

Water deficits in Bogowonto

Evaluation of hydrological effects of stakeholder prioritized response options for the agricultural water deficits in Bogowonto, Indonesia

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Indonesia is a tropical country situated in South-East Asia that faces water scarcity during the dry season. The yearly returning agricultural water deficits caused by periods of insufficient rain, lack of water retention capabilities, degraded irrigation infrastructure and inefficient management of the irrigation weirs result in sub-optimal cropping conditions for the farmers who depend on the irrigation water flows.

The overall objective of this study is to select potential measures for the Bogowonto catchment to decrease the agricultural water deficits by following a participatory approach to obtain preferred measures and by applying a water allocation model which addresses the spatial and temporal variations in the agricultural water deficit. This study includes the construction of a water allocation model with multiple scenarios for climate variability (i), results from participatory meetings for the up-, mid- and downstream irrigation weirs (ii) and statements on stakeholder prioritized measures to assess the agricultural water deficit (iii). Based on this, the historical (1992-2012) and future (2025-2045) agricultural water deficits are simulated and a set of measures is proposed based on the prioritization of the stakeholders and a multi-criteria analysis.

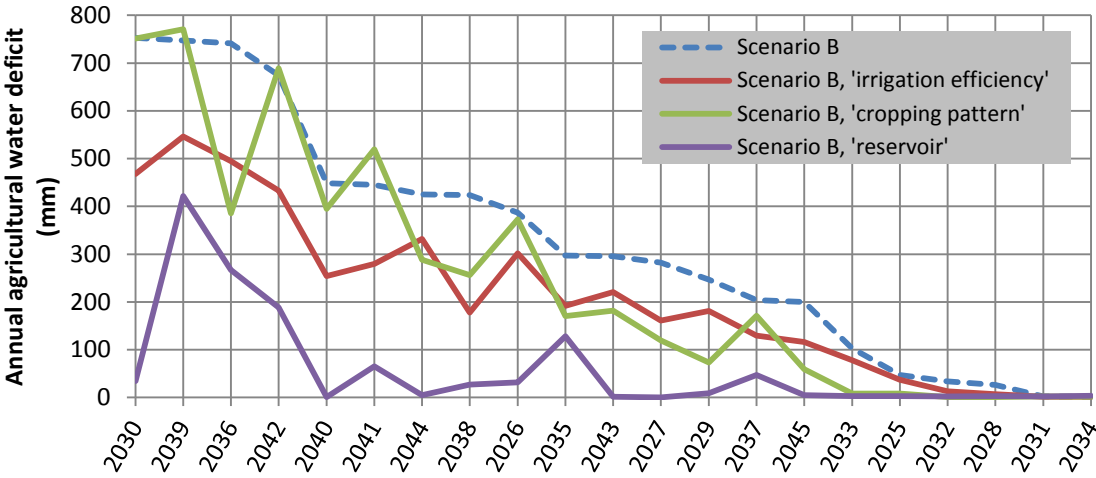


Figure 1: Annual agricultural water deficit for midstream irrigation weir, Bogowonto catchment, Indonesia.

A part of the main findings of this study is shown in figure 1. This figure presents the annual water deficits in mm for the period 2025-2045 for a midstream located irrigation weir in the Bogowonto catchment. Scenario B shows the simulated decrease of the annual water deficit for three different kind of measures. The first measure is increasing the irrigation efficiency by rehabilitation of the irrigation system, the second measure is to adapt to a less water consuming cropping pattern and the third option is to construct a reservoir to better regulate the water availability in times of water scarcity. In general the measures “irrigation efficiency” and “construction of the reservoir” are able to positively contribute in the reduction of the agricultural water deficit for 2025-2045 and are supported by the majority of the stakeholders which effectuates a positive implementation of these measures.