Reviewer: The content is very relevant, as inter-basin water transfer (or transboundary systems) can alleviate the water deficit crisis caused by the uneven distribution of water resources. This new approach/index (i.e., Water Deficit Evenness Index – WDEI) seems to be a very efficient manner to sharing the pressure of water scarcity as a social demand objective, although some uncertainty in this methodology may be still relevant. Additionally, the English of the manuscript seems to be very good, congratulations. Here below and attached are some recommendations.

Introduction

Lines 32 – 34: Some references should be included in order to support your statement in these lines. I would recommend regional studies.

Lines 37 – 38: I would include more studies in this statement "Inter-basin Water transfer projects have been widely constructed worldwide (references)". I would recommend adding the references below, as they provide some examples of how the inter-basin water transfer impacted the water availability in these water demand regions. Or you could include them in Line 44, in order to support your statement.

Medeiros, P., & Sivapalan, M. (2020). From hard-path to soft-path solutions: slow–fast dynamics of human adaptation to droughts in a water scarce environment. Hydrological Sciences Journal, 65(11), 1803-1814.

Ghoreishi, M., Elshorbagy, A., Razavi, S., Blöschl, G., Sivapalan, M., & Abdelkader, A. (2022). Cooperation in a Transboundary River Basin: a Large Scale Socio-hydrological Model of the Eastern Nile. Hydrology and Earth System Sciences Discussions, 2022, 1-24.

Wei, Y., Wei, J., Li, G., Wu, S., Yu, D., Ghoreishi, M., ... & Tian, F. (2022). A socio-hydrological framework for understanding conflict and cooperation with respect to transboundary rivers. Hydrology and Earth System Sciences, 26(8), 2131-2146.

Lu, Y., Tian, F., Guo, L., Borzì, I., Patil, R., Wei, J., ... & Sivapalan, M. (2021). Socio-hydrologic modeling of the dynamics of cooperation in the transboundary Lancang–Mekong River. Hydrology and Earth System Sciences, 25(4), 1883-1903.

Lines 58 – 60: "Currently, most IBWD projects primarily follow various laws, regulations, policy guidelines, and historical experience in dispatching strategies set by the government." Which laws, regulations, or policy guidelines are those? Please, explain a little bit of them or

include a reference, only mentioning that there are a bunch of laws it is not so clear, you should show them in case the reader wants to know more about them in China.

Lines 60 – 62: What are the main lacks? You did mention that there a lack in the detailed operation rules, but you did not explain what this/these lack (s) is/are specifically. In addition, what is the main question (s) you want to address in this manuscript? These should be explicit in the introduction.

Lines 55 – 86; Lines 87 – 114; I would recommend breaking these long paragraphs in shorter ones, as sometimes hard to follow the main idea you wanted to transmit.

The introduction section provides a lot of information showing some of state-of-the-art studies (which is good), however, it needs to be shortened, and a deep reformulation is required. I would recommend maximum of four or five shorten paragraphs, with the last one being the objectives of this study.

Lines 126 – 127 are not necessary, however, I would recommend including a flowchart figure in the methodology section, showing which steps were required to implement this methodology, since the data gathering to the model/index approach execution.

Methodology

Figure 1: All the symbols in Figure 1 should be in the legend. It is a good idea to color the legends from each line (makes it easier to understand for the reader), but the symbols should be included as well, for example, the pumping and city symbols. In addition, what is the green line in the map? The coordinates from the left and top should be removed as they are just repeating information. In addition, I would make a zoom out of China, or maybe creating another box locating China in Asia continent, as although China's locations is well known, it is always good to include a broader map of the country we are studying.

Figure 3: I would suggest to change the color of the normal years to black, and the dry years to red, as it makes easier for the reader to follow. I would also recommend changing the rage of the Monthly mean inflow in Hongze Lake (a) to 0, 100, and 200, in Luoma Lake (b) to 0, 25,

and 50, in Nansi Lake (c) to 0, 1, and 2, respectively, that way your graphs would be cleaner. The Monthly mean average dots should be bigger as we can barely see them in the graphs.

Line 194: "The issue is particularly severe here." Here where?

Line 208: Where are the symbols meaning for Equation 1? As well as for the other used equations? Every equation should come with the meaning of each used symbol right after the equation.

Figure 4: I would recommend using the standard flowchart boxes/symbols. For example, rectangles means a "process", circle means a "terminal", and so on. That makes easier for the reader to understand what has been done in each step. This recommendation should also be applied to the recommended flowchart and for Figure 2.

Results/Discussion

Although your results showed to be very aligned with the necessities of one of China's water transboundary systems, was this methodology used elsewhere? If not, would it be possible to apply this methodology to other similar water transfer systems? Which would be the main concerns in applying this method in other locations? On top of that, what are the main uncertainties of this method? I mean, although your results showed a high confidence, I think there are some concerns in this methodology that should be considered and discussed.

Please add a new section regarding the "Sources of Uncertainty" as they were not so clear in the discussion section. The objective of this section is an auto critique of your own work, showing its limitations and it can be improved. No work is so perfect that can't show any limitations, please rethink about the main uncertainties and write this section.

In the discussion section, I would also recommend adding some statements showing the costs to implement and maintain the inter-basin water transfer, showing how much it is (in average) to install in China and comparing/discussing with other system worldwide (values in American dollar).

Another questions arise for the discussion section:

How many years did it last to be build? How many years it is expected to work? What are the main trade-offs (e.g., environment impacts; positives and negatives for the biota; how the local hydrology will be changed; how many energy is used to pump the water in the whole system; etc.) of this kind of system?

Are isolated communities allowed to use this transferred water where the transboundary system flows? If not, how this issue would be addressed?

Are there any conflicts between two communities (i.e., the one that is providing the water and the one that is receiving this resource)?

Conclusion

I suggest joining all points in the conclusion section. In my opinion it makes this section more "fluid" and easier to read. In addition, some recommendations for future work need to be included, for example, the application of this method in other similar watersheds worldwide in order to revalidate this method in other circumstances.

Overall, the work is very good, it just needs more discussion and some explanations, as I included in the review. The writing is also fine and formal.