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<b>Project Title</b>	<b>Understanding medium to long term effects of conservation agriculture practice on soil physical properties. A case of Mbire rural district in Lower Zambezi- mana pools TFCA</b>

## **Abstract**

Conservation agriculture (CA) is believed to take advantage of natural ecological processes to conserve moisture, enhance soil fertility and improve soil structure. There has been a lot of effort to disseminate this technology; however the adoption rate is still low. This creates the need to document potential benefits realized by the farmers over time and lobby for policy evaluation in line with climate change and the world call towards climate smart agriculture technology. A study to determine changes in soil physical properties over time will be conducted in two cropping seasons 2015/16 and 2016/17 in Mbire rural district situated in natural farming region IV and V where average rainfall is around 450 – 600mm per season. The soils are mostly sandy to sandy loam. A survey will first be conducted to determine CA adoption. CA practice will be categorized based on tillage methods i.e. digging basins, ripper lines and direct seeding as well as and in addition any other of the three principles practiced by the farmer. The survey is an identification strategy for CA farmers and will also be used to quantify the loss (in terms of CA benefits) that farmers in Mbire district are experiencing. In order to determine the changes in soil physical properties, 50 farms will be selected and categorised into conventional tillage (CT); undisturbed or natural soil (NS) at the field boundary; and CA. CA will be further divided into three subcategories based on duration of practice by the farmer at the site: viz CA1 (< 3 years), CA2 (5-7years) and CA3 (> 8 years). Trials at each site will be classified into the aforementioned categories, with four farmer field replicates per category giving a total of 12 farmers for CA out of the 50. CT fields and field boundary sites will be identified purposively as the nearest fields neighbouring the CA plots. Four studies will be carried out. The first study will be evaluating the effects of CA on Soil Organic Carbon using the Walkley-Black method (Walkley & Black, 1934). The second study will determine the effects of CA on surface run off over time using reconnaissance method. The third study will investigate the effects of CA on soil loss making use of volumetric measurements while the fourth study will evaluate effect of CA on weed seed banks. Measurements will be drawn from four replicates of each field category or 'treatment' and each farmer will represent a replicate thus making the data amenable to analysis of variance in a completely randomized block design. Regression will be used to analyse Organic Carbon.