

## ***Interactive comment on “Unravelling intractable water conflicts: the entanglement of science and politics in decision-making on a large hydraulic infrastructure project” by Jonatan Godinez-Madrigal et al.***

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Received and published: 3 May 2020

Dear Leticia Lima,

We thank Leticia Lima for the detailed and constructive comments and suggestions. To facilitate the reading of our response, we reproduce your comment verbatim and divide it into sections, then, we respond immediately after each of the points that were raised.

"Dear Editor and Authors, After carefully reading the manuscript, I decided to provide my comments in this review following the questions that are used to guide reviewers

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provided by HESS editorial team in their website. I believe the manuscript provides very thoughtful insights about a much needed topic and it is worth publishing. However, the authors would need to solve some particular issues beforehand. Please consider that the following comments are entirely based on my personal experience and, therefore, they may be contested as well."

> Does the paper address relevant scientific questions within the scope of HESS?

"The paper addresses an important topic which is: the causes of potential failure in science-policy processes behind fundamental decisions regarding water resources, particularly in the context of conflicts over water supply/demand and large infrastructures. The content relates to the scope of HESS as it refers to a study of interactions of hydrological systems and human activities, focusing on water management. By being an interdisciplinary study, with a fundamental intake from Political Ecology, it also falls within one of the aims of the journal, which is the cross-fertilization across disciplinary boundaries."

> Does the paper present novel concepts, ideas, tools, or data?

"There is no novel concept, idea or tools presented in the paper. However, the authors' contribution to the scientific debates around the science-policy interface and its impacts on society is noteworthy and it is accomplished by means of a thoroughly presented case study. In addition, the authors provided new data produced by means of their own modelling scenario for the case study."

> Are substantial conclusions reached?

"The paper reinforces some important perspectives over the science production process and its appropriation by different actors in society. There is an important contribution to the debate on the use of science by hegemonic actors in policy processes. Particularly, it concludes emphasizing the importance of proper social participation and collaborative paths into the scientific process in order to reach better decisions when it

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comes to water management. However, POINT 1) the study lacks considerations about the potential challenges and/or pitfalls of an inclusive process in science. Although addressing these does not constitute the aim of the paper per se, I believe that at least some considerations and some references on this point should have been made. The only point on that made by the authors is: "this might not be a panacea against vested interests". POINT 2) The conclusion section in this paper is, by far, the longest I've ever seen. There seems to be repetition of some results in it too. I believe that the conclusion section should not repeat results, but instead, provide a broader perspective on the topic raised based on the insights of the study."

Response Point 1: We consider this a valid point. However, as you mentioned, since this is not the aim of the paper, considering potential challenges and pitfalls would require future research based on experimentation with participatory approaches in water conflicts. We will add to the text some sentences for future research, as well as finding critical analysis in the literature.

Response Point 2: We will shorten the conclusion in the revised version of the paper.

> Are the scientific methods and assumptions valid and clearly outlined?

"The methods section provides useful information to understand the investigation process taken by the authors. However, it is quite confusing the way the whole paper is structured and how information is provided in each section. Taking this into account, I have some points to make and some suggestions that may help the authors: POINT 3) There are plenty of information about the case study in several different parts of the manuscript. Complementary information about the history of the case appears not only in the section called "case study" but also in the "methods", and then new information is added to "controversies", and then to "analysis of scientific products". Because of that, a large portion of the manuscript content may fall into what we could call the description of "a case study". Therefore, I believe the authors should: (A) replace the name of the section "case study" to "study area" and limit the content of this section to

