Channarong Thangkanasup 2008: Water Productivity Analysis for Rice Cultivation in the Upper Chao Phraya Irrigation Project by Crop Growth Simulation Model and Remote Sensing Technique. Master of Engineering (Irrigation Engineering), Major Field: Irrigation Engineering, Department of Irrigation Engineering. Thesis Advisor: Assistant Professor Ekasit Kositsakulchai, Dipl. Docteur 193 pages.

This research presented the analysis of water productivity of rice cultivation in the upper part of the Greater Chao Phraya Irrigation Project during dry season, from November 2001 to April 2002. The analysis of rice production included: classification of rice cropping pattern using time-series MODIS data, evaluation of potential rice production by SWAP model, and estimation of biomass using NOAA/AVHRR data. The evapotranspiration (ETa) was estimated by considering crop evapotranspiration (ETc) from simulation and evaporative fraction from remotely sensed data. The water productivity was derived in term of biomass per unit of water. From the estimation, it was possible to classify paddy fields in the upper part of the Greater Chao Phraya Irrigation Project into 3 areas, including (1) area with low density of dry season rice cropping: The average of water productivity was 0.71 kg/m^3. It was relatively high during the end of wet season cropping, and later tended to decrease; (2) area with continuous rice cropping during dry season: Average water productivity was 1.08 kg/m^3. It was the highest value, and continually high during dry season; (3) area with inundation during the end of rainy season: Average water productivity was 0.58 kg/m^3. It was the lowest value in comparison with the others. However, water productivity was increased, after inundation had been mitigated from the middle of dry season. In conclusion, the forecasting of crop production and evapotranspiration by simulation model and remote sensing techniques provided a satisfactory result. However, further researches seem essential in order to improve precision and reliability of the estimation. In addition, it is possible to apply this approach as a decision support tool in water resources planning and management.

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