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%**

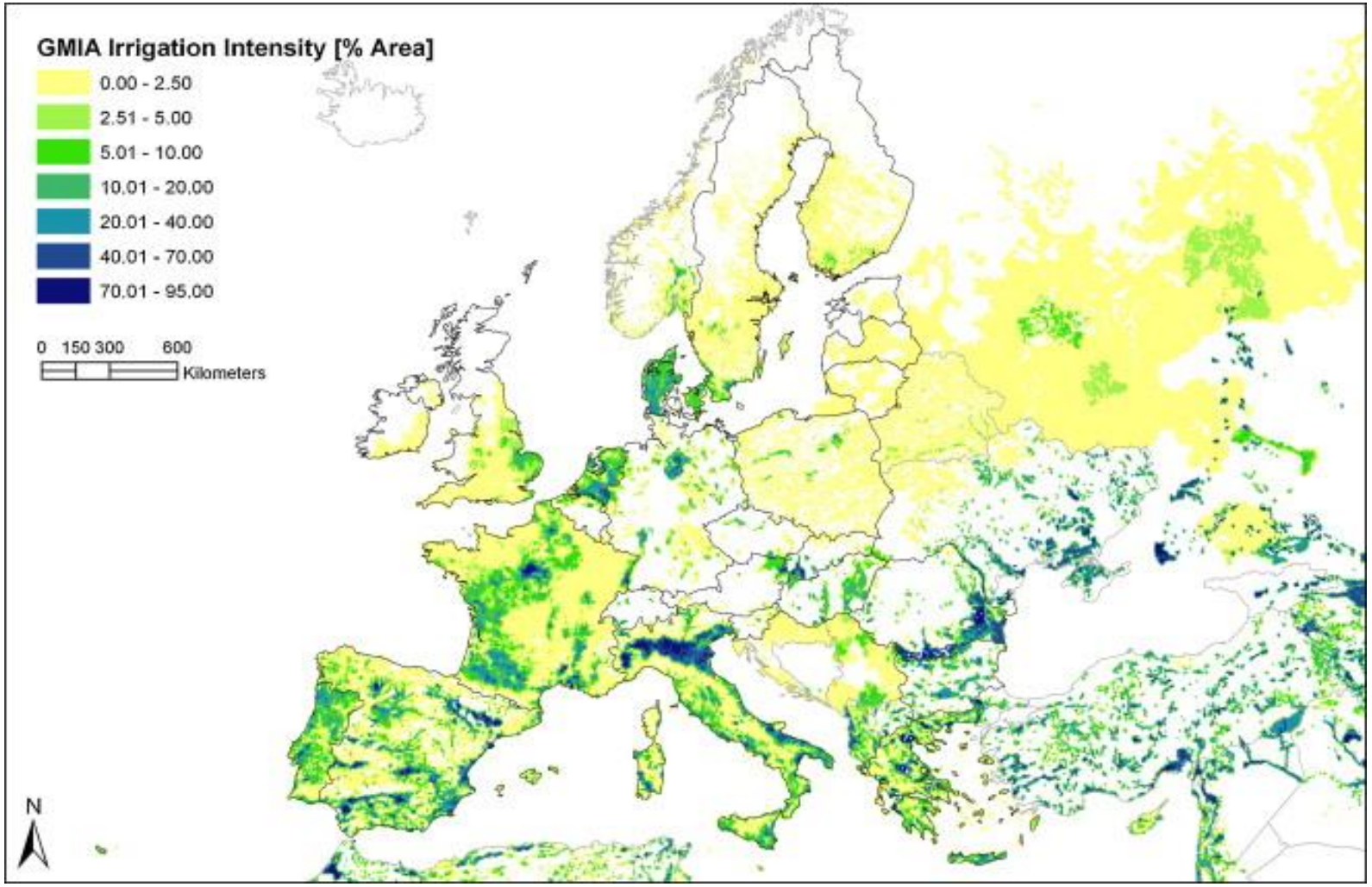
Portugal: **80%**

Italy & Spain: **64%**

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

… **more than 30%**

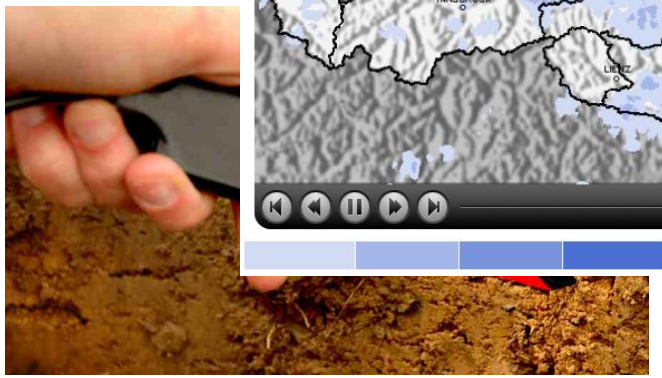
(OECD/Eurostat,2000) (OECD, 2006)
(EU, DG Environment, 2000)



