Modeling surface water quality of ui recharge pond using numerical method

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Abstrak

During the last decade, water scarcity in terms of quantity and quality degradation has become a major issue in Indonesia. In 2006, Universitas Indonesia (UI) supported by the Ministry of Public Works built a recharge pond as a field model to overcome flood and drought in Jakarta and its surroundings. However, since then, a lack of research has been conducted to monitor and analyze the rate of change in water quality in the UI recharge pond. The purposes of this study are to identify the characteristics of UI recharge pond and evaluate the surface water quality changes. Water samples were taken from the pond and analyzed in the laboratory for water quality tests. The evaluation method used for simulation of water quality was a numerical model using Runge-Katta Order 4. Laboratory analysis results show concentrations of Mn, Fe, BOD and COD are exceeding the water quality standards (GR No.82/2001). The water purification process in the pond was found to be faster in response to BOD (?= 0.5 d-1) and for Mn, Fe, and COD are found to have similar results at ?= 0.4 d-1. The 95% response time of the pond was found to be longer for Mn, Fe, and COD (t95 = 7.5 d) and the faster rate is BOD (t95 = 6.0 d). The result of numerical modeling demonstrates Mn concentration in the pond will be doubled (0.45 mg/L) on the day-15th and asymptotically converges on a steady state. The Fe, BOD, and COD reaches the steady state concentration around on the day-11th (0.95 mg/L), on the day-13th (56.6 mg/L), and on the day-17th (224 mg/L), respectively.