



UNIVERSITÀ
DEGLI STUDI
FIRENZE



Arable crops production cycle with SPA technologies

- Area1 - SPA Overview
- Lesson 2 - Use cases/Case study
- Sequence ID - 9

Quinta da Cholda



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A1.L2.T3 Arable crops production cycle with SPA technologies:

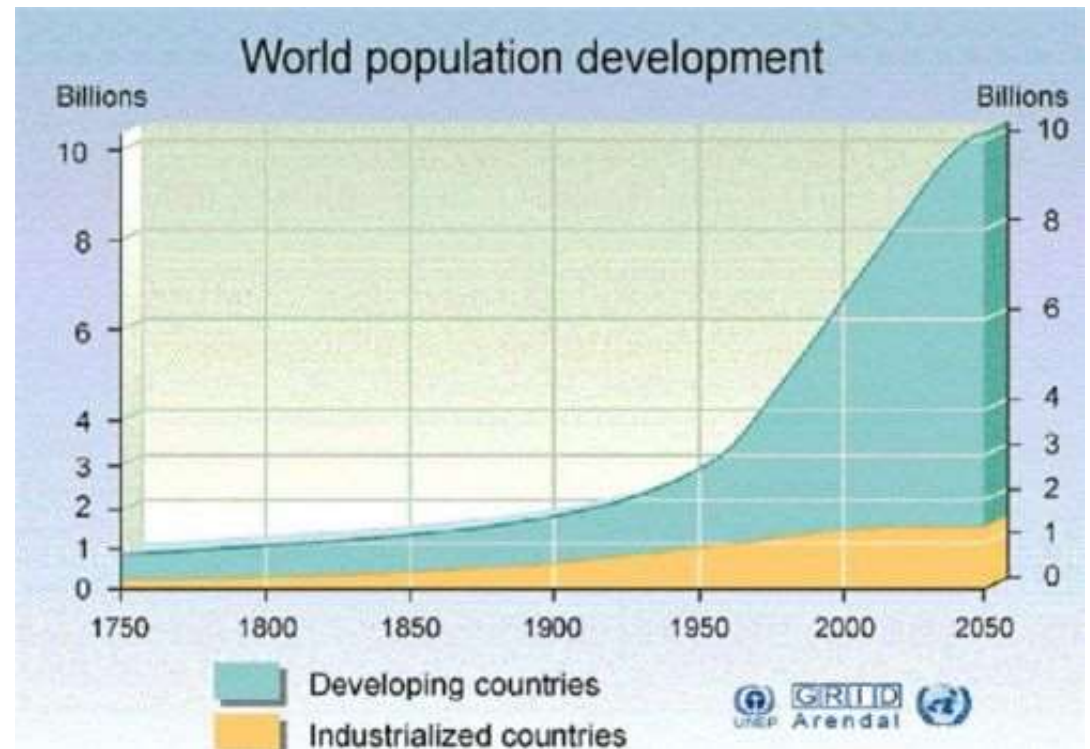
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Global challenges





Produce more with less

Intensification of agriculture versus biodiversity.

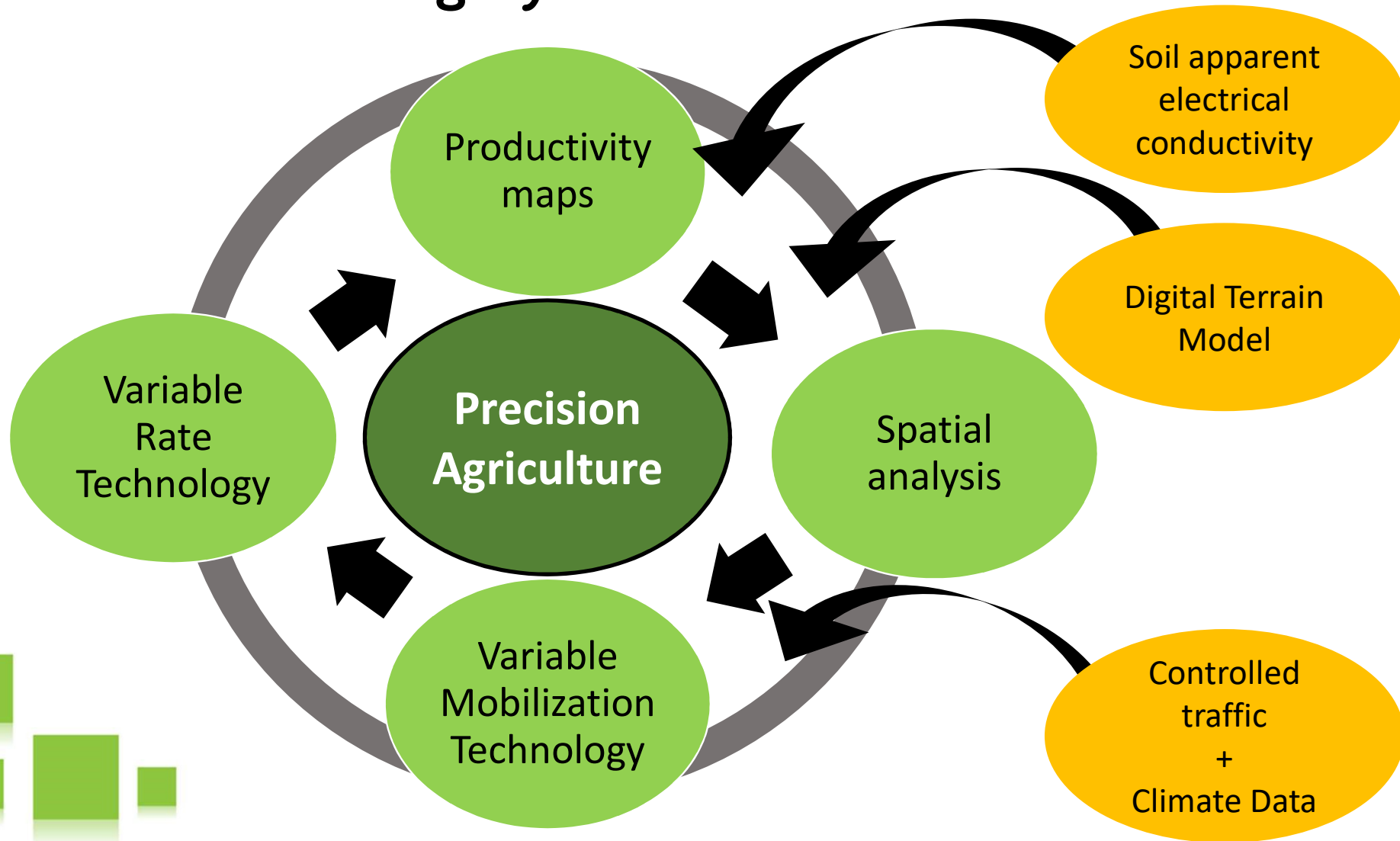
What to do?

