

“ I am proud to  
be part of this  
*farm revolution* ”

J. G.  
Farmer  
in the South of France

President of the Durance Irrigation Association (200,000ha)



# ¿Why is it a revolution?

Digital Farming + Space Technology  
gives access to **variability**...

“give each plant exactly  
what it needs & when,  
not more – not less”

→ Optimize resources & benefits



## Agriculture 4.0: all about variability (in space & time)

“**knowing** variability → **managing** variability”

Copernicus helps to know – FATIMA shows how

FATIMA: Optimizing nutrient & water management  
in intensive agriculture

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### FATIMA outcomes:

Practical tools, endorsed by users across Europe,  
within reach of all:

Service operational, large-scale, affordable for farmers  
& commercially viable (demonstrated SMEs)

Supported /backed up by 8MEUR of rigorous science  
in multi-actor project 2015-2018

Thanks

Teşekkürler

Grazie

Merci

Ευχαριστώ

Obrigad@s

Благодаря

Děkuji

Paldies

Danke

Dank u



# ¡GRACIAS!







¿How is it done?

Management zones &

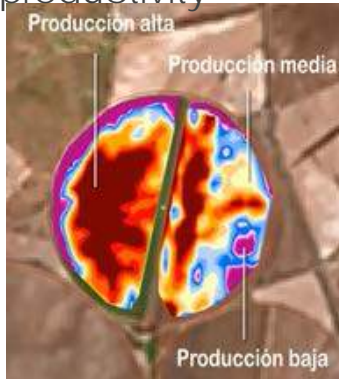
Spatialized

N- balance & water balance

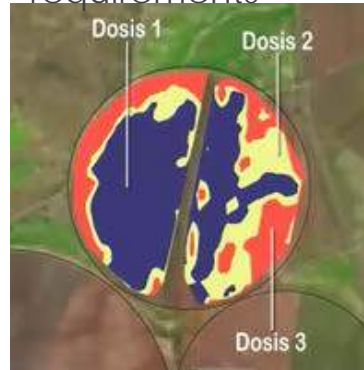




EO-generated map  
of potential  
productivity



transformed (using models)  
into map of fertilization  
requirements



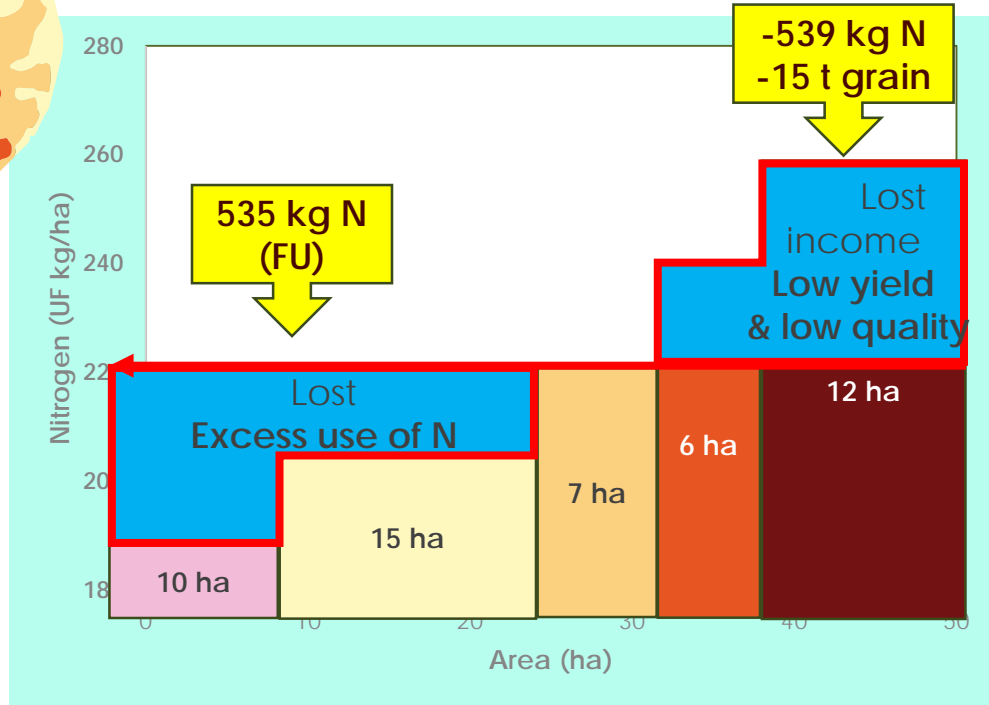
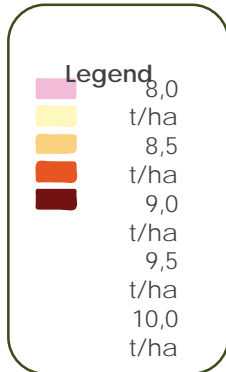
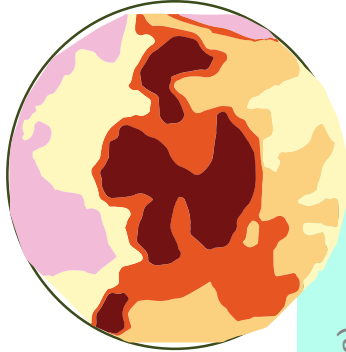
Introduced into variable-  
rate spreader intelligence