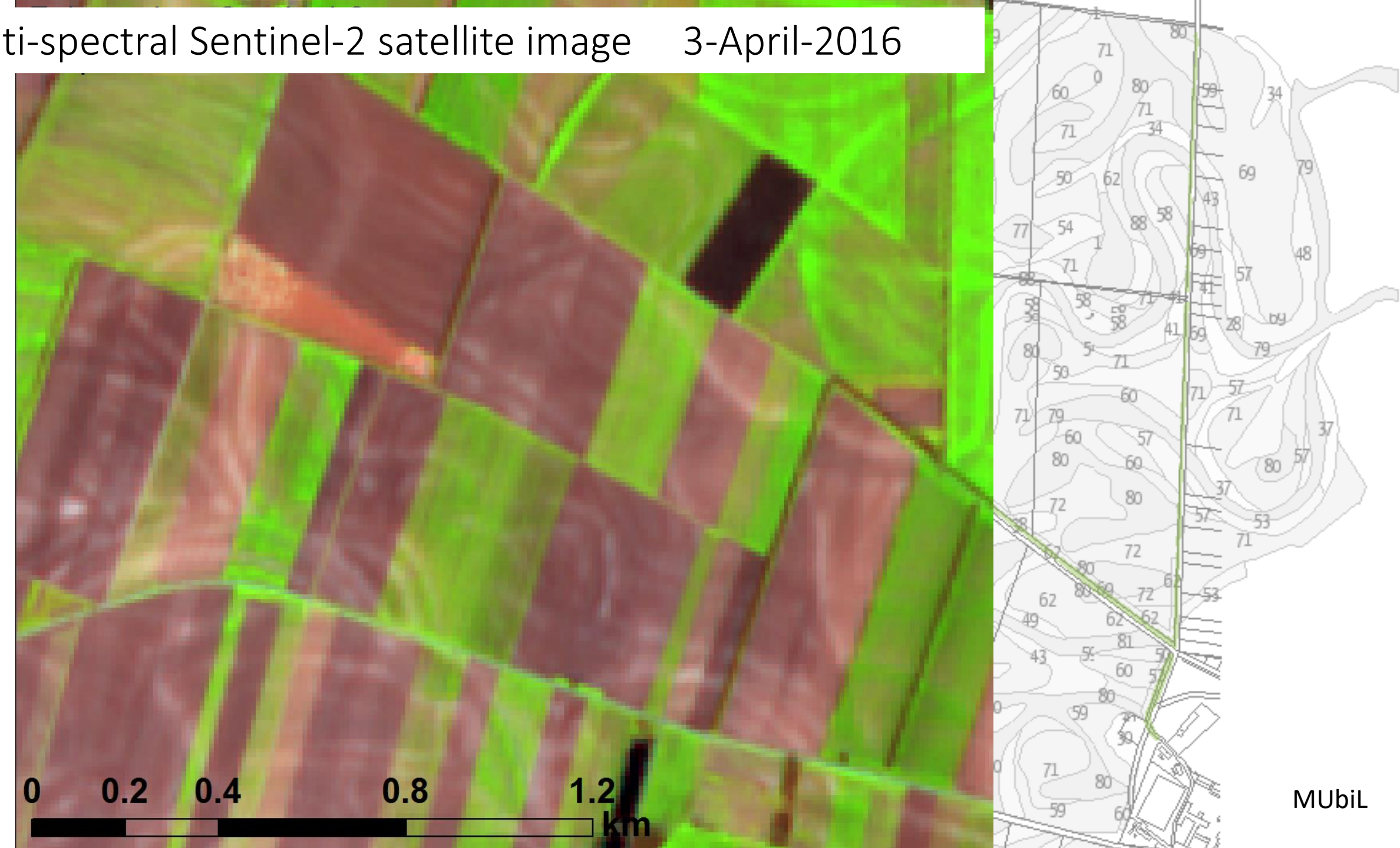
Irrigation intensity in the EU as area equipped for irrigation in % of total area by 5′ cell.