Irrigated farming destroys biodiversity?

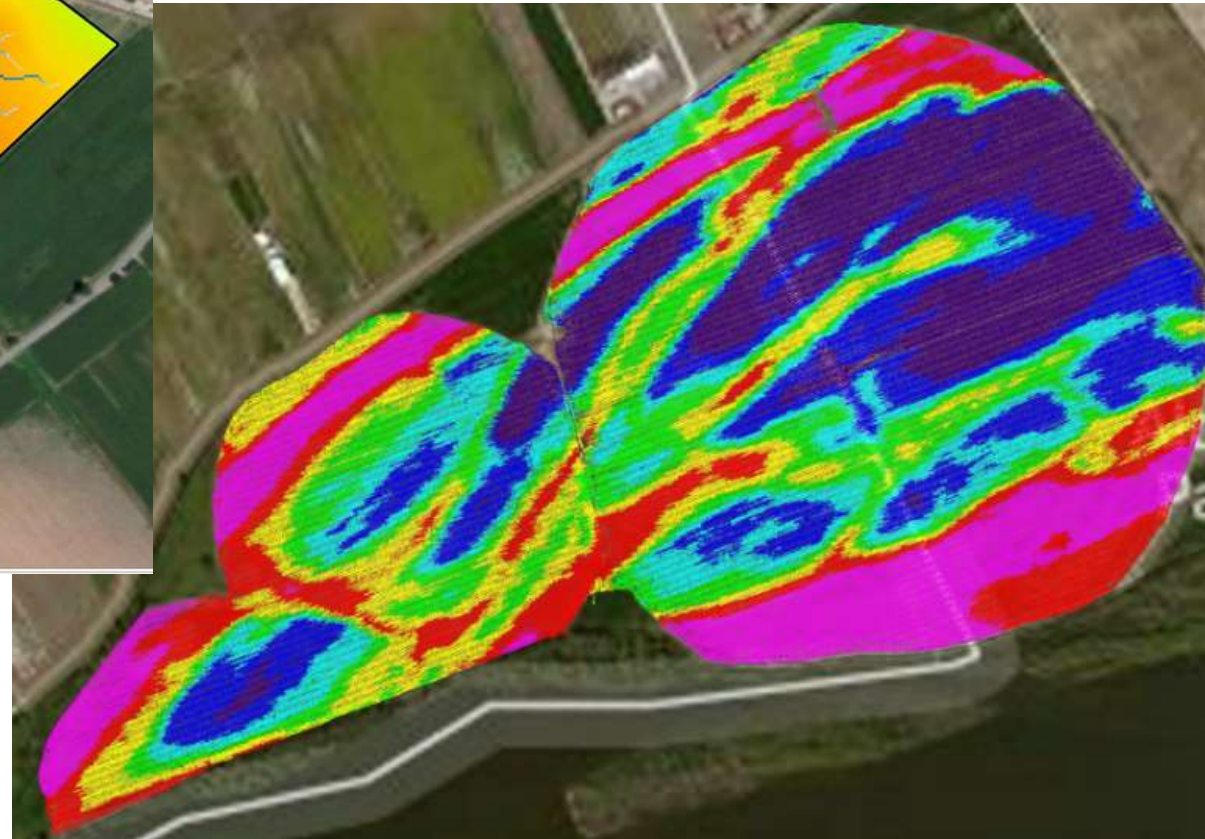
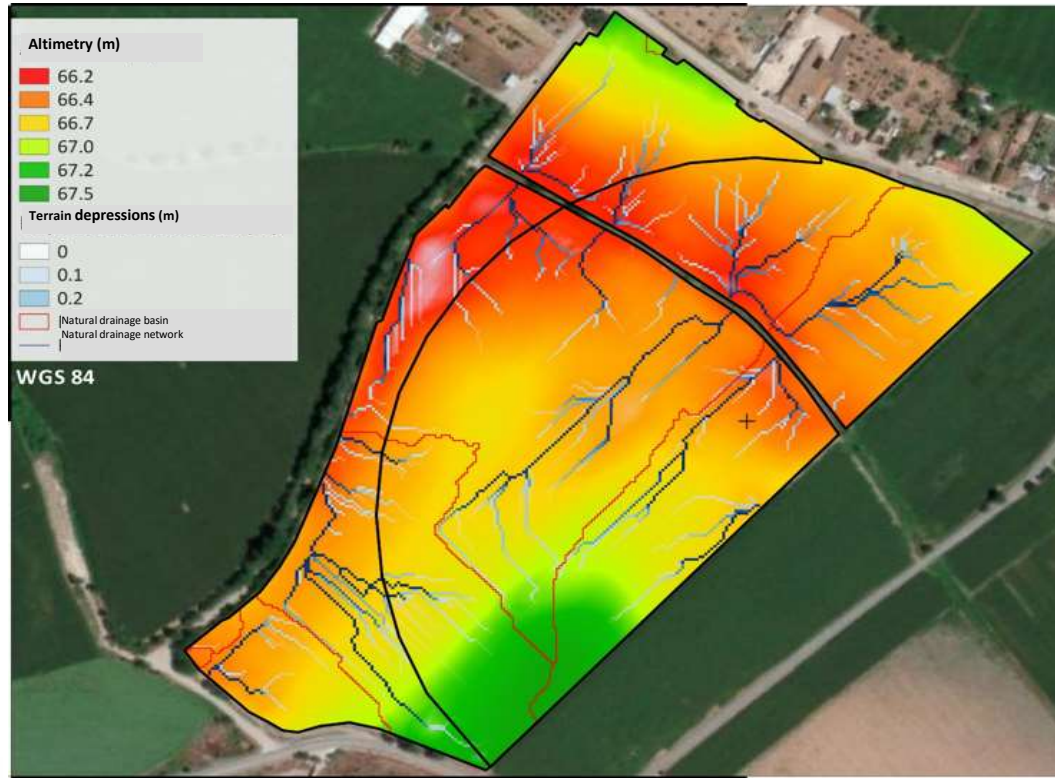
How to reconcile intensification and sustainability?



