

Article title	Tillage and fertility management effects on soil organic matter and sorghum yield in semi-arid West Africa
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Keywords	Soil, Fertilizer, Tillage
Abstract	<p>Whether it is traditional, modern or “sustainable” agriculture, soil organic matter plays a key role in sustaining crop production and in preventing land degradation. A field experiment was conducted on a Ferric Lixisol at Gampela (Burkina Faso) in 2000 and 2001 to carried out the effects of tillage, fertilisation and their interaction on soil organic carbon (SOC) (0–10 cm), crop performance and microbial activities. Maize straw or sheep dung were applied separately or combined with urea in a till or no-till systems and compared with urea only and a control treatment. Sampling was done each year at 2 months after sowing and at harvest. SOC was increased in the tillage treatments in 2000 by 35% but only with 18% in 2001 suggesting reduced carbon accumulation in the absence of organic and mineral restitution. Ploughing in maize straw under conditions of N deficiency led to a drastic decrease in SOC due microbial priming effect that, was not observed when ploughing in sheep dung. In no-till system, losses, organic amendment N concentration and the soil N status determined the impact on SOC and crop productivity. The negative effect on SOC in the tillage treatment with maize straw (4.1 g kg⁻¹) was less when maize straw was combined with urea (6.2 g kg⁻¹). It is concluded that in semi-arid West Africa, without both organic resource and N inputs, soil organic matter “pays” for crop N nutrition. Increasing SOC accumulation while improving crop yield may be conflicting under low-input agricultural systems in semi-arid West Africa. Therefore, optimum soil organic carbon and crop performance results from a judicious combination of organic resources and inorganic N mediated by microbial activity.</p>
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