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Diversity of Soil Fertility Management Practices in Sudanian Zone of Benin (Western Africa)

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Abstract

Various soil fertility management practices are observed in the Sudanian agrarian zone of Benin. This study highlights some traditional practices such as agroforestry, fallow, animal parking, use of crop residues as organic fertilizer, post-harvests of grasslands, farming associations and rotations, which were commonly used by 67 % of farms.

Five variant of agroforestry system were observed: (i) woody parks with *Parkia biglobosa*, *Vittellaria paradoxa*, *Adansonia digitata* and *Ceiba pentadra*; (ii) fields pioneers on forest territories; (iii) agricultural plots planted with fruit-lofts of *Anacardium occidentale* and *Mangifera indica*; (iv) shifting cultivation using *Eucalyptus camaldulensis*, *Acacia auriculiformis* and *Leucaena leucocephala*; (v) fallows planted with *Tectona grandis* and *Gmelina arborea*. This traditional system is more largely used, as well as planted fallows of fruit trees, collective grazing fallows under contracts and fixed parking of sedentary herds. Crop residues and domestic wastes are largely exploited. Revenues from grasslands post-harvests were higher than those from leguminous plants and foster the control of flows of post-harvests residues and the development of mechanisms that guarantee grasslands. The cereal-leguminous plants account for 63% of farming associations, and are observed where the organic manure is less commonly used. Successions of cotton by cereals are associated with significant depletion in mineral while those of cereals by leguminous resulted in nitrogen gain.

The improved practices such as improved parks, composting, cropping of plants that enhance soil fertility (i.e. *Vigna unguculata*, *Glycine max*, *Mucuna pruriens*, *Cajanus cajan*, *Aschynomene histrix* and *Moringa oleifera*) were adopted. Adoption rate of "Biological Cotton" increased by 8% per year and yielded 600 kg of cotton per ha while the non biological cotton showed 980 to 1200 kg per ha. It reduces investment costs, risks in animal and human health and enhances agroforestry practices. Improved cropping techniques such as thinning, flat ploughing, application of optimal quantities of mineral manure and of organic manure were successfully adopted by 25%, 52%, 71% and 55% of farmers respectively.

Keywords: Benin, agro-diversity, soil fertility, Sudanian zone

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