

Investigation on Water Environment and Pollution Load Analysis in the Nhue-Day River Basin, Vietnam

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Key Words: Vietnam, Water Pollution, Flow Rate, Tank Model, Pollution Load

1. Background and Objectives

The Nhue-Day River basin which covers most parts of the Hanoi city, in Vietnam has been severely polluted due to urbanization these days. In this study, flow rate and water quality survey were conducted at the Nhue River which is one of the most polluted rivers in the basin. Finally, I described about characteristics of water flow, water balance and pollution load by developing flow models which can be applied to the basin.

2. Methodology

Flow rate and water quality survey were conducted for 4 times in 2012 and 2013 at 14 sampling points on the Nhue River and main tributaries of the river. Also, water quality from upstream to downstream was measured continuously (TN, TP, TOC, SS, VSS, *e.coli*. and coliform group). At the Ha Dong water gate and Dong Quan water gate, statistics about daily water level and formula for calculating daily flow rate were collected. At the same time, the basin was divided into 105 small sub-river basins by using DEM datasets, and statistics were distributed into the sub-river basins. These sub-river basins were classified into 3 clusters; urban, sub-urban and rural. Finally, tank models for urban and sub-urban were developed and these models were applied to 9 sub-river basins located in the upstream of the Nhue-Day River basin.

3. Results and discussions

Flow rate estimated by the model at the Dong Quan water gate had a good correlation with the observed flow rate (Figure 1). According to the model, it was estimated that 78% of the effluent from urban areas originated from domestic wastewater (Figure 3 (a)). At the urban area, most wastewater is discharged from tank 1, and as a result, water pollution was serious at the urban areas located in the upstream according to my survey result (figure2). At the sub-urban area shown on figure 3 (b), most effluent was discharged from tank 2.

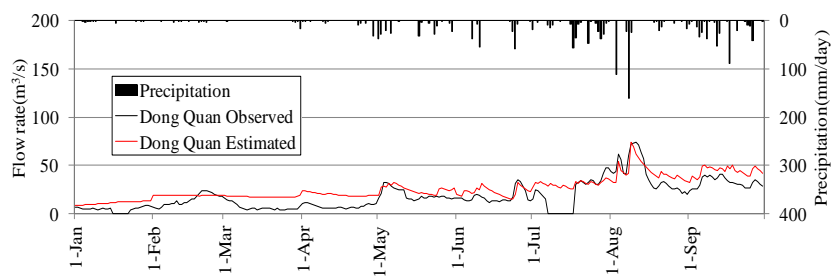


Figure 1. Output from tank model at Dong Quan water gate

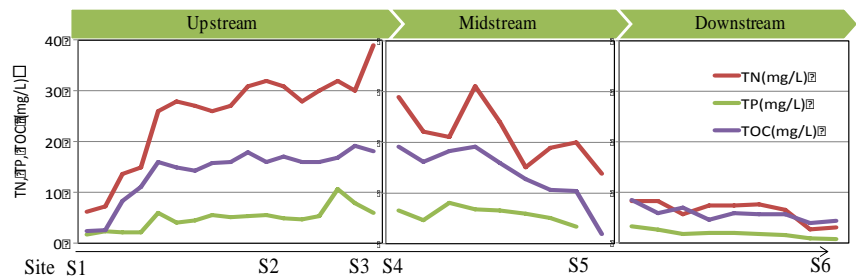


Figure 2. Water quality of the Nhue River from upstream to downstream

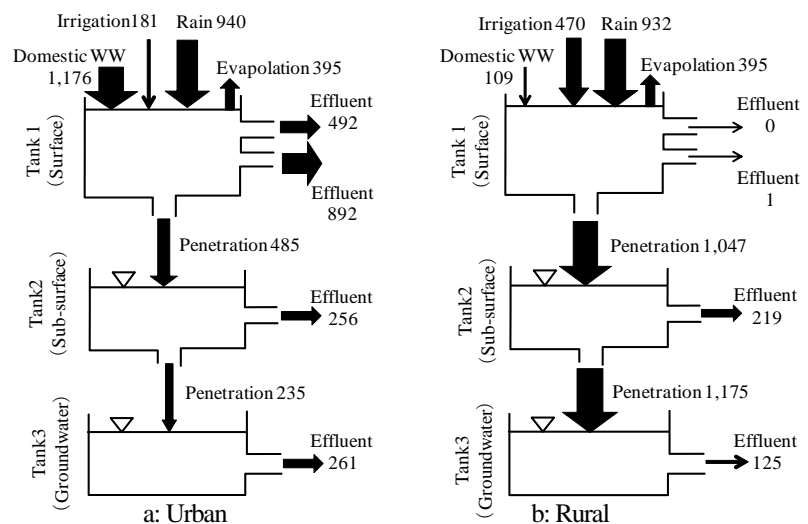


Figure 3. Water balance of the representative sub-river basins

($m^3/km^2/day$)