



Universität für Bodenkultur Wien

Water & nutrient management: satellite technologies support efficient farming

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Agricultural Water Use in EU

Mediterranean areas:

Greece: **88%**

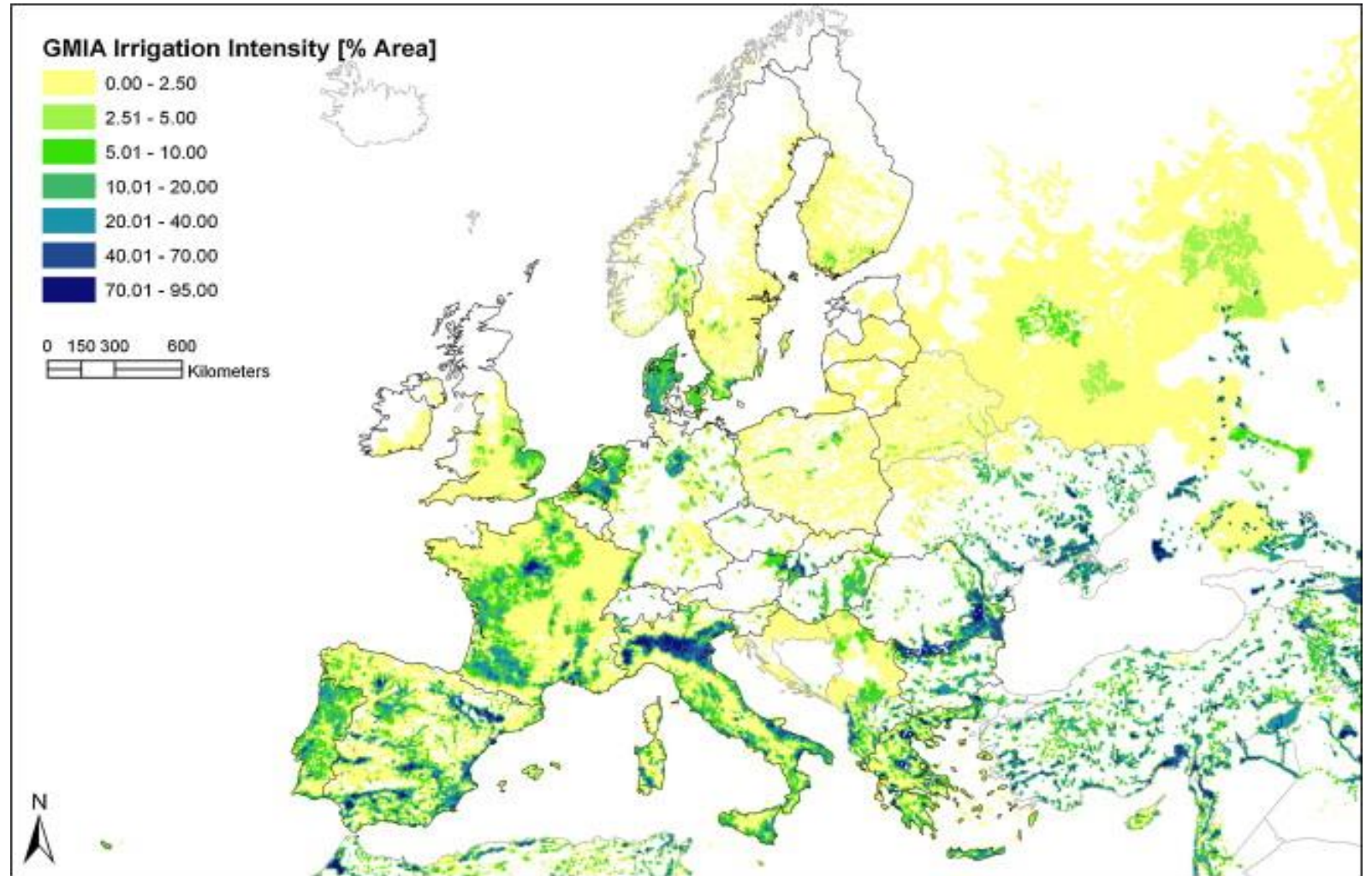
Portugal: **80%**

Italy & Spain: **64%**

Increasing in UK, Belgium, the Netherlands, Germany, Austria and France

... **more than 30%**

(OECD/Eurostat, 2000) (OECD, 2006)
(EU, DG Environment, 2000)



Irrigation intensity in the EU as area equipped for irrigation in % of total area by 5' cell.

Gunter Wriedt et al., 2009,
Agricultural Water Management
Volume 96, Issue 5, May 2009, Pages 771-789

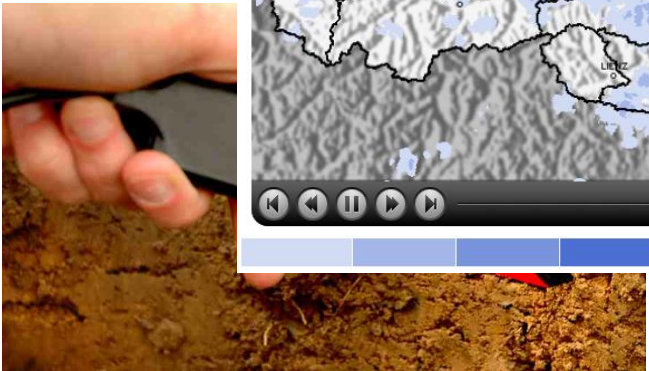
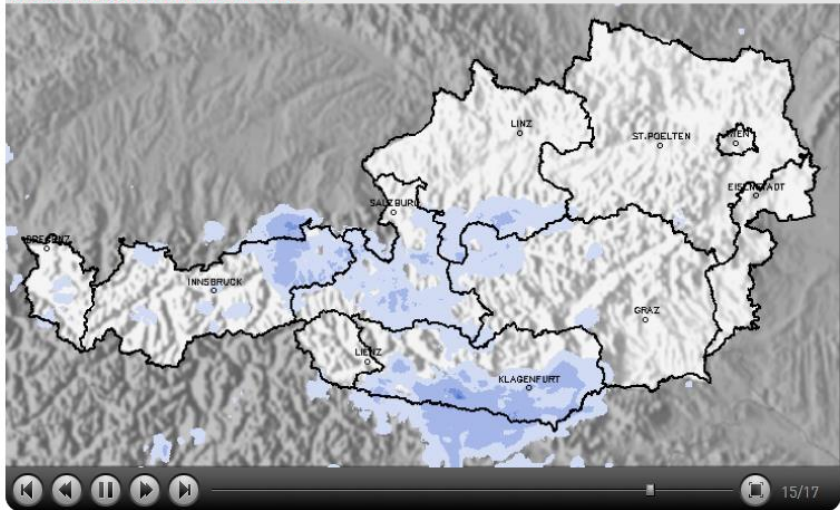
... efficient irrigation management



