

I enjoy reading this manuscript. A landscape at water catchment is a holistic system in which nature and culture co-evolve. This begs the question: to what degree did the cultural construct influence the water catchment hydrology, and vice versa? However, the cultural construct (societal values) has not been adequately studied in existing hydrological models, except those studies mentioned in the manuscript. Therefore, this review is important by bringing this knowledge gap to the hydrology community (HESS). I would like to recommend this manuscript to be accepted, subject to responses to the comments as follows:

Culture is a notoriously slippery concept, has no agreed-upon definition across social science fields. There are more 170 definitions of 'culture' in the literature. Culture is often perceived to be opposed to nature, becomes synonymous with civilization. Culture is defined operationally as a set of common values, norms and attitudes shared by the majority of a region population, which is arguably the most important mediating mechanism that links us not only with other human beings, but also with the rest of nature of which we are part and within which we live (Keesing 1974). To talk about cultural change is one thing. To measure them precisely is quite another. The study of cultural evolution has traditionally been the purview of anthropology and sociology. Past attempts to explain cultural evolution used the 'thick description' rather than explanatory approach which would not distinguish between explanandum and explanans. It is known that they have poor predictability. This is why culture (societal value) has not been nicely integrated in the hydrological models. However, these disciplinary studies provide the fundamental basis for any attempts of quantifying the societal value. So, I would like to this manuscript to include a more thorough review of measurement and explanation of societal value in these disciplines.

VBN is one of many theoretical frameworks in sociology which explains the impact of the value-belief-norm on individual or societal decision-making and practice. However, I do not think it is practical in the context of socio-hydrology, in particular when we aim to simulate and reconstruct the historical societal value. Given the limited documents (data) sources, how can you obtain data on value, belief and norms? You make detailed difference between value, belief and norms in Figure 2, but you did not make clear difference between these three concepts in text. So I suggest to combine 3.1 and 3.2 and use a general concept to explain the feedbacks between value and behaviour. You did not give a full explanation of Figure 2, and you did not use main info in Figure 2 in your manuscript either, so I would suggest you delete it.

There is a bit repetition between Section 1, Section 2 and Section 4.

Besides our findings in Australia (Wei et al., 2017) which you cited and used the data from, we had published similar findings in China (Xiong et al., 2016). I list it here for your information.

Yonglan Xiong, Zhiqiang Zhang, and Yongping Wei. 2016. Evolution of China's water issue framed in Chinese mainstream media. *AMBIO* 45 (2): 241-251 DOI: 10.1007/s13280-015-0716-y.

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