

# European Agriculture and Remote Sensing: Changes and Perspectives



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# Spatial R.S.: the Improvements

- The old good stuff:  
LANDSAT, SPOT 1-4, ERS, IRS, RADARSAT
- Better revisit time: MODIS, MERIS
- Finer resolution: IKONOS, QUICKBIRD, SPOT  
SUPERMODE, ORBVIEW, EROS  
MSG2
- Wider Coverage: DMC
- Better prices

# Aerial R.S.: the improvements

- Digital cameras:  
Leica Geosystems ADS40, Vexcel Ultracam, Z/I DMC
- Better radiometry (shadows)
- Lower final price (fly window time, no scanning, automatisisation)
- True ortho for land administration
- Fine DSM for 2.5D rendering

# R.S. Agricultural needs

- Crop Production Forecasts and Estimates
  - Area and yield
- GIS in Agricultural Management
  - Rural Resources Management
  - Farm Management
  - Aid Schemes Management
- Controls of CAP Direct Aids to Farmers

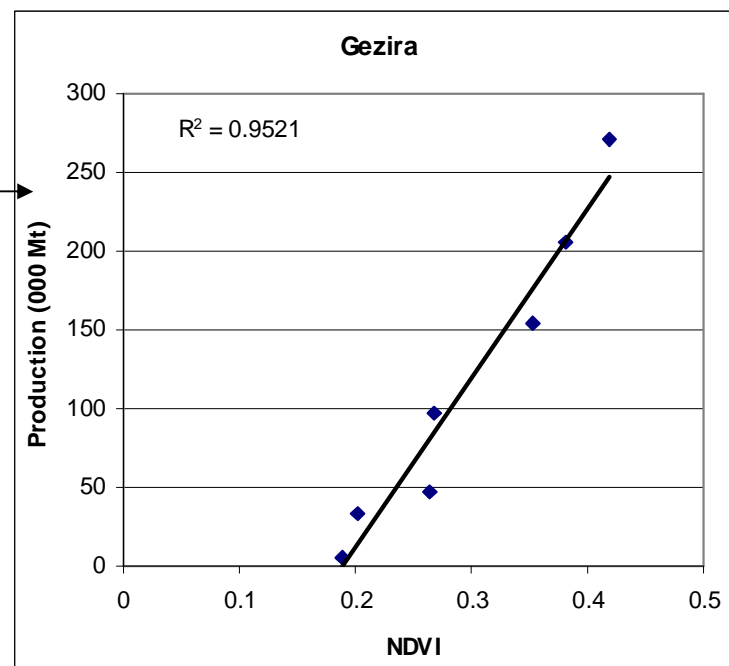
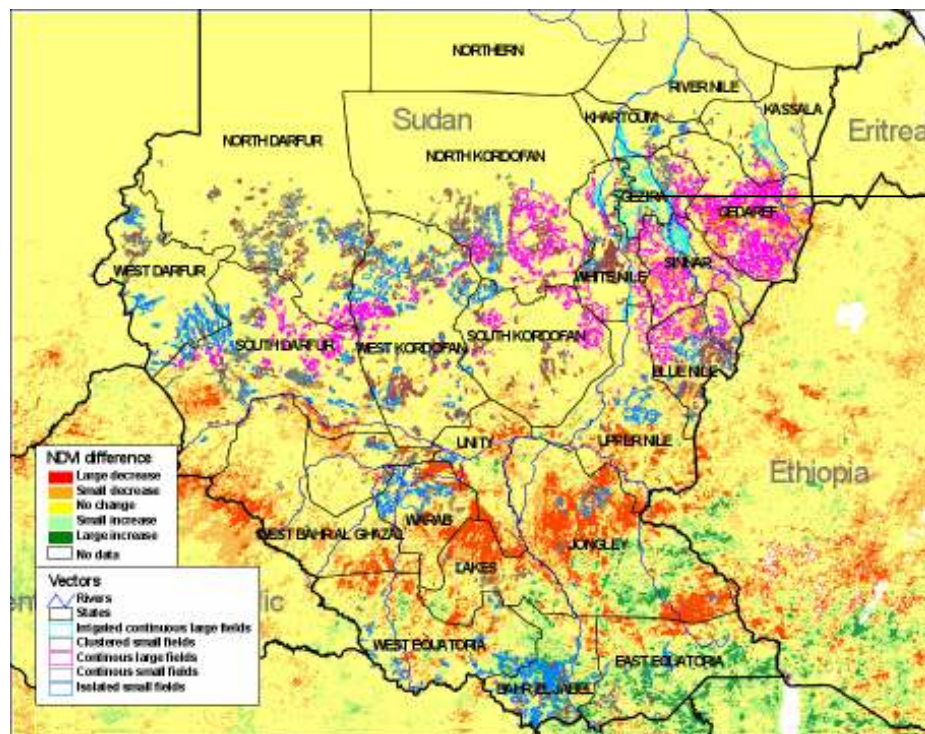
# Production Forecast and Estimates

