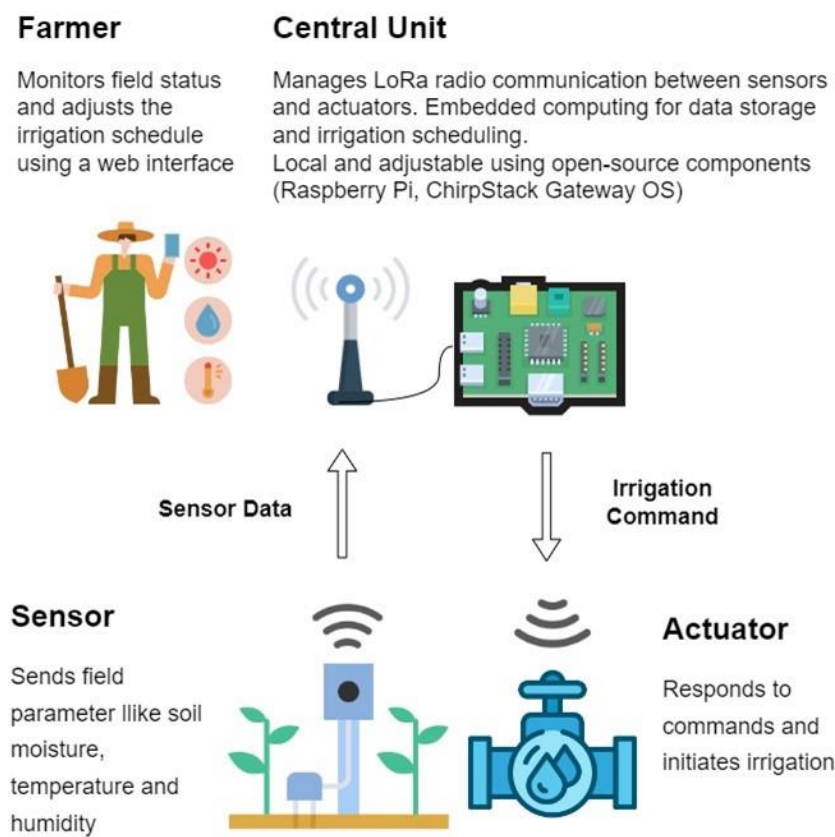


**Open smart irrigation**

Smart irrigation integrates modern technology to optimize irrigation practices, improving water efficiency and agricultural productivity. Within the FoodLAND project, Agroscope conducted field trials in Uganda using various smart irrigation components, alongside farm surveys across the country. The trials revealed a potential 30% increase in productivity compared to conventional irrigation methods, but they also identified significant challenges that could hinder the widespread adoption of complex technologies in Uganda’s farming context. Insights from farm surveys, combined with statistical household data, led to the development of a requirement catalogue tailored to the unique needs of Uganda’s agricultural environment. Building on the core principles of accessibility and robustness, Agroscope introduced the “Open Smart Irrigation” platform to deliver affordable and practical solutions to farmers in emerging economies. The platform includes a software solution and educational materials designed to facilitate the creation of smart irrigation systems suited to diverse and resource-constrained settings.



*Figure1. System architecture of the “Open Smart Irrigation” platform*

adjust irrigation schedules. The ultimate aim of the “Open Smart Irrigation” platform is to empower smallholder farmers to adapt to climate change while improving their productivity and resilience. To achieve this, the project incorporates farmer feedback and experiences to continually improve the platform’s core principles of accessibility and robustness.

The system architecture (Figure 1) leverages LoRa radio technology to create a low-power wide-area network (LPWAN), enabling communication between sensors and actuators. At the heart of the system is a “Raspberry Pi” computer running open-source software (Customized Chirpstack Gateway OS), which supports local data storage, LoRa communication, and irrigation scheduling. By operating offline and consuming minimal power, the platform addresses rural challenges like unreliable electricity and internet access. To ensure its relevance and scalability, the project continuously evaluates hardware solutions for compatibility with the requirement catalogue, integrating the most suitable options into the platform. The software allows advanced super-users to customize configurations, while farmers (end-users) access the system via an intuitive web interface to monitor soil moisture and environmental data and