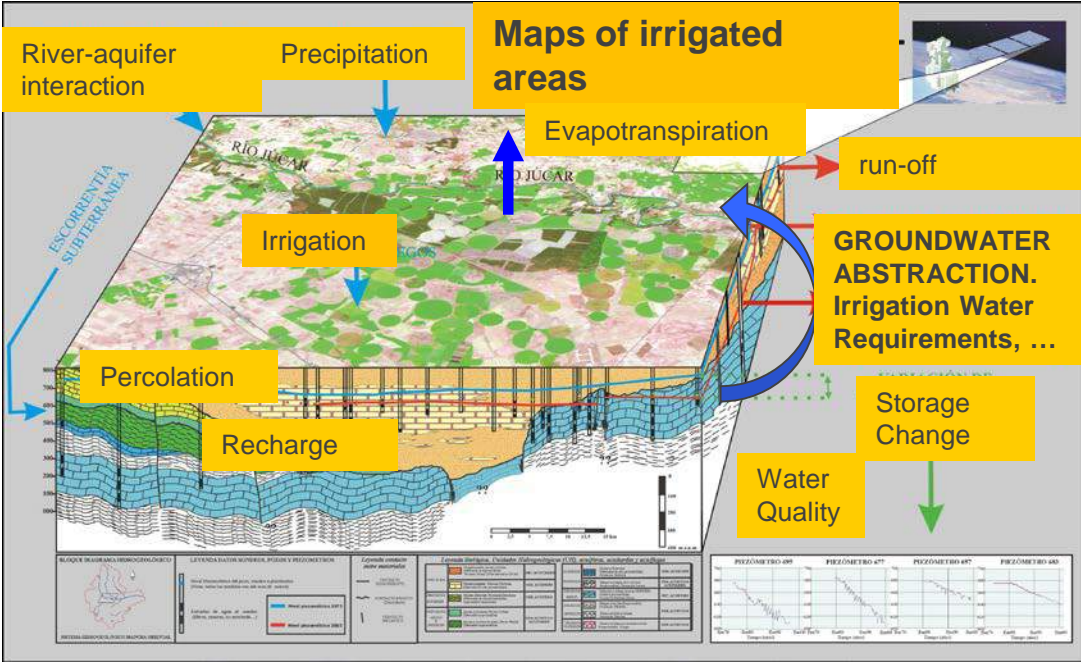
Tractor in field spreading  
differential N rate

# Variable Rate vs Simple Rate

FATIMA tools



# Spatially Distributed Soil Water Balance based on remote sensing



BEFORE

**Farmer  
pre-FATIMA**

**Decision based on**

- FAO tables (water)
- national tables (nutrientes)
- consultants or Extension Services (in some cases)
- their own experience
- ...

