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Evaluation of Different Fertilization Practices and Their Impacts on Soil Chemical and Microbial Properties in Two Agroecological Zones of Ghana

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Abstract : Renewed interest in soil management aimed at improving the productive capacity of Sub Saharan Africa (SSA) soils has called for the need to analyse the long term effect of different fertilization systems on soil. This study was conducted in two agroecological zones (i.e., Guinea Savannah (GS) and Deciduous forest (DF)) of Ghana to evaluate the impacts of long term (> 5 years) fertilization schemes on soil chemical and microbial properties. Soil samples under four different fertilization schemes (inorganic, inorganic and organic, organic, and no fertilization) were collected from 20 farmers` field in both agroecological zones. Soil analyses were conducted using standard procedures. All average soil quality parameters except extractable C, potential mineralizable nitrogen and CEC were significantly higher in DF sites compared to GS. Inorganic fertilization proved superior in soil chemical and microbial biomass especially in GS zone. In GS, soil deterioration index (DI) revealed that soil quality deteriorated significantly (−26%) under only organic fertilization system whereas soil improvement was observed under inorganic and no fertilization sites. In DF, either inorganic or organic and inorganic fertilization showed significant positive effects on soil quality. The high soil chemical composition and enhanced microbial biomass in DF were associated with the high rate of inorganic fertilization.

Keywords : deterioration index, fertilization scheme, microbial biomass, tropical agroecological zone
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