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

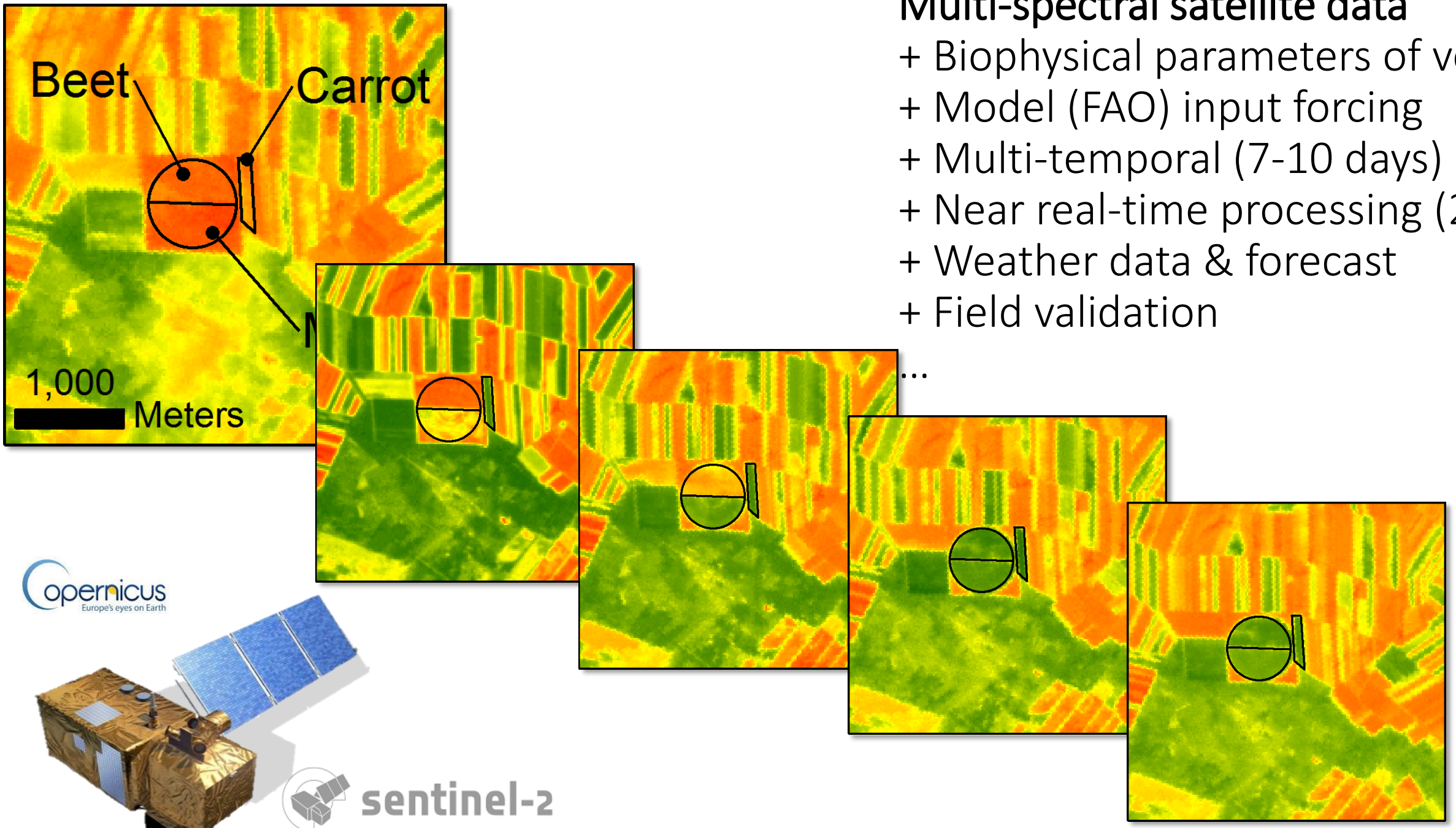
… efficient irrigation management



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

…

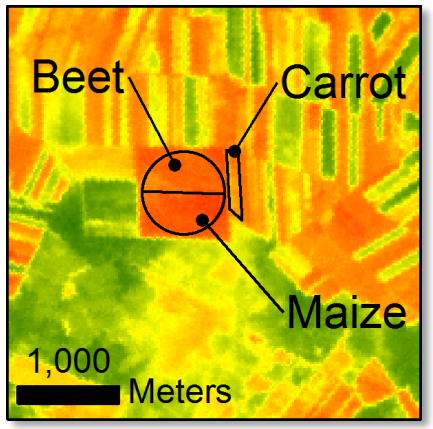
...assist individual farmers in the decision making process