**In all cases: homogeneous application**



## BEFORE

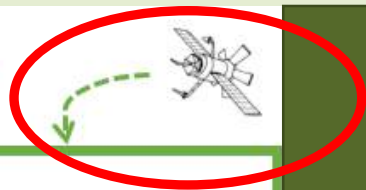
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### EO-enabled innovation



#### FATIMA

key element:

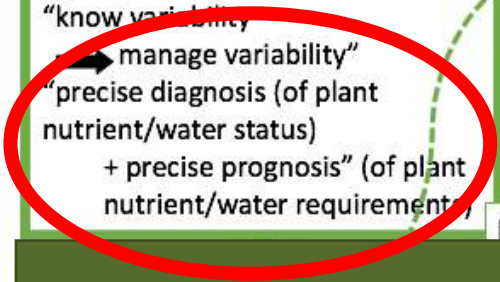
Variability of crop requirements  
(space, time)

"know variability"

→ "manage variability"

"precise diagnosis (of plant  
nutrient/water status)

+ precise prognosis" (of plant  
nutrient/water requirements)



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#### FATIMA provides

- Info (maps, stats?, assessments, roadmaps, guidelines)
- Calculators
- Tools (for info visualization & analysis)
- Services
- (multi-actor) community
- Enabling environment



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## AFTER

### Farmer with FATIMA

#### Decision adapted to

- local spatial variability
- at precise moment in growing cycle

No over-input

No under-input

#### Reduce

- Cost
- Amount (nutrients, water)
- losses (leaching, emissions)

#### Maximize

- Yield quantity & quality
- benefits

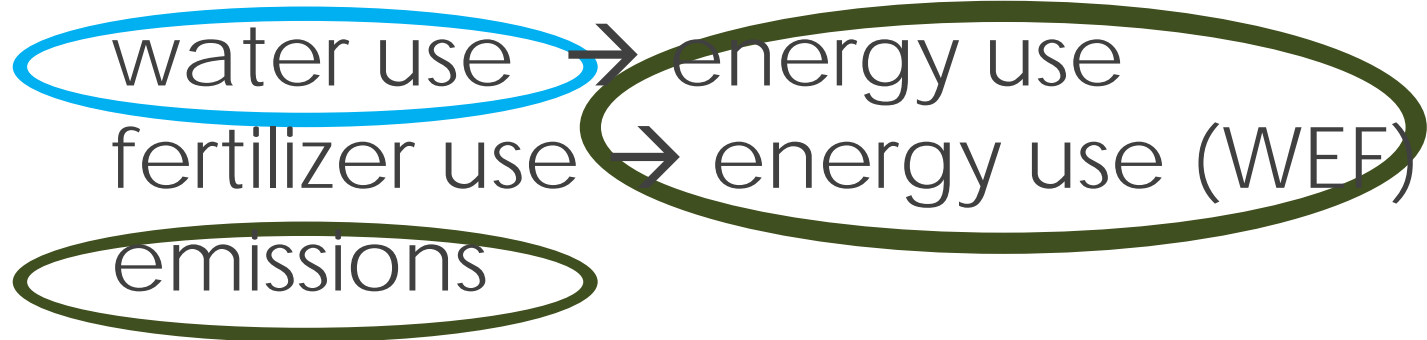
Strengthen prosperous farming communities & give back to environment & society



# Climate change relevant outcomes

\*Tools for adaptive management

\*Tools for reduction of





Level of reduction...

...depends on starting point

exGR 38% (fertilizer / energy / emissions)

exES 5-10% (fertilizer / energy / emissions)

general 5-20% (water / energy)



## Integration of different technologies into a practical variable-rate delivery system of high resolution



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

# WARNING



Digi-Space-Tech alone doesn't do the job

needs to be used / adopted / taken up:

- co-creation process
- multi-actor community
- business (intermediaries)

**end-users  
+ biz**



# Take-home message

Digital Farming + EO Space Technology  
opens **new dimension in agriculture:**

**manage variability**

Needs **multi-actor user community to convert**  
this into **Climate Change-relevant impacts:**

Reduce water, fertilizer, energy use;

Reduce emissions;

Adaptive management



# FATIMA MULTI-ACTOR LOCAL CHAMPIONS

