

Impact of land use patterns on nitrogen cycling at

Sakaerat Environmental Research Station (SERS).

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Thesis. Kasetsart University, 1981.

ABSTRACT

Four small-watershed at the Sakaerat Environmental Research Station (SERS), namely : Huay Kokped, Huay Tatoo and Huay Namkhem which covered with dry evergreen forest (DEF), swidden or old shifting cultivated area (OSCA) and agricultural mixed with DEF (ADEF) respectively, were employed to study the impacts of land use patterns on N-cycling. The investigation was carried out during June, 1980 through May, 1981. Rain-water, throughfall and stemflow collectively deposited from all storms occurred in each month of each watershed were partly taken as monthly representative samples. About 500 cc. Of stream water drained from each watershed was weekly collected and deposited to be one month-representative samples. Soil samples at the depth of 0-20 cm. and 20-50 cm. were monthly taken from 3 soil pits topographically sequentially located at the ridge top, hill slope and bottom areas of each watershed. Litterfall accumulated in each watershed was collected by 0.5 x 1.0 m. temporary plots. Additional plots of 0.5 x 0.5 m. were also placed in Huay Kokped for collecting dead-leaves of *Arundinaria pusilla*. Litterfall was taken every month to determine N-concentration. Suspended sediment deposited in small plastic-boxes which placed at the streamflow measuring sites was also taken every month for representing as monthly sample. All samples were analyzed in laboratory to determine amount of nitrogen, excepted those samples in liquid state that $\text{NH}_4\text{-N}$ was examined.

The cycling of N in each watershed ecosystem was described basing on amount of total nitrogen in input rainfall, output streamflow and storage as intracycling in throughfall, stemflow, litterfall and in soil profile. The stability of watershed ecosystem reflecting the degree of forest disturbance was determined from net gain or loss of N of each watershed. Analysis showed that annual amount of $\text{NH}_4\text{-N}$ in input rainfall was about 1.5643, 5.0152, 7.0598 and 9.9447 kg/ha/yr.

and in output stream flow was about 0.0575, 0.0778, no stream flow and 0.2225 kg/ha. for DEF, ADEF and OSCA respectively. Net gain indicating the storage in $\text{NH}_4\text{-N}$ form within watershed was 1.5068, 4.9374, 7.0598 and 9.7222 kg/ha/annum respectively. From the mentioned n-budget, it can be theoretically assumed that Huay Wanasart watershed which covered with DEF had the strongest ecosystematic stability followed by Huay Namkhem, Huay Kokped and Huay Tayoo respectively.

Annual amount of N in intrasystem cycling, which is the summation of $\text{NH}_4\text{-N}$ (net) in throughfall, stemflow, N in litterfall and in soil profile, was largest in Huay tayoo (4,460.16 kg/ha.) and followed by about 3,216.12 ; 2,635.92 and 1,919.63 kg/ha in huay Wanasart, Huay Namkhem and Huay Kokped respectively.

This study revealed that land with different vegetative cover and soil types may naturally diverge in N-cycling and changing the land use from natural forest into land for agricultural and/or left it as swidden area would more or less affect on N-cycling. Hence, soil-water conservation measures and introduction of the suitable land use practiced should be taken into consideration in upland farming.