

**Thesis Title** An Evaluation of Phosphorus Balance of Upper  
Huai Fa Pah Watershed After Long-term  
Monocropping of Maize

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**ABSTRACT**

Phosphorus is a very important plant nutrient that is commonly found deficient in most maize cropping areas of Thailand. The phosphorus budget of upper compartment of a small Huai Fa Pah watershed in Amphoe Pak Chong of Nakhon Ratchasima was investigated to determine the present phosphorus status after long-term monocropping of maize. A comprehensive soil survey and sampling method was devised to gather required quantitative site-soil-plant-atmospheric information for the calculation of phosphorus budget. Farmers in the area practiced double cropping of maize but only the data gathered from the first crop of 1990 growing season were used in the calculation and in estimation of the amount of phosphorus removed by each maize crop. Soil profile water content and plant samples were taken at V6, R1, R4 and R6 stages to determine the characteristics profile water content, total and available soil phosphorus contents and phosphorus uptake by the maize crop. A simple water balance model was utilized to determine the amount of P nutrient input from

rainwater and losses from land surface due to runoff water.

Appraisal results indicated that the soils in Upper Huai Fa Pah have very poor physical and chemical properties. Total phosphorus content of the top 15 cm soil layer varied from 193 to 383 ppm while the Bray II available-P index varied only 3 to 4 ppm. Total phosphorus content of the 15 to 30 cm subsoil layer averaged 200 ppm with available-P index of 1 ppm.

The estimated 1990 phosphorus input to Upper Huai Fa Pah watershed were 6.6 kg/ha from fertilizer applications, 2.6 kg/ha from weeds and crop residue recycling and 3.7 kg gained from contamination in rainfall. The estimated output and losses were 2.7 kg through exportation of maize grain. The calculated net result was a positive phosphorus balance of 10.2 kg/ha.