We would like to thank all reviewers for their constructive suggestions. We reply to every comment as follow. For clarity, all comments are marked in blue and answers are marked in black.

Reviewer comment:
My primary concerns with the original manuscript were that (i) it was unclear how the authors envisioned translating this model to other transboundary basins, and (ii) the paper lacked an adequate description of parameter selection and calibration.

The first concern (i) has been addressed within the manuscript conclusions. The authors have mostly addressed the second concern (ii) pertaining to parameter selection and calibration by describing their process throughout Section 3 and adding a new table (Table 3) that shows the value of key parameters and the range used in the uncertainty analysis. There are a couple of minor points that should still be addressed, as I describe in the comments below.

Author response: We thank the comments from reviewer#2. We would like to reply to the further questions raised by reviewer#2 as follow.

1. The distinction between parameter selection versus parameter calibration for P is unclear given differences between the author response and the manuscript. The authors' response states:

"As for the parameters in policy feedback module, such as political factor P, responsive change rate s, and sensitivity of agriculture loss and fishery loss εa and εf, they should be "calibrated" so that the simulated cooperation demand and cooperation level are consistent with reality and sentiment analysis data."

This appears to contradict the manuscript, which states (L484):

"The parameters in the policy feedback are defined a priori because there is limited research and knowledge at present on the quantification of cooperation and political benefits, which need further investigation."

Author response: We thank the reviewer#2 to point out the issue here. In this study, the parameters in policy feedback module including political factor, responsive change rate, etc., are assigned as introduced in the manuscript. The uncertainty analysis in Figure 12 shows that, although the parameters in policy feedback module could lead to uncertainty of simulated cooperation demand of downstream, the trend and fluctuation pattern of simulations are similar, and Figure 11 shows that the simulated cooperation demand are consistent with sentiment analysis results. Therefore, in this study, we do not need to "calibrate" parameters in policy feedback module after the initial assignment of parameter values. The statement in response that parameters should be "calibrated" means that when simulations with assigned parameters disagree with sentiment analysis results, parameters should be adjusted. We clarified the selections of parameters in the revised manuscript.

2. In the uncertainty analysis (Fig. 12), why is there no effect of the China Political Factor on cooperation demand? Perhaps this has to do with the logistic structure of the model for the change in cooperation level C, but nevertheless this counters the narrative that indirect political benefits to China (and therefore willingness to cooperate) relieved economic pressure (and therefore cooperation demand) in downstream countries. This should be clarified.

Author response: Figure 12 shows that with different values of China political factors, downstream cooperation demands vary slightly. According to the structure of model, higher China political factor results in higher cooperation level of China. Downstream countries will get higher benefits, and downstream cooperation demand will thus decrease. However, the logistic structure of calculation of cooperation level lead to subtle distinctions of downstream cooperation in the uncertainty analysis in figure 12. It does not mean that China political factor has no effect on downstream demand. When the values of China political factor differ more remarkably, simulations will illustrate the pattern that higher China political factor leads to lower downstream cooperation demand. We emphasized the aim and implication of uncertainty analysis in the revised manuscript, and clarified that the impacts of certain parameter on simulation should be investigated with larger range of values and more tests.