Infrastructure sufficiency in meeting water demand under climate-induced socio-hydrological transition in the urbanizing Capibaribe River Basin – Brazil

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Review of the revised version

I have read the revised manuscript as well as the authors responses with interest. I note the following:

The authors have seriously attempted to address all issues raised by the reviewers.

The framing of the paper in terms of the theme of the special issue has significantly improved, and is now acceptable. But still I have problems to precisely pin down what this paper actually contributes, and what the "socio-hydrological transition" in this particular basin is, how it unfolds, and whether or not, and if so how, it has been has been included in the modelling. As far as I can tell, it has not been included in the model, but some remarks on it are being made in the discussion and conclusion sections. I also have my doubts whether the following concluding statement is sustained by the results of this paper: :".. we can conclude that the combined use of mathematical models is able to indicate the effectiveness of measures for socio-hydrological transition management"(p.16 lines7-9).

The authors have also made changes to the manuscript that were not required by the reviewers. However, these changes have not been declared and justified in the authors' response, which I think the authors should have done. For example, modelling results have significantly changed compared to the original version. Especially noteworthy is that whereas in the original version network water supply was 6.59 m3/s in the baseline period as well as in the period 2010-2040, it decreased to 5.84 m3/s in 2040-2070 and to 4.83 m3/s in 2070-2100, in the new version the present flow is given as 7.59 m3/s, which decreases to 6.63 m3/s in 2010-2040, then increases to 7.67 m3/s (2040-2070) and finally decreases to 6.99 m3/s in 2070-2100, which is still 45% higher than in the original version. It remains unclear why there are these significant differences.

There are a few details that in my view need to be clarified before this paper can be considered for publication in HESS. These include:

(1) The high volume errors for Toritama and Vitoria gauges in the validation of the model (-31 and +45%) are not adequately explained. The authors therefore do not give a satisfactory rebuttal to the

comment of Reviewer #1 (“The model performance during the calibration period is not critically discussed in section 4. In fact Table 3 should lead to some serious discussion – why does the model perform so badly in the lower part of the basin? The authors cannot skirt that question!”). And yet, in the concluding section the authors write: “The MODHAC hydrological model accurately represented the streamflow” (line s 15-16, p.14). What is the basis for this qualification?

(2) Some statements made are in my view implicitly normative or are assumptions rather than facts. These should in my view either be reformulated or qualified:

- p.2 line 1-2 “... which together reduce future water demand by 23.0%.”
- p.10 lines 20-21: “Both increase by 2040 and remain constant until 2100...”
- p.14 line 29: “Brazil has a history of inappropriate policies...”

(3) There are still some editorial flaws, or sentences that are difficult to understand. I noted the following:

- p.4 line 15: Savenije et al., 2014
- p.7 line 14: “made”: omit or replace by “done”
- p.10 line 24: hypothesis -> hypotheses
- p.10 line 27 & 29: return -> return flow
- p.11 line 11: “It was used..”
- p.11 line 21: stream guage -> stream gauge
- p.12 lines 3-6: data are literally repeated on p.13 lines 7-8.
- p.13 lines 4-6: edit sentence
- p.13 lines 28-29: edit sentence; unclear what this sentence wishes to say.
- p.14 lines 23-28: “Supply-side strategies ... (Cheng and Hu, 2012).” These sentences expounding on demand and supply management do not belong in the conclusions
- p.15 line 14: “...sustainable economic growth..” The word sustainable is not appropriate here. Do you mean “sustained”? Otherwise consider omitting the word.
- p.15 line 21: “lower water surface” -> “smaller water surface”