Paranyu Mailpom 2014: Runoff Estimation of Upper Ping River Basin on Land Use Changes using SWAT Model. Master of Engineering (Water Resources Engineering), Major Field: Water Resources Engineering, Department of Water Resources Engineering. Thesis Advisor: Assistant Professor Napaporn Piamsa-nga, Ph.D.
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In the northern part, Chiang Mai has developed rather the area from the changing of land use and they will affect to runoff quality in both rainy and dry season. Therefore, the runoff estimation from the land use planning will make more efficient of water usage in the area.

Runoff estimation by SWAT model used the data of land use in 2004 and 2009, respectively which is calibrated the model by in 2003 to 2006 and the verification of models was performed during 2007 to 2010. The coefficient of efficiency (R^2) in calibration and validation models is the range of 0.71- 0.91. The square root mean square of the relative error (ER) is 0.30 - 0.40. The property infiltration value (CN) is amount of 70-95, which is consistent with the character of the area.

This study is performed two scenarios namely the affect in Chiang Mai urban and upper Ping River Basin by changing of landuse. Based on data in 2009 and changes next 5, 25 and 50 years, respectively (2014, 2034 and 2059). The simulated results the stream flow was increased 0.002%, 0.004%, 0.008% from 2009, respectively. Moreover the forest area was decreased 0.03%, 0.19%, 0.41% the agricultural area was increased 0.01%, 0.09%, 0.19% and urban areas was increased 0.02%, 0.10%, 0.22%, respectively. The result of changed land use in upper Ping River Basin the results indicate that the streamflow was increased from 2009 with amount of 0.009%, 0.011%, 0.027%, respectively. Moreover, The forest area was decreased 0.45%, 2.28%, 4.55% and agricultural area was increased 0.36%, 1.83%, 3.66% as well as urban areas was increased 0.09%, 0.45%, 0.89%, respectively.

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