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An Integrative Approach of the Geography of Soil Organic Matter (SOM) Management Practices to Prospect Future Below-Ground BioDiversity Erosion (BGBD), in the Taita Hills, South-East Kenya

GENTIANE BLANCHARD ORTIZ¹, ANNE CHABOUSSOU¹, SYLVIE SPOERRY², MIREILLE DOSSO¹

¹*CNEARC, Institute for Teaching and Training in Tropical and Subtropical Agricultural Studies, Agronomy and Innovations in Rural Systems, France*

²*CNEARC, Institute for Teaching and Training in Tropical and Subtropical Agricultural Studies (Montpellier, France), Social Management of Water resources, France*

Abstract

The issue of land intensification impacts on Below-Ground BioDiversity (BGBD) erosion is often addressed by linking soil micro-, meso- and macro-fauna quantity with land cover. However, it is also possible to adopt a deductive approach by drawing the geography and the dynamics of farming practices -- related to Soil Organic Matter (SOM) management -- with a direct bearing on BGBD. This integrative approach is based on an analysis of the socio-economics of land cover, e.g. determinants of farming practices. It helps building scenarii on future evolution of soil fertility.

This paper presents the outcomes of two fieldworks in the Taita Hills and their surrounding semi-arid plains, South-East Kenya. Small-scale farmers adopt various strategies to cope with increasing land scarcity. Some strategies are particularly outstanding, e.g. the intensification of the farming practices in the more humid highlands or the agrarian colonisation of the semi-arid foothills and lowlands.

This study required a multidisciplinary and systemic approach. Based on an extensive data collection on a 52 square km area, in-depth interviews and fool-proofing process, involving 150 farmers and key informants, eleven farming systems were identified. The farming systems segmentation relies on (i) combination of cash and home-consumption production (horticulture, dairy, coffee beans, maize, beans, and extensive livestock), (ii) farm acreage, (iii) livestock, (iv) labour force and (v) possible casual labour. It was hence possible to link the localisation of each farming system with the identified farm trajectories: highland valley bottom, rainfed highland and midland, foothills and lowlands. Furthermore, main SOM management practices were identified in each system, such as organic and inorganic fertiliser application, mulching, composting, fallow rotation, etc. Areas where SOM was decreasing and BGBD could be severely reduced were eventually located.

At a larger scale, the diversity of farming practices results in a mosaic of soil fertility status. The key drivers are pedoclimatics (natural resources distribution) and socio-economics (livelihood systems). Further consequences of BGBD erosion and fertility decrease are to be expected on land use and livelihood systems.

Keywords: Below-Ground BioDiversity (BGBD), farming practices, Kenya, land intensification, soil organic matter management, Taita Hills

Contact Address: Gentiane Blanchard Ortiz, CNEARC, Institute for Teaching and Training in Tropical and Subtropical Agricultural Studies, Agronomy and Innovations in Rural Systems, 14 Bis Rue Delmas- Appt 28, Montpellier, France, e-mail: gentianeblanchard@yahoo.fr