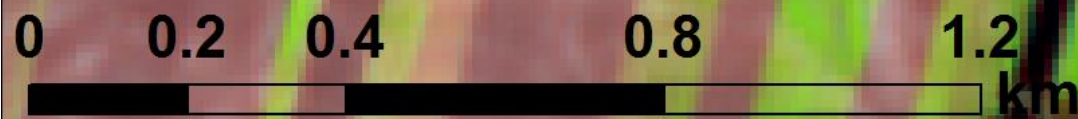
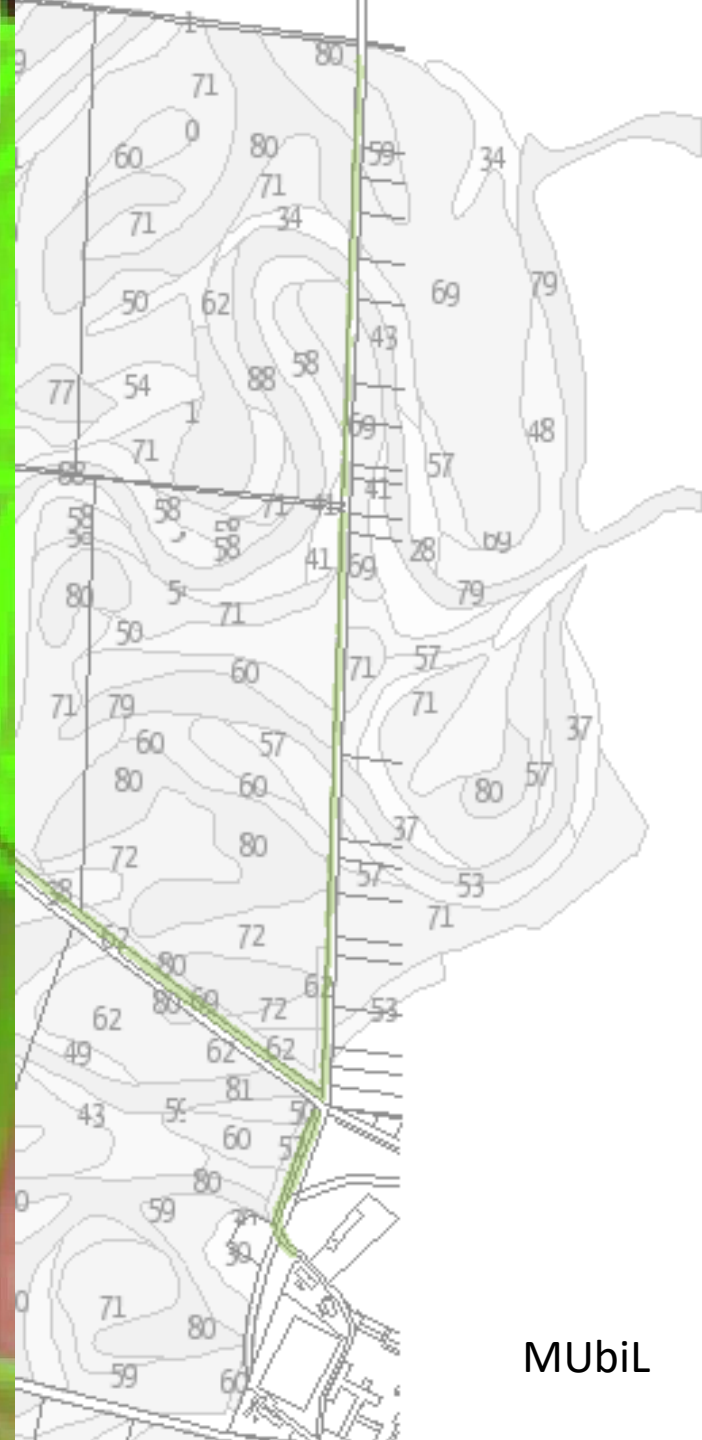
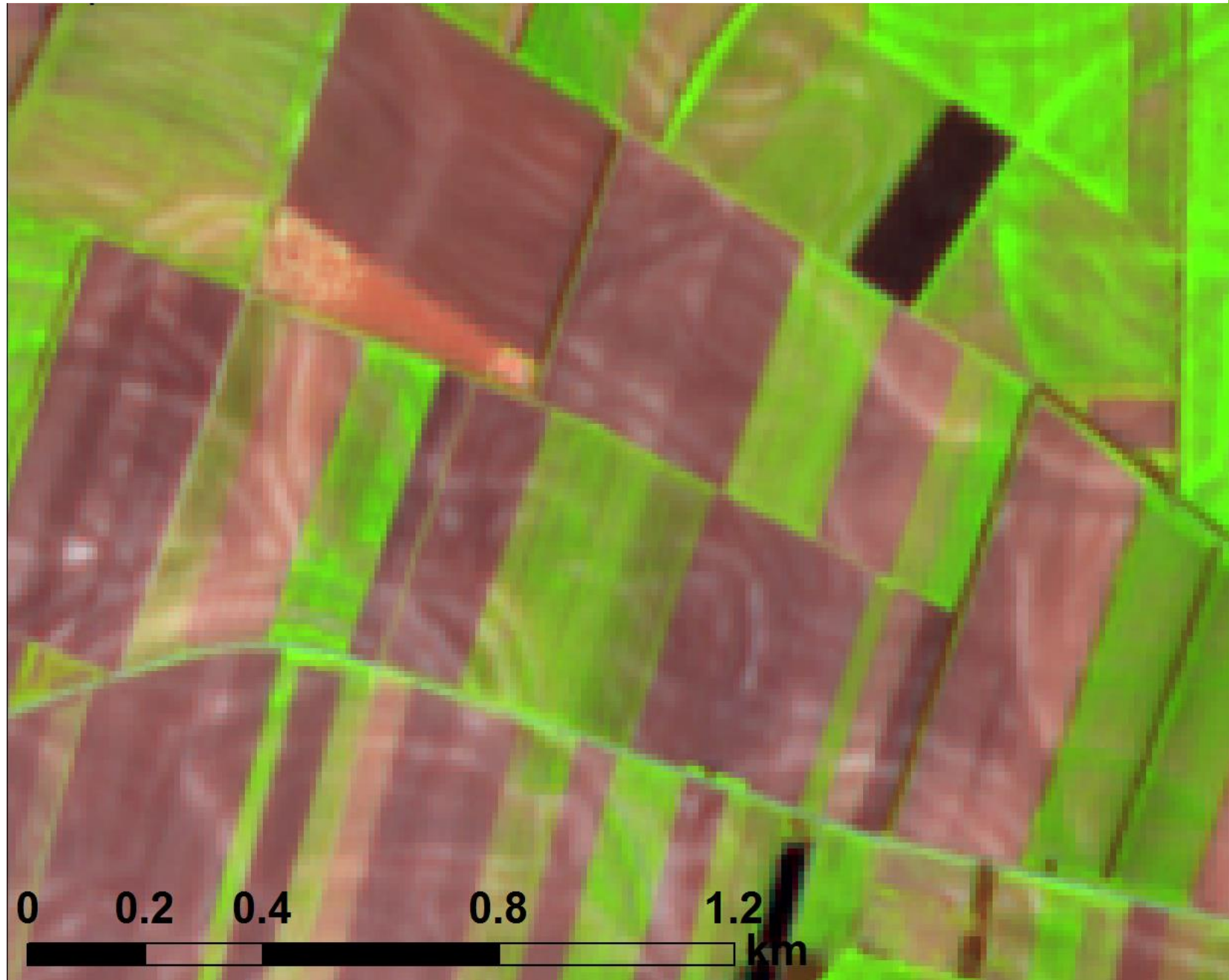
Wetterradar Animation



