

# Enhancing water use efficiency of cassava and sorghum based cropping systems in drylands

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## Background

The study is based on the premise that soil moisture is a major limiting factor in crop growth and productivity in rain-fed agricultural systems, especially in the drylands. Efforts to improve crop production in the drylands of Sub Saharan Africa are envisaged to depend on efficient capture, management and use of the rainwater resources. The study evaluates effects of cropping systems and tillage management strategies on soil water flows in cassava-sorghum cropping systems.

## THE STUDY

The study is located in eastern Uganda (34° 0' E and 1° 40' N) in the Usuk sandy farm-grasslands agroecological zone. The dominant soil type in the area is *Petroferric Haplustox*. The experiment is set in a randomised complete block design laid out as split plot. Two tillage management practices (mouldboard; ripper ploughing) constitute the blocks (Plate 1). Treatments (sole cassava; sole sorghum; sole cowpea; cassava + sorghum; cassava + cowpea; sorghum + cowpea) replicated three times.



Plate 1. Seedbed preparation using, a) mouldboard plough, b) a ripper plough.

## RESEARCH

### APPLICATION

There are indications that surface runoff is not a major water flow pathway in both mouldboard and ripper ploughing. Soil moisture storage is almost similar in the 10-40 cm layer of the profile in all cropping treatments. Treatments with cowpea were able to build a surface cover of about 40% by 4 weeks after planting (WAP).

Soil moisture distribution, use and efficiency can be modified by soil surface conditions through tillage and canopy cover. Tillage management appreciably modifies soil moisture storage but only satisfies the crop demand during the dry spell.

### Further Outputs

Quantification of water used in the different cropping systems.

Identification of the cropping system with the best water use efficiency

Tillage practices that reduce surface flow and increase green water flow in cassava and sorghum crops identified.



Monitoring yield performance



Monitoring plant available water (PAW)

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