ADDFerti - A Data-Driven Platform for Site-Specific Fertigation

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Kick-off cofunded Projects Seminar
17-18th March 2021

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grand agreement no 862665 ICT-AGRI-FOOD.

Goal and context

Problem:

- Environmental contamination from excess use of chemical fertilisers.
- Shortage of water associated with climate change.

Goal:

To design, develop and test a fully-automated data driven platform for variable rate fertigation (VRFI).

Question:

Can nutrients (e.g., N, P and K) and water be combined during a VRFI process to maximise yield and reduce input cost, environmental footprint and water and fertiliser use in arable production?

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Main project activities / challenges

- Development in the hose reel irrigation system (HIS) by partner Sezer to implement VRFI.
- Developing a **fully automated decision supported loop of VRFI**.
- Developing a **cloud-based framework** for extracting hidden patterns of data.
- Developing a **user-friendly interface platform**.

ADDFerti will build on findings of FarmFuse (ICT-AGRI project

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What will your project do?/ Objective and Hypothesis

Objectives:

•Collect data on soil, crop, and topography attributes.

•Develop recommendations for VRF of N, P and K and water use for irrigation using advanced machine learning, data fusion, geostatistics and decision support tools.

•Develop a fully-automated ICT platform for data transfer, data storage, data processing and management, accounting for data stewardship and data standardisation.

•Validate the fully-automated ICT platform for VRFI in commercial fields.

•Apply cutting edge life cycle analysis (LCA) and socio-economic tools to evaluate the environmental and economic performance of the developed solution.

•To communicate with key stakeholder groups to promote adoption of the combined solution.

Hypothesis:

implementation of a fully automated, data-driven platform for VRFI increases crop yield, and reduces environmental footprint by reducing the amount of N, P and water use for irrigation.

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What is your project contributing to? Potential impact

↑ Yield
↑ Profit (10%)

↓ Fertilisers (10%)
↓ Water use (20%)

Fully automated transfer of data and recommendations to and from the cloud

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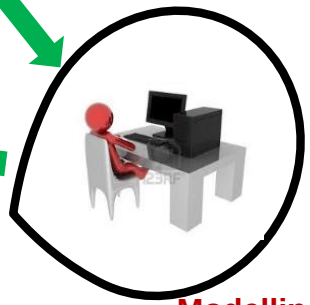
The selected approach / Research approach & activities

