

Patchares Chacuttrikul 2014: Application of SWAT Model for Studying El Nino and La Nina Phenomena toward Streamflow in Lam Chi Subwatershed. Master of Science (Watershed and Forest Environmental Management), Major Field: Watershed and Forest Environmental Management, Department of Conservation. Thesis Advisor: Assistant Professor Somnimirt Pukngam, Ph.D. 83 pages.

This research aimed to investigate El Nino and La Nina phenomena toward streamflow in Lam Chi subwatershed using SWAT model. The climatic data from the Thai Meteorological Department (TMD) during the year 1984 to 2012 were used as input data for streamflow evaluation and streamflow data from Royal Irrigation Department were used for model calibration.

The research results indicated that all mean air temperatures (mean air temperature, mean minimum and mean maximum air temperature) in El Nino years were higher than normal years by 0.78-1.35 % and rainfall was 3.00 % below normal. In La Nina years, mean maximum air temperature and mean air temperature were lower than normal years by 1.03-1.35 % while mean minimum air temperature was not remarkably different compared with normal years and rainfall was 7.23 % above normal. For estimation of streamflow using SWAT model showed the largest amount of streamflow in the year 2000 and the smallest value in 1998. In particular, streamflow in El Nino years were less than normal years by 137.67 MCM (9.82 %) while in La Nina years were above normal by 31.47 MCM (2.25 %). However, differences in streamflow between El Nino and La Nina years were not statistically significant in confidence level at 95%. For streamflow scenario, it decreased 220.17 MCM (18.02 %) in extreme El Nino year and increased 341.17 MCM (27.93 %) in extreme La Nina year. The streamflow forecast during 2015-2034, the lowest value was found in 2018 and the highest value was showed in 2020.

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Thesis Advisor's signature