

## Nitrogen dynamics under different farmer practices in sandy salt-affected paddy fields in Northeast of Thailand

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### Abstract

Soil salinity hazard along with nitrogen mineralization has been identified as the main limiting factors for rice production in Northeast paddy fields. Management activities in rice systems, such as fertilization and Organic Matter (OM) incorporation, affect losses of N through denitrification activity. The aim of the study was to quantify the effects of different farmer practices and level of salinity on the Nitrogen dynamic in soil solution. Two neighbouring fields with different farmer practices were selected. One field was managed with the incorporation of OM and supplied with fertilizers while the other had no amendment at all. Soil solution sampling was performed each week in 2004, at three depths (10, 25 and 45 cm) over a 3 month period under flooded conditions. In each field, sampling was performed in two profiles with distinct salinity levels. Samples were analyzed for  $\text{NH}_4\text{-N}$  and  $\text{NO}_3\text{-N}$ . Results indicated that accumulation of mineral N during cropping period demonstrated the capacity to supply sufficient N to produce reasonable rice yields. Evidences of the influence of OM incorporation, fertilizer application and anaerobic soil conditions were found on the dynamics and distribution patterns of  $\text{NH}_4\text{-N}$  in the soil solution. OM management resulted in sufficient  $\text{NH}_4\text{-N}$  supply for rice in the root zone and enhanced nitrification-denitrification processes. Salinity influenced the rate of mineralization, nitrification-denitrification processes, leading to potential  $\text{NO}_3\text{-N}$  contamination of groundwater, especially under extreme salinity conditions. With no OM incorporation, nitrification-denitrification was depleted due to lack of carbon source for microbial activity. It should be noted that further research is needed to confirm under controlled conditions, the influence of high salt contents on nitrogen dynamics.

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