Maize and potato

Sensing

Cloud intelligence

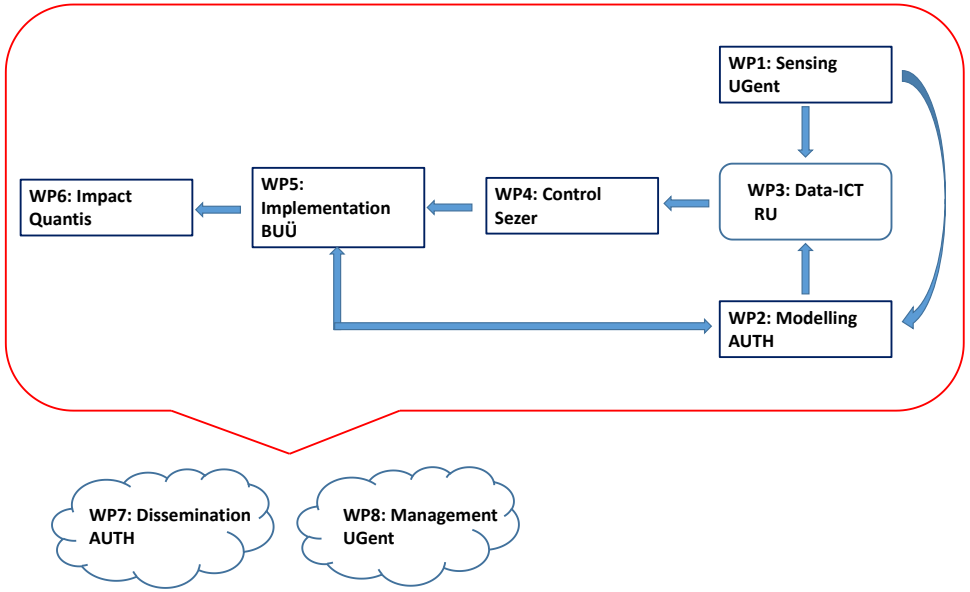


Modelling

Real-time information on MC

Control

Hose-reel Irrigation System



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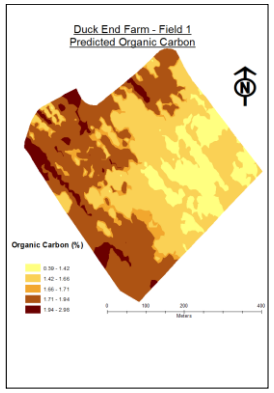
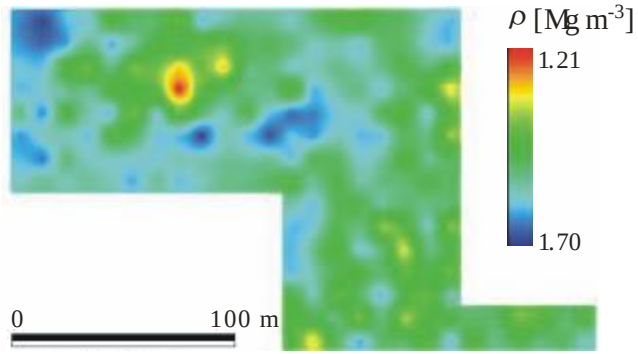
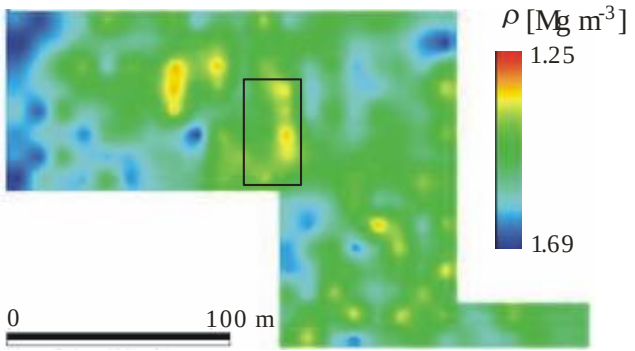
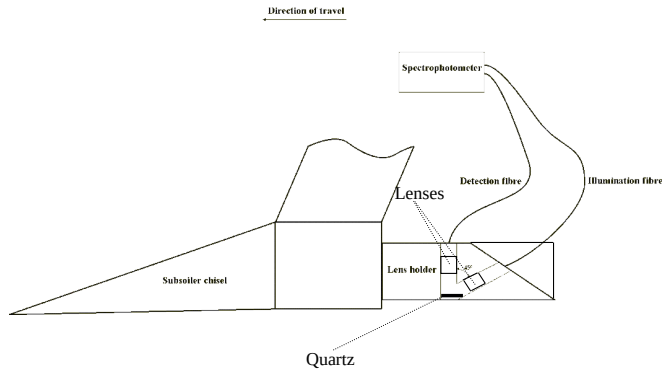
The selected approach / Research approach & activities

- High resolution data (1500 – 2000 readings per ha).
- Any depth between 5 – 50 cm.
- Can be fit onto different soil equipment e.g., tillage, planters & seeding machine.
- Particularly successful for organic carbon, moisture, total nitrogen, clay and organic matter.
- Less accurate for pH, phosphorous, calcium cation exchange capacity and magnesium.









On-line multi-sensor platform (Mouazen, 2006)

Mouazen, A.M. (2006). Soil Survey Device. International publication published under the patent cooperation treaty (PCT). World Intellectual Property Organization, International Bureau. International Publication Number: WO2006/015463; PCT/BE2005/000129; IPC: G01N21/00; G01N21/00.

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The selected approach / Research approach & activities