Precision Farming Cycle



Studying drainage restrictions and others



Drainage process

Objective is to increase and uniformize production, preparing for climate changes.



Measuring soil apparent electrical conductivity



Studying soil management zones



Variable soil decompaction



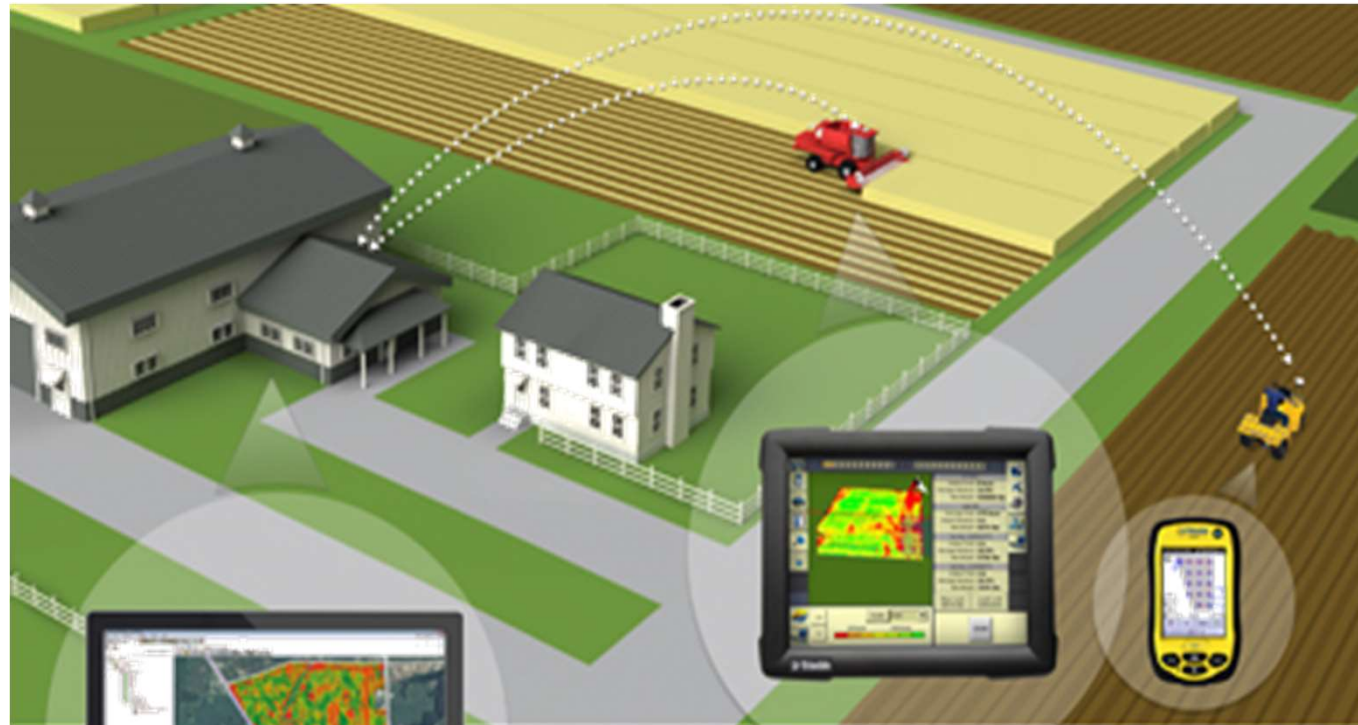
Precision Farming equipments



Auto steering and georeferencing of cultural operations.



Communications and interoperability



Communication

Machines software – Office – Machines



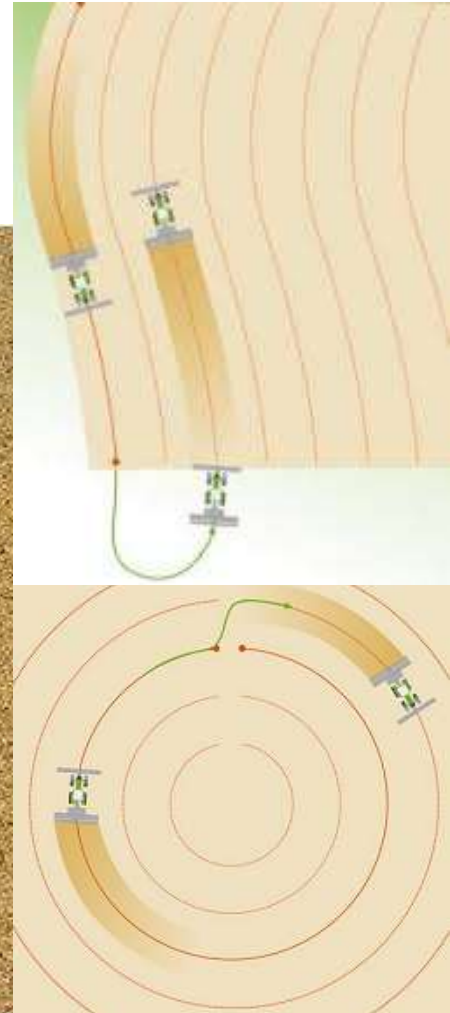
Auto steering

Support throughout the production cycle.



Soil preparation equipment and telemetry

Auto steering system with GPS, works without intervention from the operator.



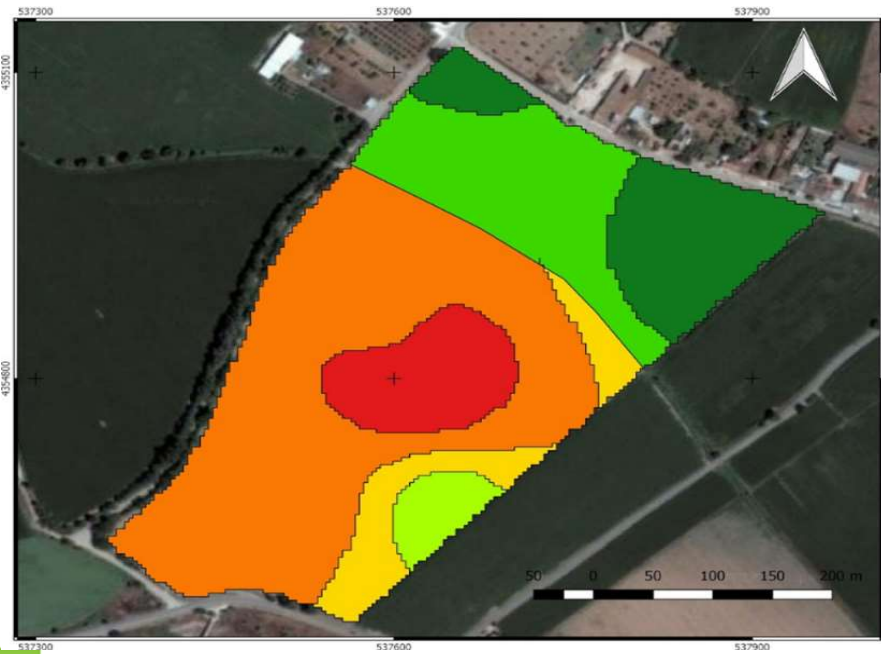
Fertilization with Variable Rate Technology (VRT)



Fertilization with Variable Rate Technology



Map for VRT application of potassium



Omnias

(kg/ha)

- 50
- 100
- 125
- 150
- 175
- 200



Omnias

(kg/ha)