## Africa, Asia, South America

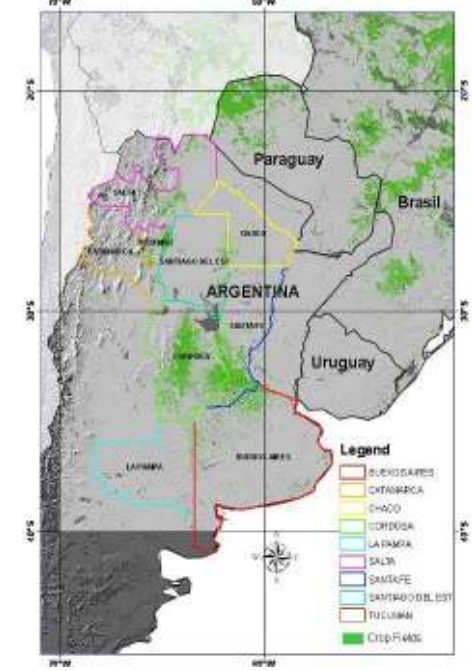
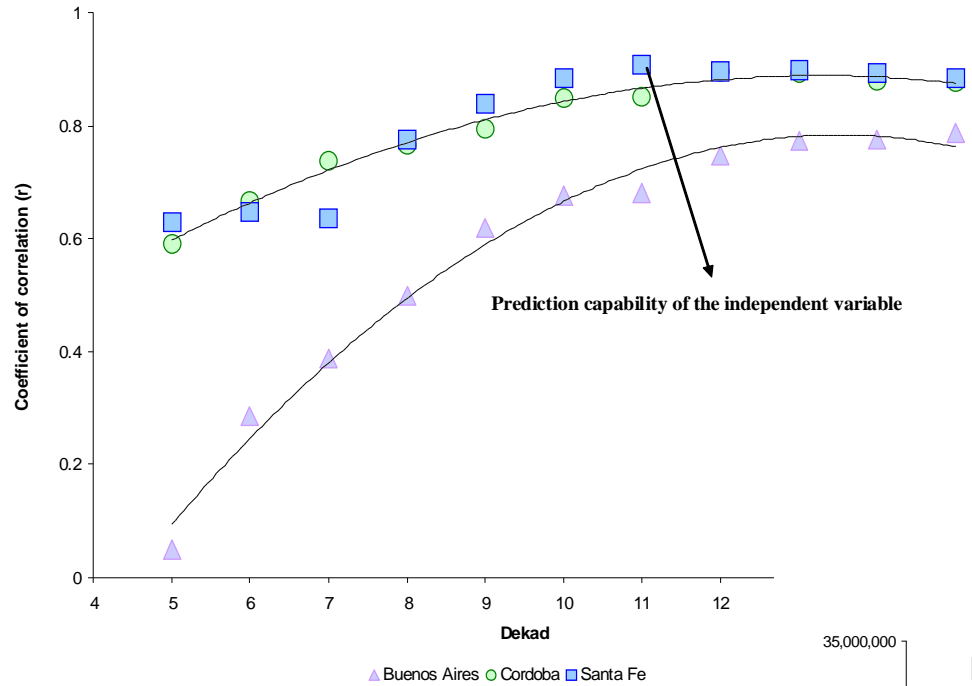
METEO (ECMWF), SPOT VEGETATION, CROP MASK