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a very direct and precise description of the two cities, only bringing basic information such as location, demography, basic biophysical data, basic water demand numbers; (B) save the remaining content previously placed in "case study" to a new section that describes the entire history of the case, highlighting the most important facts and their context (it could go as sub-section of Results considering that it is a product of the authors' interviews), refraining to evaluate or take any stance on the case itself in this part; (C) check if there is no information in the following sections that would be better placed in this new section dedicated to the history of the case and move it; (D) remove any repetition in the text (as an example, line 366 is a repetition); (E) please provide a STORYLINE, that is, a diagram with the most important facts so that it will help readers not to lose themselves while following this long story. POINT 4) It is of high value the fact that the authors reproduced the modelling exercise made by a third part under Jalisco's government request with an additional scenario produced by themselves, including important issues like climate change, etc. This highlights the outstanding ability of the authors to work with interdisciplinary methods. However, it seems to me that the "methods" section is missing important components that are required when we are talking about models and simulations: there is no single paragraph describing the model in short terms and its assumptions, there is not a single table showing the main biophysical parameters used in the model, nor even a list of the data sources. I am aware that the authors are providing a link to a web page with the model and everything needed to reproduce the results, but still, I think that a basic overview of the simulation should be provided in plain text explained by the authors with additional figures+tables, including equations that describe how those indicators are calculated, even if all of that comes in the form of a Supplementary Material. Not all readers will have the required time to install and run the WEAP model in their computers to get a perspective of what this is about. POINT 5) I truly believe that all scientists take some sort of political stance in their own topic of research. I am not against that because it seems natural to me as we are all human beings and many of us understand our role as citizens. However, I believe that scientific writing, when it comes to the description of

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case studies, should be done in a way that helps the readers to understand the whole story BUT without inducing them to take a side/stance by mixing description of the case with the analysis made by the authors. That said, I want to give an example taken from line 206: “. . . we adopted an interdisciplinary method to assess the scientific products that were developed with the intention to have a decisive role in de-politicizing the conflict, . . .”. There is no undoubtful evidence in this paper that the “intention” was to “de-politicize the conflict”. There is SOME evidence that it might be the case, or that it may be interpreted that way. But this sort of affirmation should be placed somewhere in the discussion section, where the authors will interpret what they’ve got from fieldwork based on the literature and in their own points of view. This type of phrase should not be placed in the methods section, in my opinion. POINT 6) According to the text, the authors spent 6 months in Guadalajara, 2017, conducting in-depth interviews, including to members of the Jalisco’s government. I could not find information about interviews made with members of the Guanajuato’s government. Also, by being a “tale of two cities”, it seems that León did not receive a visit. Is that correct? How can the authors justify that? POINT 7) Although Figure 3 brings comparison of the five scenarios developed by a third part, which could fit into methods section, it also included the scenario developed by the authors themselves. Because of that, Figure 3 now seems more appropriate for the Results section because produced data is being brought to the study. POINT 8) I believe the authors should have mentioned in the methods section what the specific methodology was followed to analyse and interpret the contents obtained from the interviews. One cannot know if the authors transcribed their interviews, or if they analysed data directly from audio files or notes from the field. Readers would not able to identify if the authors used some sort of technique to code the material or applied a specific method from the literature to come up with the Table 1 “controversies and frames”. It would be good to know what the authors are calling controversies and frames here. P.S.: Line 216: ‘to record’ how? POINT 9) Small typo in footnote 3 of page 10: If is written with capital I in the middle of the phrase.”

Response Point 3A & 3B: We think this may provide more clarity to the paper, so we  
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will split the case study section into study area and case study in the results section in the revised version.

Response Point 3C-3E: We will revise again the story of the conflict to make it clearer, and create a figure showing the storyline of the conflict.

Response Point 4: We will provide an additional table in the supplementary material summarizing the main components of the model.

Response Point 5: We will delete this phrase from the method section and add it in the discussion section.

Response Point 6: No, we did not interview stakeholders in León. We have three reasons for that: one, since the negative consequences from the Zapotillo project would be carried in Jalisco, the central scientific controversies, and the focus of our research was also here; two, all the actors that we interviewed had a deep knowledge with the relationship with the city of León; and three, we complemented this knowledge through relevant literature on the issue from the perspective of León, as well as relevant official documents from its main stakeholder, SAPAL, the water utility of León. We are confident that our identification of Leon’s role in the conflict through interviewing Jalisco’s actors and mobilizing secondary data is sufficient to support the analysis of the case. We are adding a sentence in the methodology explaining this.

Response Point 7: We respectfully disagree with this point. Figure 3 should be part of the methods section because it only indicates the parameters that we introduced in the model for a new scenario. The results are described in Figure 4.

Response Point 8: We will provide additional information on this in the revised version of the paper. We electronically recorded some interviews and later transcribed them; and some other interviews, due to the delicate nature of the conflict, were not recorded, only chronicled through fieldnotes. The informal interviews mentioned in line 216 were not electronically recorded, but only chronicled in fieldnotes.

Response Point 9: We will correct that typo in the revised version of the paper.

