

Response to Reviewer 3 Comments

General comments

The manuscript “A Study on Agricultural Water Supply Method on the Reservoir based on Runoff Condition of the Basin” presents an approach, as a continuation of a previous study, aiming to estimate the actual agricultural water supply of multi-purpose dams taking into account the hydrological regime. The study is based on a set of 15-year data from Seom River basin (Korea), where Hoengseong multi-purpose dam is located.

The topic of the study is interesting, dealing with the sensitive matter of agricultural water supply, under possible conditions of water scarcity (e.g. droughts) and potentially competitive water uses. However, the manuscript has several weak points as presented in detail in the specific comments below. In brief, the goals of the study are not clearly set, while the proposed approach seems to be mostly limited in the specific case, in which several assumptions have been introduced and, consequently, the presented results do not appear to be sufficiently solid in order to be generalized in other cases.

→ Author appreciates for your knowledgeable comments.

→ First of all, author appreciate for your knowledgeable comments. This paper focused on the practical application for newly invented concept in previously study. The novelty of the paper could be slightly insufficient because it is not purely new concept, it was modified and improved from Kwak's study to apply to actual dam operation. However, that's why it could also has another worth. There are so many theories and concepts were suggested and disappeared, therefore, practical application to test its applicability could has its own novelty, and the comments of the reviewer maybe considered these point. To improve understand of the reader, manuscript was totally and carefully reexamined and revised. Again, thank you for your knowledgeable comments.

Specific comments

1. [Title] A revision of the title is suggested; it is difficult to comprehend the selected phrasing.

→ Title was modified, “A Study on Agricultural Water Supply on the Hoengseong Dam based on Hydrological Condition of the Basin”

2. [Abstract] Several facts are unclear in the abstract, e.g. which is the “particular source” (L.7) on which South Korea relies on, or which is the “previous study” (L.11) that is referred to? In any case, the abstract should be thoroughly revised to present briefly the background of the topic that leads to the objectives and goals of the specific study.

→ Abstract was revised to clearly meaning

3. [Section 1] The introductory section presents a general literature review regarding agricultural water use. However, the actual issues which are intended to be investigated, as well as the objectives, goals and novelty aspects of the study are unclear. It is recommended to focus on the specific topic of interest, setting clearly the investigated problem and the intended goals. It seems that the study is a follow-up of a previous research, therefore it must be further emphasised the reasons leading to the need of this follow up and the added value of the current study.

→ The most important objective of the study is to suggest and examines a practical and simple methodology to estimate agricultural water supply amount of the dam. As the comment of the reviewer, the later part of the introduction section was revised.

4. [Section 2] Following the previous comment, it is not clear why the selected study area is suitable for studying the agricultural water supply. More specifically, it is stated that this is due to the fact that “it uses a relatively large amount of agricultural water due to its high ratio of paddy field to the basin area and relies on the Hoengseong Dam for a significant portion of agricultural water supply” (L.106-108). However, the paddy fields cannot be considered as a characteristic case of typical agricultural water use, due to the high water requirements, therefore the suitability of the area for the study is not evident and must be clearly explained (along with the objectives that should be set in the introduction). Furthermore the “threshold curve method” (L.123) which is mentioned to be used in the previous study should be briefly described, as well as its components (e.g. “the maximum usage of agricultural water” – L.131). It is also noted that the use of this threshold approach (as it is also shown later in the results), does not seem to take into account any of the other water uses, considering that the case refers to multi-purpose dams; please justify/elaborate on this issue.

→ Section 2.1 and limitation section were revised. It is relying on the characteristic of agriculture on the South Korea. Rice is the major crops on Korean peninsula, so it is not a particular case. Of course, another major crops would have its own pattern of water demand, and it means that the URP curve could be useless.

→ Section 2.2 was also revised to more clearly meaning for threshold curve and maximum usage.

→ For the other water use, it is needs to explain water apply method on South Korea. In principle, all of water including domestic, industrial, and agricultural supplying same amount throughout the year, but agricultural water supplying only irrigation period (April to October). Therefore, there is two amount of supplying on the dam, irrigation and non-irrigation period. Fig. 3 was revised to reveal this feature.

5. Considering that agricultural water consumption seems to be directly related to the development stages of the main crops of the area (as presented in Section 3), additional information on the development stages of the crops for the specific study area should be provided in Section 2.

→ Section 2.1 was revised according to reviewer's comment.

6. [Section 3.1] Please clarify whether the presented runoff amounts (Fig.3) are before or after the regulated discharge due to the existing reservoir. This is important regarding the assumption that the decrease of runoff is due to agricultural consumption (L.209-212), which is the basis for the further presented case. It is noted, that there are several references mentioning similar assumptions and results presented in "the preceding study" (Kwan, 2021), though the international readership is rather difficult to follow these statements due to the fact that the aforementioned study is written in Korean. Additional details should be provided regarding the base of the assumptions and the results which are mentioned regarding the study of Kwan (2021).

→ The section 3.1 was revised according to reviewer's comment. Also, new figure was added in Section 3.1 to more clearly understanding.

7. [Fig. 4] Please clarify what is the 'monthly average runoff of previous years' and why is it presented in the graph. Also, the x-axis labels ('06yr, '07yr, etc.) should be changed (i.e. 2006, 2007, etc.). The latter applies also for Fig. 6 & 7.

→ The axis label and description of Fig. 4, 6, 7 were revised.

8. [Equations 1 & 2] These equations are poorly justified and not supported by any relevant references, while the explanation of the presented terms is also rather weak. For instance,

it is not clear which are the “characteristics of the basin” on which the “critical constants” a, b and c are based on and why (L.248-250).

→ It is not a general formula, it just a sort of recession curve, so it could not be supported from other studies. The derivation and explanation part in Section 3.1 (Line 249-280) was revised according to reviewer's comments.

9. [Section 3.2] The presentation of the approach in the first paragraph of the section should be further elaborated. Furthermore, the statement that “severe droughts occurred in the Han River system” (L.292) is unsupported; considering that one of the intended goals of the study is the approach to be applicable under drought conditions, it would be expected to justify and quantify the severity of droughts in the period of study, using some typical drought assessment approach (e.g. appropriate hydrological and/or agricultural drought indices), that could also verify the performance of the approach under specific drought severity cases. Finally, it is not understood which exactly are the “supply adjustments” (L.293) which do not have impacts on agricultural water used, leading to the conclusion that these can be applicable to multi-purpose dams; please elaborate/justify.

→ First and second paragraph in Section 3.2 was revised according to reviewer's comment.

→ The sentence about drought (Line 354) was just missing reference. According to

10. The use of the language requires improvement as it is quite difficult to follow smoothly the flow of the text (especially in the first sections); an edit by a native English speaker is advised.

→ The manuscript was checked and revised for clearly understanding.