Article title	Revisiting a ‘cure against land hunger’: soil fertility management and farming systems dynamics in the West African Sahel
Authors	Nico de Ridder, Henk Breman, Herman van Keulen & Tjeerd Jan Stomph
Keywords	Soil fertility
Abstract	Analysis of agricultural production systems in West Africa at the end of the 1980s revealed that arable farming without external inputs would lead to expansion of arable land at the expense of grazing land. With increasing population and demand for cereals, fallow systems would change to permanent cultivation, with the risk of decline in soil fertility of both grazing and arable land. This development finally would lead to decreasing land productivity jeopardising food security. Despite this alarming picture, food security has improved in the last decades. This paper reviews literature in order to revisit the analysis by testing the following hypotheses: Decline of soil fertility over time is hard to estimate and to measure.Expected decline in soil fertility is counteracted by farmers through reallocation and intensified use of organic material produced within the system.As farming systems develop soil fertility is first managed through reallocation and intensified use of organic material and mineral fertilisers are only used when such options are exhausted.To test the first hypothesis nutrient budgets and the direct monitoring and measuring of soil fertility to detect changes in soil fertility are discussed. To evaluate the second and third hypotheses a possible pathway of development of farming systems is presented substantiated with supportive evidence.Nutrient budgets show negative trends in stocks, which are probably overestimated because lateral in- and outflows are scale-dependent, difficult to estimate and often ignored.Under farming conditions, decline in soil fertility can hardly be measured. Factors involved are inherent low soil fertility, heterogeneity of soils and highly variable soil fertility management in space and in time. However, at coarser scales, gradients in soil fertility are detected being a result of centripetal transport of organic material.In the schematic development pathway, soil fertility management practises follow the path from fallow, via intensifying recycling of nutrients combined with increased integration of livestock and arable farming to using external inputs. Spatial analysis shows that the different stages in development co-exist.It is concluded that the first analysis in the 1980s has overestimated the negative trends in soil fertility decline through increased use of organic material by increased labour use. However, current systems at many places will face a shift towards use of external inputs, i.e., fertilisers. This development is apparently only possible if market attractiveness permits.
Publication date	2004-05
Citation	De Ridder, N., H. Breman, H. van Keulen and T.J. Stomph. 2004. “Revisiting a ‘Cure Against Land Hunger’: Soil Fertility Management and Farming Systems Dynamics in the West African Sahel,” *Agricultural Systems*, 80:109-131.
Article link	https://doi.org/10.1016/j.agsy.2003.06.004