

ZEF: Should the rest of the world go it alone?

Tirpak: As a member of the secretariat, it is not for me to say, this is a matter for the Parties to decide. Mr. Pronk, President of the Conference of the Parties, has launched a catalogue of new ideas that will be discussed at a ministerial meeting the week after

Easter in New York. Later in the spring, there may well be additional consultations between governments. Hopefully, by the time COP 6 resumes the USA will be able to come forth with ideas of its own. At that time, Parties will have to decide how they wish to proceed



Nutrient Response Units (NRU)

A Landscape Based Concept for Sustainable Land Management in Uganda

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Nutrient loss and soil erosion are widely spread problems in Uganda. A "landscape based" nutrient management approach shall help combat these problems.

The simple way of managing the fertility of the soil is to tailor technology to the farmer's abilities rather than to the needs of his land. Such an approach is widespread in Africa but ignores differences in land quality (e.g., soil organic matter levels) and soil fertility transfer (e.g., nutrient flows due to erosion) within a landscape. A new way

In densely populated areas of Uganda, such as the Lake Victoria Crescent and the Eastern and South Western Highlands, soil nutrient resources are being rapidly depleted. This is mainly due to continuous cultivation coupled with poor land management. As farmers lack the financial means, markets for input and the knowledge of appropriate land husbandry, there is little or no replenishment of nutrients - neither with organic nor inorganic fertilizers. Heavy rainstorms cause rampant soil erosion on slopes where virtually no soil or water conservation is practised. Farmers struggle with deteriorating land quality and are forced to grow low nutrient demanding crops or abandon highly degraded fields. Over the past thirty years this has led to a shift of banana (Matoke) cultivation in favor of root crops such as sweet potato and cassava within the Lake Victoria Crescent. Matoke cultivation has moved to the west. Farmers are also encroaching on wetlands in valleys and fragile lands such as traditional grazing land on hilltops. Since these lands have low resilience, soil nutrients are being depleted at a faster rate.



Nutrient loss through agriculture and erosion is one of the most urgent problems in Uganda. Photo: ZEF

of targeting fertility management options within a landscape is being developed by ZEF and the Kawanda Agricultural Research Institute (KARI) of the National Agricultural Research Organization (NARO), Uganda. The objectives of the approach are to assess spatially distributed soil nutrient stocks and flows as well as soil fertility problems within a landscape. Site specific and socio-economic appropriate technologies which integrate nutrient management and soil-water conservation are identified, tested and provided to agricultural extension services for dissemination.

Landscapes in Uganda are complex, comprising smallholder farming systems with many small plots of different land use on different aspects of the slopes. Patches of land with similar nutrient stocks, flows and soil fertility problems within the landscape are expected to respond equally to integrated nutrient management and soil/water conservation practices. Groupings of such patches are defined as *Nutrient Response Units (NRU)* for which management options are developed and fine-tuned according to the socio-economic conditions of farm households. Last year a survey was carried out in over 100 communities by the ZEF-IFPRI research project on "Policies for Improved Land Management in Uganda". Community resources were mapped, farmers were interviewed and soil samples analyzed to characterize soil fertility decline and land management (see ZEF News No. 4, May 2000). Out of this community sample, two catchments have been selected for more detailed NRU modeling.

With the help of farmers a plot survey was conducted and data collected on the spatial variation of land use and land management within each catchment. The socio-economic conditions of farmers, such as available land and labor were recorded during semi-structured interviews. Farmers also guided ZEF researchers to assess their plant nutrient resources and to map the flow of nutrients on hillslopes. Soil fertility was further estimated by a systematic nested grid soil sampling scheme. The Differential Geopositioning System (DGPS) was used to construct a digital elevation model and to record plot boundaries. All data are stored in a Geographical Information System (GIS). This GIS is coupled with a mathematical model to simulate nutrient flows across the landscape. Spatial statistics and spatial modeling are then applied to demarcate Nutrient Response Units as homogenous landscape patterns.

The NRU concept is being developed jointly with a local agricultural extension agency and farmers to ensure that it can be easily adopted. This participatory approach will facilitate dissemination of integrated nutrient management technologies at catchment scale, which can be targeted both to the NRU specific needs of land as well as to the socio-economic capability of smallholder farming systems, thus stabilizing or improving soil resources of all landscapes for sustainable food production.



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