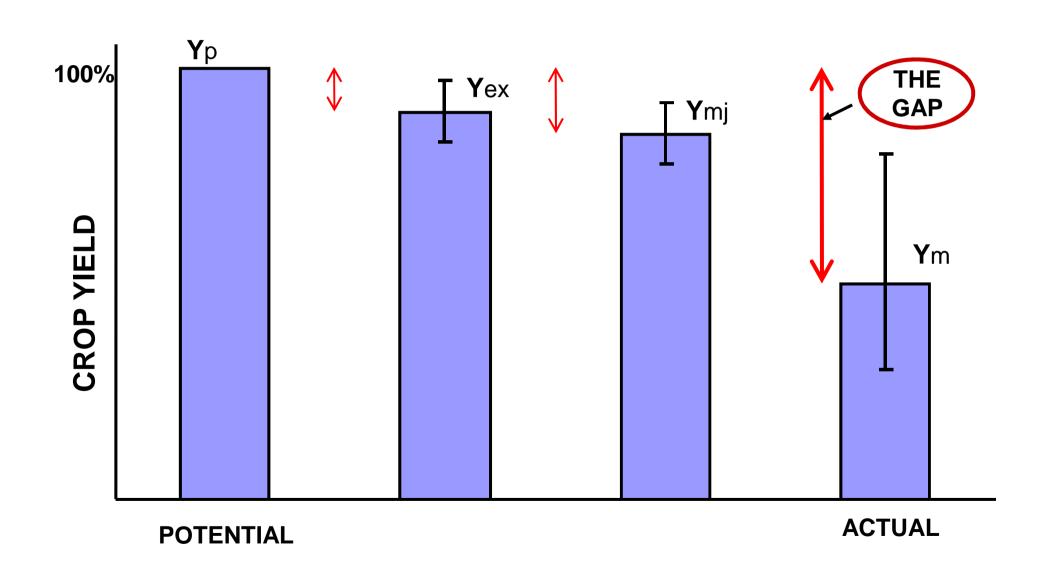








THE CHALLENGE OF PRODUCING SUFFICIENT FOOD: UNDERSTANDING THE YIELD GAP



BENCHMARKING

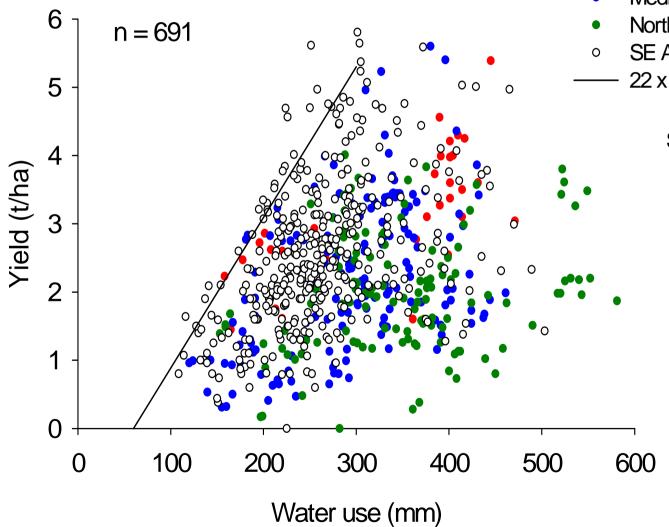
WHAT LIMITS CROP PRODUCTIVITY??

WHEAT IN DIFFERENT **WORLD REGIONS**

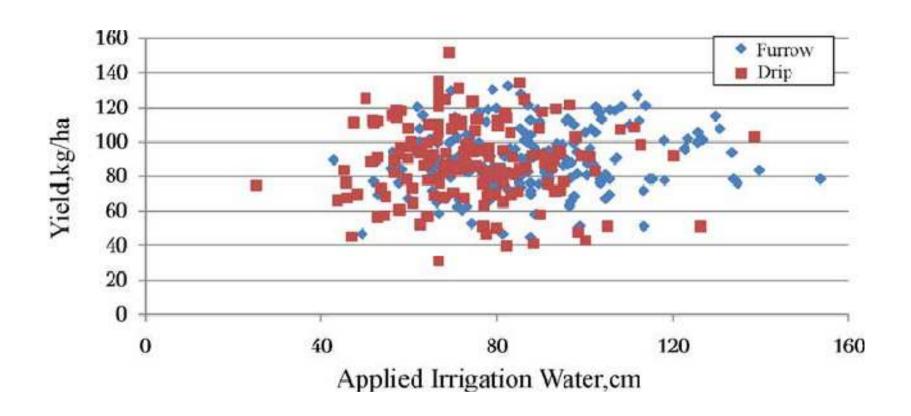


- Mediterranean Basin
- North American Great Plains
- SE Australia
- 22 x (water use 60)

Sadras & Angus, 2006



Tomato yields under two irrigation methods in California



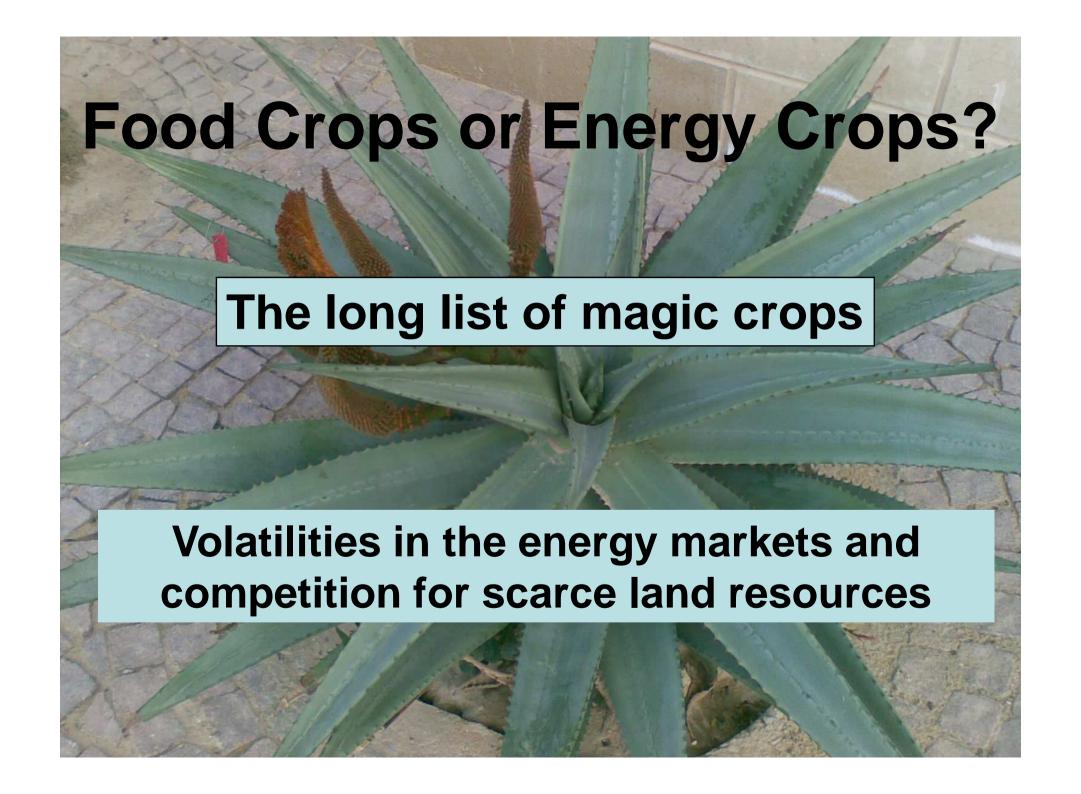




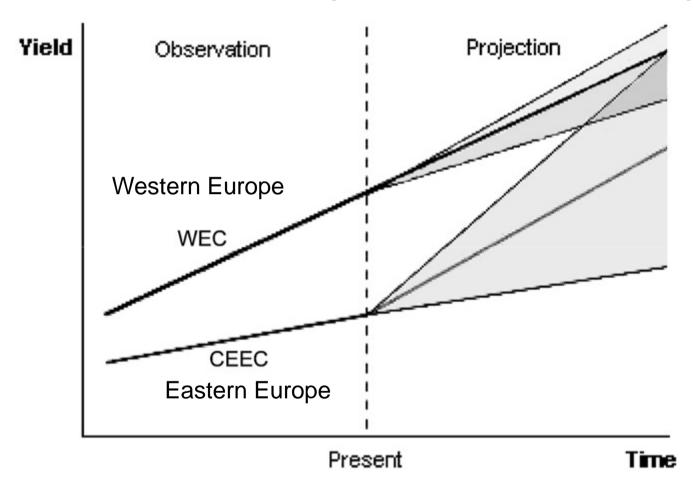
In Europe, what it means is to produce at levels closer and closer to potential yield while decreasing GHG emissions.

CAN IT BE DONE?

Sustainable or ecological intensification: preserving the resource base, including endangerous species, the farmer in particular



LAND AVAILABILITY FOR ENERGY CROPS DEPENDS ON YIELD PREDICTIONS (UNDER UNCERTAINTY)

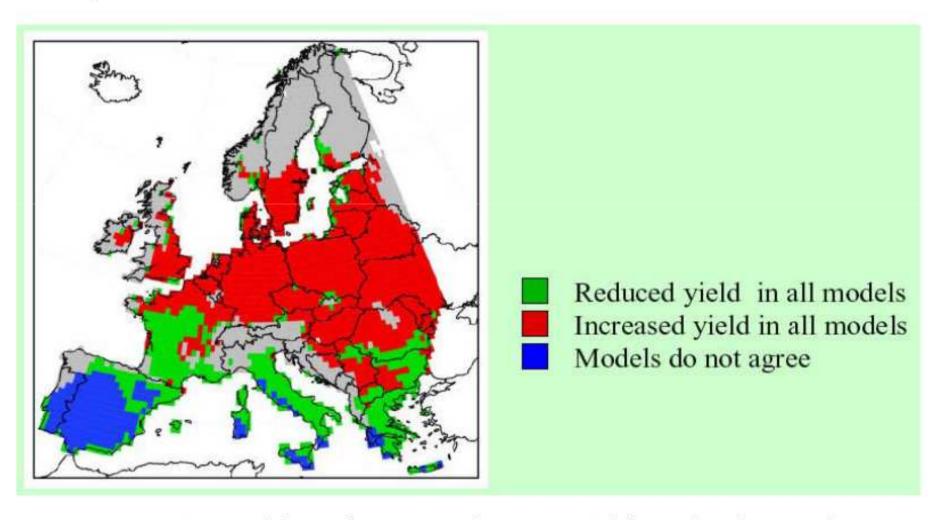


After de Wit & Faaij., Biomass and Bioenergy, 34:188 (2010)

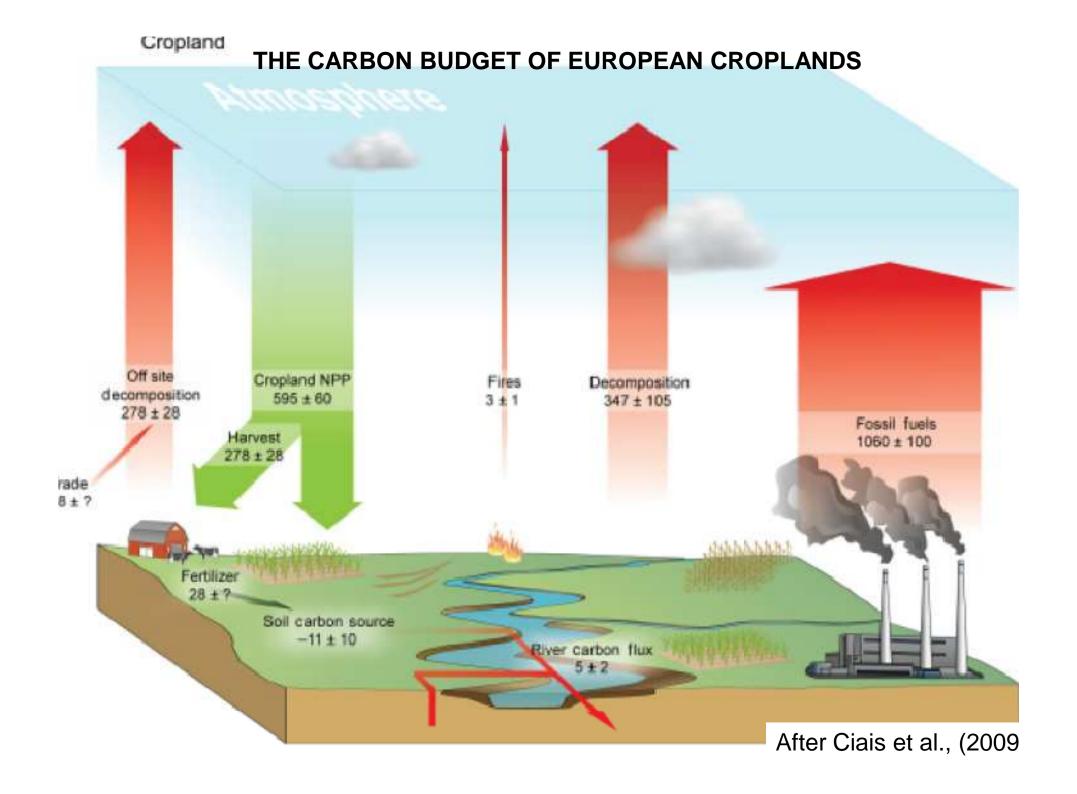


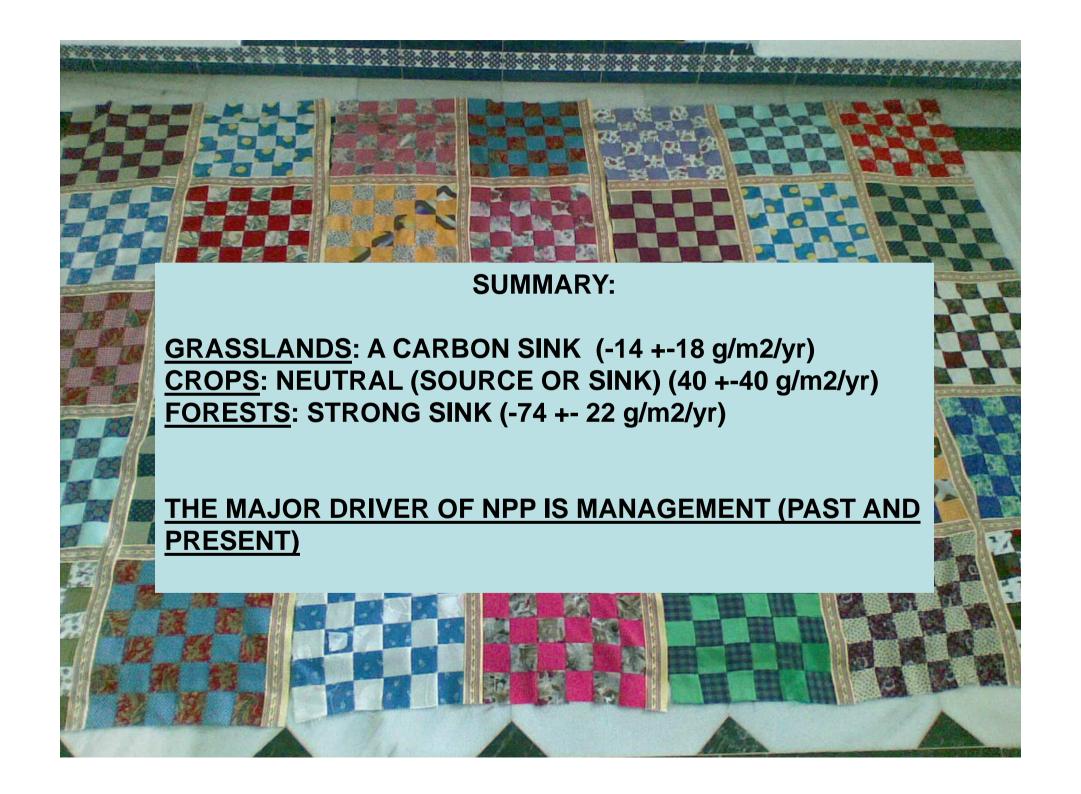
LARGE <u>UNCERTAINTIES</u> ABOUT REGIONAL PREDICTIONS

Figure 1.7: Changes in wheat yield, 2080 (amount of agreement between 9 regional models).

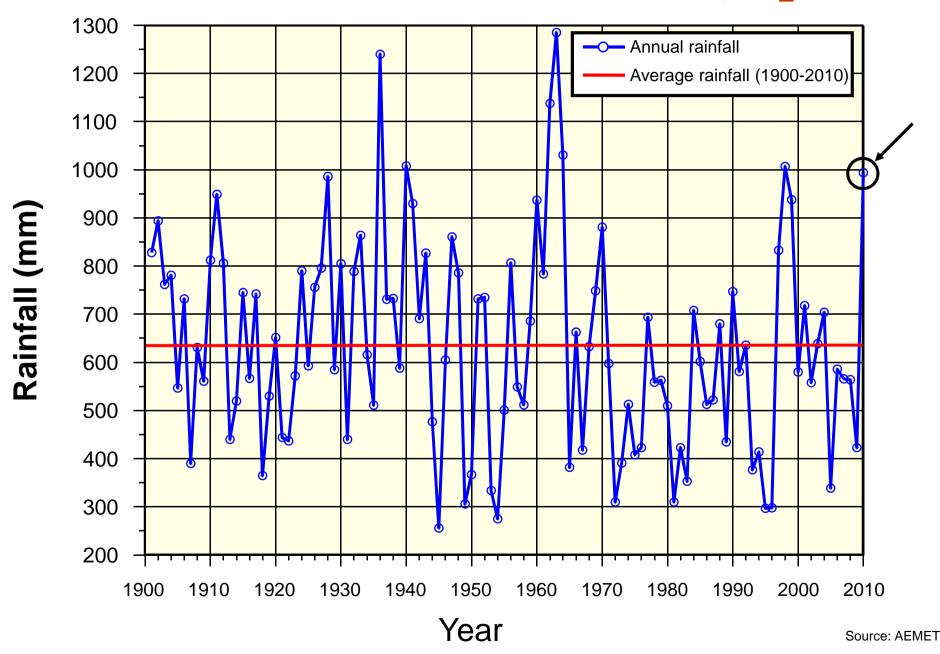


Source: Martin Parry, 'Impacts of Climate Change on Agriculture in Europe' (slide 15), Informal Meeting of EU Agriculture and Environment Ministers, 11 September 2005, London





Annual Rainfall in Cordoba, Spain



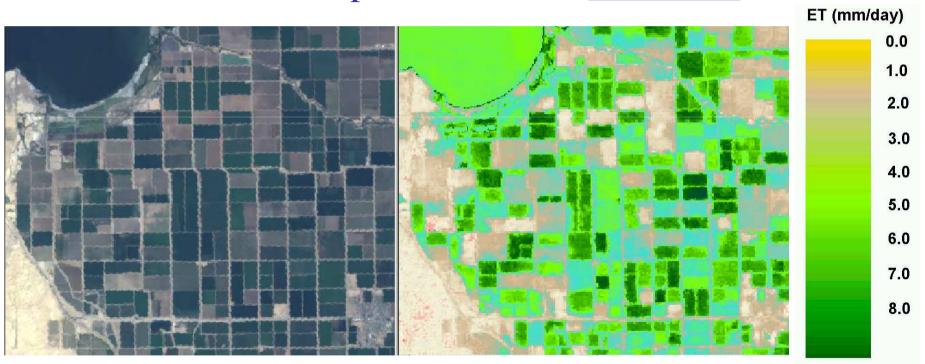


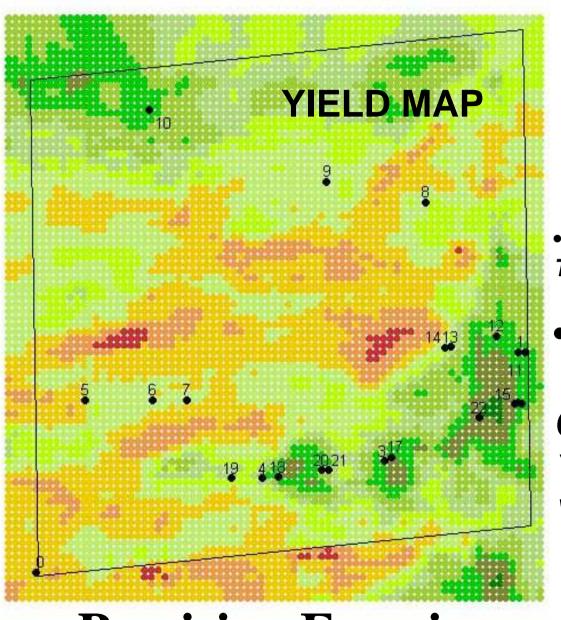


IT applications: High Resolution Satellite Imagery

Use of thermal infrared imagery and energy balance equations

We can "see" the performance of *individual* fields



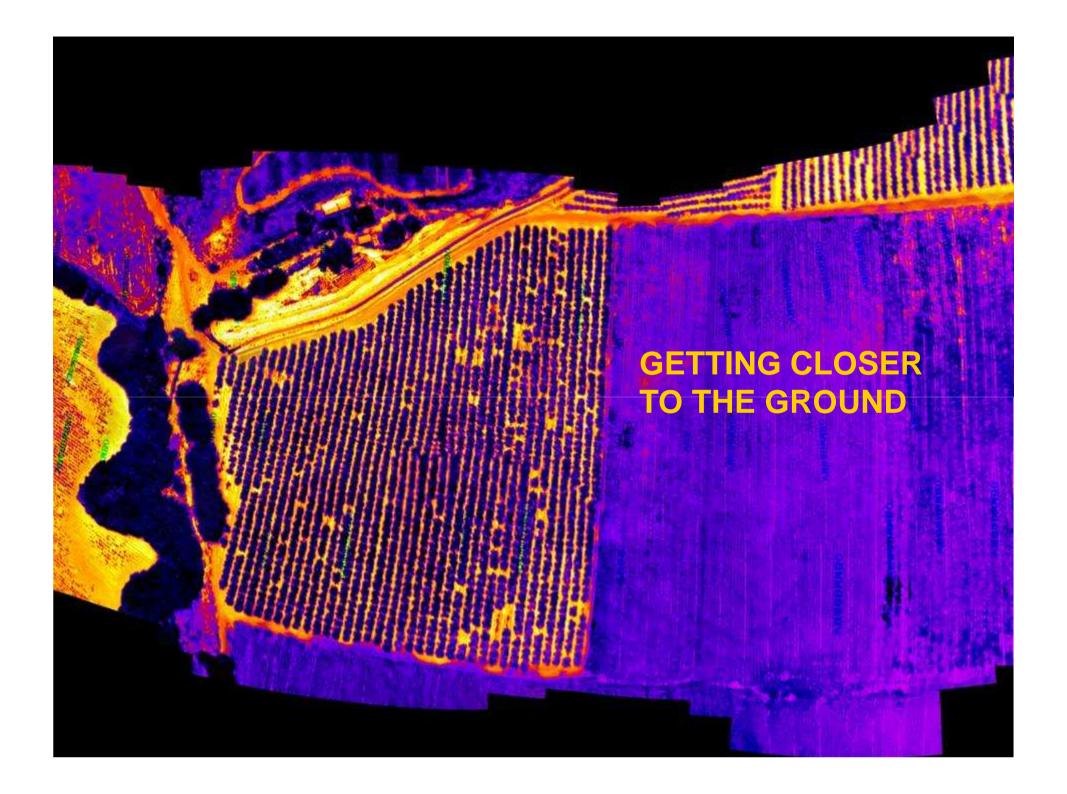


ANOTHER CASE
OF ENGINEERING
BEING AHEAD OF
THE SCIENCE

•VARIABLE RATE TECHNOLOGIES

•KEY ISSUE:
WHAT ARE THE
CAUSES OF
YIELD
VARIATIONS?

Precision Farming







Joining Forces in Europe:
Agriculture, Food Security and Climate Change
(FACCE JPI)