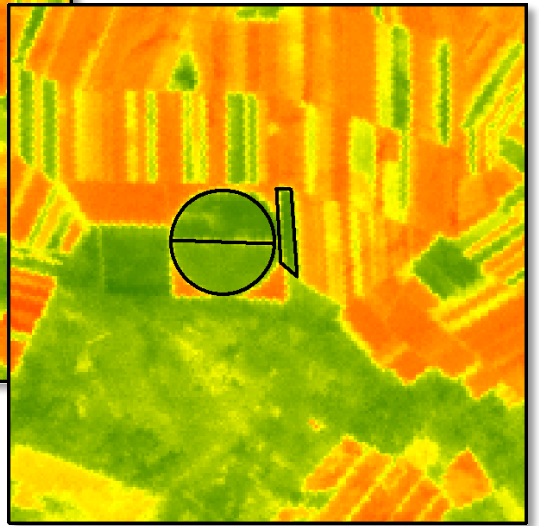
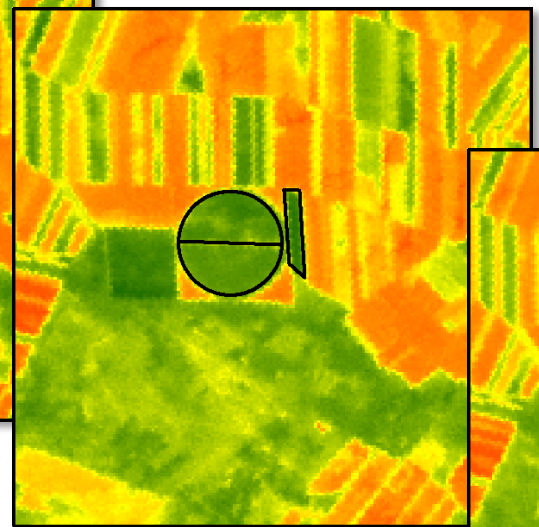
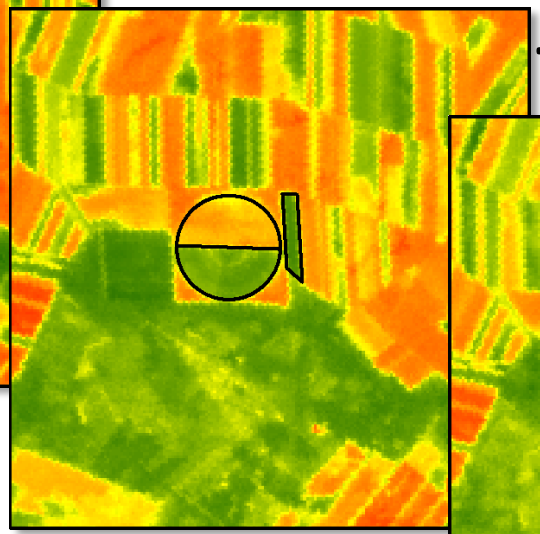
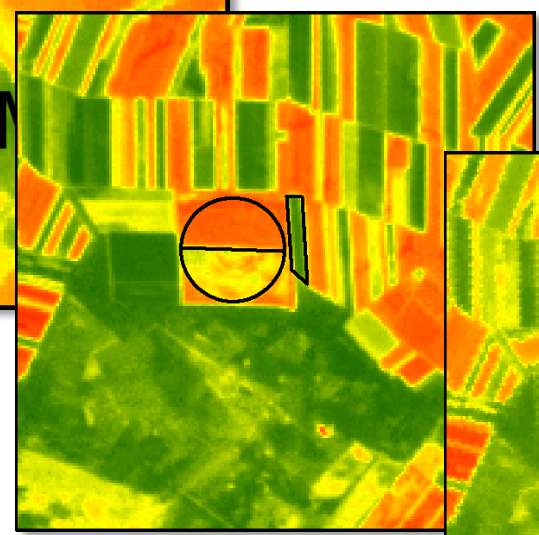
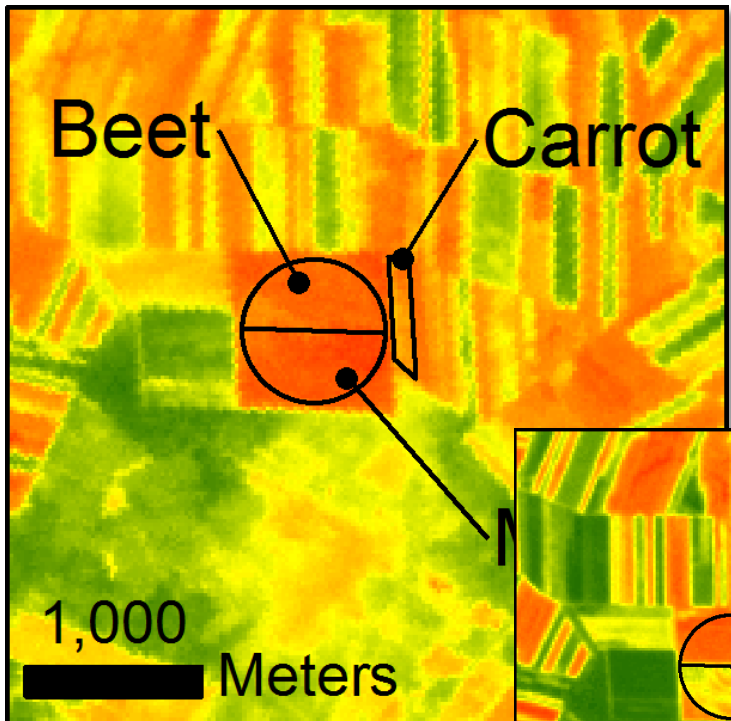
Niederschlag 2016-03-09 00:45 MEZ



