



Tropentag, October 11-13, 2006, Bonn

“Prosperity and Poverty in a Globalised World—  
Challenges for Agricultural Research”

## Exploring the Potential for Recycling Nutrients from Waste Water to Enhance Agricultural Productivity — the Example of Valley View University in Accra, Ghana

JÖRN GERMER, JOACHIM SAUERBORN

*University of Hohenheim, Stuttgart, Institute for Plant Production and Agroecology in the Tropics and Subtropics, Germany*

### Abstract

Agriculture in many countries of the developing world suffers from soil nutrient depletion with a directly associated reduction in yield. Contrariwise the rising population produces increasing amounts of organic human wastes derived from the food cycle. These wastes contain valuable nutrients which are withdrawn and not returned to the arable land instead they contaminate natural ecosystems. Use of human excreta and waste water for crop production could improve sustainability of agricultural systems through an increased emphasis on recycling and greater return of nutrients and water. At the Valley View University alternative sanitation and waste water technologies are installed which collect greywater and urine to boost crop production. Greywater from showers and sinks is used to irrigate crops like papaya (*Carica papaya*), banana (*Musa × paradisiaca*), plantain and cassava (*Manihot esculenta*), while urine collected from dry urinals is deployed to fertilise cereals. A mixture of urine and water derived from separating toilets is applied to mango (*Mangifera indica*) and cashew (*Anacardium occidentale*). The performance of all crops is closely monitored with the goal of optimal adaptation of the sanitary and collection facilities to local conditions and to investigate the nutrient and water cycling efficiency. Parallel the acceptability by the local people is assessed and pathogen monitoring programme is in place to guarantee hygienic safety. The nutrient efficiency of pure urine is studied in comparison with control, compound fertiliser, compound fertiliser plus water, compost and chicken manure in 6\*5 block design field trial planted to maize. The nutrient supply is based on the application of NPK 15:15:15 compound fertiliser at a rate 667 kg ha<sup>-1</sup> supplying 100 kg N, 44 kg P and 83 kg K per hectare. Urine, manure and compost are adjusted by the addition of TSP, KCl and Urea to provide the same amount of N, P and K. Preliminary results indicate that all nutrient sources increase the production drastically. With the aim to assess long term changes in soil fertility and to integrate the impact of low and highly variable precipitation, this trial will be continued for several years.

**Keywords:** Ecological sanitation, greywater, nutrient efficiency, urine