



Tropentag, September 16-18, 2015, Berlin, Germany

“Management of land use systems for enhanced food security:
conflicts, controversies and resolutions”

Agroforestry Options for Sustaining Food and Biomass Production and Adapting to Climate Change

ANTHONY KIMARO¹, STEFAN SIEBER², GÖTZ UCKERT²

¹World Agroforestry Centre (ICRAF), Tanzania Country Programme, Tanzania

²Leibniz Centre for Agricultural Landscape Research (ZALF), Inst. of Socio-Economics, Germany

Abstract

The trend of crop yield and cultivated areas in SSA, suggests that agricultural expansion is the main strategy used by farmers to sustain food production. This practice, however, accelerates natural resources degradation. For instance, 27 % of deforestation in eastern and southern Africa is linked to agricultural expansion through wood extraction for accessing woodfuel. This demonstrates that food and biomass energy supply systems are closely linked. Thus, technologies integrating food and biomass production systems are critical for sustainable intensification of agriculture in SSA to enhance food security while minimising natural resources degradation. We analyse opportunities for meeting household's food and wood demands and increasing the adaptive capacity of smallholder farmers to climate change in SSA through agroforestry. Soil fertility depletion is one of the major driving forces for agricultural expansion, but integrating fertiliser trees on-farm can improve soil fertility and crop yields. High dense (10,000 trees per ha) stands of leguminous shrubs (e.g. *Tephrosia spp* and *Gliricidia spp*) planted in 1–2 year rotations with crops, has been noted to improve soil fertility and reduce fertiliser costs by 50 % without compromising maize yields. Consequently, there is ongoing work in Malawi to integrate agroforestry with the input subsidy programme as a strategy to scale out proven agroforestry practices and reduce investment risk to farmers. Longer fallows (up to 5 years) of trees have also been noted to build N and P to levels similar to recommended rates and doubling or tripling crops yields relative to unfertilised monoculture. Besides, improving crops production, agroforestry can reduce harvesting pressure on native forests through on-farm wood supply. For instance, clearing 2000–8000 ha of forest annually could be avoided in Tanzania if farmers would adopt woodlots to meet their household's woodfuel demands. Agroforestry practitioners in Kenya and Tanzania have been noted to be more adaptive to climate change (by 25 %) than non-agroforestry practitioners because of diversified products and ecosystem services from agroforestry. Consequently, agroforestry is increasingly being recognised as a climate-smart production system which through provisions of sustainable ecological and socio-economic benefits helps to increase resilience of farming systems and the adaptive capacity of farmers to impacts of climate change.

Keywords: Bioenergy, food and energy security, land degradation, resilience and sub-Saharan Africa