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"Solidarity in a competing world — fair use of resources"

Conservation Agriculture in the Mt Elgon Highlands of Kenya and Uganda: Successes and Limitations

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Abstract

Degradation of soil resources underlies yield gaps and nutritional deficiencies in sub Saharan Africa (SSA) and is a principle barrier to sustainable intensification (SI) of agricultural production. Proper management of soil resources is key to SI, increasing options for diverse crop-livestock systems, but there are many persistent barriers to adoption of soil-building farming practices. Results of a five-year study that utilised co-design and co-innovation frameworks toward participatory research indicate that conservation agriculture systems (which utilise reduced disturbance, soil cover, and crop rotation) can effectively improve yields and soil quality in the densely populated Mt. Elgon border region of Kenya and Uganda. Systems evaluated included maize-bean intercropping with a cover crop relay in maize inter rows following bean harvest and a strip-intercrop system in which maize, beans, and a cover crop are grown in monocultural strips narrow enough for advantageous interactions such as light interception and complementary root growth. Each system was planted using three tillage approaches: conventional moldboard plow, minimum tillage, and no tillage. Using *Mucuna* as the cover crop, both systems performed well agronomically under all tillage approaches, with similar or greater grain yields than conventional maize-bean intercropping. Structured focus group discussions with participating farmers, their neighbours, ag technicians, and others familiar with the project revealed a preference for the strip-intercrop system combined with minimum tillage. Reasons for preferring minimum tillage over no till included more options for weed control than herbicides alone and decreased labor/traction needs compared to conventional tillage. Reasons for preferring the strip intercrop system included higher yields in the monocrop rotations, particularly for maize following *mucuna*, easier management of single-crop strips with cultivation or herbicides, and the observation that cash and labour outlays for maize could be concentrated on one-third of the area, increasing yields and reducing labour. The discussions made it clear that knowledge of fundamental crop and soil fertility management concepts is a primary need. Proper fertilisation of smaller plots could maintain overall maize yields while reducing labour and creating space for soil building cover or forage crops.

Keywords: Conservation agriculture, fertiliser management, soil organic matter

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