ACEIoT

UNIVERSITY of RWANDA

College of Science and Technology

Africa Center of Excellence in Internet of Things (ACEIoT)

Research Seminar

Simulation of Internet of Things Water Management for Efficient Rice Irrigation in Rwanda

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Abstract:

The central role of water access for agriculture is a clear challenge anywhere in the world and particularly in areas with significant seasonal variation in rainfall such as in Eastern and Central Africa. The combination of modern sensor technologies, the Internet, and advanced irrigation equipment combined in an Internet of Things (IoT) approach allow a relatively precise control of agricultural irrigation and creating the opportunity for high efficiency of water use for agricultural demands. This IoT approach can thereby increase the resilience of agricultural systems in the face of complex demands for water use. Most previous works on agricultural IoT systems are in the context of countries with higher levels of economic development. However, in Rwanda, with a low level of economic development, the advantages of efficient water use from the application of IoT technology requires overcoming constraints such as lack of irrigation control for individual farmers, lack of access to equipment, and low reliability of power and Internet access. In this work, we describe an approach for adapting previous studies to the Rwandan context for rice (Oryza sativa) farming with irrigation. The proposed low cost system would automatically provide irrigation control according to seasonal and daily irrigational needs when the system sensors and communications are operating correctly. In cases of system component failure, the system switches to an alternative prediction mode and messages farmers with information about the faults and realistic irrigation options until the failure is corrected. We use simulations to demonstrate, for the Muvumba Rice Irrigation Project in Northeast Rwanda, how the system would respond to growth stage, effective rainfall, and evapotranspiration for both correct operation and failure scenarios.

DATE & TIME:

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10:00 am to 11:00