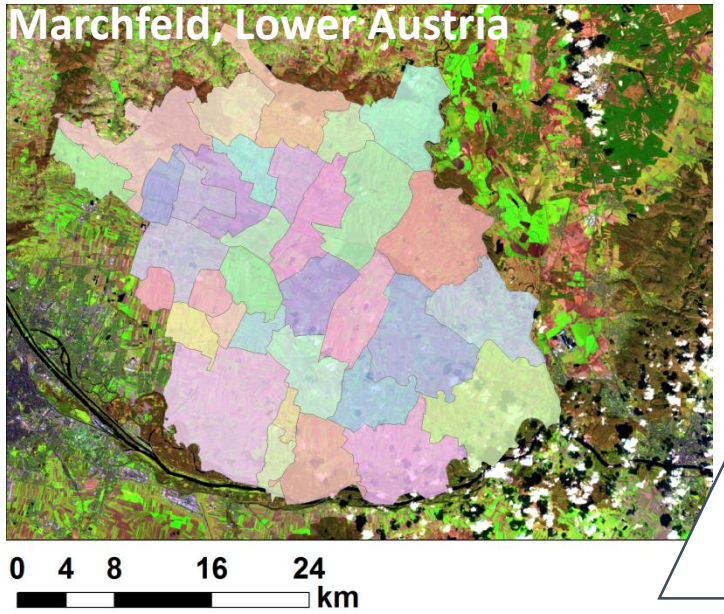
right inputs

right place

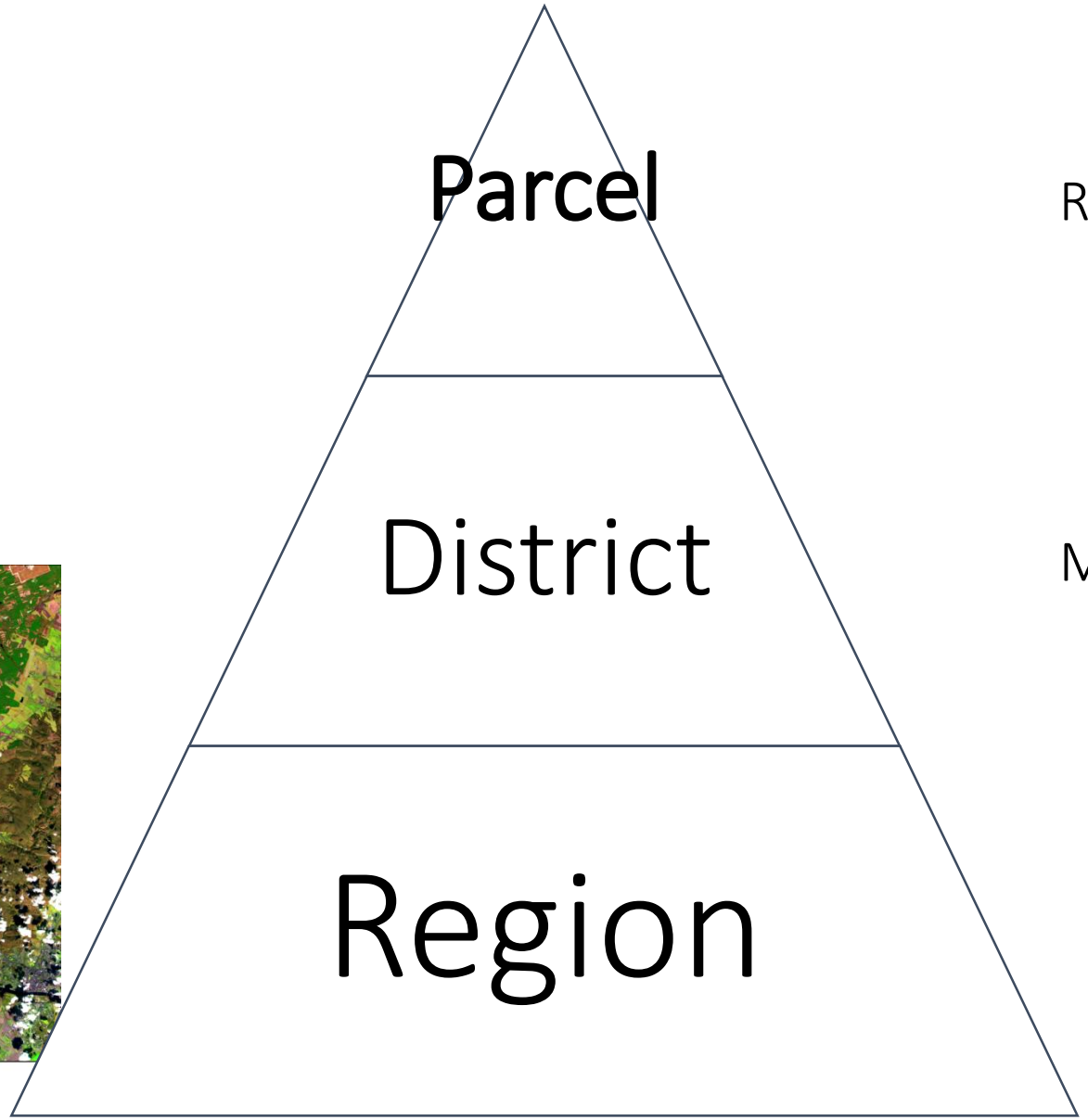
right time

Multi-scale





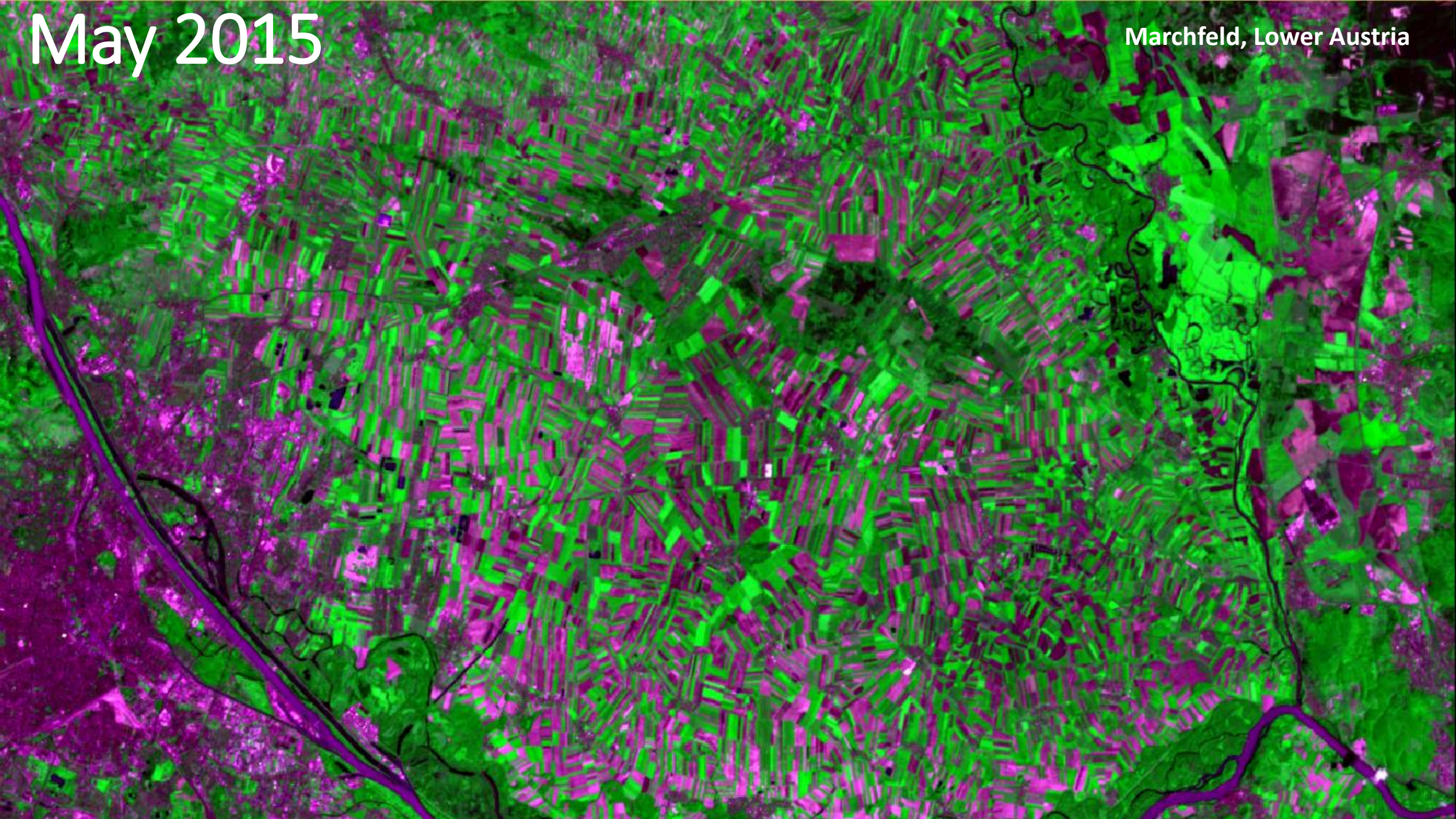
Multi-purpose

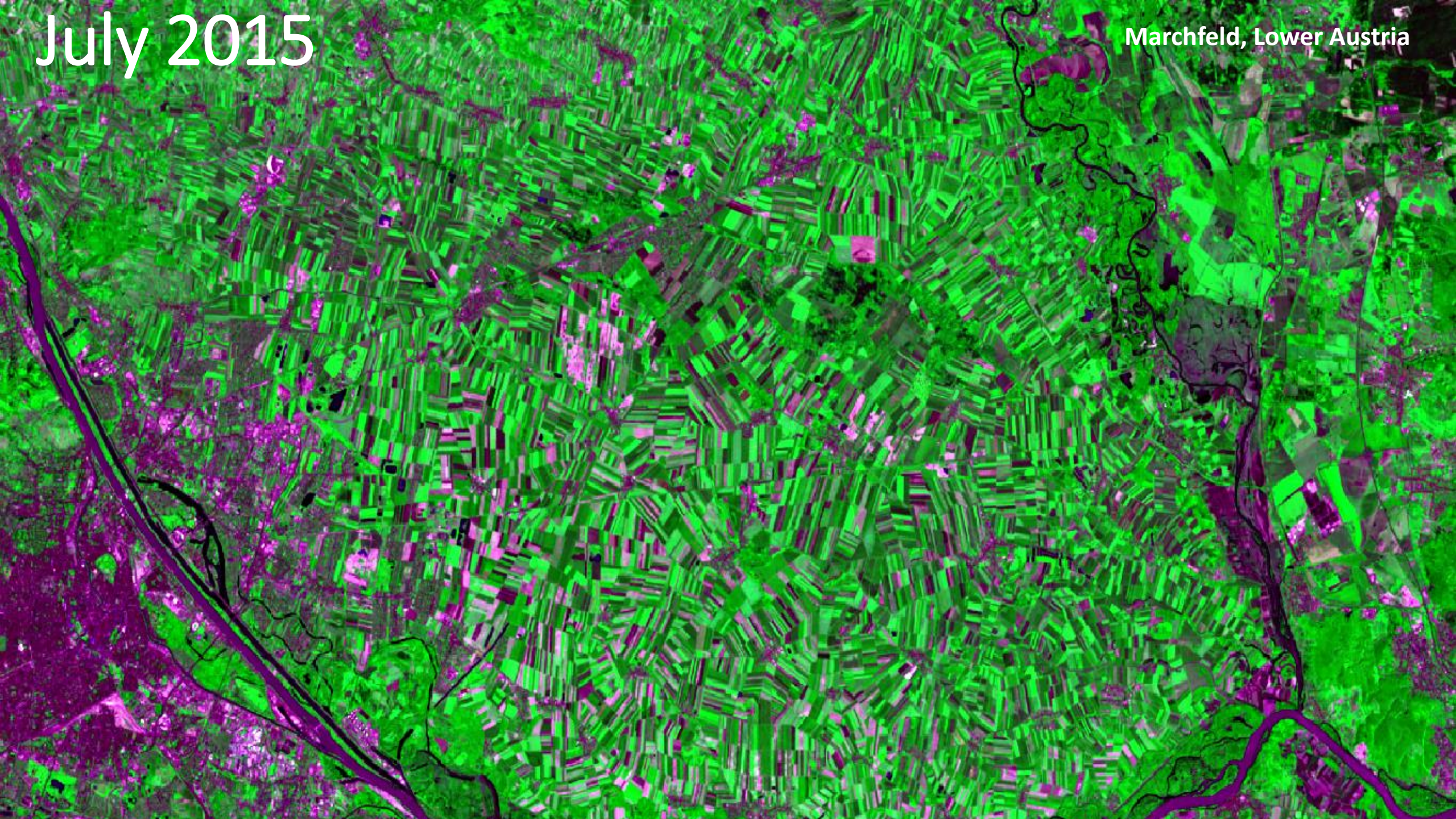


Resource use efficiency

Monitor & management

