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Horizontal Nutrient Fluxes in Urban and Peri-Urban Gardens of Niamey, Niger

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Abstract

Horizontal nutrient fluxes were measured in 4 selected urban and peri-urban gardens of Niamey, capital city of Niger. Two gardens were strongly market-oriented; the other two were mainly cultivated for auto-consumption. Quantification of nitrogen (N), phosphorus (P), and potassium (K) inputs through application of animal manure, urea and irrigation water and determination of nutrient extraction in harvested products took place in the cool dry season 2005/06 (November - February).

For the two market gardens, N inputs through urea and animal manure by far exceeded N extraction in vegetables, resulting in strongly positive partial balances of 256 and 914 kg N ha⁻¹. At 11 and 63 kg N ha⁻¹, N balances in the gardens serving auto-consumption were also positive but to a much lower extent.

For one market garden where cabbage was mainly fertilised with urea, balances for P (-35 kg ha⁻¹) and K (-147 kg ha⁻¹) were negative. In the other market garden animal manure was applied to lettuce and extraction rates of P and K were only 17% and 43% of the extraction in the first garden. Consequently, positive horizontal balances for P (84 kg ha⁻¹), and K (115 kg ha⁻¹) were measured in the second market garden. Positive partial balances for P (2 and 27 kg ha⁻¹) and K (11 and 56 kg ha⁻¹) were also determined in the gardens serving auto-consumption.

The results point to an excess application of nutrients, and especially nitrogen, in gardens with a strong market-orientation. To determine the fate of the excess nutrients and conclude on eventual environmental hazards of gardeners' fertilisation strategies, the vertical losses of these nutrients through leaching (N, P, K) and gaseous emissions (N) have to be determined. First results regarding these aspects are presented by Predotova *et al.* at this conference.

Keywords: Horizontal nutrient fluxes, market gardens, Niger, urban agriculture