

ABSTRACT

Serang watershed is located in Kulon Progo, Daerah Istimewa Yogyakarta. It consists of eleven water districts, i.e. Tinalah, Girimulyo, Sambiroto, Kalibawang, Kokap, Papah, Pekikjamal, Pengasih, Sendangsari, Sermo, and Temon. Study area has been developed into irrigation, residential and industrial area. Kulon Progo future development plan in construction of Tinalah dam and international airport will affect the balance of water availability and demand in Serang watershed. This study is aimed to analyze the existing water balance in 2008 and to predict future condition that possibly occurs due to change in irrigation efficiency, Tinalah dam, and new airport in Serang watershed.

This study covers water availability and demand calculation in year 2008, 2013, 2018, 2023 and 2028. Water availability is modeled using Mock method and water allocation is simulated to year 2028 using Ribasim model. The analysis is considering several conditions, i.e. based on existing condition, on irrigation efficiency change, on Tinalah dam, on combination of irrigation efficiency change and dam, dam and airport, and also on combination of irrigation efficiency, dam, and airport altogether.

This study ends up in a conclusion that there is unfulfilled water demand in entire Serang watershed. In scenario 1 which analyzes water balance until 2028, there is averagedly $7,347 \text{ m}^3/\text{s}$ deficiency. While in scenario 2, considering change in irrigation efficiency, the average deficiency is $7,2362 \text{ m}^3/\text{s}$. This is bigger than scenario 3 which based on new dam with $7.0967 \text{ m}^3/\text{s}$ deficiency. Combination of irrigation efficiency and dam in scenario 4 yields in $6,8324 \text{ m}^3/\text{s}$ average deficiency, while combination of dam and airport in scenario 5 results in averagedly $7,2855 \text{ m}^3/\text{s}$ deficiency and combination of irrigation efficiency, dam and airport in scenario 6 comes to $7,2513 \text{ m}^3/\text{s}$ in average deficiency.

Keywords : water availability, water demand, irrigation efficiency, Tinalah dam.