

Nitrogen budget and gaseous nitrogen loss in a tropical agricultural watershed

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Abstract	<p>Although agricultural systems in tropical monsoon Asia play a central role in the global nitrogen (N) cycle, details of the N cycle in this region on a watershed scale remain unclear. This study quantified the N budget in a tropical watershed of 221 km² on Java Island, where paddy fields cover 28% of the land, by conducting field surveys. The amount of net biochemical gaseous N loss to the atmosphere (X (GB)), which is generally difficult to determine, was calculated as the residual of the N balance. Assuming that NH₃ volatilization balances deposition, and hence subtracting NH₄-N from the N import with atmospheric deposition, the average total import and export of N per year was found to be 46.5 kg ha⁻¹ year⁻¹ over the watershed. Of this, 71% was imported as fertilizer (M-F) and 29% with atmospheric deposition (M-AD). On the export side, 42% was lost as X (GB), 37% with incineration of rice residues and wood fuel (X-GI), 13% with river discharge (X-D) and 9% with rice surplus export (X-R). A large portion of X-GB, and consequently, a small portion of X-D could be explained by the high rate of denitrification resulting from the high temperature and humid climate, and are thought to be common features of tropical watersheds where paddy fields are found.</p>
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