



Improved modelling with a RZWQM using field measurements of ET and crop parameters for improved system understanding in an African semi-arid agro-ecosystem

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Most African agroecosystems in arid and semiarid areas have constantly reported low crop productivities due to water scarcities, poor agricultural practices and poor irrigation systems which have in turn led to low water productivities. Low water productivities have dominantly been linked to poor evapotranspiration efficiencies hence the need to better understand field scale ET dynamics. To address this challenge, improved simulation and understanding of the field scale ET dynamics especially within the soil-plant system is needed where in-situ ET measurements along with other crop parameters are incorporated into field modelling systems. In this study we built a field scale model using the RZWQM2 for a selected field in the midlands of Makanya catchment, Northern Tanzania. Field measurements of ET from a Bowen Ratio Energy Balance (BREB) system were taken together with other crop parameters such as crop height, canopy cover, biomass, yield and soil moisture contents. Model performance was improved with the integration of these field measurements with good simulations of ET, biomass, yield and the surface energy balance components. Preliminary analysis of these results indicated that high evaporation rates from the soils, occurring especially during early crop development stages, greatly affected the amount of soil moisture available for the crops. This was especially due to the high evaporating power of the environments in the area indicating that moisture conservation techniques are needed in the area. However, there is still need to understand and quantify the impacts of the different agricultural impacts on ET efficiencies.