- 0
- 25
- 40
- 50

Map for VRT application of phosphorous



Herbicide application using VRT



Case study 2018

High resolution ortophotomaps

One drone flight

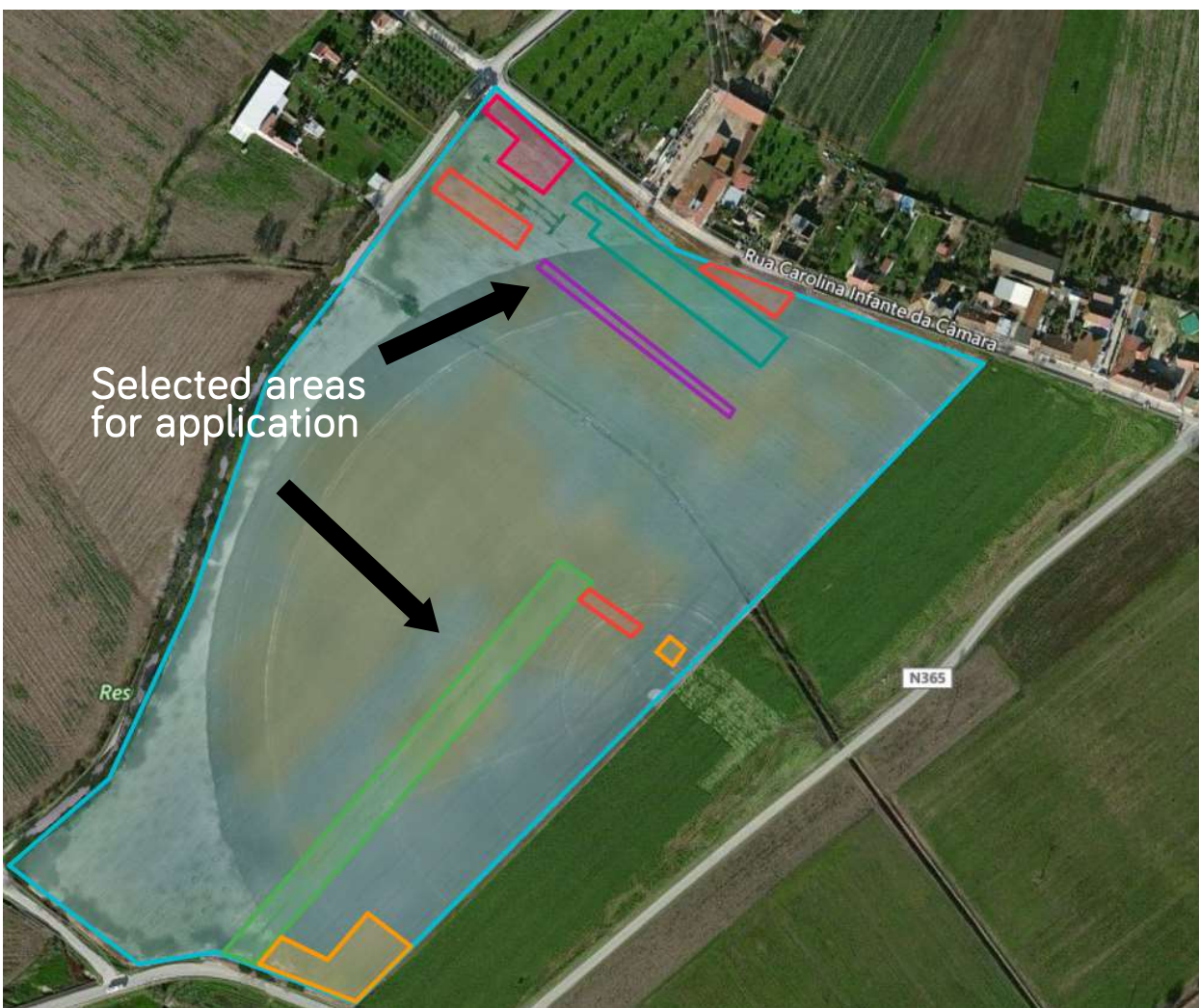
Spatial resolution: 3 cm

250 ortophotos at 70 m high





Herbicide application using VRT



Case study 2018

Results

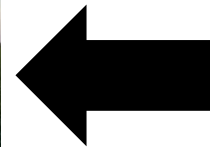
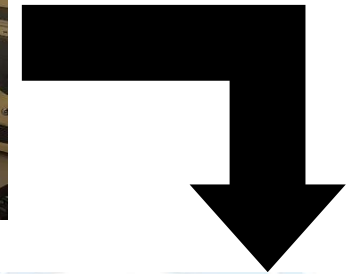
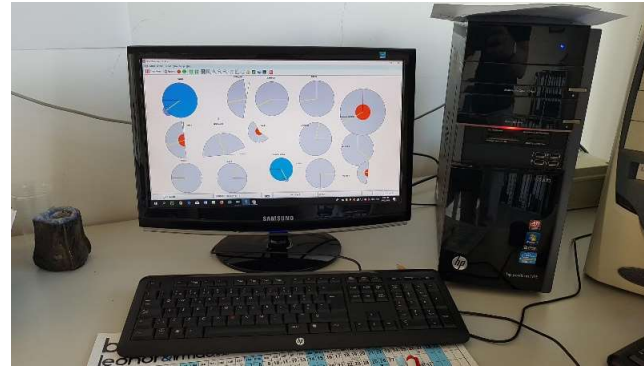
Total Area: 15 ha

