Hydrol. Earth Syst. Sci. Discuss., 11, C355–C360, 2014
www.hydrol-earth-syst-sci-discuss.net/11/C355/2014/

Hydrology and Earth System Sciences
Discussions

Interactive comment on "Hydrological, ecological, land use, economic, and sociocultural evidence for resilience of traditional irrigation communities in New Mexico, USA" *by* A. Fernald et al.

M. Ertsen (Referee)

m.w.ertsen@tudelft.nl

Received and published: 10 March 2014

General comments

The paper deals with an important issue in sociohydrology, which is linking the "socio" and the "hydrology", through a detailed case study in New Mexico. The title already reflects the ambition of this paper, but it also suggests the main pitfall at the same time. I agree that linking the diverse issues mentioned in the title are key to really develop an interdisciplinary approach based on sociohydrological ideas, and it is obvious that this is rather challenging. However, the paper itself reads like a summing

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

up of evidence from those different fields, with many promises of connections between them, but without connecting them too much in this paper. In itself, I have no problem with research-agenda setting papers, especially for new fields, and especially not for the type of research suggested in the paper. However, I have my doubts whether this paper is the one to go for.

First, the different paragraphs seem to be collected from the different authors. Style and language differ, but what is more problematic is that each new issue starts with a (new) introduction of the case under study, the acequia system. New (interesting) information on the case study is spread out in the text, and would need to be synthesized earlier. The same goes for the data sets used and discussed, and the specific questions on those data. This paper may propose interdisciplinarity, but it reads like a multidisciplinary effort as it is now.

Second, although it is clear that working on the socio-side of sociohydrology does require detailed understanding of those issues (labour, production strategies, organization), one would also expect that there is considerable attention for hydrology. The paper mentions hydrological issues a few times, but most of the hydrology seems to be based on the 2010 publication of the main author. The redistributing effects of irrigation on the natural hydrology (problematic as that term may be) are important indeed, but this new paper does not provide anything new on it, it seems to me.

Third, once connections with hydrology are made, the paper is full of “if” and “could”. Anytime a connection between hydrology and society is assumed or suggested, one of those two words pop up. Indeed, this would fit in an agenda-setting paper, but if that agenda is not detailed too much, I would think it does not really work. The modelling approach briefly mentioned in the final pages, could be a description for many systems; what makes it specific for this one? How does it build on the one already discussed in the 2012 Sustainability paper? How can the different data sets be related, what time steps are used, how to use both quantitative and qualitative data?

HESSD

11, C355–C360, 2014

Fourth, the suggestion is made that the acequia community is able to adapt pretty nicely. What I do miss, however, is more detail on the relevant socio-economic relations within that same community. I do not know that many social groups in which everyone wins in a process of change. I would be surprised this community would be the exception to that experience. But if so, more discussion would be needed.

To conclude, I would love to see a study along the lines suggested in this paper, as I think it is a key approach in sociohydrology and would nicely show how complex the issues and relations are we would need to take up if we want to do serious sociohydrology on appropriate temporal and spatial scales. I am just not sure this paper is sufficiently specific and can build on sufficient results for taking up that question.

Other comments

Abstract: to what extent can climate changes, “specific practices” and “community cohesion” be analysed on the same time scale?

Already on the first page, words like “benefits” and “threaten” show where the sympathy of the authors is. That may be a little distracting?

Page 1824, line 25: change is not just an issue for traditional irrigation systems.

Page 1825, line 9/10: this is a strong statement, but not really surprising anymore, given the thematic issue... it is not about the relevance of the connection, but about the how.

Page 1825, last paragraph of intro: the language is rather optimistic, and a little general.

Page 1825, line 23: how does one “increase water distribution”? One can distribute more water, but is that meant here?

Page 1825, line 26: biological diversity suddenly drops in.

Page 1826, first paragraph of 2.1: this may go to an earlier part of the paper?

HESSD

11, C355–C360, 2014

Page 1826 and figure 2: can the claims made be seen from one image, without comparing to another setting? I would need more explanation.

Page 1827, last paragraph of 2.1: again a very general paragraph, what about the case?

Page 1828, lines 19-21: only one example of the suggested results, but not based on any results, at least not explained.

Paragraph 2.3: the text does not really defend the species richness as a suitable proxy for the type of issues discussed in the paper, nor is the scenario selection explained. Are combinations of economic and environmental scenarios not taken into account?

Page 1830, line 24: why is cattle reduction a sign of decreased stability? Why not see this as an indication of change, to which communities adapt?

Paragraph 3.2: apart from some very general remarks, the direct link between land use and such to hydrology is completely absent in this part. I agree that the information presented would be useful, as it is hard to imagine no relation to hydrology, but how that link works in this case remains hidden.

Page 1834, line 25: the concept of "storages" for capital assets may work on community level – even though I am not sure the concept of storage would hold in theoretical terms – but the issue of political-economic power relations to contribute to or extract from the "reservoirs" would need to be introduced as well. "The community" does not exist.

Page 1836, line 25, to page 1837, line 12: linking economic data to stream flows seems to be at the heart of sociohydrology, and could be a topic this paper discusses much more. Where is the streamflow measured? Is that taking into account the redistribution effects? If so, how does the human-natural system allow for using those data, as the two data sets are not independent anymore? Can flow be used as proxy for economic success? The text seems to suggest that economic success is independent from the water: what does this mean for the connection suggested in the paper between water

HESSD

11, C355–C360, 2014

and acequia success? Looking at image 15 suggests that the links may be different for the two different communities shown. What is the cause-effect direction? Does water drive the economy, or the other way around? This part of the text would be a possible focus for a deeper analysis. Although lines 4-7 on page 1837 suggest that not much is known yet about it?

Page 1837 and further: the start of paragraph 4.1 is another example of a new introduction, with information that might have been used for a general introduction.

Page 1837, line 14: the concept of "traditional local knowledge" is highly problematic. I would not suggest that the authors show all details about the debate on such knowledge, but using the term here in such standard way does not do credit to the richness of issues and data sets this paper proposes to be of relevance. The paragraph is of rather general nature as well (eg lines 23-26 on page 1838, and lines11 to 22 on page 1839).

Paragraph 4.2: the survey results suggest that community members are concerned about participation, irrigation and infrastructure. What does this say about community resilience? How do community members use that concern? It at least shows that human agency is needed, but the paper does not take up that issue.

Page 1841, lines 7-9: "adaptability is self-evident" etcetera: this short sentence hides a larger problem, at least to me. Those acequia communities we find today are the winners per definition, they are the ones that survived. That may yield interesting data on what they did, but one would need some evidence of the "loosing groups" to be able to analyse success factors properly (?).

On the modelling approach, basically paragraph 5: how does one avoid that the proposed explanations of acequia resilience are not already included in the system dynamics? In other words, how to avoid that the modelling results are self-evident?

Page 1846, lines 14 to 16: are acequias resilient because they are in line with na-

HESSD

11, C355–C360, 2014

ture (first sentence) or because they adapted/manipulated nature to be in line (second sentence)? What does this debate tell us about the human and the natural?

Figure 1: why is the top-category “Growth”?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 1821, 2014.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper