

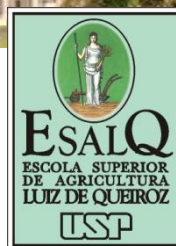


4º Diálogo
Brasil-Alemanha
de Ciência,
Pesquisa e
Inovação

Technology and Precision Agriculture



University of Sao Paulo

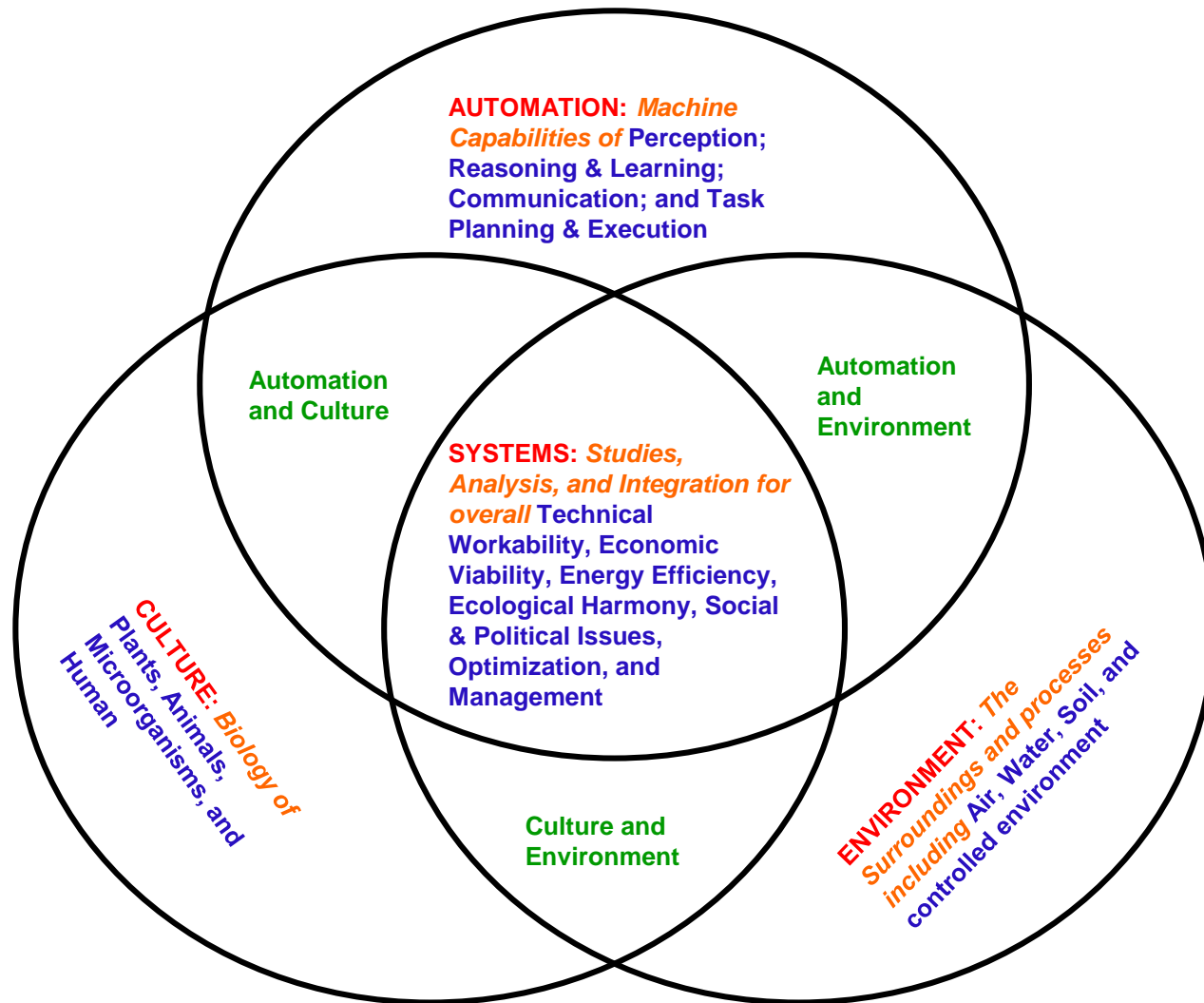


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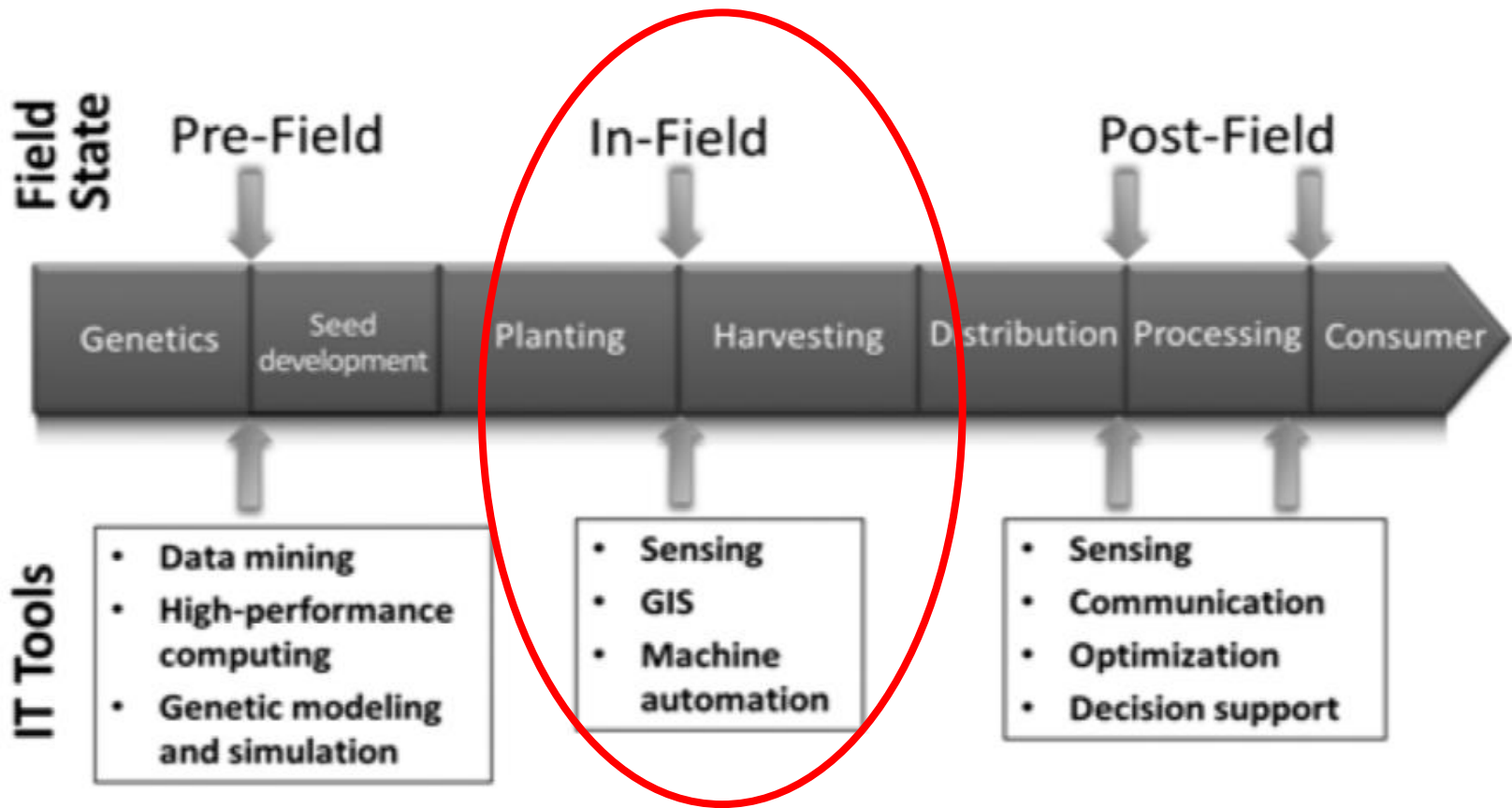
Precision Agriculture

- Spatial variability in the agricultural fields
 - Investigation and mapping
 - Tools for sampling and sensing, GIS
 - Management and decision making
 - Site-specific treatments (“Site-Specific Crop Management”)
- Technologies related to GNSS and automation
 - Auto steering, telemetry, controlled traffic in the field, sections control (sprayers, seeders) etc...

THE NECESSITY OF A SYSTEMIC VIEW



TING, 2008



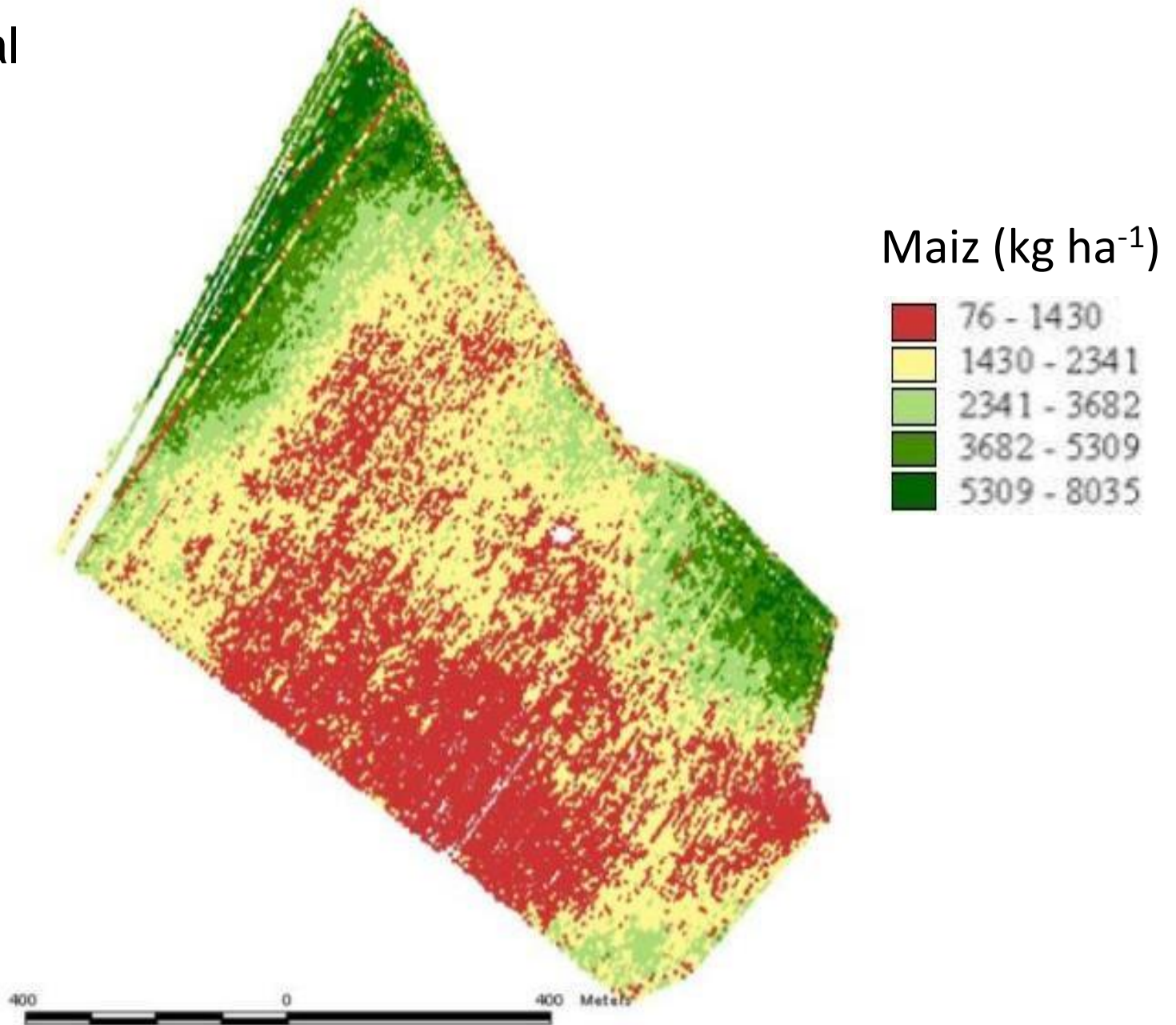
Precision agriculture is just a small part of IT in agriculture

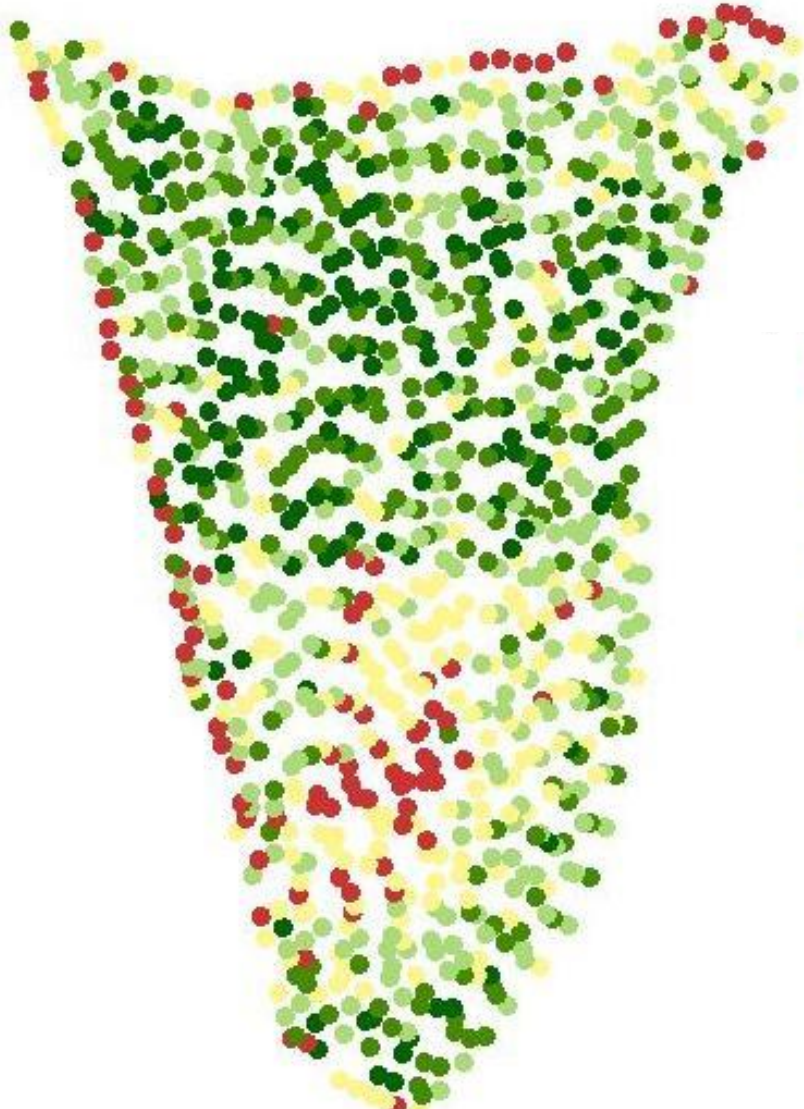
TING et al.(2011)

History of PA

- In the 1980's – some actions in Europe and in North America related to spatial variability of soil and crops in the field
- GPS available for civilians – around 1990
- First solutions on variable rate controllers (around 1985 in the USA) and on yield mapping (1990, UK; 1991, USA)

