

Abstract

The study deals with water quality index (WQI) of drainage water from paddy fields. It took place in Klong Preuw-Saohai irrigation project in Saraburi and Phra Nakhon Si Ayutthaya province, central Thailand to illustrate changes of water quality from paddy fields. The WQI of drainage water from paddy fields was established by evaluating questionnaires from experts and the equations of water quality. The questionnaire showed that 11 parameters should be included in the WQI. They were paraquat herbicides (Her), biological oxygen demand (BOD), nitrate-nitrogen (NO_3^- -N), organophosphate pesticides (OP), carbamate pesticides (Car), phosphate-phosphorus (PO_4^{3-} -P), ammonia-nitrogen (NH_3 -N), pH, suspended solids (SS), total dissolved solids (TDS), and conductivity (EC) resulting in the equation: $\text{WQI} (\text{Pad}_{11}) = 0.097 (\text{Her}) + 0.097 (\text{BOD}) + 0.096 (\text{NO}_3^-) + 0.095 (\text{OP}) + 0.094 (\text{Car}) + 0.092 (\text{PO}_4^{3-}) + 0.091 (\text{NH}_3) + 0.088 (\text{pH}) + 0.085 (\text{SS}) + 0.084 (\text{TDS}) + 0.081 (\text{EC})$. Attempts were carried out to reduce parameters for the appropriate drainage WQI from paddy fields. A statistical test showed no significant difference ($p < 0.05$) between the equations with 11 parameters and 3 parameters. The equation with 3 parameters is $\text{WQI} (\text{Pad}_3) = 0.338 (\text{BOD}) + 0.338 (\text{NO}_3^-) + 0.324 (\text{PO}_4^{3-})$. Water samples were taken during February to May 2009 and water quality was analysed physically and chemically. The sampling of 1 station in the irrigation canal and 11 stations in the drainage canals in the study area were carried out. The WQI of drainage water from paddy fields, Klong Preuw-Saohai irrigation project in Saraburi and Phra Nakhon Si Ayutthaya province showed the average value of WQI from the 11 parameters equation as 77.01 throughout the 4 stages of rice growth. Similarly, the average value of WQI from the 3 parameters equation was 69.64. Both WQI's were in class 1 water quality that could be drained from paddy fields to the canal or river safely.