**Shrubs and trees counter land degradation in the West African Sahel: a quantitative analysis**

Georges F. Félix (MSc Agronomy and Tropical Forestry)  
PhD Candidate  
Farming Systems Ecology  
Wageningen University  
Droevendaalsesteeg 1, 6708 PB  
Wageningen, The Netherlands

[georges.felix@wur.nl](mailto:georges.felix@wur.nl%20)

**Abstract**

Soil degradation and fertility loss pose severe threats to the livelihood of farmers in sub-Saharan regions. Due to need for land, continuous cultivation with staple food has gradually replaced previous shifting cultivation systems, so that fallow periods have considerably reduced and no longer fulfil their soil regeneration role. Here we explore the use and management of native woody resources for providing an in situ renewable organic amendment as a basis for increasing soil carbon and biological status, thus sustaining fertility, enhancing water capture and utilization and therefore buffering climatic stress. In areas such as the central plateau in Burkina Faso, slash- and drought-tolerant shrub species are commonly present in farmers’ fields. Cut branches from these shrubs sometimes are placed on degraded soils as part of traditional soil restoration practices. Moreover, shrubs tend to intercept sediments and leaves and promote biological activity whereby they may form fertility islands of increased crop yield.

Land degradation is defined as the loss of properties to sustain soil productive capacity. Continued crop cultivation and insufficient fallow periods have led to severe soil organic matter depletion and subsequent soil degradation in semi-arid West Africa. Intensified pressure on land resources for subsistence farming has been observed in this region, undermining food provision of local farm communities. Improved use of local manure and compost are options to regenerate soils but often limited by availability of organic material to amend soils. Competing claims exist since crop residues are mainly used as livestock forage during dry season, limiting the availability of mulches to maintain or restore soil productive capacity.

Aim of this paper is to show a quantitative analysis of effects about farmer innovations regarding temporal and spatial arrangements including the use of native evergreen woody shrubs. Shrub-crop farming systems are naturally occurring and their designs provide input services such as fuelwood, medicine, and woody residues for mulch, amongst others. The latter supporting soil protection, while not conflicting with forage use of crop residues. These systems could constitute a viable alternative for sustaining soil fertility and improving crop productivity, with important consequences in maintaining and enhancing local livelihoods in the Sahel and in other dry areas of Africa.