

Reply to Review #1 on “Hess Opinions: Socio-economic and ecological trade-offs of flood management – benefits of a transdisciplinary approach” by Karl Auerswald et al.

We appreciate the encouraging comments and helpful amendments. In blue we explain how we considered the reviewer’s advice in our manuscript.

Anonymous Referee #1

This is a nice opinion paper, which discusses the side of effects of structural flood protection. It starts from the recently discussed issue of the safe-development paradox (levee effect) and moves towards a more critical assessment of ecological impacts. The argument is not new, as vast literature is available, but this is a commentary and the main arguments are well supported by the cited literature. Indeed, there is still a major lack of fundamental understanding of these issues, and more transdisciplinary research is needed.

I have two main comments that I hope can help improve this opinion paper. First, I think the paper would benefit from at least a paragraph in which the negative (environmental and social) impacts of structural flood protection are more fairly compared to the positive (economical) effects, e.g. growth or development.

We added at the beginning of our outlook:

“In the past, there were many good reasons for river reconstruction such as controlling disease through sewage collection and treatment (Preston and Van De Walle, 1978; Nithsdale, 1996; Kesztenbaum and Rosenthal, 2017), hydropower extraction (Koch, 2002), improving navigability (Smith and Winkley, 1996), and reclamation of land for urbanization, infrastructure and arable agriculture by increasing return periods of floods (Déchamps et al., 1988) “

Second, as the paper suggests a transdisciplinary research agenda, I think that the authors should be aware that Di Baldassarre et al. (2013) published a paper on the same journal (HESS) arguing for transdisciplinarity for a better understanding of deltas and floodplains as human-environment systems. I also suggest a few more references on the topic that might help the revision of this manuscript.

Suggested references

Burton, C. and Cutter, S. L.: Levee failures and social vulnerability in the Sacramento- San Joaquin Delta area, California, *Nat. Hazards Review*, 2008.

Di Baldassarre, G., Kooy, M., Kemerink, J. S., and Brandimarte, L.: Towards understanding the dynamic behaviour of floodplains as human-water systems, *Hydrol. Earth Syst. Sci.*, 17, 3235-3244, <https://doi.org/10.5194/hess-17-3235-2013>, 2013.

Jahn, T., Bergmann, M., and Keil, F.: Transdisciplinarity: Between mainstreaming and marginalization, *Ecol. Econom.*, 79, 1–10, 2012.

We appreciate drawing our attention to this point and we regret that we only mentioned transdisciplinarity in the Abstract and in the Conclusions without developing this idea further. We added a paragraph on transdisciplinarity at the end of the Outlook.

“In agreement with Di Baldassarre et al. (2013) but expanding their view to include ecological and economic aspects, we propose a transdisciplinary approach to address the interrelated, complex and dynamic social, hydrological, ecological and economic challenges on floodplains. Transdisciplinarity has been promoted as an adequate scientific response to pressing societal problems even though it is far from being academically established and from being effectively supported by funding and research institutions (Jahn et al. 2012).

Transdisciplinarity is understood as a collaboration of academic and non-academic thought styles to break ground for a comprehensive, multi-perspective, common-good oriented trajectory of development (Pohl, 2011). This could guide the interaction of institutions and governance processes with hydrological and ecological processes on floodplains.”