

Narintorn Chamthong 2014: Klong Si Yad Reservoir Integrated Water Resources Management for Irrigation and Hydropower. Master of Engineering (Water Resources Engineering), Major Field: Water Resources Engineering, Department of Water Resources Engineering. Thesis Advisor: Associate Professor Chaiwat Kayankarnnavy, M.Eng. 162 pages.

The purpose of this research is to study the integrated water resources management of Klong Si-Yad reservoir for irrigation and hydropower. WUSMO program and HEC-3 program were used as a tool to simulate water demand for irrigation and hydropower system respectively. The results shown that Klong Si-Yad reservoir had sufficient amount of water supplying for irrigation area of 182,000 rais, which is calculated as water demand equals approximately 250 million cubic meter per year ( $\times 10^6 \text{ m}^3/\text{y}$ ). In case of the power capacity of micro-hydropower, 885 kilowatt (kW) is built at the terminal structure and its construction cost is 66.23 million baht, the electrical capacity will be 6,409,000 kilowatt - hour per year (kWh/y). The energy benefit of the project is equal to 14.83 million baht per year, which is calculated as saving cost of natural gas import about 2.93 million baht per year. Furthermore, the analysis of economic feasibility evaluated NPV, B/C, EIRR and FIRR at 8 percent (%) discount rate; the values are 38.26 million baht, 1.28, 12.30 and 11.35 percent (%) respectively. Consequently, the project should reduce CO<sub>2</sub> emissions to 3,717 Ton-CO<sub>2</sub>, which is calculated as the value of reduce greenhouse gas emissions is 636,960 baht per year. Based on the results, dry season area reduction curve (DSAR curve) can be used as a guide to recommend the annual planning of cultivated area during the dry season to determine the target cultivated area which is followed by using the relationship between the amount of storage water in the Klong Si-Yad reservoir after the end of the wet season each year and the amount of cultivated area suitability during the dry season. Moreover, DSAR curve should help users manage the cultivation during the dry season most efficient without the damage from lack of water. Most importantly, supplying the amount of enough water through the whole growing season directly impacts to certain income of farmers and indirectly impacts to economy in term of the quality of life.

---

Student's signature

---

Thesis Advisor's signature