Multi-spectral Sentinel-2 satellite image 3-April-2016

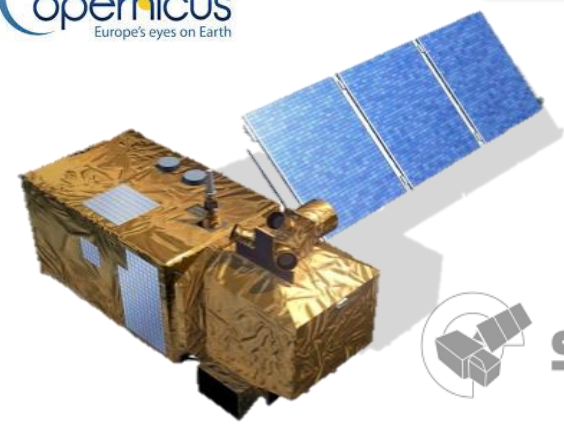


MUbiL

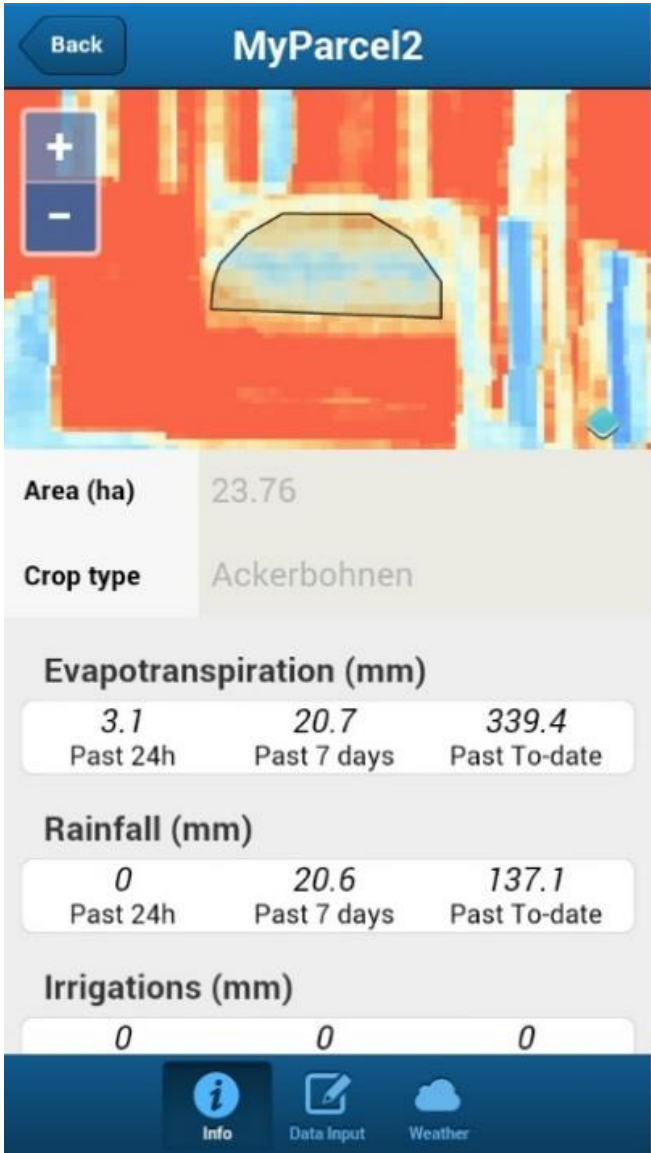


- Multi-spectral satellite data
- + Biophysical parameters of veg.
- + Model (FAO) input forcing
- + Multi-temporal (7-10 days)
- + Near real-time processing (24h)
- + Weather data & forecast
- + Field validation

Copernicus
Europe's eyes on Earth



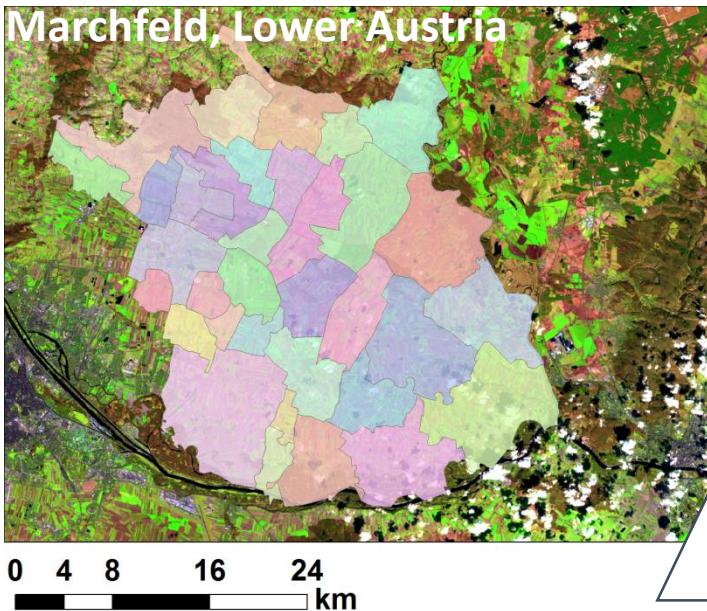
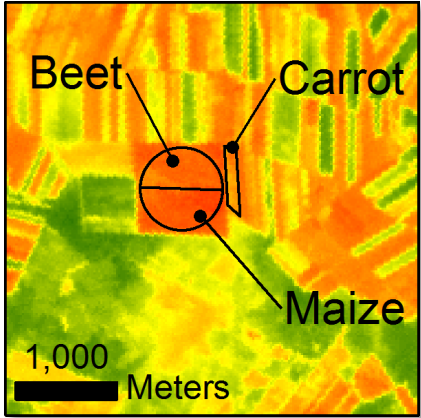
sentinel-2



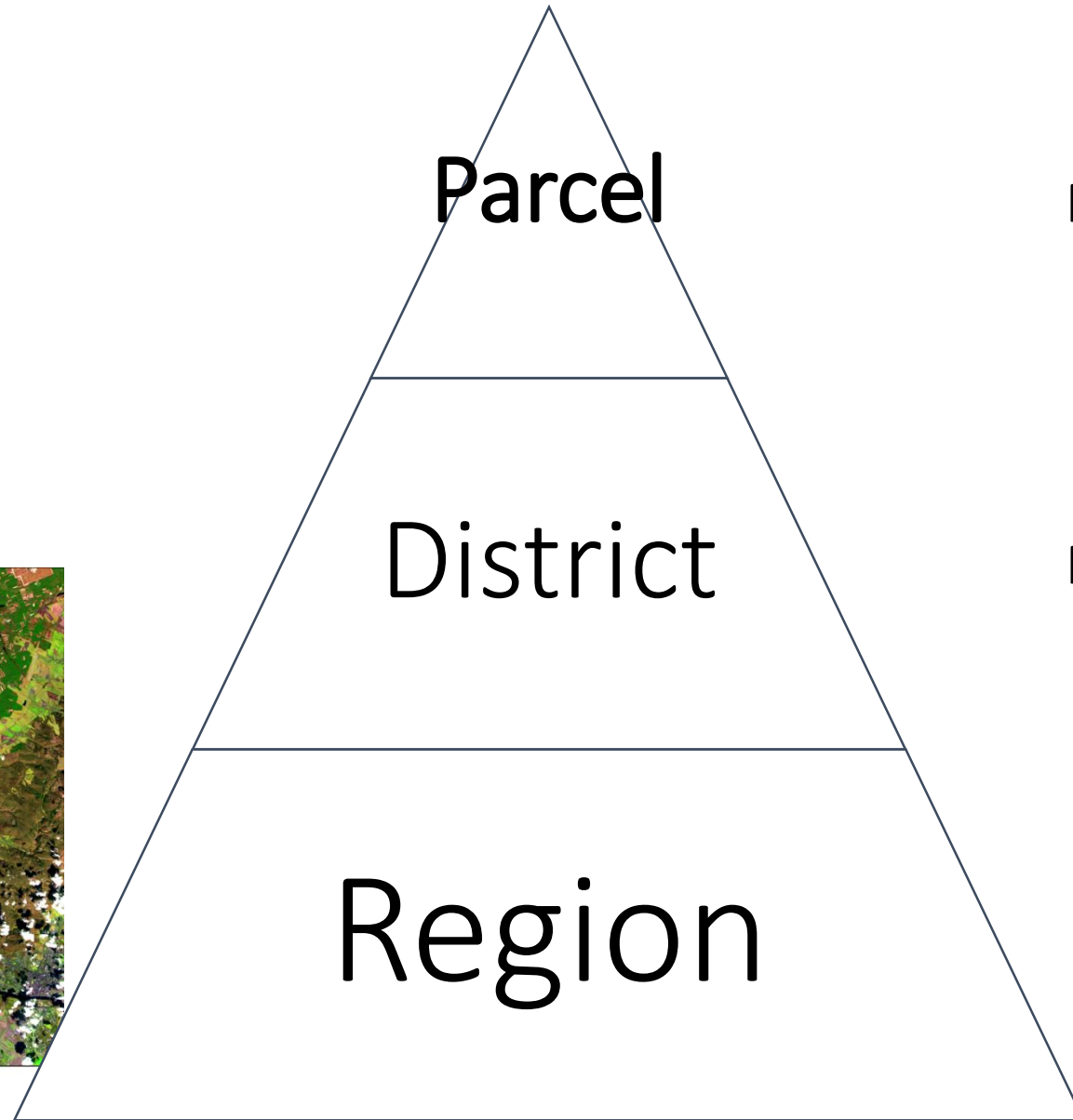
...assist individual farmers in the decision making process

