

Chameleon Sensor: Soil Moisture Monitoring Sensor

Simple signals, smarter farming

The Chameleon Sensor is a device the is used to measure and monitor soil moisture in the soil. It mimics the way a plant experiences the amount of water in the soil, measuring the effort (tension) roots need to extract moisture. Because the Chameleon Sensor measures tension, it does not require calibration for different soil types.



International Water Management Institute
Adebayo Oke

Commodities

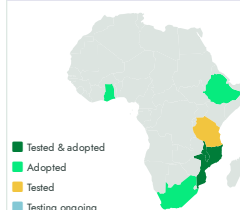
Sustainable Development Goals



Categories

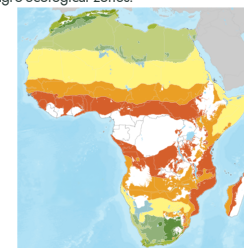
Production, Equipment, Water management

Tested/adopted in



Where it can be used

This technology can be used in the colored agro-ecological zones.



Target groups

Farmers, Soil scientists

Warning: This technology is not yet validated.

Scaling readiness: idea maturity 8/9; level of use unknown

Inclusion assessment



Climate impact



Problem

- **Over-irrigation** wastes water, reduces fertilizer efficiency, increases costs, and can even lower yields.
- **Under-irrigation** leaves crops water-stressed, slowing growth and reducing productivity.
- **Soil degradation and salinization** happen when too much water leaches nutrients and builds up salts.
- **Pests and diseases** are encouraged by overly wet conditions.

Solution

- **Optimized irrigation:** Ensures water is applied only when crops need it, improving yields and avoiding waste.
- **Efficient fertilizer use:** Keeps nutrients in the soil for plants instead of being washed away.
- **Soil health protection:** Prevents nutrient leaching and salt build-up, keeping soils productive.
- **Pest and disease reduction:** Avoids overly wet conditions that encourage harmful organisms.

Key points to design your project

The **Chameleon™ Soil Water Sensor** is a low-cost, colour-coded tool that shows farmers when to irrigate (blue = wet, green = good, red = dry). It prevents over- and under-irrigation, saving water, protecting soil health, and boosting yields.

For projects:

- **Costs:** USD 66 (Card kit) or USD 200 (Wi-Fi kit), sensors last 2–4 years.
- **Procurement:** Source via licensed manufacturers (e.g., REng, South Africa).
- **Training:** Extension agents and farmers need guidance on installation and use.
- **Outreach:** Posters, radio, and demos encourage adoption.
- **Installation:** Sensors placed at 20–60 cm depths depending on crop.
- **Partnerships:** Work with research institutes, NGOs, and extension services to scale.

Chameleon sensors help governments strengthen **water management, food security, and climate-smart agriculture**.

2 - 4 Years

Typical lifespan of a sensor



Open source / open access



Chameleon Sensor

<https://taat.africa/nqi>

Last updated on 2 October 2025, printed on 2 October 2025

Enquiries e-catalogs@taat.africa