

## INTISARI

Sistem *subak* memiliki satuan pemberian air irigasi disebut *tektek* dengan bangunan pengambilan yang disebut *tembuku penyahcah*. Penyesuaian jumlah *tektek* di Subak Pulagan sebagai upaya untuk memberikan keadilan atas pemanfaatan air di *subak* masih bersifat perkiraan dari *Pekaseh Subak*. Oleh karena itu perlu untuk mengetahui pendistribusian air yang terjadi di petak observasi. Tujuan dari penelitian ini adalah menganalisis penggunaan dan neraca air di petak observasi serta merumuskan persamaan dengan pendekatan bangunan ambang lebar pada *tembuku penyahcah* dan melakukan validasi hasil perhitungan.

Penelitian dilakukan pada musim tanam padi-II tahun 2021 dimulai dari bulan Agustus hingga Desember dengan luas petak observasi sebesar 7,70 ha. Tahapan penelitian dilakukan dengan mendapatkan debit terukur yaitu pengamatan tinggi muka air, pengukuran laju aliran dan analisis regresi (*power equation*). Metode neraca air digunakan untuk menghitung penggunaan air irigasi. Analisis kalibrasi dilakukan dengan membandingkan persamaan debit bangunan ambang lebar dan debit terukur menggunakan persamaan berpangkat. Pangkat dari kedalaman ( $h$ ) disesuaikan dengan pangkat persamaan bangunan ambang lebar. Validasi hasil berbagai persamaan terhadap debit terukur menggunakan metode koefisien korelasi, RMSE, RMSE relatif, MAE dan MAE relatif.

Hasil menunjukkan nilai kebutuhan air irigasi nyata rerata maksimum sebesar 17,46 l/s terjadi pada masa penyiapan lahan dan kebutuhan air irigasi nyata rerata terendah sebesar 3,30 l/s terjadi pada masa panen. Rerata kebutuhan air irigasi untuk satu musim tanam padi-II sebesar 10,55 l/s. Kelebihan air irigasi rerata tertinggi sebesar 149,23 l/s pada masa pertumbuhan generatif, sedangkan kelebihan air terendah sebesar 67,27 l/s pada masa panen. Kelebihan air yang terjadi dialirkan ke sistem sungai sebagai bentuk dari *return flow*. Nilai koefisien debit terkalibrasi pada bangunan pengambilan *tembuku penyahcah* A, B, C dan D adalah sebesar 0,767; 0,410; 0,710 dan 5,233. Hasil validasi menunjukkan persamaan lengkung debit terkalibrasi mampu untuk menurunkan nilai kesalahan dari persamaan lengkung debit teoritis ambang lebar.

Kata kunci: *Subak, Tektek, Inflow – Outflow, Kalibrasi Bangunan, Ambang Lebar, Tembuku Penyahcah*

## **ABSTRACT**

*The subak system has a measurement of irrigation water distribution called as tektek (leak) and this distribution is conducted in a building called as Tembuku Penyahcah (a building to distribute). In Subak Pulagan irrigation, the adjustment of the water amount for one tektek unit in providing the equity of the water use is still based on the estimation from the subak leader (Pekaseh Subak). Therefore, the water distribution system at the study area is essential to be studied. The aims of this study are to analyze the water use and balance at the study area, formulate an equation using a broad crested weir approach at the Tembuku Penyahcah building, and validate the result of the calculation.*

*The study was conducted during the paddy-II planting season between August and December 2021 in an observation site of 7.70 hectares. The step of conducting the study was started from obtaining the measured discharge by observing the water level, measuring the water speed, and analyzing the regression (power equation). Moreover, the water balance method was applied to calculate the use of the irrigation water. Furthermore, the calibration analysis was applied by equating the broad crested weir discharge and the measured discharge using a power equation. The power of water depth ( $h$ ) is adjusted to the power of broad crested weir. The result validation of the various equations toward the measured discharge was done using correlation coefficient, RMSE, relative RMSE, MAE, and relative MAE.*

*The result shows that the maximum average of the real irrigation water requirement was 17.46 l/s happened during the soil tillage stage while the minimum average was 3.30 l/s occurred during the harvesting stage. Moreover, the average of the real irrigation water requirement in one planting season of paddy-II was 10.55 l/s. Furthermore, the highest average of the water surplus was 149.23 l/s during the generative period; in contrast, the lowest average of the water surplus was 67.27 l/s during the harvesting period. Then, the water surplus was flowed back to the watershed system as a return flow. The coefficient values of the calibrated discharge in Tembuku Penyahcah distributing building A, B, C, and D were 0.767, 0.410, 0.710, and 5.233 respectively. Finally, the validation result shows that the curve equation of the calibrated discharge can decrease the error value of theoretical discharge curve equation of the broad crested weir.*

*Keywords: Subak, Tektek, Inflow – Outflow, Calibration, Broad Crested Weir, Tembuku Penyahcah*