right inputs
right place
right time

Multi-scale



Multi-purpose



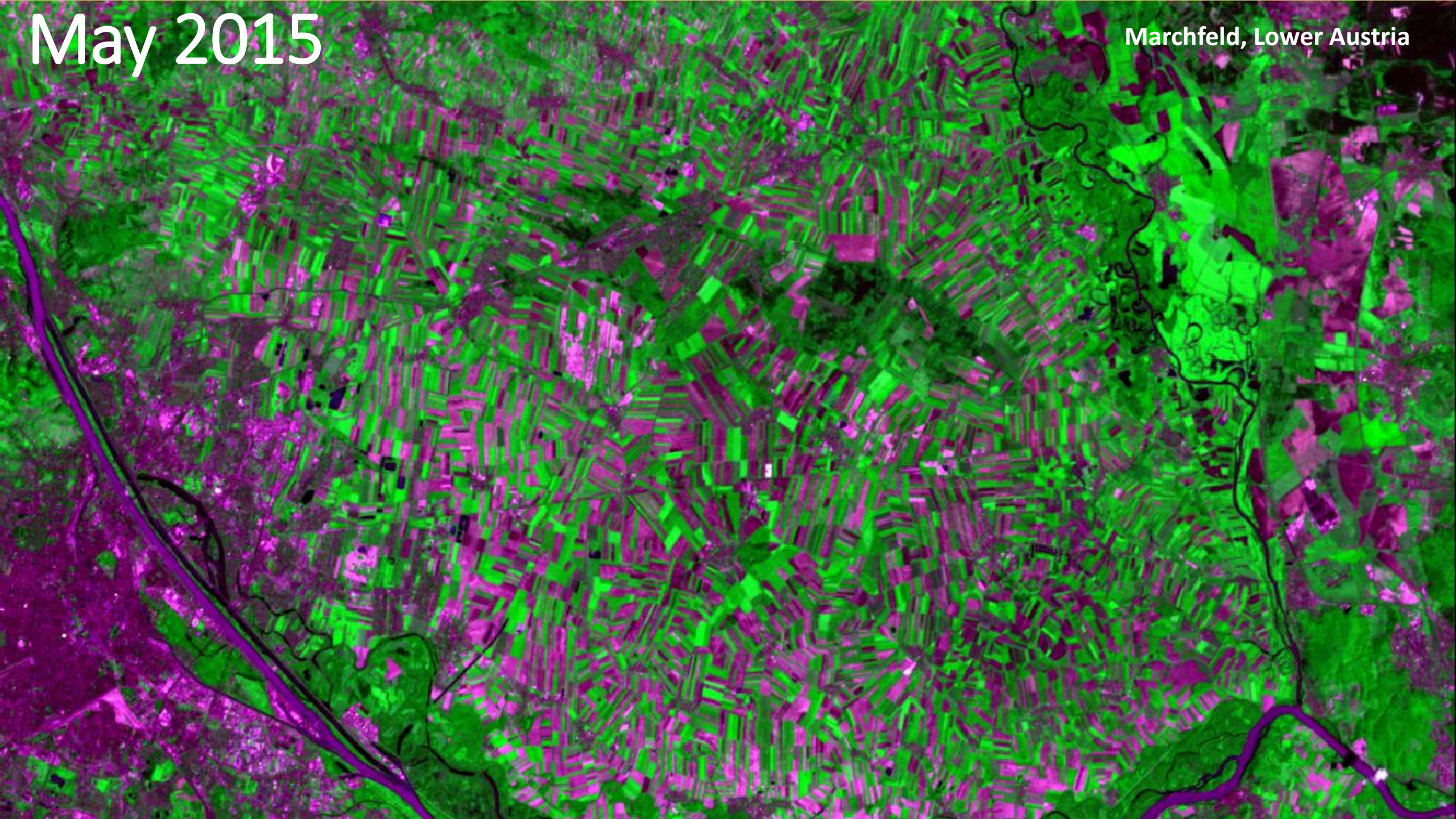
Resource use efficiency

Monitor & management

Response to policies

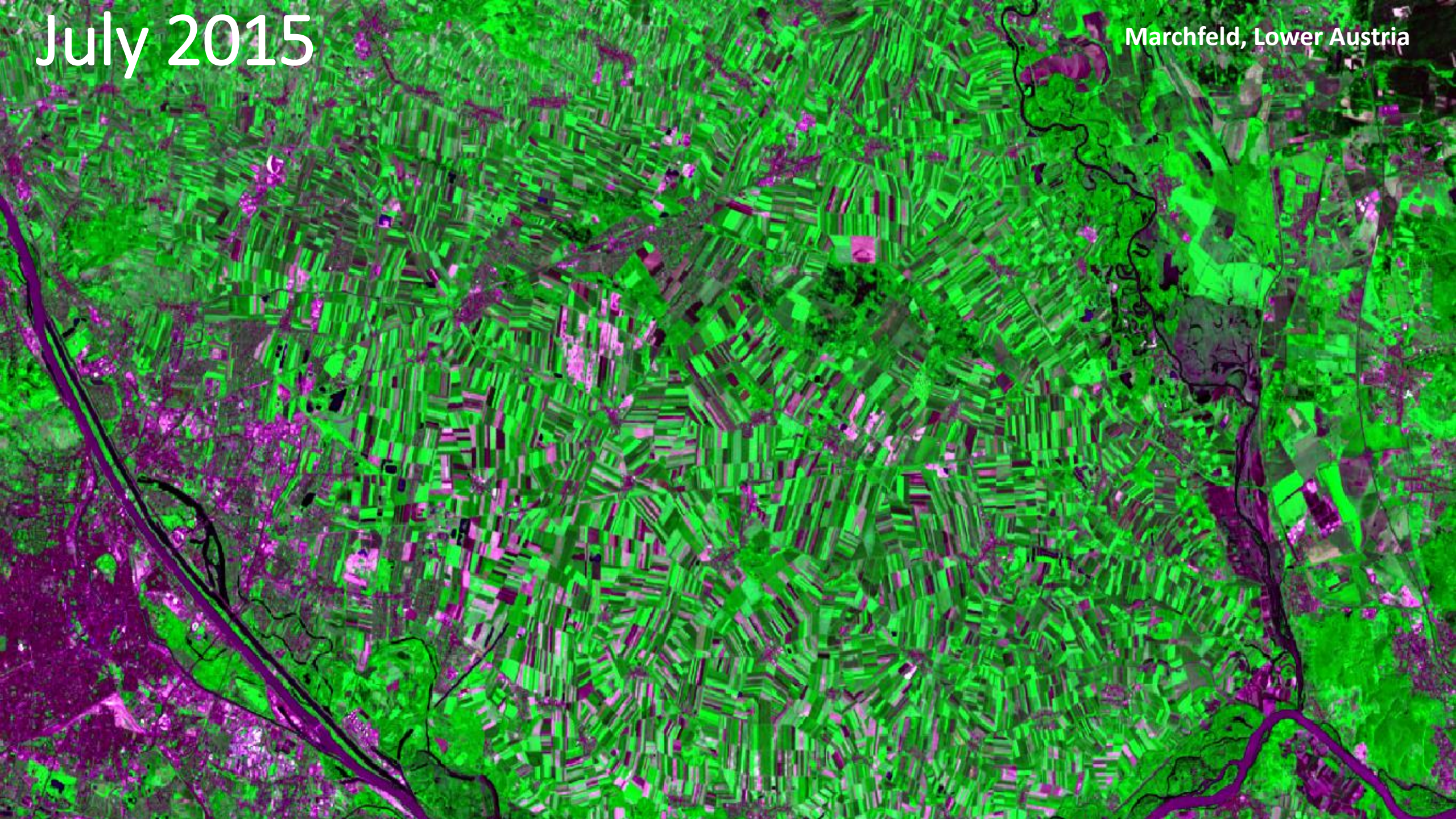
May 2015

Marchfeld, Lower Austria



July 2015

Marchfeld, Lower Austria



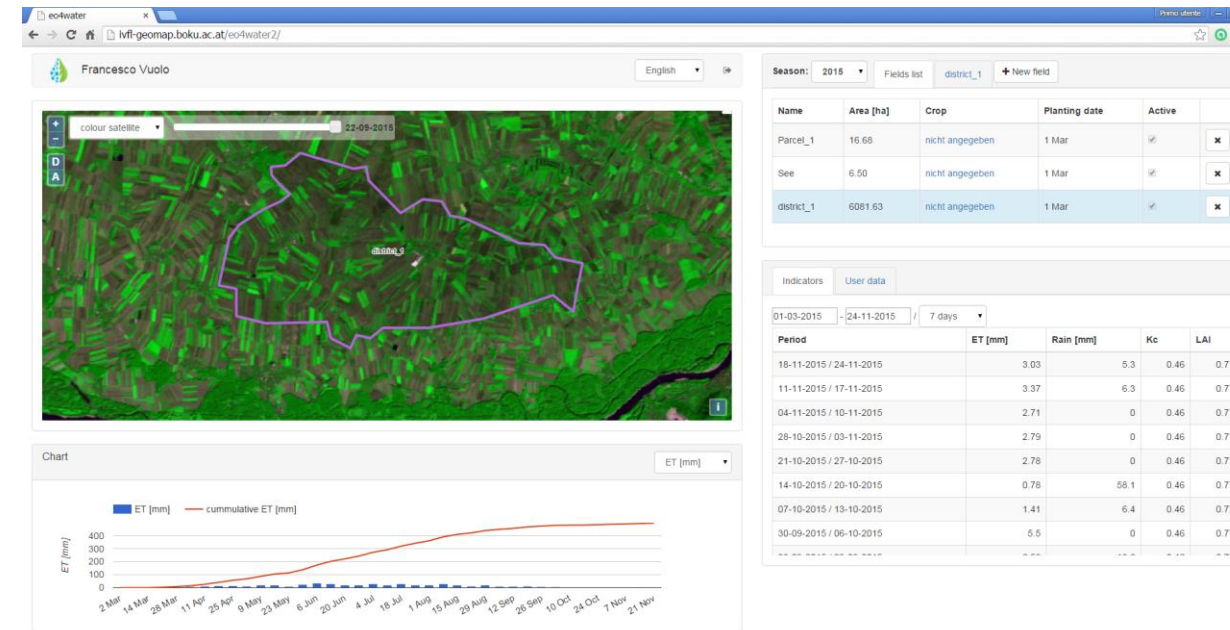
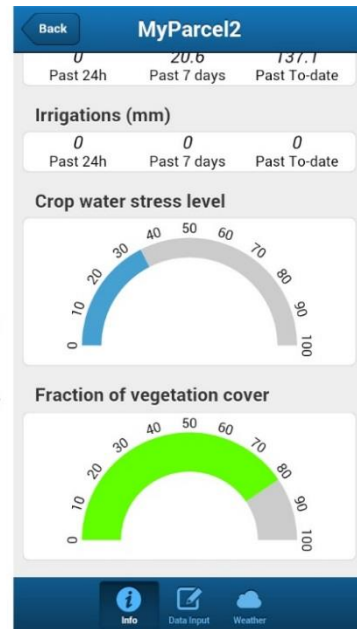
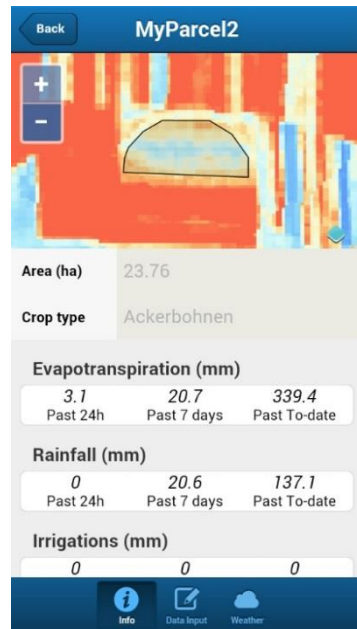
How do we implement?

- Use FAO & int. standards
- Develop in a network
- Farmers' peer to peer communication & training
- Pioneer farmers
- Integrate into day-to-day activities
- Support farmers' advisors



Key elements:

- Crop development maps (every 7-10 days)
- Spatial resolution of 10-20 m
- Evapotranspiration map and data (daily)
- Weather data and forecast (updated daily)
- Irrigation requirements



- Spatial variability of crop development
- Multi-access via web and mobile phone
- Customer support
- Training

Technology development pathway

EU research



DEMETER FP5



FP6



FP7



H2020



Private/public regional initiatives



Italy



Spain



Key numbers

Current service coverage

10%

Farmers involved for testing & evaluation

40 +

Total Cost of the service (in pilot study)

60 000 €/year

Return of investment (for water-intensive crops)

1 € invested = 10 € savings



User: password: Show password Accept [Disclaimer](#)

<http://service.eo4water.com>

FArming Tools for external nutrient Inputs and water MAnagement



FATIMA

FArming Tools for external nutrient Inputs and water MAnagement



FATIMA

Farming Tools for external nutrient Inputs and water Management

FArming Tools for external nutrient Inputs and water MAnagement

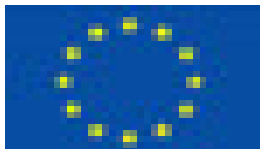
Purpose and vision:

To establish new farm tools and service capacities that help the EU intensive **farm sector** optimize its external input management (nutrients and water) and its productivity