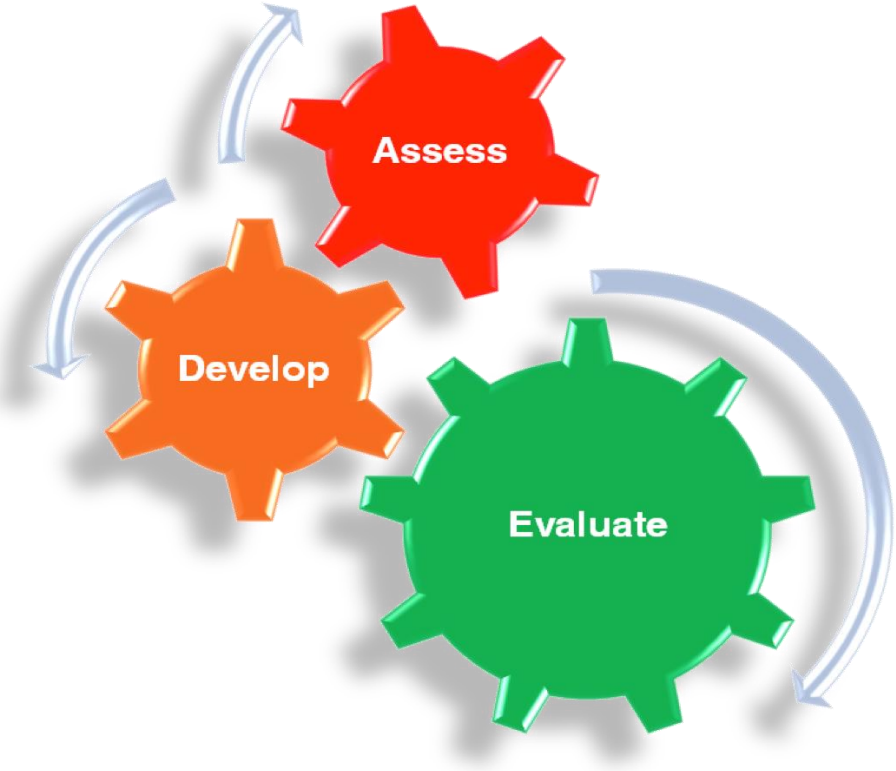
Response to policies


May 2015
Marchfeld, Lower Austria


July 2015
Marchfeld, Lower Austria

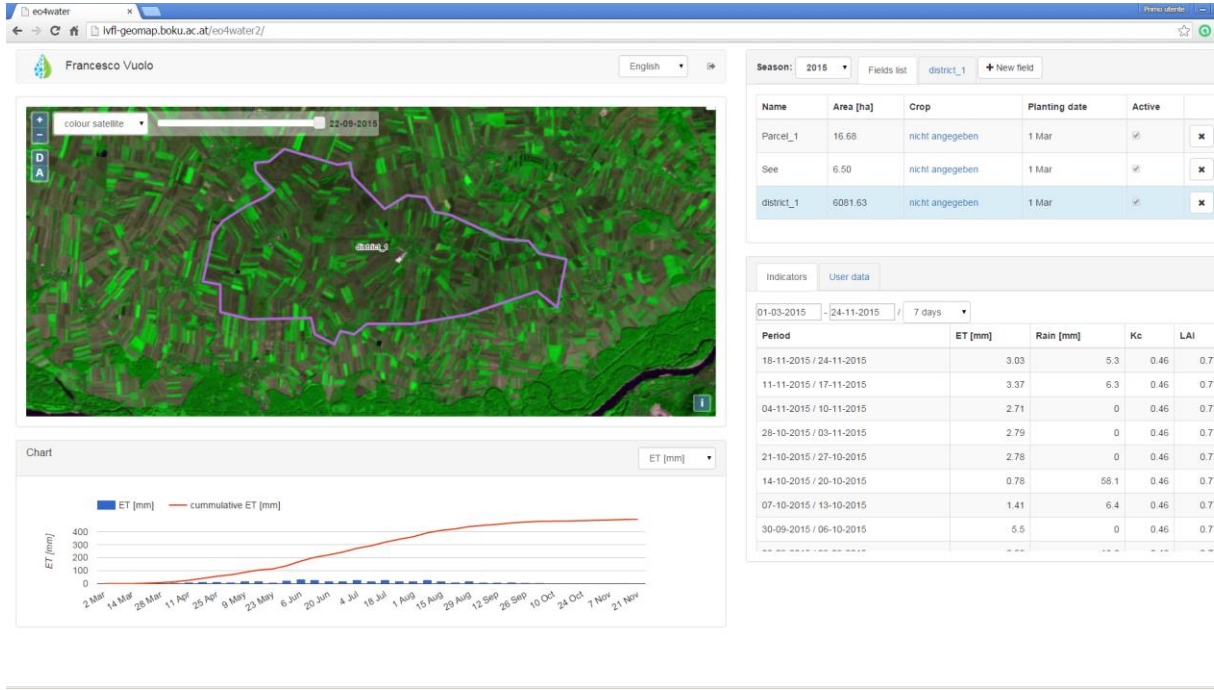
How do we implement?

- 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

Private/public regional initiatives

DEMETER FP5

