

Interactive comment on “How downstream sub-basins depend on upstream inflows to avoid scarcity: typology and global analysis of transboundary rivers” by Hafsa Ahmed Munia et al.

P. van der Zaag (Editor)

p.vanderzaag@un-ihe.org

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Editor comment on “How downstream sub-basins depend on upstream inflows to avoid scarcity: typology and global analysis of transboundary rivers” by Hafsa Ahmend Munia et al.

Pieter van der Zaag (editor)

C1

The paper is of some interest to better understand the dependency of downstream sub-basin areas on upstream sub-basins. It is also quite cumbersome to read, in particular because some symbols are prone to confusion (e.g. S for stress or for scarcity or for shortage?).

I find the two reviews illuminating, critical and very constructive. I expect the authors to benefit from these comments and to significantly improve the manuscript. In so doing, some choices have to be made. The authors must clarify the added value of their typology (Fig 6) for better understanding basin trajectories

Two additional remarks that have not been made by the two reviewers:

I have one significant problem with the paper, namely that the approach is completely blue water biased and green water blind – there is no mention of green water and its importance, nor is the capacity of green water to partially substitute for blue water needs ignored. At least in the discussion section this limitation must be discussed, and the possible implications for the findings.

Related to this I have problems with the use of Falkenmark’s per capita water availability as a measure of water scarcity (which the paper distinguishes from water stress). This is an old (1970s!) and very crude measure (with highly arbitrary thresholds of 1,700 m³/cap/year for stress, and 1,000 m³/cap/year for water scarcity). It was precisely Prof. Falkenmark who later introduced the very important concept of green water, which taught us that it matters a lot whether one lives in a humid (with a lot of green water) or an arid (little green water) climate, how much blue water one needs. So fixed global threshold values do make little sense.

Perhaps the paper does not need to use this flawed concept at all – omitting it may not alter the results nor the conclusions.

A second concern that was not raised is the concept of environmental water requirements / environmental flow requirements (EFRs), which are water flows that literally

C2

run through all the SBAs and that are untouched by the riparians to safeguard the survival of aquatic ecosystems and the like. How would these feature in the typology? At least in the discussion section I would expect a reflection of the proposed method and how, if at all, EFRs could be included.

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