

## **Delayed permanent water rice production systems do not improve the recovery of <sup>15</sup>N-urea compared to continuously flooded systems**

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Recovery of nitrogen (N) fertiliser in flooded rice systems is traditionally low compared to fertiliser N recoveries in aerobic crops. However, recent moves towards water saving irrigation techniques may have led to improved N recovery in rice crops. To investigate whether N fertiliser regimes used in delayed permanent water (DPW) systems result in greater recovery of N fertiliser than traditional continuously flooded (CF) rice systems, we conducted a multi-N rate field trial using <sup>15</sup>N-labelled urea. Around 27% of the <sup>15</sup>N-labelled fertiliser was recovered in aboveground biomass at maturity, regardless of water regime or N fertiliser rate, and approximately 20 % recovered in the soil to 300 mm depth. In the following season at the same site, a single N rate (150 kg N ha<sup>-1</sup>) trial found no significant differences in crop N uptake, biomass yields, grain yields or <sup>15</sup>N-labelled urea recovery in DPW, CF and drill sown-CF (DS-CF) treatments. However, owing to higher <sup>15</sup>N fertiliser recovery in the 0-100 mm soil horizon, total plant + soil recovery of <sup>15</sup>N was significantly higher in the CF treatment (63 %) than the DS-CF and DPW treatments (around 50 % recoveries). Subsequent pot studies investigated the forms of gaseous N losses in acid and alkaline soils. The results of the pot study, and options for future improvements in N efficiency in rice systems, will be discussed.