Comments on: "Climate change vs. socio-economic development: Understanding the future South-Asian water gap" (VERSION2: JULY 2018)

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I have gone through the revised paper carefully.

1. The authors have clarified the doubts raised about the modelling. No problem there.

2. Regarding blue water gap (BWG) versus blue water scarcity (BWS): the authors have revised the manuscript to emphasize that they are really estimating the 'blue water gap' (with the assumption that there is no adaptive response to water shortages). But the text is now rather inconsistent—switching between the two terms. There is no real discussion (either in the para starting on p3 line23, or later in the methods section) of the implications of using BWG as a proxy for BWS—so no real recognition of the socially constructed nature of this outcome variable. The authors say that Figure 9 shows how BWG is especially significant in urban areas. But this actually illustrates the risk in using BWG as a proxy for scarcity: because in urban areas, whenever there is a 'gap', it will get addressed through more imports (because the quantities required are still relatively small and drinking water is a political priority). So in fact it is not much of an issue in urban areas!

3. The authors have taken pains to include the issue of Environmental Flows as an outcome variable and added a whole analysis there. This is laudable and has made the article potentially more interesting. Their definition of EFR for low flow season as being 60% of the mean monthly flow during that season is, however, quite stringent: this makes even the Brahmaputra as 'not meeting EFR needs even in current/reference scenario. This seems rather extreme and needs to be checked.

4. The biggest problem I continue have with the paper is "what does the paper contribute to our understanding?". The authors' response has been "we are doing more novel modelling with finer spatial scale, better modelling of many of the processes involved, etc. than anyone else has done". So here we are facing a fundamental difference in our understanding of what constitutes 'contribution' to scientific knowledge: I believe that a 'better' model is one which gives either more precise predictions of changes in some outcome variable(s) or counter-intuitive results on the 'sign' of change in the outcome variable. In other words, 'better' has to be judged not by modelling sophistication per se, but whether the sophistication generates results that are different (and robustly so) from what we already know.

When I look at their results carefully, the uncertainties are even higher and the non-results even sharper:

In 3 out of 4 scenarios, the blue-water gap actually DECREASES across all 3 basins and all seasons. But these decrease estimates have a high standard deviation, making most of them no different from zero.

In the 4th scenario (greatest climate change & highest economic/demographic growth rate) we see that socio-economic growth outstrips effects of CC and there is an INCREASE in the blue-water gap. HOWEVER, this increase is not statistically significant: it is 14% with a standard deviation of 43 (% points I presume). Which means it is not statistically different from 0 (the NO CHANGE scenario).

So after all this effort, they are not able to tell us even what the SIGN on the net change is going to be, let alone give us a robust estimate of the magnitude of net change.

So why is this whole (very technically competent) exercise useful?