Water and nutrient fluxes as indicators for the sustainability of different land-use systems on the terra firme near Manaus

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The soils on the terra firme are typically poor in nutrients. Land-use systems adapted to these conditions must utilize available resources as efficiently as possible and avoid unproductive losses, e.g. through nutrient leaching. The project compares water and nutrient fluxes in different perennial land-use systems, either monocultures or mixed cropping systems, in order to determine the resource efficiency of perennial land-use systems. In this work, we were comparing monoculture systems with *Theobroma grandiflorum* or *Bactris gasipaes*, polyculture systems with *Theobroma grandiflorum*, *Bactris gasipaes*, *Bixa orellana* and *Bertholletia excelsa* and primary and secondary forest sites.

In the first experimental year, the equipment was installed to measure rainfall, throughfall, stemflow and soil water fluxes. These data could be combined with measurements of nutrient contents of the respective fluxes. For this purpose, laboratory facilities were implemented to analyse anions and cations in the different land-use systems. At the same time, the nutrient and organic matter content of the soils were studied.

First data could be gathered which allow conclusions about the impact of different tree species in mixed cropping systems. The investigated tree species differ in their effect on the water distribution within the cropping systems and nutrient accumulation. First results will be discussed in different contributions throughout the workshop.

During the next project phase, we will concentrate on the determination of the nutrient fluxes and nutrient uptake of different tree species in monoculture and in agroforestry systems. The pathways of nutrients will be assessed using tracer techniques. Special emphasis will be made on the investigation of organic pools of N, P and S in soil and soil solution.