Yield spatial variability





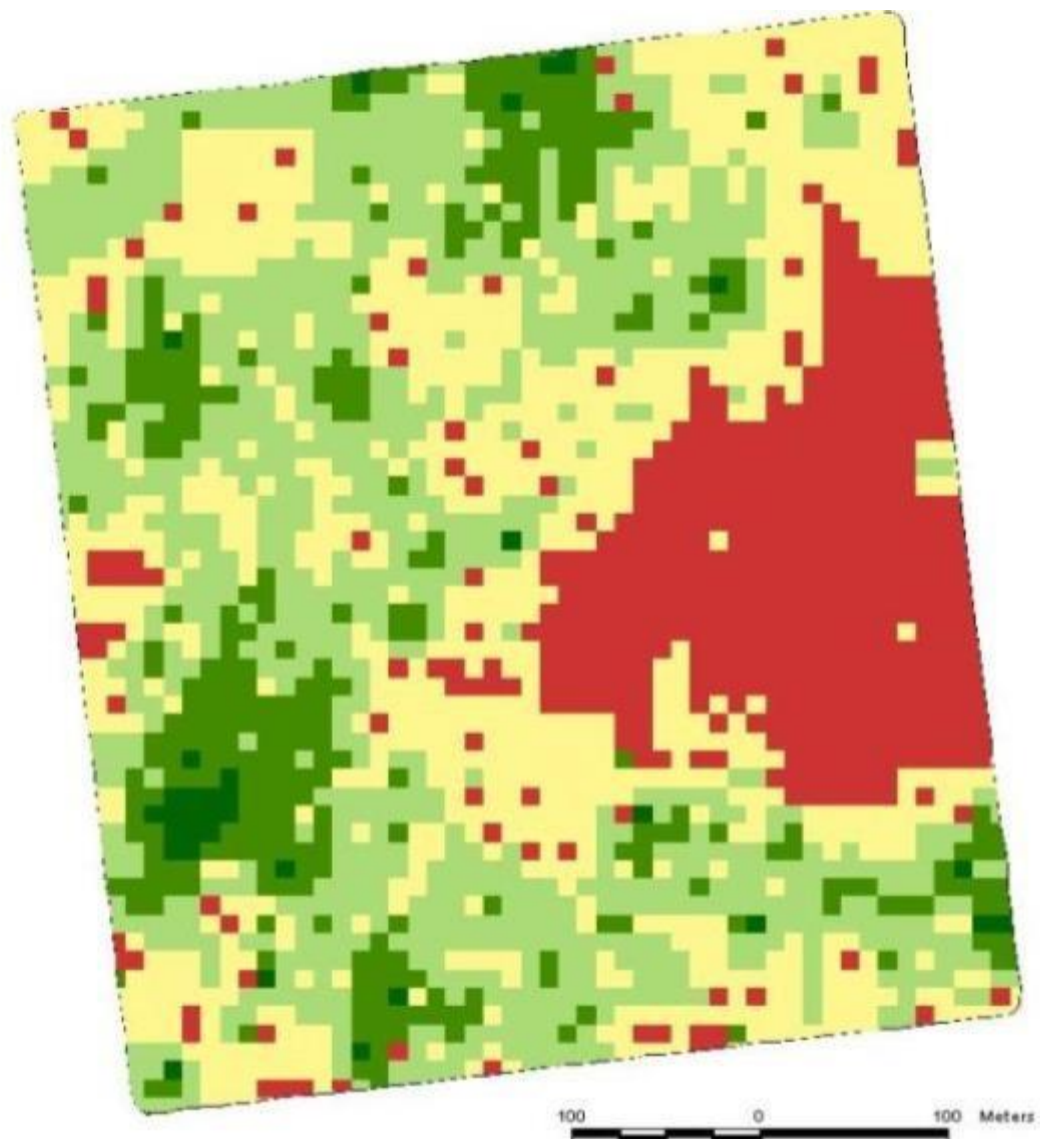
Coffee (kg ha⁻¹)

- 1119.6 - 2335.2
- 2335.2 - 3055.8
- 3055.8 - 3632.4
- 3632.4 - 4182
- 4182 - 4983

