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### Evaluation of Water-Saving Rice-Winter Crop Rotation System in a Suburb of Tokyo

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**Abstract:** Water-saving rice-winter crop rotation systems were repeated for 4 cycles from 2000 to 2004 in an urban area, Nishitokyo, Japan, to assess the effects of water-saving (i.e. non-flooded vs. flooded) on grain yield of rice (*Oryza sativa* L.) and chemical constituents of percolating water. The effects of pre-rice winter cropping compared with fallow on rice yield were also examined. The pre-cultivated crops were wheat (*Triticum aestivum* L.), italian ryegrass (*Lolium multiflorum* Lam.) or spinach (*Spinacea oleracea* L.) with their above-ground parts removed, chinese milk vetch (*Astragalus sinicus* L.) or rapeseed (*Brassica napus* L.) with their above-ground parts incorporated before rice transplanting. Neither winter cropping effects nor its interaction with water-saving were significant for rice yield, although the yield after rapeseed incorporation tended to be 9 % higher than that after fallow. In 2001, 2003 and 2004, when more than 70% of irrigation water was saved in the non-flooded trial, average yield in non-flooded trial was 58 % of flooded trial, but water productivity increased (from 0.10 to 0.16 kg m<sup>-3</sup>). Among the 3 years, yield in non-flooded trial was highest in 2004 when the amounts of irrigation and total water supply was larger, the frequency of dry spells was the lowest, and 2 seedlings were transplanted per hill. The nitrate and nitrite concentrations in the percolating water were far below the environmental standard values by WHO. The study showed that incorporation of winter crops had no negative effects on water-saving rice production at least for the first 4 years, and that under extreme water-saving, irrigation and planting methods could minimize yield reduction.

**Keywords:** [Rice-based cropping system](#), [Urban agriculture](#), [Water-saving](#), [Winter crops](#)



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