Hydrol. Earth Syst. Sci. Discuss.,
https://doi.org/10.5194/hess-2018-221-AC2, 2018

Hydrology and Earth System Sciences
Discussions

Interactive comment on "Assessing water supply capacity in a complex river basin under climate change using the logistic eco-engineering decision scaling framework" *by* Daeha Kim et al.

Daeha Kim et al.

sjchoi@kict.re.kr

Received and published: 29 August 2018

We greatly appreciate the valuable comments from the referee 1, and will consider them to improve the manuscript in revision. Specific responses are following as per comments.

This paper has integrated the logistic regressions with the ecoengineering decision scaling framework to evaluate the risk of system failures in contrast to expected performance under dynamic climate change scenarios. This paper contains new insights and contains a lot of information for scientific community. However, the authors have explained the manuscript in complicated ways which I think could be explained in a

simplified manner therefore, the authors are advised to avoid using complex English sentences and try to make their next manuscript as simple as possible which would ultimately increase understanding as well as attract more readers. In a nutshell, the results of this paper are convincing enough to support the basic objective and stance of this paper in its current version. Therefore, after a minor revision, this paper can be given a green signal to be published in journal 'Hydrology and Earth System Sciences (HESS)".

–> By considering good suggestions from the referee 2, we will reorganize the manuscript by more clearly addressing how the EEDS can be challenged and how to improve it in the introduction and methodology sections. Then, we will then provide the case study for Geum River Basin. The terminology and the sentences used in the manuscript will be reviewed and improved. The scientific contribution of this work will be better emphasized by the revision. And, we will slightly refine the stress tests and adding validation of the risk estimate from the logistic regression.

Minor Comments: 1. The authors have used 25 GCMs in current study and all of them have different spatial resolution which has a lot of implications in results section. Therefore the authors are advised to explain how the spatial resolution of all those GCMs are made consistent with each other.

–> They were bias-corrected by a statistical downscaling method. We applied the detrended quantile mapping (e.g., Eum and Cannon, 2017) as mentioned in P6L31. By the statistical downscaling, the climate hindcasts and forecasts were bias-corrected towards the observed climates during a reference period. Perhaps, the method is inadequately explained. We will add more explanation there.

2. Page6 Line13: In current study, only high demand scenario has been chosen from a conservative perspective whereas the low demand scenarios has been discarded with the justification of declining rice-planting lands. However the authors did not provide any reference which supports author assumption of declining rice-planting lands.

–> We will include some references to support decreasing rice-planting areas in South Korea (e.g., http://www.index.go.kr/potal/main/EachDtlPageDetail.do?idx_cd=1287). The decreasing trend is clearly indicated from the data. The reason why we selected the high demand scenario is to assess the worst scenario (i.e. drying climate plus high demand projections) as a case study.

3. Page6 Line11: Authors are suggested to please explain how they calculated economic growth and effectiveness so that it could be easy for readers to comprehend.

–> We will more clearly summarize the water plan 2020 for potential readers who have insufficient knowledge about the demand projection.

4. Page8 Line27: The line “The four free parameters of GR4J. . ..inputs” is confusing and needs to be rephrased. Four free parameters has not been defined yet, therefore, to make it convenient for reader, please first define the four free parameters before abovementioned line.

–> We will add one or two sentences to describe the model parameters.

5. Page14 Line14: Please rephrase “more water resources need be transferred” with “more water resources need to be transferred”

–> We will correct the sentence as advised.

6. Page16 Line9: In line “More reliable risk estimates can be achieved from other uncertainty assessment methods though expensive efforts may be required” Please mention few other uncertainty assessment methods you are talking about so that it could be easy for readers to comprehend the context.

–> This part will be revised by accepting a comment from the referee 2. We will validate the risk estimate from the logistic regression using a typical stochastic uncertainty analysis. So, this part will be revised accordingly.

7. Page24 Figure 1: The annotation color in inset maps needs to be changed because

its not clear enough.

–> We will improve readability of the figure 1.

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