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"Agricultural development within the rural-urban continuum"

Crop Responses to Conservation Agriculture Practices in Sub Saharan Africa: A Meta-analysis of Existing Data

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Abstract

Food security in sub-Saharan Africa (SSA) is often constrained by highly degraded and weathered soils, poor agronomic management and often exploitative farming systems. While there have been many attempts to devise more sustainable and efficient ways to increase agricultural production, widespread adoptions of the strategies that require changes to the farming system and some investment have been limited. Conservation agriculture (CA) is one innovation of high relevance to the rain-fed farming systems of SSA. CA works on three main principles thus reducing soil disturbance through minimal till or no till, maintaining permanent soil cover and crop rotation. CA aims at increasing crop yields whiles lowering costs of production. Many studies have shown that CA increases rainwater infiltration, reduces evaporation losses, improves organic carbon and nutrient content of the soil. Increase in crop yield under CA and rain-fed conditions are however variable and depends on a number of factors. . We conducted a meta-analysis of published data sources from SSA to help in better understanding of the effects of tillage, residue retention and/or cover crop/intercrop practices on crop grain yield under contrasting soil textures, fertiliser input and climate. All of the studies used crop yield as response variable and majority of studies (60 %) were only one growing season and this poses a great challenge to the acceptance of CA by farmers since the benefits are mostly observed after several seasons. More of the literature (90 %) captured that CA performs better under fertiliser management. All studies used reported on soil characteristics but texture was only limited to the top soil (0–20 cm) and described by category (sandy, clayey etc.). Gaining adoption of CA by resource poor farmers in rain-fed farming systems will require clear messages about the expected productivity advantages as well as strategies to overcome the many other significant barriers to adoption.

Keywords: Conservation agriculture, crop rotation, meta-analysis, rain-fed conditions, zero tillage

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