1. Is conservation agriculture a climate-smart option for smallholders in sub-Saharan Africa?

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Sub-Saharan Africa (SSA) faces the challenge of developing a climate-smart agriculture (CSA) that simultaneously ensures food security, mitigation and adaption to climate change (CC). Conservation agriculture (CA) is widely promoted in SSA and is considered as a way to meet these CSA objectives. The objective of the study was to assess whether CA in SSA contributes to the three pillars of CSA, seeking evidence from the peer-reviewed literature that compares the performances of CA and conventional tillage-based (CT) cropping systems. The positive yield responses to CA compared to CT are widely documented in SSA. The positive effects on soil fertility result in increased yield in the long term. Yield impacts in the shorter term are variable and depend to a great extent on the climatic context. CA responds better under low and/or erratic rainfall conditions, mainly due to the mulching effect on soil water conservation. This suggests the potential of CA as a cropping strategy to adapt to more variable rainfall in the future as predicted in many regions of SSA. However, an increase in yield does not necessarily translate into an increase in farm income. The economic impact of CA is highly dependent on the socioeconomic context. The potential of CA to mitigate CC remains unclear. Retention of crop residues as mulch may not always translate into soil carbon sequestration. Further studies on the impact of CA on soils’ greenhouse gases emissions are needed. In conclusion, the ability of CA to contribute to CSA is very site- and farm-specific, and lies to a great extent in its capacity of retaining crop residues as mulch on the soil surface.