

Reply to Editor, Prof. Wang Lixin

Both reviewers are satisfied with the revision and have identified a few minor issues that need to be fixed. I concur with the reviews and recommend a minor revision of this manuscript.

Response:

Dear Editor, Prof. Wang Lixin

We sincerely thank you and the reviewers for the time and effort invested in improving our manuscript. Your and the reviewers' insightful feedback has significantly enhanced the quality of our work. In response to the comments, we have used **orange** highlighting to indicate revisions made in response to Reviewer 1, and **blue** highlighting for those addressing Reviewer 2's suggestions. Additionally, we have also included our responses to the comments from the editor, Daria Karpachova, regarding the manuscript revisions. Additionally, we have thoroughly reviewed and standardized all in-text citations and the corresponding reference list, and have performed a spell-check of the entire manuscript.

We will upload two versions of the revised manuscript: a clean version (without track changes) and a marked version (with track changes).

On behalf of all authors, I would like to express our sincere gratitude for your rigorous and meticulous work.

Sincerely

Yang You, on behalf of all authors

Reply to Referee #1

The authors have made a good revision. I only have some minor suggestion to further improve the presentation quality.

Dear Reviewer

Thank you very much for your comprehensive review of our manuscript. We have endeavored to address all your comments as clearly as possible and have thoroughly revised the manuscript accordingly. If any points remain unclear or require further clarification, we would be delighted to provide additional explanations. To distinguish between your comments and those of Reviewer 2, we have used orange highlighting for revisions made in response to your suggestions, blue for those addressing Reviewer 2's comments. We will upload two versions of the revised manuscript: a clean version (without track changes) and a marked version (with track changes).

On behalf of all authors, I would like to express our sincere gratitude for your rigorous and meticulous work.

Kind regards

Yang You, on behalf of all authors

L18. "dynamic evolution mechanism" is not an exact expression in scientific writing.

Response: We sincerely appreciate your valuable comments. We have replaced "dynamic evolution mechanism" with "dynamic evolution pattern" to better align with the content of the abstract.

L48. "Arid zones" is better to be changed to "Drylands".

Response: We sincerely appreciate your valuable comments. We have replaced the above words

L128. "its application to deeply explore" is not a good research gap. Coupled PLUS-InVEST is only a tool.

Response: We sincerely appreciate your valuable comments. Here, we have rephrased this sentence to better convey that the effectiveness of the PLUS-InVEST coupled model in comprehensive regional water-soil balance analysis lacks sufficient and thorough exploration, thereby more clearly justifying the adoption of this model in our study. The revised text reads: "Furthermore, the PLUS-InVEST coupled model has demonstrated good performance in regional water supply assessment (Liu et al., 2023). Although its effectiveness in comprehensive regional water-soil balance analysis remains insufficiently explored (Liu et al., 2022), it holds potential for functional expansion through

integration with other methods, thereby better supporting efficient regional water and land resource management." Additionally, we have included relevant literature to substantiate our explanation.

Liu, Y., Jing, Y., Han, S.: Multi-scenario simulation of land use/land cover change and water yield evaluation coupled with the GMOP-PLUS-InVEST model: A case study of the Nansi Lake Basin in China. *Ecol Indic.*, 155, 110926, <https://doi.org/10.1016/j.ecolind.2023.110926>, 2023.

L134-135. What do the abbreviations in the brackets mean?

Response: We sincerely appreciate your valuable comments. The abbreviations in parentheses are abbreviations for the six land scenarios, and we have added the full names and abbreviations of the six land scenarios here.

L382. “Spatial heterogeneity” is not suited because this section only showed the amount, not spatial pattern.

Response: We sincerely appreciate your valuable comments. We have changed the sentence to "Land use change characteristics under multiple scenarios".

L439. All of "significant" is better to be changed, because it is not statistically significant.

Response: We sincerely appreciate your valuable comments. We have replaced all 'significant' in this paragraph.

4 Discussion. There are too many sentences in one paragraph. Please separate them into several paragraphs.

Response: We sincerely appreciate your valuable comments. We have split some of the paragraphs in the discussion.

Reply to Referee #2

I have carefully reviewed the authors' responses to the reviewers' comments and their revised manuscript. The authors have provided comprehensive and thoughtful responses to all the questions and suggestions raised by myself and the other reviewers.

Dear Reviewer,

Thank you very much for your comprehensive review of our manuscript. To distinguish between your comments and those of Reviewer 1, we have used blue highlighting for revisions made in response to your suggestions, orange for those addressing Reviewer 1's comments, and red for changes made based on the shared recommendations of both reviewers. We will upload two versions of the revised manuscript: a clean version (without track changes) and a marked version (with track changes).

On behalf of all authors, I would like to express our sincere gratitude for your rigorous and meticulous work.

Kind regards

Yang You, on behalf of all authors

Reply to Editor, Prof. Daria Karpachova

1. With the next revision, please consider making comments in Track changes version without the use of hieroglyphs. Since the TCV will be available for users when peer review completed and article will be published.

Response: We sincerely appreciate your valuable comments. In this revision, we used the English version of Word to upload the modifications. We will upload two versions of the revised manuscript: a clean version (without track changes) and a marked version (with track changes).

2. For the next revision please include the credit for a reused map in a Figure 1 also in a description.

Response: We sincerely appreciate your valuable comments. We have added explanations about the review section in Figure 1. In addition, we have also added some explanations in the title of Figure 1 in response to your comments. Additionally, we have thoroughly reviewed and standardized all in-text citations and the corresponding reference list, and have performed a spell-check of the entire manuscript.

On behalf of all authors, I would like to express our sincere gratitude for your rigorous and meticulous work.

Sincerely

Yang You, on behalf of all authors