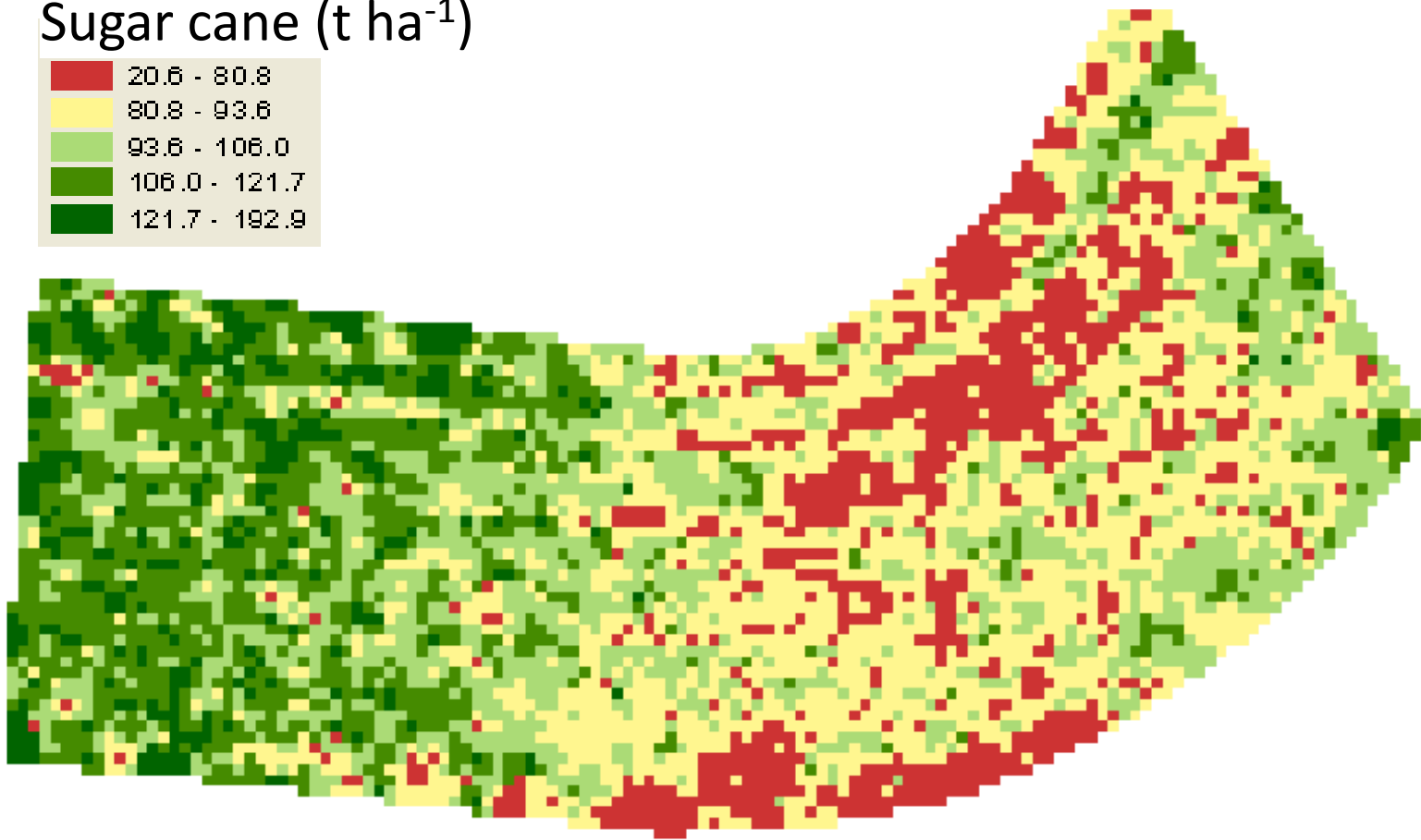
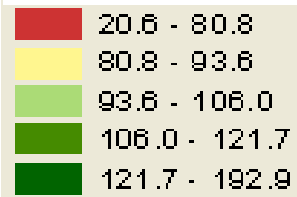
50 0 50 Meters



Oranges (kg ha⁻¹)



Sugar cane (t ha⁻¹)



Electronics in agriculture

- From 1980's to 2000's – automation of tractor commands in the cabin
- 1990's – electronic communication between tractors and implements is developed (ISOBUS)
- 2000's – auto steering consolidates
- Next 20 years:
 - Communication among machines and with the management central unit
 - Autonomous vehicles

Autonomous vehicles – the next generation (?)