FP6

FP7

H2020

2005 -2015

Italy

Spain

Austria

Key numbers

Current service coverage

10%

Farmers involved for testing & evaluation

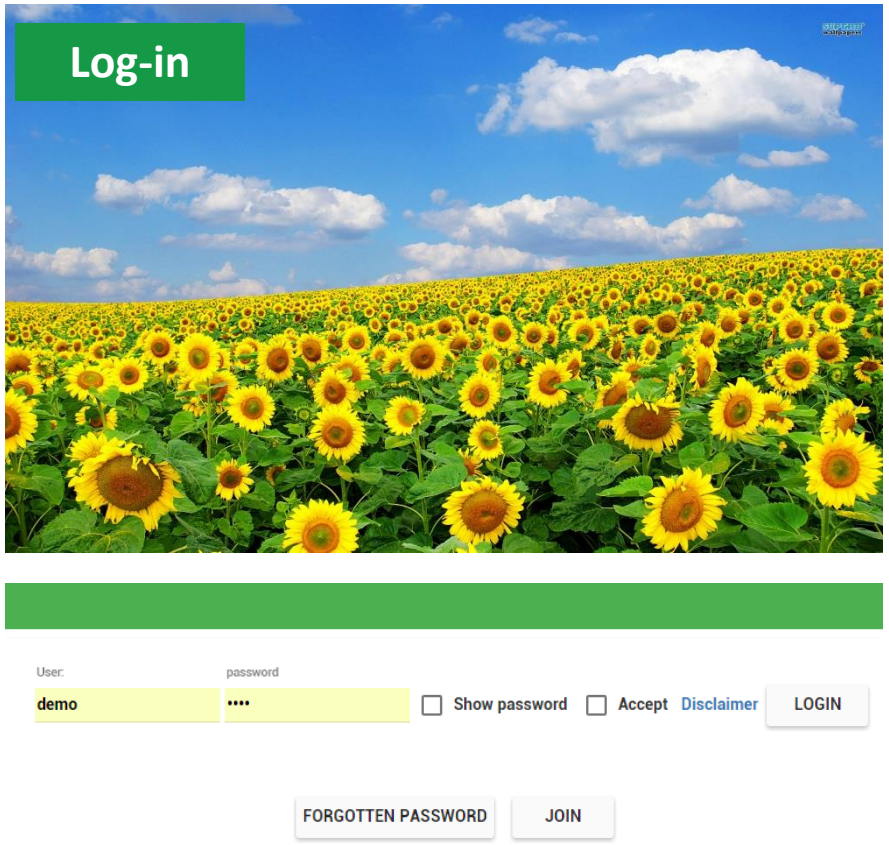
40 +

Total Cost of the service (in pilot study)

60 000 €/year

Return of investment (for water-intensive crops)