Bridging sustainable **crop production**

with fair economic competitiveness

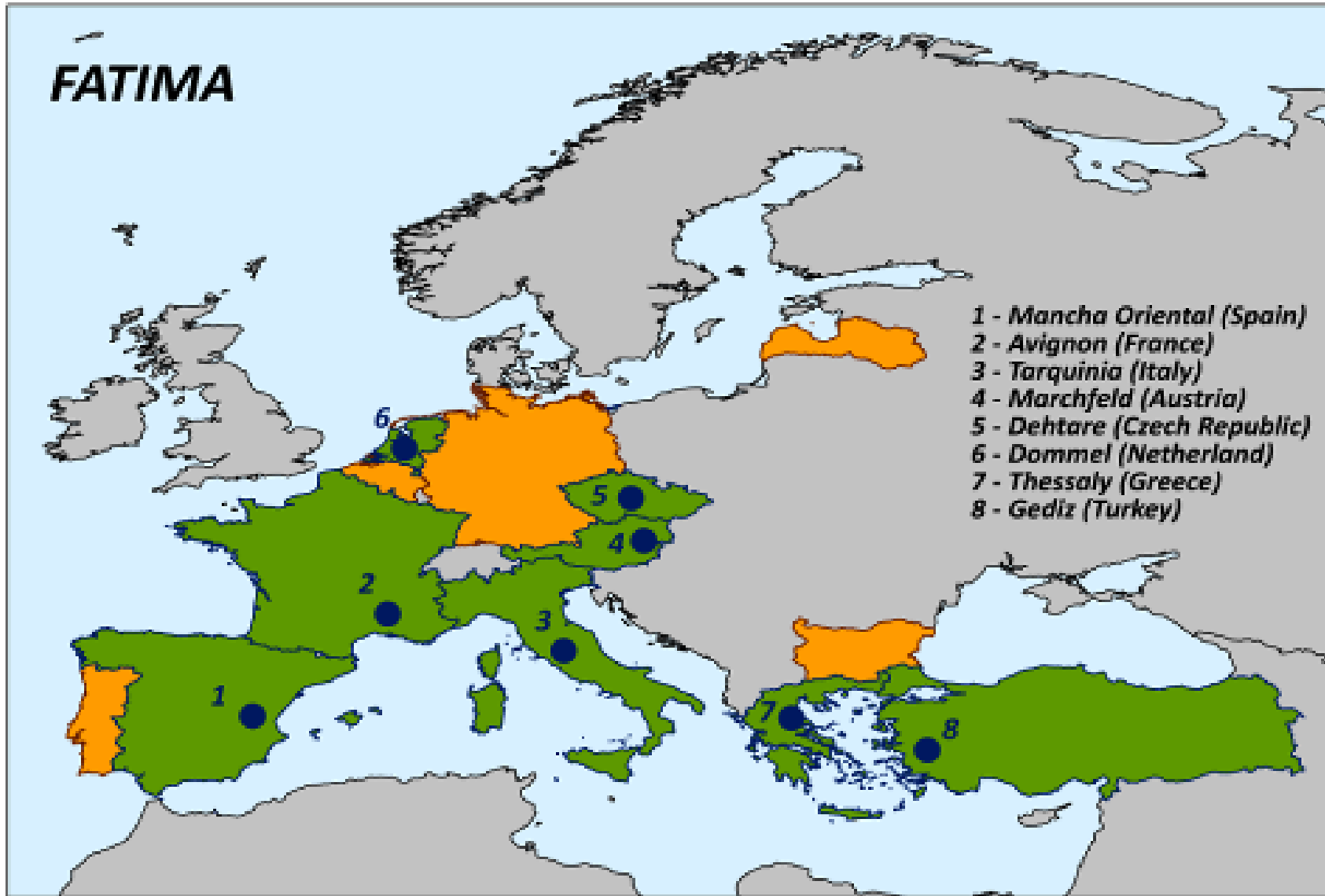
Universidad de Castilla-La Mancha coordinator
(Anna Osann & Alfonso Calera)



Research and Innovation Action 2015-2018
co-funded by EU H2020 (8 MEUR, grant 633945)



FATIMA >>> where and who?

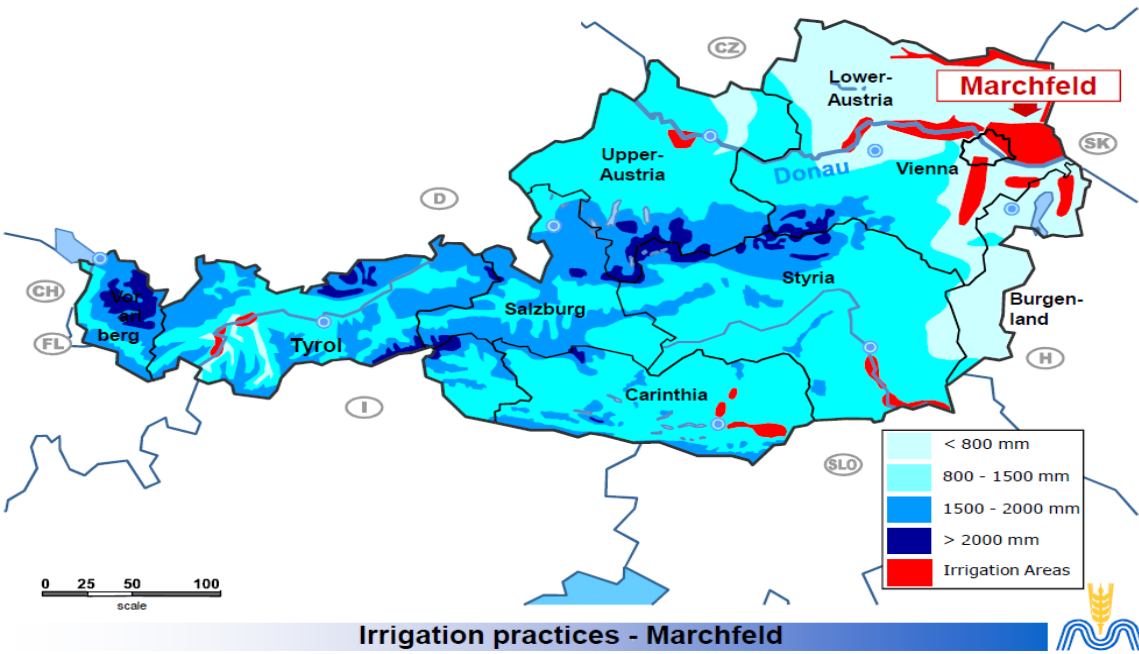


FATIMA in Austria:



Implementing in the Marchfeld region with farmers

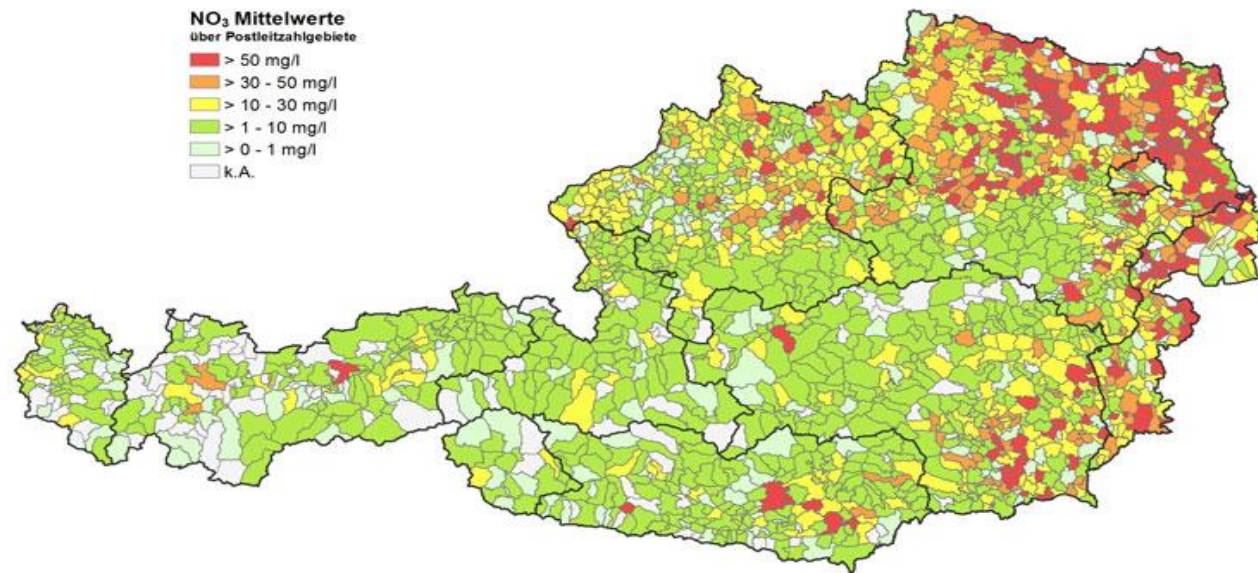




Irrigation practices - Marchfeld

Nitrat in Österreichischen Hausbrunnen

Datenbasis: WasserCheck Proben 2003 bis 2014
NO₃ Mittelwerte über Postleitzahlgebiete



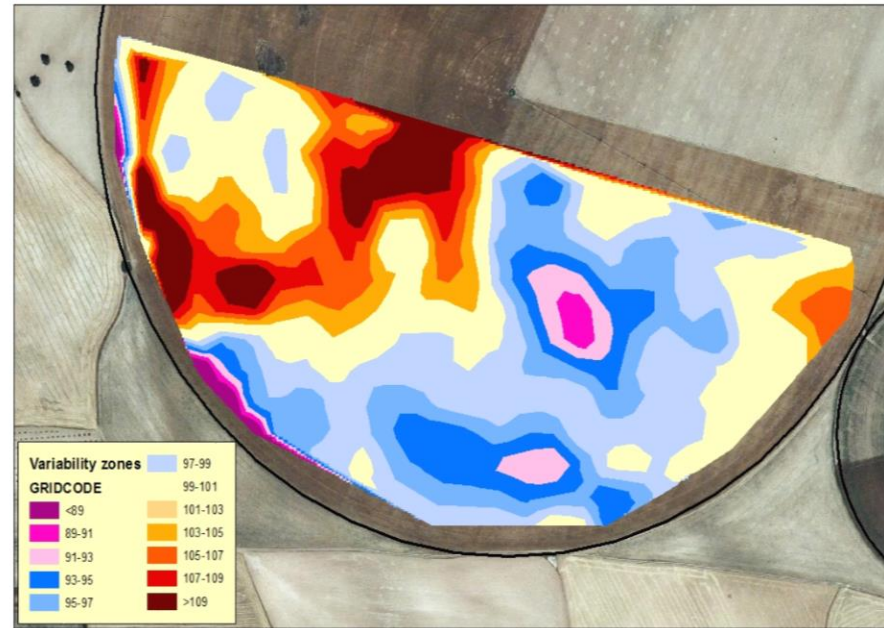
million m³/year

Marchfeld, Lower Austria



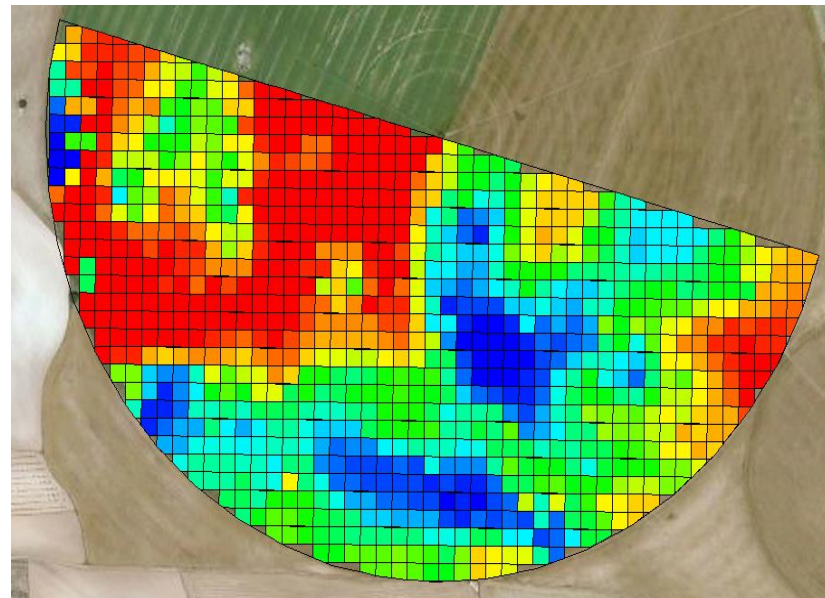
Soil potential productivity map

Variability Zones Casa del Monte (P4V)



Map of “bulk” N requirements ready to be used as guidance for Variable Rate Machinery

Deliver fertilizer (N) prescriptions



The role of **VRT** in FATIMA

V = **Variable**

what varies? why? how?

at what scale(s)? to what effect?

why do we care? why should we bother?

how can we measure this variability?

R = **Rate**

T = **Technology**





- Tool for **more informed decision making** in agriculture
- **Save water and money**; potentially increase yields and improve quality
- Reduce environmental impact
- Addresses individual farmers, communities and policy makers (provide a **wide range of benefits**)
- **Transparency** in the resource management process

Long-term sustainability



- Seeking integration into existing Farm Advisory Services
- Link to performance indicators and reward of good practices
- Synergy with private sector




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BOKU-Start > Department für Raum, Landschaft und Infrastruktur (RALI) > Institut für Vermessung, Fernerkundung und Landinformation (IVFL)


Fernerkundung für Landwirtschaft
support improved crop production while minimizing environmental impacts



GIS Basiskurs
4.4.-8.4.2016
Vermittlung von Basiswissen im Umgang mit GIS Software.



IVFL-Seminar
12.04.16 Fabian
Faßnacht: Individual tree crown detection and classification using WorldView-2 data
Dienstags um 16:00 Uhr im IVFL-Seminarraum: Präsentation von Masterarbeiten, Dissertationen und Forschungsarbeiten am Institut bzw. Vorträge von Gastwissenschaftlern.

**EO4Forest**
Neues FFG Forschungsprojekt im Bereich forstlicher Fernerkundung untersucht die Eignung von Sentinel-2 und Pleiades Satellitendaten für die Ermittlung verschiedener forstlicher Parameter.

Drought monitoring in Kenya
Operational Drought Monitoring in Kenya Using MODIS NDVI Time Series

 **FATIMA**  **EO4Water**