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Evaluation of Transplanting Date and Nitrogen Fertilizer Rate Adapted by Farmers to Toposequential Variation of Environmental Resources in a Mini-Watershed (*Nong*) in Northeast Thailand

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Abstract: Environmental resources for rainfed rice production show large variability even within a small area in Northeast Thailand, and it is said that farmer's management is well adapted to the variability. This study evaluated transplanting date and nitrogen (N) fertilizer rate in the management to improve rice productivity. The effect of transplanting date and N fertilizer rate on rice productivity was analyzed by investigating rice growth, and also by dividing rainfed rice fields located in a mini-watershed into 4 subecosystems: (1) medium deep water, waterlogged (MDW), (2) shallow water, favorable (SWf), (3) shallow water, drought- and submergence-prone (SWds), and (4) shallow water, drought-prone (SWd). Rice grew at almost a constant rate until maturity and the growth rate was higher at a lower field. The difference in productivity was derived from not only a water condition but also soil fertility, and was associated with the rate of N uptake. Small leaf area index was found to be one of the causes for low productivity in rice. Statistic analysis showed that earlier transplanting increased biomass production in all subecosystems. The biomass-increase resulted in a higher yield in SWds and SWd fields while it resulted in a reduced harvest index (HI) and did not increase yield in MDW and SWf fields. The effect of N fertilizer was apparent in the field where rice biomass was small due to later transplanting or unfertile soil, but the effect was generally small. Earlier transplanting in upper fields and later transplanting in lower fields in mini-watersheds were suggested to improve rice production, and proper distribution of N fertilizer use is considered necessary.

Keywords: [Farmer's management](#), [Rainfed rice](#), [Rice groth](#), [Soil fertility](#), [Subecosystem](#),

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