3RD SADC GROUND WATER CONFERENCE

SUB-THEME 1: Sustainable Groundwater Use for a Food Secure SADC Region

Preliminary investigation of Ground Water Response to Conservation Agriculture Practices on Maize-Legume Intercrop Systems

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ABSTRACT

The advent of climate change has resulted in negative impacts on terrestrial water resources in some regions, for instance, increased seasonal variability and more frequent occurrence of flooding and drought which impact negatively on water retention and groundwater recharge. Water availability and reliability are essential for drinking purposes and food security. The linkage of water resources to food security is a function of several factors including access to water, water production functions and field management practices. With regard to the latter, in agriculture, one of the responses to climate change is therefore the promotion of climate resilient agriculture, such as conservation agriculture (CA). CA involves several

practices such as zero/minimum tillage, mulching, and early planting, which are considered more water conserving than conventional agriculture because of reductions in evaporation. The prospect of water saving through adoption of CA could unlock water resources for increasing food production or for other uses. While a number of studies have been undertaken on the beneficial effects of CA on soil health, fertility, and soil moisture retention in the upper layers, there is limited data on the impacts of CA practices like conservation tillage on soil moisture propagation into the deeper layers and on how this affects groundwater recharge. To fill this gap, we set up a plot-scale study in three countries (Malawi, Zambia and Zimbabwe) to monitor groundwater recharge and to identify differences in recharge patterns and amount under CA in comparison to conventional tilled fields. The monitoring approach includes different physical monitoring methods, as well the evaluation of hydrochemical and isotopic changes in groundwater at different depth over time. The objective of the study is to quantify measurable effects on groundwater, which arise from adopting CA practices. This presentation intends to present the set-up and preliminary results from the three study sites.

Keywords: Conservation agriculture, Conventional tillage, Soil moisture, Groundwater recharge, Africa