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# A Virtual Irrigation Academy to Improve Water Productivity in Malawi, Tanzania and South Africa

## Overview

The Virtual Irrigation Academy (VIA) combines new irrigation monitoring tools with an on-line communication and learning system. The VIA has several roles including:

- Physical data capture from irrigation schemes in real time, so that project and country leaders can understand the situation and mentor extension workers and farmers
- Capture of the dialogue between farmers, extension workers and scientists for analysis of how learning occurs
- Training resources such as: videos on equipment installation and maintenance, interpretation of data and documenting success stories which can be shared with other farmers in the project countries.

The monitoring tools have been designed to fit the mental model of farmers and to give an output that is linked to action. Information on soil water suction, nitrate concentration and salinity levels are illustrated by colours that represent action thresholds, and not as numbers with complicated units. Each country will form "learning coalitions" consisting of farmers, extension workers, a district irrigation officer and research and project staff. Each coalition will be located around an irrigation scheme, and will build their own case studies based on experiential learning. The learning coalition will be resourced to expand to neighbouring irrigation communities, using the VIA as the major resource.

## Research

The project is refining a set of monitoring tools that show soil water, salt and nitrate status as colour patterns, instead of numbers and graphs. These colours are displayed on the Virtual Irrigation Academy platform at <https://via.farm/> and are used as a basis for social learning among the irrigation community."

The fundamental building blocks of the Virtual Irrigation Academy are now in place and being evaluated by third parties. This includes purchase of equipment from the VIA shop, use of instruction videos, automatic upload of data to the website and visualisation of data.

The whole system is being built to be scaleable i.e. once each part of the system has been perfected, it should not matter how many users there are.

ACIAR project number	LWR/2014/085
Start date and duration	July 2015, 4 years
Location	Malawi, Tanzania and South Africa
Budget	\$2,955,000
Project leaders and Commissioned Organisation	Dr Richard Stirzaker CSIRO Agriculture and Food
Partner country Project leaders and their institutions	Dr Brian Isabirye, Association for strengthening agriculture in Eastern and Central Africa Dr Isaac Fandika, Malawi Department of Agricultural Research Services Dr Eliakim Matekere, Tanzania National Irrigation Commission Dr Joe Stevens, University of Pretoria
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Most users are still on the manual reader system, while we determine how well the automated reader works across the different countries with different mobile phone carriers and coverage. We are also developing a manual data upload facility into the website to capture all the historical data and to allow all users of the Chameleon system to participate in the VIA.

Note that this project has a sister project LWR/2016/137 *Transforming irrigation into profitable and self-sustaining systems in southern Africa*. The project is operating in Mozambique, Tanzania and Zimbabwe and is combining the use of the tools and VIA with agricultural innovation platforms to overcome market and water supply problems.



Photo: Chameleon reader with sensors

## Achievements

- Chameleon reader redesigned from solid state version to new Arduino-based micro-processor which has contributed to two thirds drop in price
- Chameleon sensors redesigned to be more robust and reproducible included 3-D printed sensor cradles and ENIG electrodes printed on circuit boards
- Temperature compensation and unique ID chips built into sensor arrays
- Wi-Fi capability built into Chameleon reader for direct transmission of data to website
- Website that can display soil water patterns in real time and capture basic crop information <https://via.farm/our-community/>
- 22 short videos illustrating how the equipment works, installation and interpretation of data <https://via.farm/how-to-guides/>
- Training workshops with project staff and extension workers in Tanzania (Morogoro) and Malawi (Blantyre)
- Built equipment in Pretoria and installed at five of the six irrigation sites
- Virtual Irrigation Academy shop provided online <https://viashop.csiro.au/>