Application surface: 3 ha

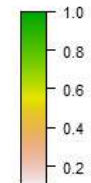
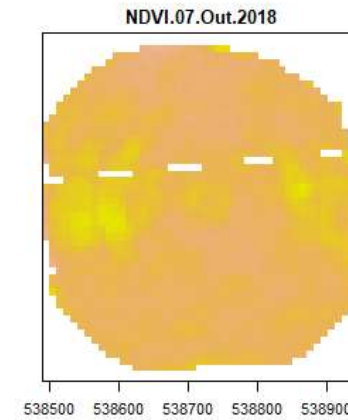
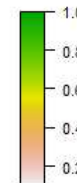
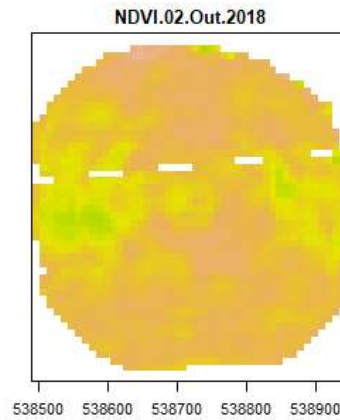
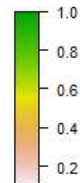
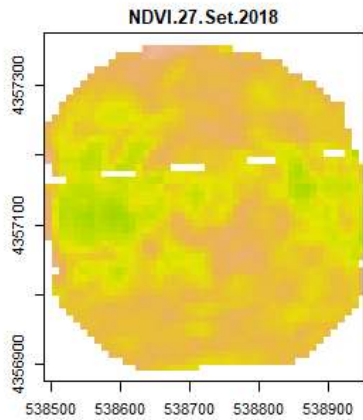
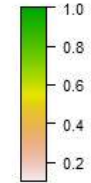
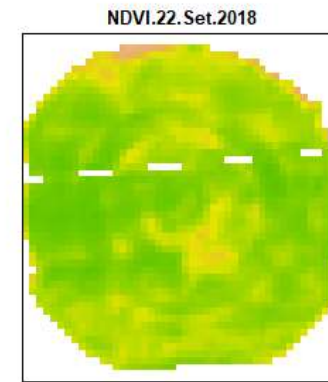
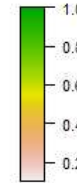
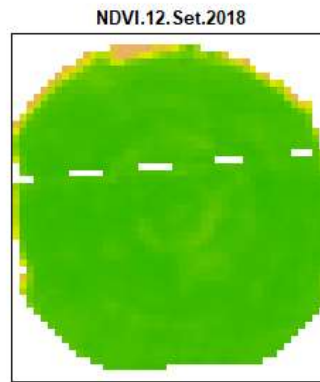
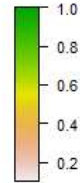
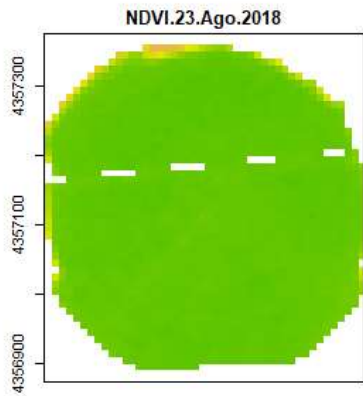
Herbicide savings: 80%
(840€)

