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## Conservation Agriculture: A Panacea for Food Insecurity among Smallholder Farmers in East Africa

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### Abstract

Low crop productivity among smallholder farmers in Sub-Saharan Africa attributed to poor and declining soil health has led to severe food insecurity. Previous attempts to address this problem have been hampered by socioeconomic constraints of the smallholders who often are unable to afford the needed inputs for improving soil fertility. Conservation agriculture has been reported to be a sustainable approach for intensification of crop production in low input farming systems. Moreover, in rain fed agriculture, higher soil moisture content has been observed in CA systems compared to conventional systems. However the lack of empirical data to elucidate CA benefits on soil productivity have been scarce. This paper identifies Conservation Agriculture (CA) as a low cost production strategy for improving soil productivity and enhancing crop yield. An experiment was conducted in Western Kenya to test the effect of varying rates of crop residue retention on the recovery of applied nitrogen and soil water content on a maize crop. Soil was sampled at 4 different soil depths two weeks after application of calcium ammonium nitrate (CAN). It was observed that treatments receiving incremental amounts of crop residues as mulch had significant amounts of applied nitrogen within rooting depth compared to the control and thus increasing its availability for crop uptake. The crop had greater water use efficiency in plots receiving 8 tons as crop residue. Cost benefit analysis showed that CA practices had between 20 to 30% less labour cost compared to convention practices. Conservation agriculture therefore portends a more cost effective strategy for improving soil productivity, better income due to reduced costs of labour and increased fertiliser and water use efficiency for the rural poor smallholder farmers in sub Saharan Africa.

**Keywords:** Conservation agriculture, crop residue, maize , nitrogen use efficiency, water use efficiency