Blackmore, 2006

Sensors and sensing

Function: generate better, more reliable and in a higher resolution, diagnostics of factors involved on the spatial variability of agricultural fields

- Targets?
 - Soil
 - Plants
 - Products (quantity & quality)

Sensors and sensing



They measure some physic or chemical quantity that indirectly relates to our indicators of interest



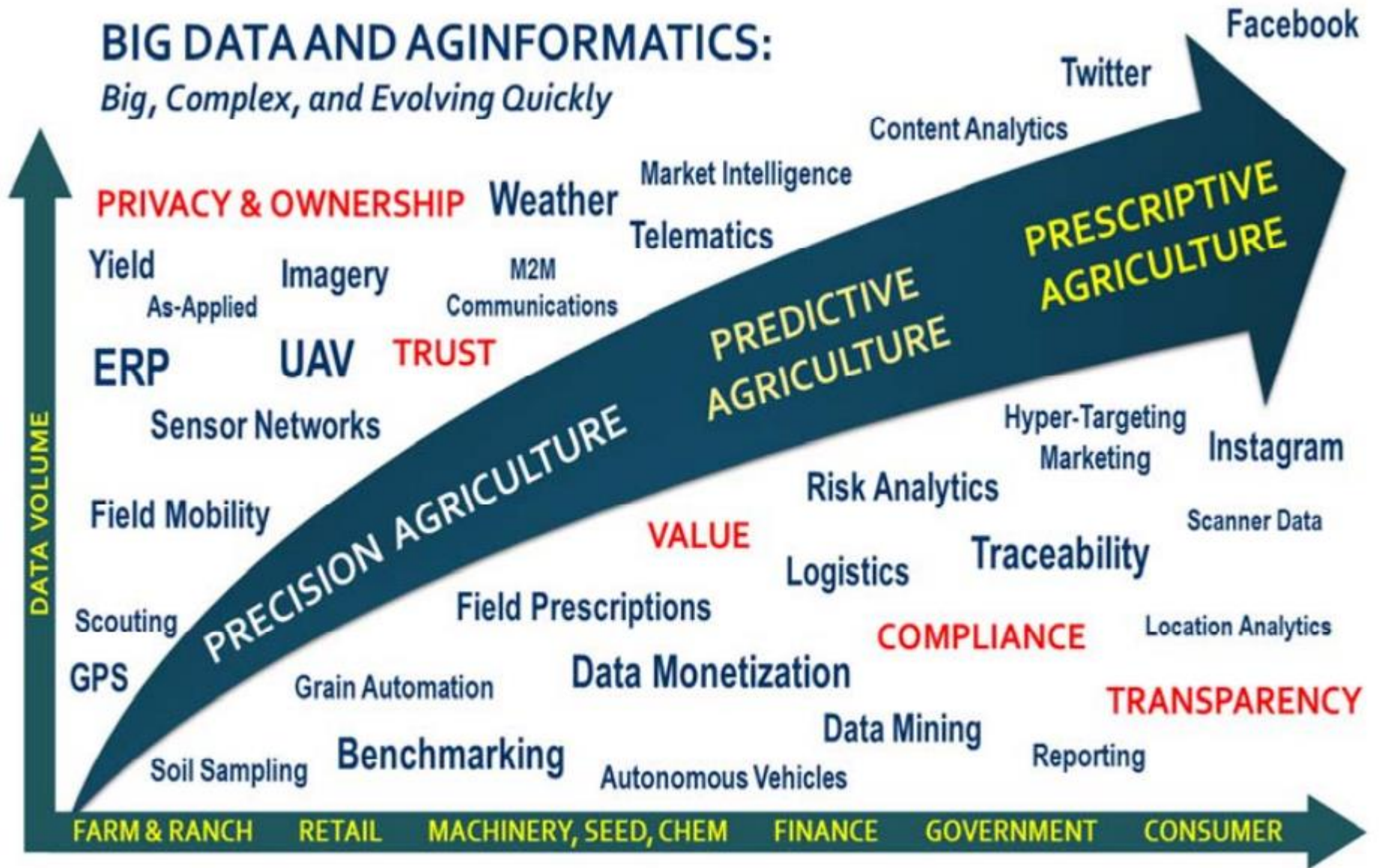
soil



plants

BIG DATA AND AGINFORMATICS:

Big, Complex, and Evolving Quickly



GeoSilos (2013)



Prof. J. P. Molin

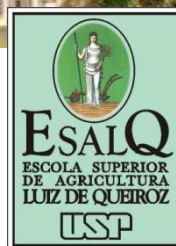


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Thanks!



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