Working hours savings: 6 h

Efficiency in irrigation and energy management



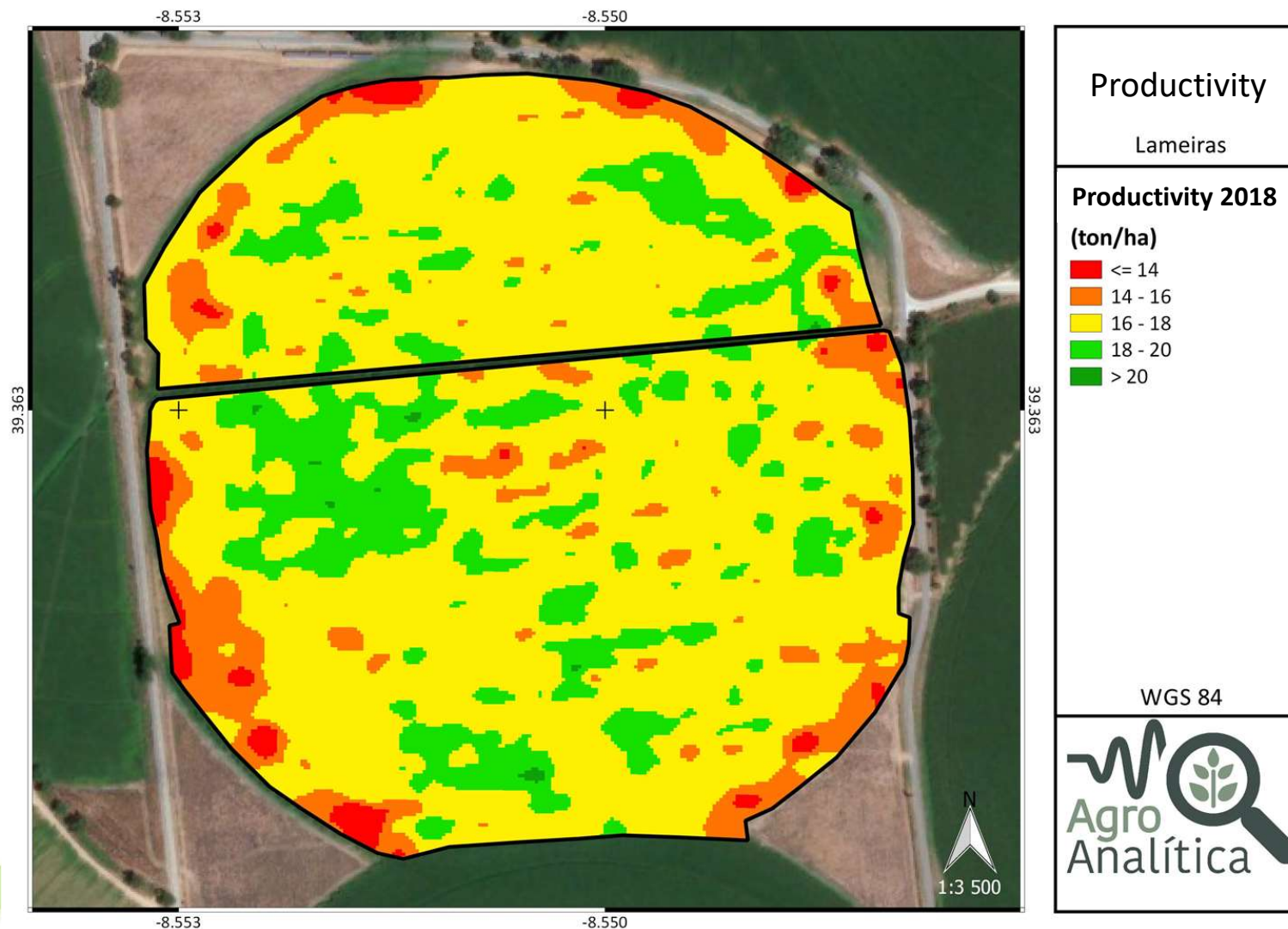
Crop monitoring with satellite images - NDVI



