of EIC theory) and type “C” (constructing a climactic theory of cooperative institutions) of comparative analysis. The authors posit the following causal relationship:

climate change -> change in spatial distribution of water scarcity -> change in “autarkic valuations” of regions -> adaptive change in cooperative social-spatial organization

The authors do not present adequate data to argue for this causal relationship using a “C” type of comparative analysis. In order to rigorously argue this casual mechanism, one would have to show through a case study that the hypothesized causal factor (e.g.;

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change in spatial distribution of water scarcity, or “the spatial distribution of autarkic valuations” (p. 4835)) was decisive in determining outcomes. But it should also be shown that lack of the hypothesized causal factor is decisive in determining a different historical trajectory – otherwise it is not analytically possible to isolate and identify a specific causal force. For example, if I want to argue that racially homogenous societies have higher rates of public service provisioning, I would have to produce at minimum one case where a racially homogenous society has a high rate of public provision, as well as at least one case where a racially heterogeneous society has a low rate of public provision. The more these two cases are similar in every respect other than racial homogeneity, the stronger the argument.

I suggest one of two courses of action to clarify and strengthen the comparative analysis in the paper. The first is to abandon the comparative analysis altogether, and to focus on an in-depth case study of the IVC that challenges or qualifies some aspect of EIC theory. In order to do this, much more information will be needed on the actual institutions of the IVC. The IVC case engages the EIC theory in a much more interesting way than the Hohokam case, especially with respect to changes in autarkic valuation in the downstream/upstream direction.

If the authors are unwilling to do abandon a comparative analysis, an alternate course of action is to reorient the comparison so it operates more purely in the “A” type of comparison: theory-validation. To do this, the authors should highlight how similar patterns of institutional adaptation hold in these two cases, despite all the many differences between them. By clarifying the objective of the comparison, the authors should also be better able to adjudicate what information should be included in the description of the cases.

This paper tackles an important topic with a unique perspective. As such I found this paper stimulating and I am sure others will too. I am especially grateful to the authors for introducing me to the literature on upstream/downstream institutional conflict and cooperation. There is a need, however, for the authors to clarify and tighten their

analysis. This is especially true with regard to their use of comparative analysis. I hope the comments I have provided help in this task.

Technical Comments:

The Indus section uses the notation of “before present”, while the Hohokam section uses the traditional BC/AD. Date notation should be standardized across the paper.

p. 4831; Citation needed for sentence ending on line 4

p. 4833; Possible misspelling of Vayda on line 15

p. 4842; line 20; “may be re-known for” should be “is renowned for”

p.4844; line 21-23; the insertion of the website name makes for awkward reading – I suggest making a traditional citation to the website at this point and putting the complete link in the references.

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