Response to Anonymous Referee #1

This paper presents a study of complex water-energy-food-ecology nexuses at two river basins in Central Asia. The authors used the Bayesian network to analyze the causality of the nexuses. The results indicated that the water management conflicts between downstream countries may turn into a long-term chronic problem. It is necessary to promote water conservation practices and strengthen cooperation between countries. The manuscript is on a topic of interest to the audience of HESS.

Response: We would like to thank the reviewer for the positive comments and the time invested to review our manuscript. The revised manuscript will follow the reviewer's recommendations.

I only have a few minor comments that I hope the authors could address in their revision.

1 Section 2: Please add some references to support your proposed framework.

Response: Thank you for the insightful comments. We will add relevant references on how to build a Bayesian network in the fields of geography, ecology, hydrology and environment. Some previous literatures were used in the Bayesian network framework applied in this research, and they will be referenced.

2 Fig. 3: Please identify the upstream and downstream areas in the map.

Response: Thank you for the insightful comments. We will identify them.

3 Section 4.1: This part could be elaborated to include more details. How well does the model capture the key causal links in the system? What are the limitations of the model?

Response: Thank you for the insightful comments. We will strengthen the analysis of the effects of the model to capture causality effects. We will also strengthen the analysis of the limitations of the framework in the discussion section. The newly added discussion content in the revised manuscript may include potential limitations caused by inappropriately selected nodes, lack of consideration of detailed causal processes, lack of expert knowledge, and low data quality/sufficiency. If a selected node variable is inappropriate, it may lead to the failure in capturing causality. For example, we used the average life expectancy instead of the incidence of specific diseases caused by ecological problems, such as respiratory diseases caused by sand and salt storms. The lack of a more detailed description of causality may cause some detailed but important causality to be ignored, making it difficult for us to discover the differences between river basins. Therefore, the scale to which the structure needs to be refined and when it needs to be refined are what we need to consider carefully when promoting this framework. Lack of expert knowledge often leads to failure when building network structures and when initializing conditional probability tables. Complex networks may often require experts or stakeholders in multiple fields, and their concerns are often different, which may cause conflicts in the setting of the network structure and the initial conditional probability table. River basins in underdeveloped areas may also lack sufficient expert knowledge due to long-term insufficient investment in local related research fields. Also weak data support (insufficient in quantity or accuracy) may weaken the effectiveness of the framework.

4 Section 4.3: This part could also be elaborated. The authors may add discussion about the

outcome of each management scenario and propose new water management strategies based on the scenario analysis results.

Response: Thank you for the insightful comments. In Section 4.3 of the original manuscript, we only described the optimization schemes in a few scenarios. We will add discussion about more management scenarios and propose new strategies based on the scenraios in the revised manuscript.