



CEPHaS Project Briefing

No.2 June 2018

RECENT ACTIVITIES IN SOIL PHYSICS

The CEPHaS project is a joint undertaking between colleagues in Zambia, Zimbabwe, Malawi and the UK to strengthen our shared capacity to study how conservation agriculture practices affect the behaviour of water in soil, crop and groundwater systems. Key to this is the use of new methods to study soil water, both in the field and the laboratory.



Figure 1 Data logger with cables in a maize-soybean plot at Liempe Farm, Lusaka.

The University of Zambia's CEPHaS experiment is a new trial established at the University's farm at Liempe near Lusaka. The experiment comprises a conventional maize crop and a maize/soybean intercrop, the latter to have crop residues and other biomass left on the plots after harvest. The treatments are replicated in four blocks. Plots were planted in January 2018. In February 2018 colleagues from Rothamsted Research, University of Zimbabwe and Lilongwe University of Agriculture and Natural Resources visited Liempe farm for on-site training and collaborative establishment of soil physical sensors and data loggers on the CEPHaS plots.

One data logger was established in each of six experimental plots. Each logger collects data from three types of sensor. The first is a soil profile probe, which measures soil water content at each of six depths to one metre. In addition five soil moisture sensors are installed at depths of 10, 20, 40, 60 cm and 1 m, and three sensors to measure the matric potential of the soil water are installed at 10 cm, 40 cm and 1 metre. Measurements from these sensors will allow us to understand what happens to water in soil under the contrasting treatments, and to understand and monitor changes in the availability of water to the crop and soil temperature throughout the soil profile.

The Liempe farm experiment has now been harvested, and data logging continues. Whilst treatment differences are not expected in the first season, the system has proved to be robust and reliable, and we shall be able to use the data to establish protocols for analysis. Instrumentation at the sites in Zimbabwe and Malawi is in an advanced stage of planning, and experience that colleagues acquired in Zambia will be invaluable when the new sites are instrumented later this year.



Figure 2 Colleagues preparing soil moisture sensors for installation at Liempe Farm.



Figure 3 Colleagues discussing an experimental site near Domboshava, Zimbabwe.

In addition to field-based soil physics, requirements for laboratory equipment have been identified. Equipment for University of Zambia is soon to be shipped and established, including apparatus to measure soil water retention and hydraulic conductivity, and a new drying oven. In August, Rothamsted Research colleagues will visit Zambia, Zimbabwe and Malawi for further focussed soil physics work on the project and to discuss a proposed soil physics workshop in the autumn, which will mark a substantial step in the development of our shared capacity to understand the soil under conservation agriculture.

WHO ARE WE?

We are soil scientists, agronomists, hydrogeologists, geophysicists, statisticians and agricultural economists from the University of Zimbabwe, the University of Zambia, Lilongwe University of Agriculture and Natural Resources, University of Nottingham, Rothamsted Research, Liverpool School of Tropical Medicine and the British Geological Survey. We are also joined by Kasi Agricultural Training Centre as an NGO partner.

Together we constitute a unique multidisciplinary team with a wide range of experience, including in capacity strengthening.

OUR PARTNERS

We are working with the Zambian Agriculture Research Institute (ZARI), the Department for Agricultural Research Services (Malawi), and our commercial partner, Delta-T Devices (UK).



HOW CAN I FIND OUT MORE?

- Contact your appropriate country lead (see below).
- Contact the principal investigator (see below).
- Look out for opportunities to attend project Stakeholder Workshops. The first of these will be at Lilongwe in July 2018.
- If you wish to subscribe to this series of project briefings, then contact the principal investigator by email.

UK Research and Innovation



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