GREEK PILOT AREA

Thessaly

FATIMA

PRODUCE MORE WITH LESS

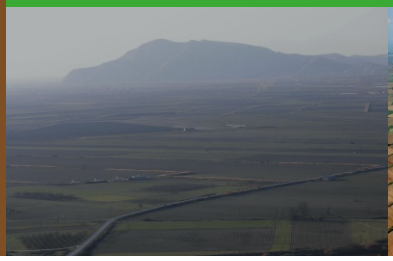
- **The most extensive area of agricultural production in Greece**
- **Agricultural activity determines economic development of the region**
- **Agriculture is the major water consumer representing 90-95% of the annual water demand**

General Description

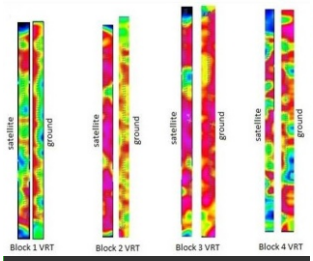
- TOTAL POPULATION: **500.000** // OVERALL SIZE: **10.500 km²**
- LAND USES: **Agriculture 36%, Municipal/communal 23% Forests 19.5%, Private 14%, Other 7.5%**
- AVERAGE FARM SIZE: **4 ha**
- AGRICULTURAL USE: **450.000 ha** // IRRIGATED AREA: **250.000 ha**
- ANNUAL RAINFALL: **400 mm** // ANNUAL ET: **2.66 mm/day**
- IRRIGATION SYSTEMS: **Sprinkler 65% Drip 30% Furrows 5%**
- MAJOR CROP TYPES : **Wheat/Barley (180.850 ha) Cotton (100.500 ha) Orchards (43.200 ha) Maize (20.000 ha)**

Pilot Area features

- Low organic matter reduces soil fertility
- High soil clay content is of frequent occurrence that influences crop yields
- Excessive fertilizer and pesticide inputs
- Very dry climate during summer, limited availability of irrigation water during the summer growing season, water over exploitation

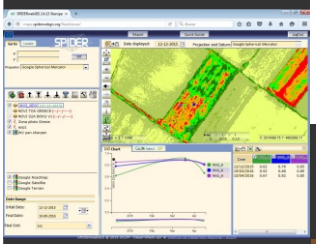


Experiments in Greek Pilots



Comparison of N App Rate derived from ground and WV-2 data at the same strips for cotton 2015 field

Crop classification of a 100 km² area using satellite image spectral analysis



Comparison of N App Rate derived from ground and WV-2 data at the same strips for cotton 2015 field

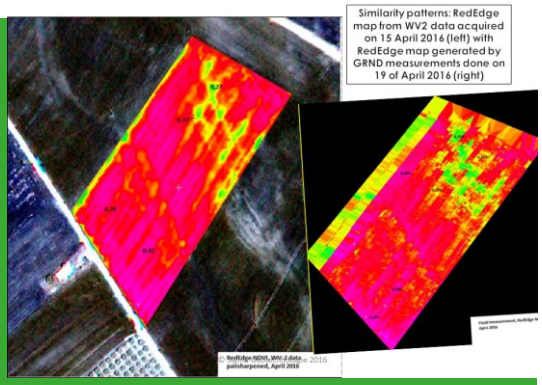
- 2 years 3 crops. Summer: Cotton and Corn, Winter: Wheat
- Implementation of a high resolution variable rate (VRT) nitrogen management
- Field-strip design to accommodate machinery
- Monitoring of crop stress, nutrient status and yield
- Monitoring of Water balance to determine irrigation efficiency, ET and leaching potential
- Incorporation of SPIDER webGIS to farm level inputs management
- Supervised classification on satellite WV-2 images
- Comparison of ground sensor and satellite-driven VRT systems

A mechanized variable-rate (VRT) fertilizer application system for site-specific in season nitrogen management is based on the ability of ground-based sensors to detect canopy N content, to translate the spatial information into fertilizer N requirement and to convey a rate signal to a variable-rate spreader for application of granular fertilizer with inter-row precision of placement under real-time conditions. The system is based on sensor and spreader components that are commercially available by independent vendors. But the concept is a prototype because these components have not previously operated together, thus requiring the modification of communication protocols and various adjustments between electronic devices. The high-resolution VRT system is accepted to reduce total nitrogen inputs where maintain yields resulting to environmental benefits and profitability with the least uncertainty for the farmers.

Various components of the VRT application system after installation in corn field

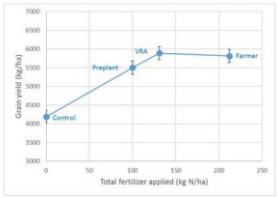
Area Pilot Area Facts & Figures

First Year Pilot Results



VRT system

- On wheat cultivations: On average, VRT system used 72% less in-season N or 38% less total N than that applied by the farmer without any yield losses in a slope wheat farm. VRT system applied more N in areas of lower soil fertility and plant productivity that utilized by plants.
- On cotton cultivations VRT system increase Nitrogen Used Efficiency of Fertilization by 50%



Winter wheat (February 2016)

VRT system decreased N inputs by 38% without any losses of grain yield in replicated wheat strips

Comparison of ground sensor and satellite-driven VRT systems

- Strong correlation of canopy indexes at farm level from satellite data of WV2 and L8
- Strong correlation of biophysical-biochemical parameters when collected from "neighboring" dates from satellite data of WV2 and field measurements regarding NDVI, redEdge and CI.
- Satellite data can be used as agricultural information source for the VRT machinery deployment

Future Perspective / Regional Impact of FATIMA

- Implementation of new experiments to Corn, Cotton, Wheat cultivations
- Dissemination of the VRT systems, and SPIDER webGIS to stakeholders by
- Regional meetings
- Communications with local farmers in experimental fields regions
- Incorporate SPIDER webGIS to the upcoming experiments
- Dissemination of the FATIMA tools to the local farmer community

VRT system demonstration to local stakeholders

Country Pilots regional team

HELLENIC AGRICULTURAL ORGANIZATION - DEMETER
INSTITUTE OF INDUSTRIAL AND FORAGE CROPS
http://www.ipsw.gr/en/

REDCOAST INTERNATIONAL EOOD
http://redcoast-int.com/

GOULANDRIS NATURAL HISTORY MUSEUM
http://www.gnhm.gr/en

SIGMA GEOTECHNOLOGIE

AGRICULTURAL UNIVERSITY OF ATHENS
http://www2.aua.gr/en

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