



smart **AKIS**
Smart Farming Thematic Network



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Open source hardware for crop monitoring



Title	Open source hardware for crop monitoring
Title (native language)	
Category	<ul style="list-style-type: none"> • Recording or mapping technology • Farm Management Information System
Short summary for practitioners (Practice abstract) in English	<p>A system to monitor climatic variables using OSS and OSH to be applied in PA was developed. It was demonstrated that it is possible to design an accurate system using open source hardware and open systems to record the input for these models and monitor crops. The system presented has two main components: a device that records environmental parameters and a smartphone application (software) that links this device to a data server in order to process and analyse the information. The solution is scalable in terms of the type of sensors used (i.e. temperature and relative humidity of the air or soil), the rate of information retrieval and so on, so it can be used in various scenarios, including environmental or land policy monitoring. Moreover, this open source hardware can be used by a broad variety of users and is an alternative in poor rural areas because of its low cost compared to other solutions.</p>
Short summary for practitioners	
Website	
Audiovisual material	
Links to other websites	
Additional comments	
Keywords	Farming equipment and machinery Fertilisation and nutrients management Soil management / functionality Water management Climate and climate change

Additional keywords	hardware, smartphone, field
Geographical location (NUTS)	EU
Other geographical location	Very general, could be used all over the world.
Cropping systems	Arable crops Open field vegetables
Field operations	Crop and soil scouting
SFT users	Farmer
Education level of users	All
Farm size (ha)	0-2 2-10 10-50 50-100 100-200 200-500 >500

Scientific article

Title	Open source hardware to monitor environmental parameters in precision agriculture
Full citation	Mesas-Carrascosa, F.J.; Verdú Santano, D.; Meroño, J.E.; Sánchez de la Orden, M.; García-Ferrer, A (2015). Biosystems Engineering, DOI:10.1016/j.biosystemseng.2015.07.005

Effects of this SFT

Productivity (crop yield per ha)	No effect
Quality of product	No effect
Revenue profit farm income	No effect
Soil biodiversity	No effect
Biodiversity (other than soil)	No effect
Input costs	No effect
Variable costs	No effect
Post-harvest crop wastage	No effect
Energy use	No effect
CH4 (methane) emission	No effect
CO2 (carbon dioxide) emission	No effect
N2O (nitrous oxide) emission	No effect
NH3 (ammonia) emission	No effect
NO3 (nitrate) leaching	No effect
Fertilizer use	No effect
Pesticide use	No effect
Irrigation water use	No effect
Labor time	Some decrease
Stress or fatigue for farmer	No effect
Amount of heavy physical labour	No effect
Number and/or severity of personal injury accidents	No effect
Number and/or severity of accidents resulting in spills property damage incorrect application of fertiliser/pesticides etc.	No effect
Pesticide residue on product	No effect
Weed pressure	No effect
Pest pressure (insects etc.)	No effect
Disease pressure (bacterial fungal viral etc.)	No effect

Information related to how easy it is to start using the SFT

This SFT replaces a tool or technology that is currently used. The SFT is better than the current tool	disagree
The SFT can be used without making major changes to the existing system	no opinion
The SFT does not require significant learning before the farmer can use it	no opinion
The SFT can be used in other useful ways than intended by the inventor	disagree
The SFT has effects that can be directly observed by the farmer	no opinion
Using the SFT requires a large time investment by farmer	disagree
The SFT produces information that can be interpreted directly	no opinion

[View this technology on the Smart-AKIS platform](#)

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