1 € invested = 10 € savings



http://service.eo4water.com

FArming **T**ools for external nutrient **I**nputs and water **MA**nagement

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

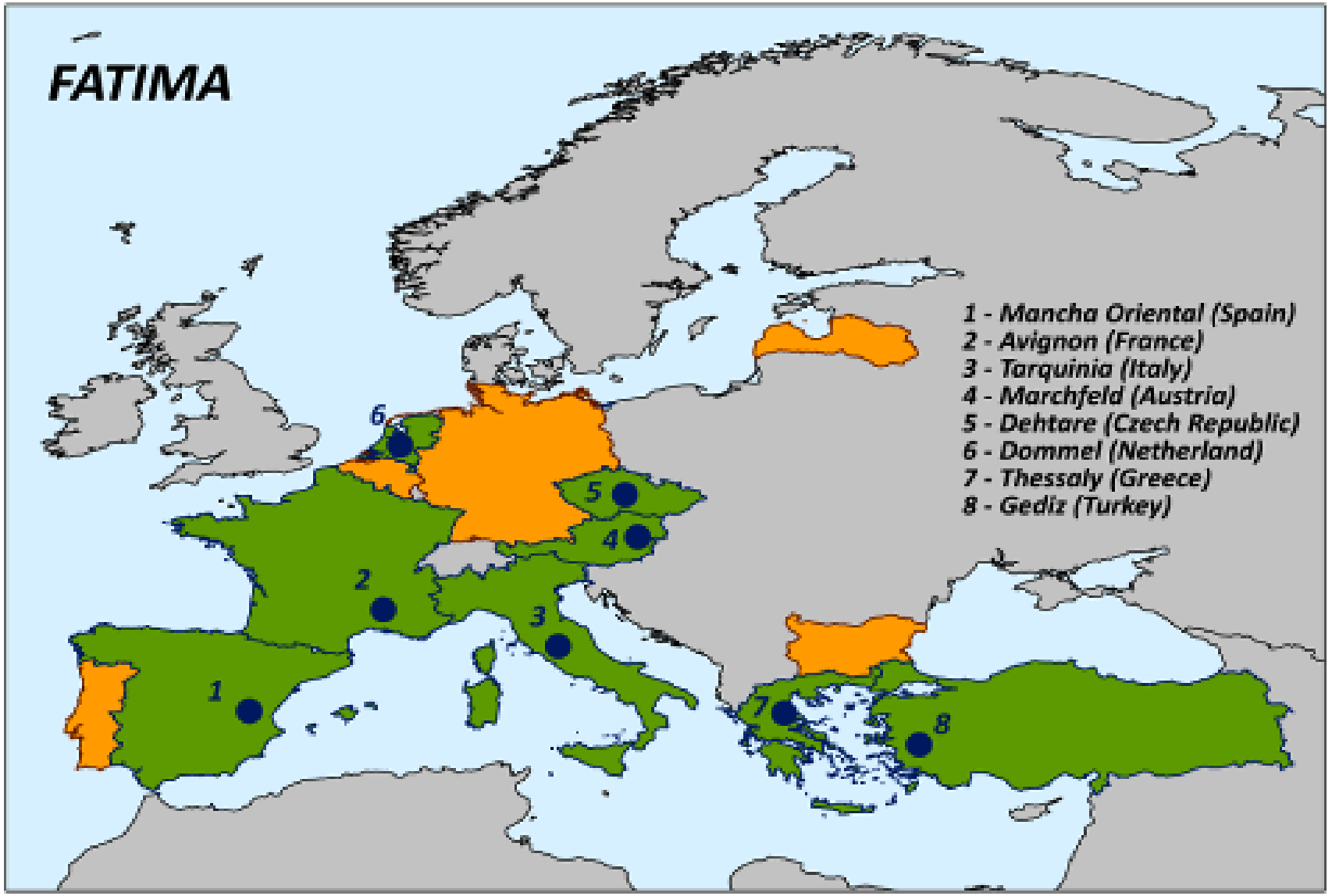
Bridging sustainable crop production

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)

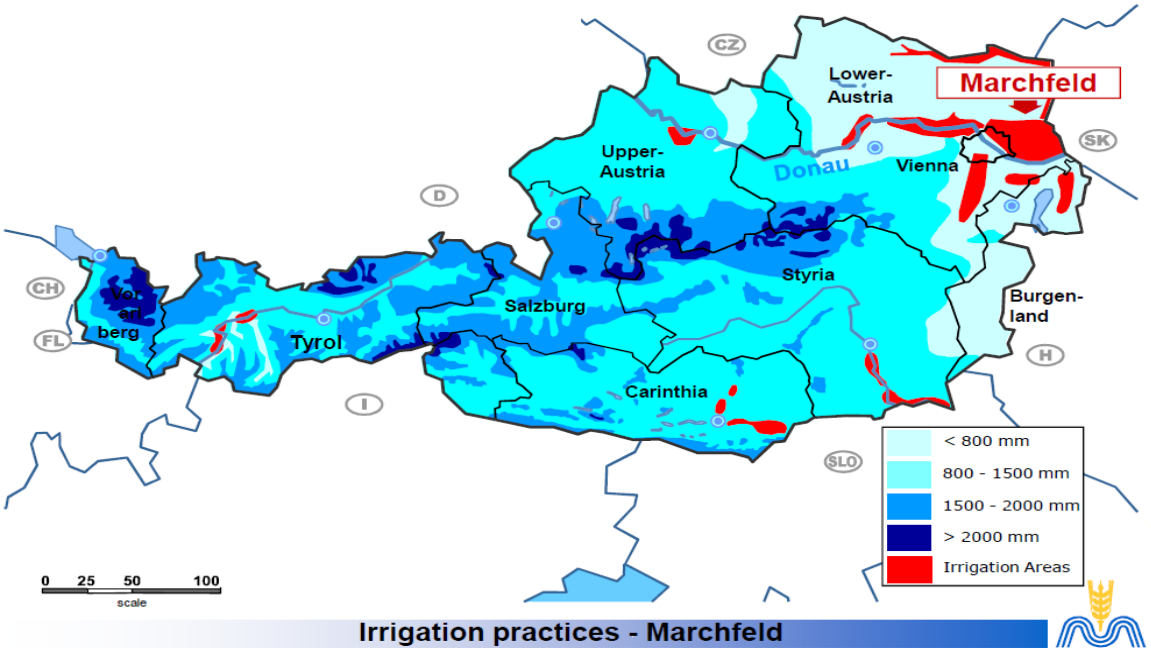
FATIMA >>> where and who?



FATIMA in Austria:

