Banchongsak Faksomboon, Acting Sub Lt. 2011: Estimation of Actual Evapotranspiration and Carbon Dioxide Emissions by Using Some Meteorological Data at Teak Plantation, Lampang Province. Master of Science (Watershed and Environmental Management), Major Field: Watershed and Environmental Management, Department of Conservation. Thesis Advisor: Mr. Piyapong Tongdeenok, Ph.D. 92 pages.

The study of actual evapotranspiration (ET_A) using Bowen Ratio technique and carbon dioxide emissions (CO_2 emissions) using flux measurement at Teak plantation, Mae-Moh district, Lampang province during January 2007 to September 2009. The relationship between ET_A and CO_2 emissions with some meteorological parameters that collected from automatic weather station (AWS) were used for applied mathematical model for prediction ET_A and CO_2 emissions. Suitable meteorological parameters were selected by using stepwise multiple regression analysis method. The model were validated with measurement data and calibrated with nearby watershed.

The results shown that the average ET_A during January to December was 3.4 mm/day or ranged with 2.6 - 3.9 mm/day/month. The highest value was found in April and lowest in December. The daily average of CO_2 emissions was 3.3 $mgCO_2/m^2/s$ or daily/monthly with ranged 1.6 - 4.7 $mgCO_2/m^2/s$. The highest value was appeared in September and lowest in December. Mathematical model for estimating ET_A and CO_2 emissions were found that annual model were $ET_A = 0.761 + 0.095Ta + 005R$ (r= 0.56) and $CO_2 = -1.272 + 0.007R + 0.161Ta$ (r= 0.91) while in wet period the suitable model were $ET_A = 1.542 + 0.131Rs$ (r= 0.63) and $CO_2 = 0.507 + 0.047RH$ (r= 0.95) and ET_A nonsignificance in dry period, on the other hand $CO_2 = -2.170 + 0.202Ta$ (r=0.45) where ET_A, CO_2, Ta, Rs, RH and R are actual evapotranspiration (mm/day), carbon dioxide ($mgCO_2/m^2/s$), air temperature (^oC), solar radiation ($MJ/m^2/day$), relative humidity (%) and rainfall amount (mm) respectively.

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