> Are the results sufficient to support the interpretations and conclusions?

"Results section brings a lot of information drawn from interviews. The authors assume a form of storytelling in order to bring the details about the controversies, mainly following the major events that happened. The results presented do support in part their interpretations and major conclusions. For instance, it seems clear that a lack of transparency and public participation during the modelling process requested by the Jalisco's government resulted in scenarios that were not entirely useful for the case, considering the lack of some aspects such as future water demands and climate change in the scenario 5, as an example. That leads to the conclusion that more transparency and participation are needed to solve such intractable problems. However, some points must be made about the results section: POINT 10) As it seems to be the case in the whole text, there is some sort of mixing of information in the results section. I truly believe that the authors could benefit from taking a time to reorder the text, choosing more carefully where each piece of information will be placed, and maybe using more sub-sections to sort it out. They can take advantage of tables to summarize information too. Here, a question remains to the authors: how can you present the story behind the contradictions without making your reader feel lost? POINT 11) Lines 362-365: The authors are calling the groundwater in the basin "an uncertainty". I think they should consider wording here. . . the groundwater cannot be called an uncertainty, in my opinion. You may consider rephrasing it to something like "the epistemic uncertainty related to the groundwater physical processes in the basin". POINT 12) Lines 421-423: authors should provide scientific references here to support their argument that the GRACE data is not suitable in this case because of its resolution."

Response Point 10: See point 3A

Response Point 11: We consider this a valid point. We will change that in the revised section of the paper.

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Response Point 12: We consider this a valuable observation. We have found the following reference stating the same problem of resolution, which we will include in the revised version of the paper: Castellazzi, P., Longuevergne, L., Martel, R., Rivera, A., Brouard, C., & Chaussard, E. (2018). Quantitative mapping of groundwater depletion at the water management scale using a combined GRACE/InSAR approach. *Remote sensing of environment*, 205, 408-418.

> Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)?

"The authors declared having all required materials and model available online to run the reported simulations. In fact, their web link is working well, although I did not have the time to download it and try it by myself. However, as I commented previously, the methods section lacks details about model description, table of main parameters, source information about the dataset used to run the simulations, etc."

> Do the authors give proper credit to related work and clearly indicate their own new/original contribution?

"Yes."

> Does the title clearly reflect the contents of the paper?

"Yes. Totally."

> Does the abstract provide a concise and complete summary?

"Although the abstract is well written and summarizes very well the content of the paper, I would argue that it is too long for an abstract and the authors would benefit from writing everything in the paper (not only the abstract) more concisely and direct to the point. Tiny detail - Line 2: nobody "owns" a model in your case. A freeware was used to run the simulations. You could say, instead, that the modelling process was dominated by a particular group."

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Response: We understand your point, and we think it is a matter of interpretation of the word own. We did not intend to use the literal meaning of "own", but the figurative meaning of a sense of ownership by the stakeholders. Anyway, we understand the confusion and will make it clearer in the revised version of the paper.

> Is the overall presentation well-structured and clear?

"In my opinion, although the paper presents a very interesting case and it is worth publishing, the major drawback here is, in fact, presentation and structure. The text is too dense, it repeats in some parts, information is not well distributed, nor a good use of structures (such as tables/figures/diagrams) was made to summarize and facilitate the reading. I strongly advise the authors to consider improving the structure and readability of the paper."

Response: We will change some sections and add a timeline.

> Is the language fluent and precise?

"The language is fluent and there are just a few typos. Every piece of information is well understood. However, again, the writing should be straight to the point in order to improve readability."

Response: We will revise the paper again to find the typos.

> Are mathematical formulae, symbols, abbreviations, and units correctly defined and used?

"Yes."

> Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated?

"In my comments above I emphasized the need to reduce, clarify, and reorder the text into more meaningful sections. Particularly in terms of reducing the text, I would advise the authors to apply this to the abstract and the conclusion sections."

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Response: We will condense these sections in the revised version of the paper.

> Are the number and quality of references appropriate?

"Yes."

> Is the amount and quality of supplementary material appropriate?

"According to my comments about the methods section, additional information about the model, parameters and data sources could be provided in the form of a supplementary material."

Response: See our response for point 4.

We again want to thank Leticia for her valuable comments.

Best regards,

Jonatan, Nora and Pieter.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2020-86>, 2020.