BOKU AGES

Implementing in the Marchfeld region with farmers



Irrigation practices - Marchfeld

Marchfeldkanal

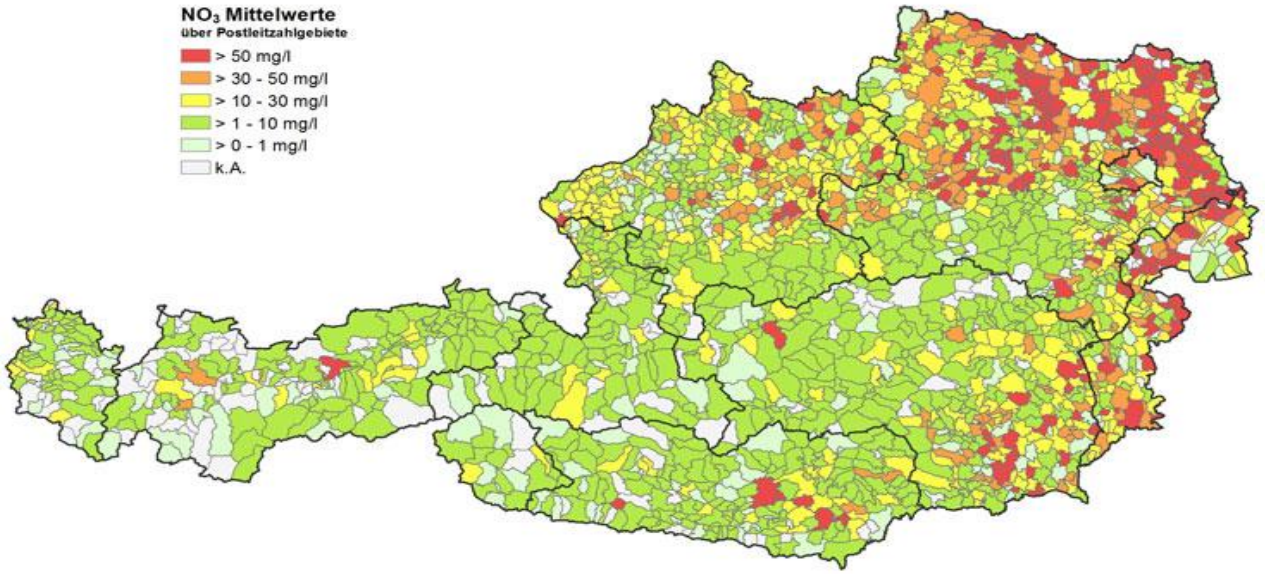
million m³/year

Marchfeld, Lower Austria

Nitrat in Österreichischen Hausbrunnen

Datenbasis: WasserCheck Proben 2003 bis 2014

NO_3 Mittelwerte über Postleitzahlgebiete



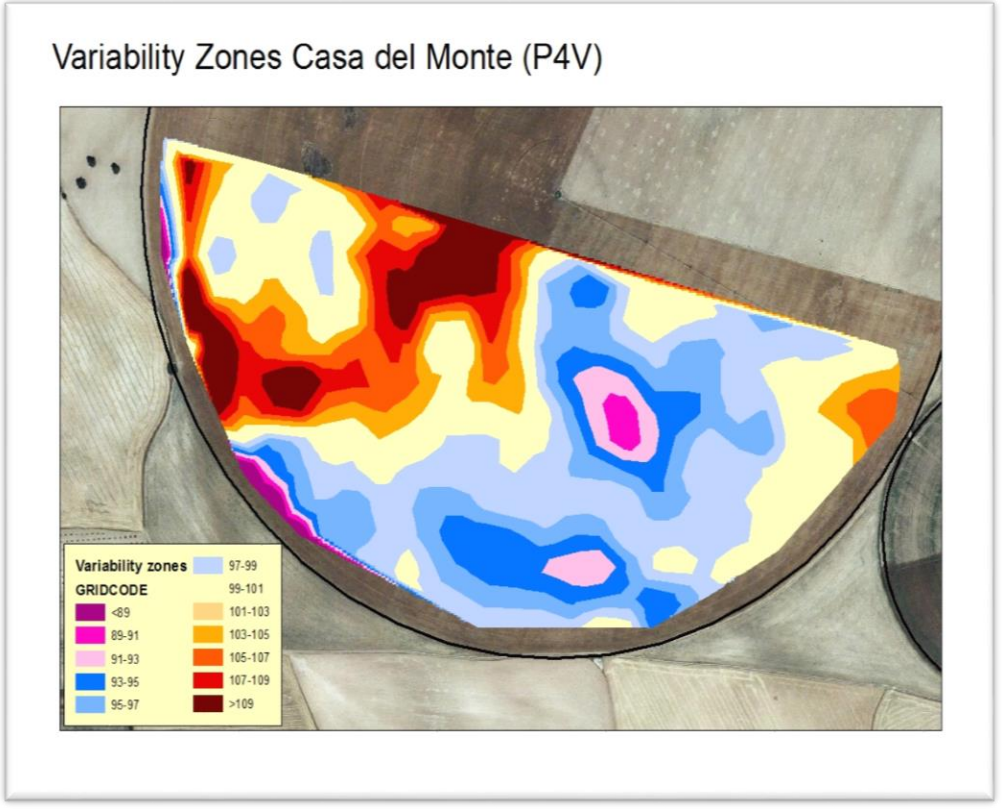
AQA

wasser CHECK

AIT AUSTRIAN INSTITUTE OF TECHNOLOGY

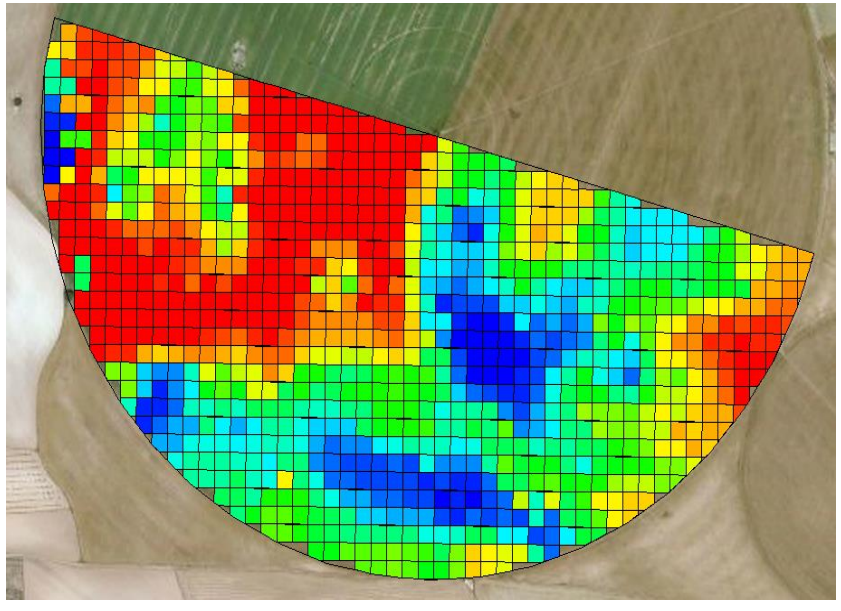
nitrate level in groundwater

Soil potential productivity map



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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http://www.rali.boku.ac.at/ivfl