

Phakamas Tamthirat 2015: Water Usage in Relation to Water Availability for Cassava Starch Production in Thailand. Master of Engineering (Advanced and Sustainable Environmental Engineering), Major Field: Advanced and Sustainable Environmental Engineering, Faculty of Engineering. Thesis Advisor: Assistant Professor Nanthiya Hansupalak, Ph.D. 100 pages.

This work aims to develop a method to assess the impact of cassava starch production on local water resources by using water footprint (WF). This research applied WSI as a tool for accessing water scarcity in the Mae Klong, Tha Chin, Bang Pakong and Mun basin in Thailand. The WF calculation covered the water usage for both cassava fields (secondary data) and starch production at the factories (primary data). For the agricultural stage, only green water was considered as only actual water use rather than virtual water, was of interest. Blue water was not included because even though irrigation increases the yield of cassava roots, the costs usually exceed the additional revenue, making irrigation an uneconomic choice. Grey water was not included because the scenario of dilution of chemicals to acceptable levels is uncertain. The results showed that for all studied basins the total WF of cassava root production was 199–306 m³/t root, the difference of WF between basins can be explained by climatic conditions, soil characteristics, and starch content of the roots. The total water usage for cassava starch production ranged from 835–1397m³/t starch. Water was used mainly in the cassava processing 13.25–36m³/t starch. The water usage for cassava starch production corresponded to 44–54% of the water availability (rainfall) in the river basins, which could be considered as high. The WSI values obtained in this current work for all basins, except Mae Klong basin was higher than 0.4, which was also higher than literature for Thailand. It is the threshold for severe water stress according to Pfister *et al.* (2009).

Student's signature

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