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## Leaching of Soil Nutrients from Tropical Cropping Systems at Different Levels of Agricultural Intensity in Bengaluru, Southern India

RENUKA SUDDAPULI HEWAGE<sup>1</sup>, BEATE MADAN<sup>1</sup>, ANDREA MOCK<sup>1</sup>, HANUMANTHAPPA DIMBA CHOWDAPPA<sup>2</sup>, CHICKADIBBURAHALLI T. SUBBARAYAPPA<sup>3</sup>, ELLEN HOFFMANN<sup>1</sup>, ANDREAS BUERKERT<sup>1</sup>

<sup>1</sup>University of Kassel, Organic Plant Production and Agroecosystems Research in the Tropics and Subtropics, Germany

<sup>2</sup>University of Agricultural Sciences, AICRP on Agroforestry, India

<sup>3</sup>University of Agricultural Sciences, Dept. of Soil Sci. and Agricultural Chemistry, India

### Abstract

Emerging mega cities with their rapidly growing urban population exert increasing pressure on the available arable land to satisfy burgeoning food demand. Meeting these demands requires intensified input use in multiple cropping systems as can be studied along the rural-urban interface in Bengaluru, South India. Under deeply weathered soil and tropical monsoon conditions, high rates of inorganic inputs into the soil improve the soil nutrient stock temporally, but may also cause high leaching losses which so far are poorly quantified. This study therefore aimed to measure seasonal leaching losses of nitrogen (N), phosphorus (P), potassium (K) and sulphur (S) at two crop specific inorganic N-fertiliser intensities (low and high), and two different water regimes (rainfed with life-saving supplementary irrigation and drip irrigated) in a factorial on-station experiment with a rotation of cabbage, eggplant, tomato in the dry (*rabi*) season followed by maize, finger millet, lablab in the wet (*kharif*) season. Leaching of soil water was determined at weekly intervals throughout the growing using micro-lysimeters. Analysis of collected data showed cumulative water losses by leaching to be 35 % higher in the dry season than in the wet season 2017. As an example, for the variation of nutrient losses among different crops, the concentration of N (as  $\text{NO}_3^-$  and  $\text{NH}_4^+$ ) in the leachate were higher in tomato than in eggplant and cabbage in the dry season, while in the wet season, lablab showed the lowest concentrations compared to finger millet and maize. In addition to those initial results, ongoing data analysis in a multi-annual study should give an even deeper understanding of the effects of inter- and intra-seasonal variations on nutrient leaching in intensive high inputs cropping systems under the influence of the monsoon climate condition in India.

**Keywords:** Agricultural intensification, India, leaching, lysimeters, mega city, soil nutrients