

Building Resilience to Climate Change by Adopting Conservation Agriculture in the Smallholder Farming Systems

Cosmas Parwada, Justin Chipomho & Ronald Mandumbu

Abstract

Continuous soil fertility decline, soil degradation and abiotic stresses caused by climate change and variability affect crop productivity in sub-Saharan Africa. Crop yields in the smallholder sector have continued to decline, and farmers whose livelihoods rely on agriculture are poor and food-insecure. Technologies to avert some of the challenges faced by these farmers have been developed, although adoption is low in some countries of southern Africa. This chapter provides a treatise review on how the farmers can build resilience to climate change through adoption of conservation agriculture (CA). Conservation agriculture is one such technology whose main objectives are to reduce soil erosion and degradation, stabilize crop yield and increase crop profits. This is achieved through minimum soil disturbance, use of mulch or crop residue and crop diversification. Conservation agriculture has several positive attributes, which enable crop productivity in semi-arid regions of southern Africa. Among other advantages, CA maintains or improves soil structure; reduces soil exposure to water and wind erosion; increases water infiltration and reduces loss through evaporation. Minimum soil disturbance slows organic matter breakdown and mineralization resulting in organic carbon build-up. Moreover, there is little disruption to the soil organisms which are responsible for the mineralization of organic matter, improvement of soil fertility and structure. Compared to the conventional tillage system, CA saves time, energy and money and enhances enterprise profitability. Crops grown under CA systems have demonstrated resilience to some abiotic stresses associated with climate change.