Currently used for site specific irrigation ⟹ VRFI

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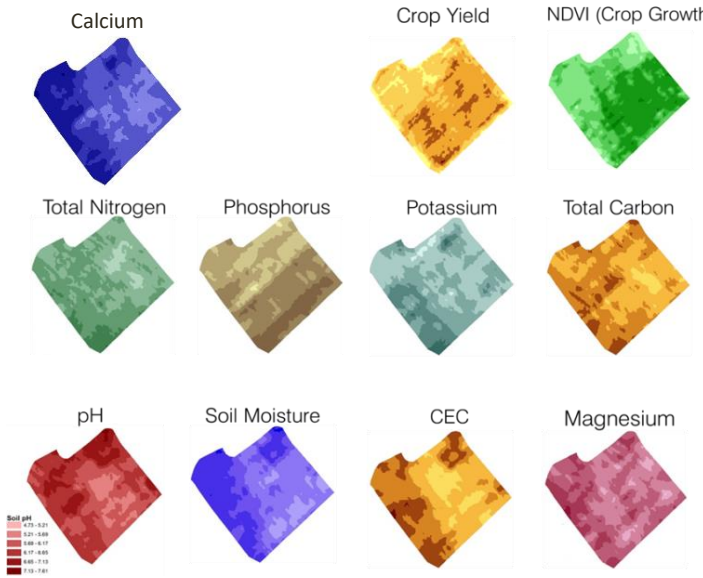
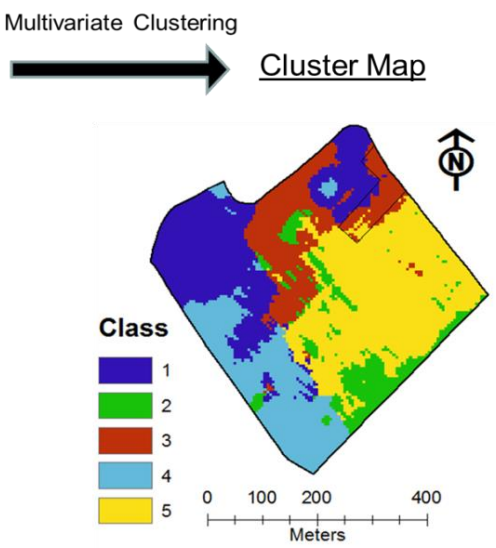
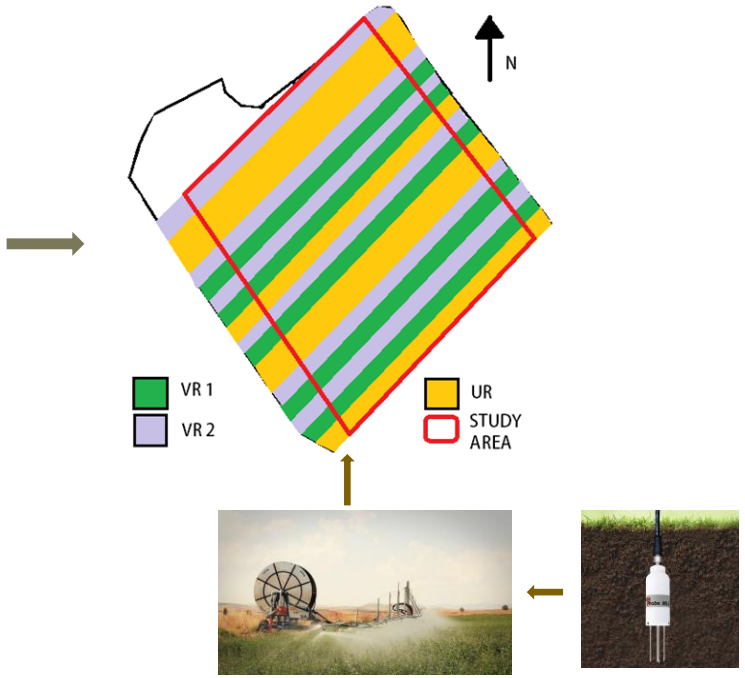
The selected approach / Research approach & activities

- Common Raster Grid Creation
- Data Fusion by Clustering or other ML tools
- Mapping







Fertility zone map

After: Halcro el al. (2013) – 3rd International Workshop on PSS

Nawar et al. (2017) – Advances in Agronomy

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Cooperation with Stakeholders / value chain

- Delanoye Farm (BE – Pilot Farm)
- Karaca Farm (TR – Pilot Farm)
- Karacebey Irrigation Union (TR – Farmer Union)
- AgroApps P.C. (GR – Agricultural Software Developer for Agri-ICT applications)
- KSG Kassow GmbH Farm (DE – Pilot Farm)
- THESGI (GR - a leading Agricultural Cooperative)

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Dissemination and outreach

- Scientific Publications
- Present findings at relevant exhibitions, conferences and workshops
- Project website
- End project workshop with stakeholders and end users
- A collocated workshop with other ICT-AGRI-FOOD related projects
- Findings will be made available for commercialization including a spin out of UGent

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Partners / funders (who are they?)

UGent, BE
Coordinator

UNIVERSITEIT GENT

AUTH, GR

ARISTOTLE UNIVERSITY OF THESSALONIKI

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RU, DE

Universität Rostock Traditio et Innovatio

QUA, CH

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SEZER, TR

SEZER

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LET’S KEEP IN TOUCH!

Please feel always free to reach out to us.

WEBSITE

www.ictagrifood.eu

http://addferti.auf.uni-rostock.de/partners.html

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Thank you for your attention!