Corn harvest



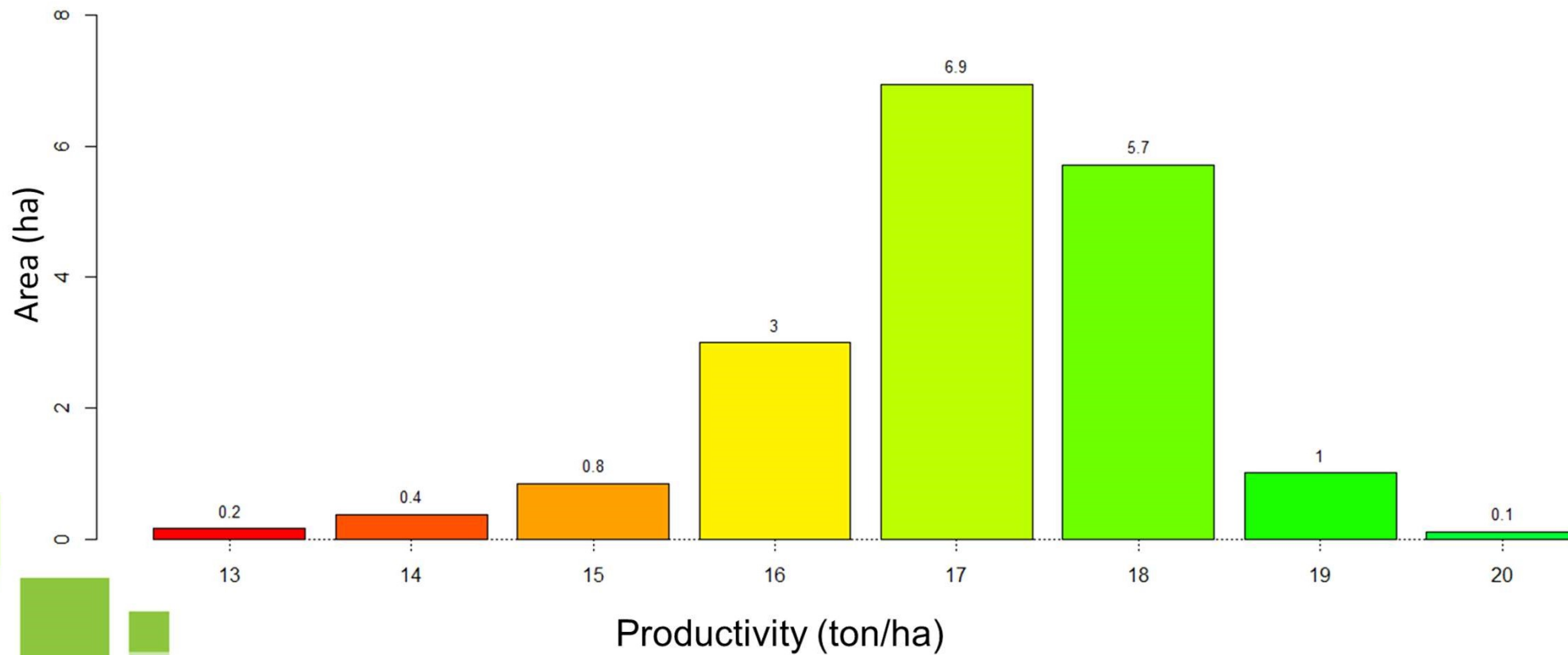
Yield maps



Yield data

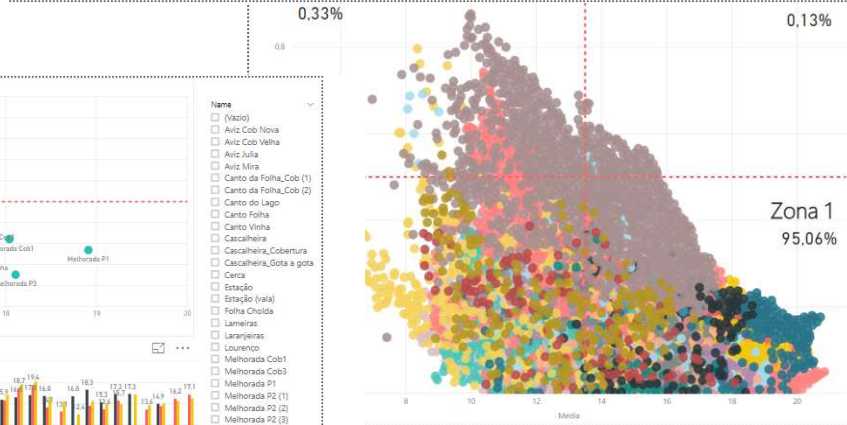
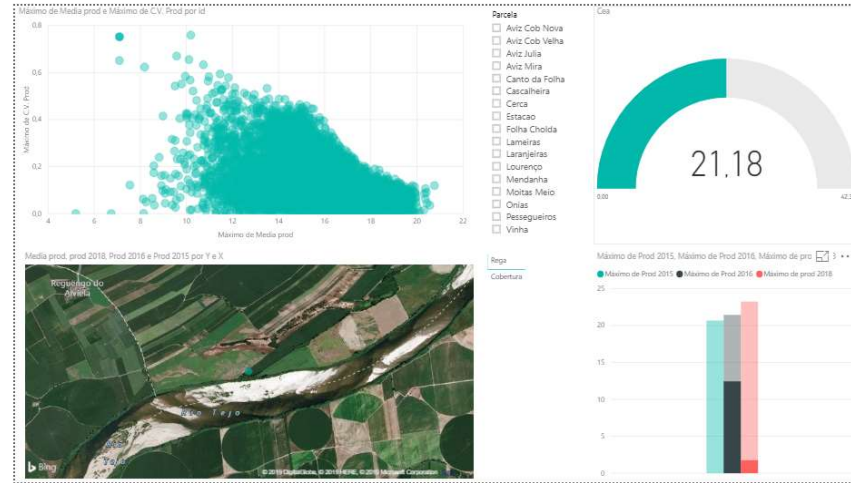
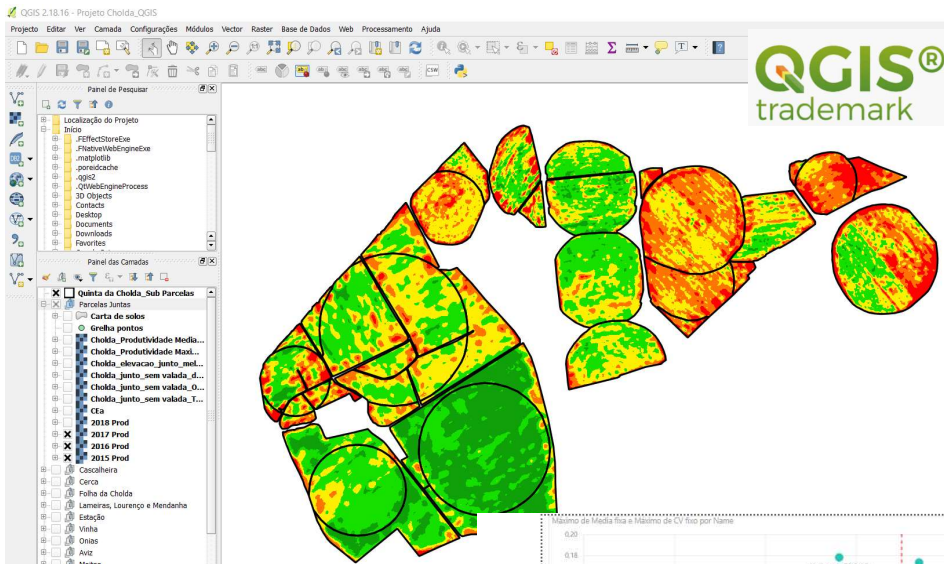


Productivity 2018



How to manage all this information?

Big data issues...



2.177	831
Zona 3	Zona 4
28.689	623.707
Zona 2	Zona 1
656.096	
Total	
Parcela	
Aviz Cob Nova	Canto do Lago
Aviz Cob Velha	Canto Folha
Aviz Julia	Canto Vinha
Aviz Mira	Cascalheira
Canto Cascalheira	Cascalheira_Gota a gota
Canto da Folha_Cob	Cerca
Canto da Folha_Cob2	Estação

