



smartAKIS
Smart Farming Thematic Network



THIS PROJECT HAS RECEIVED FUNDING FROM
THE EUROPEAN UNION'S HORIZON 2020 RESEARCH
AND INNOVATION PROGRAMME UNDER GRANT
AGREEMENT N. 696294

Map-based variable rate granular fertilizer application control system



Title	Map-based variable rate granular fertilizer application control system
Title (native language)	
Category	<ul style="list-style-type: none"> • Reacting or variable rate technology
Short summary for practitioners (Practice abstract) in English	<p>The applicator system consists of an AVR microcontroller for controlling the driving step motor of the fertilizer metering screw and a ground driven wheel integrated with a rotary encoder for the applicator displacement and speed measurement. Initially, the applicator was calibrated in laboratory to derive a relationship among the step motor speed, the input frequency, and the rate of fertilizer application as a function of metering screw rotational speed. Laboratory evaluation included measurement of the lag time while changing the application rate from low to high and vice versa. In the field tests, a factorial experiment with a split-split design was used to investigate the effects of fertilizer type (urea and triple super phosphate), applicator forward speed (3, 6 and 9 km/s) and application rate (75, 125 and 175 kg/ha) on precision of application rate (the percent of deviation between actual and target rates). The results showed that the forward speed and the application rate both had significant effect on precision of application rate, while fertilizer type had no significant effect. The precision of application rate decreased when forward speed and application rate were increased.</p>
Short summary for practitioners	
Website	
Audiovisual material	
Links to other websites	
Additional comments	

Keywords	Fertilisation and nutrients management Energy management Biodiversity and nature management
Additional keywords	Precision agriculture; Travel speed; Fertilizer type; Application rate
Geographical location (NUTS)	EU
Other geographical location	Global
Cropping systems	
Field operations	Fertilization
SFT users	Farmer Contractor
Education level of users	All
Farm size (ha)	0-2 2-10 10-50 50-100 100-200 200-500 >500

Scientific article

Title	Design, development and field evaluation of a map-based variable rate granular fertilizer application control system
Full citation	Forouzanmehr, E.; Loghavi, M. (2012). Agricultural Engineering International: CIGR Journal, DOI:

Effects of this SFT

Productivity (crop yield per ha)	Some increase
Quality of product	Some increase
Revenue profit farm income	Some increase
Soil biodiversity	No effect
Biodiversity (other than soil)	No effect
Input costs	Some decrease
Variable costs	Some decrease
Post-harvest crop wastage	No effect
Energy use	Some decrease
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	Large decrease
Pesticide use	No effect
Irrigation water use	No effect
Labor time	No effect
Stress or fatigue for farmer	Some decrease
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.	Large decrease
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	agree
The SFT can be used without making major changes to the existing system	strongly agree
The SFT does not require significant learning before the farmer can use it	agree
The SFT can be used in other useful ways than intended by the inventor	no opinion
The SFT has effects that can be directly observed by the farmer	agree
Using the SFT requires a large time investment by farmer	disagree
The SFT produces information that can be interpreted directly	agree

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

SMART AKIS PARTNERS:

 ΓΕΩΠΟΝΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ
AGRICULTURAL UNIVERSITY OF ATHENS

 REPUBLIC OF SERBIA
AUTONOMOUS PROVINCE OF VOJVODINA
PROVINCIAL SECRETARIAT FOR AGRICULTURE,
WATER MANAGEMENT AND FORESTRY

 **WAGENINGEN**
UNIVERSITY & RESEARCH

in *iniciativas
innovadoras*

cuma 
O u e s t

Delphy

zalf

DLG


BioSense

 **INTIA**
Tecnologías e Infraestructuras Agroalimentarias

CEMA 
European
Agricultural
Machinery

AGTA
Les Instituts Techniques Agricoles

David Tinker &
Associates Ltd 

This factsheet was generated on 2018-Apr-03 11:57:17.