Sudan

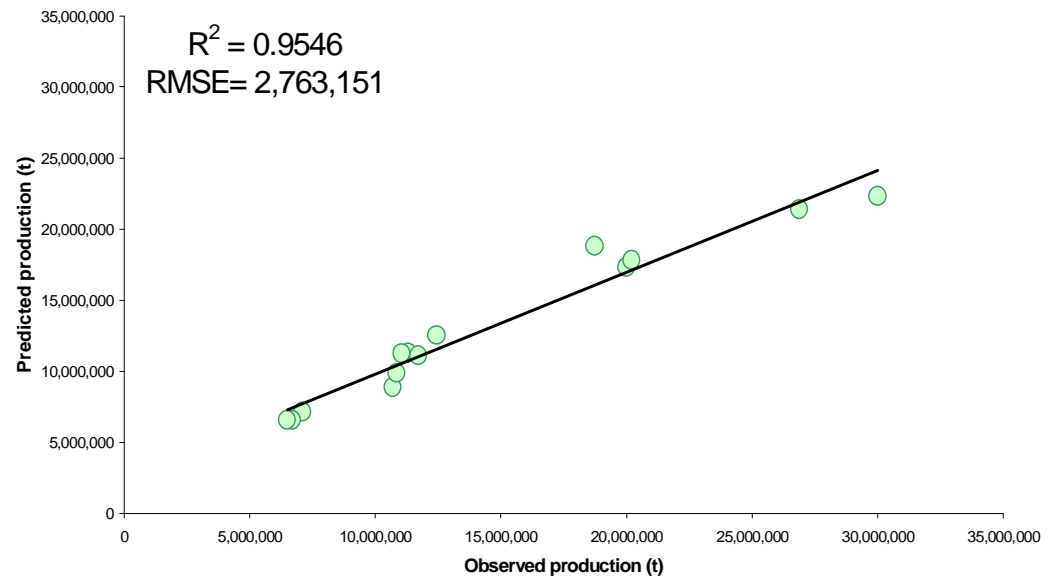
Land cover class selection for crop monitoring by comparing historical CNDVI and Sorghum production



**r of WRSI and Soybean yield during the crop cycle**



**Argentina**



Joint

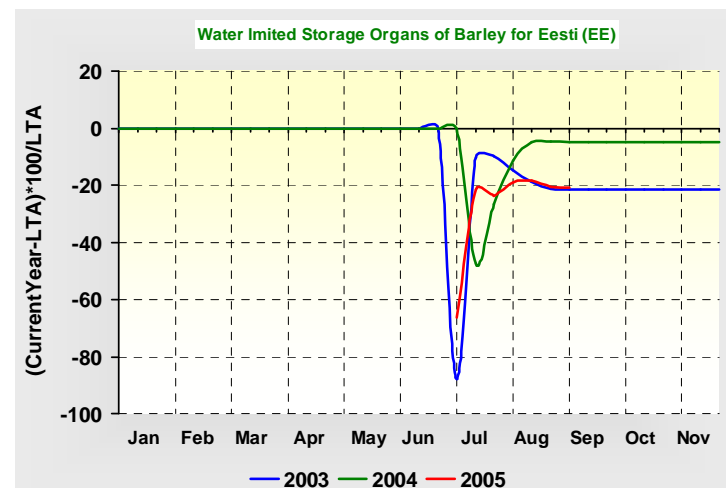
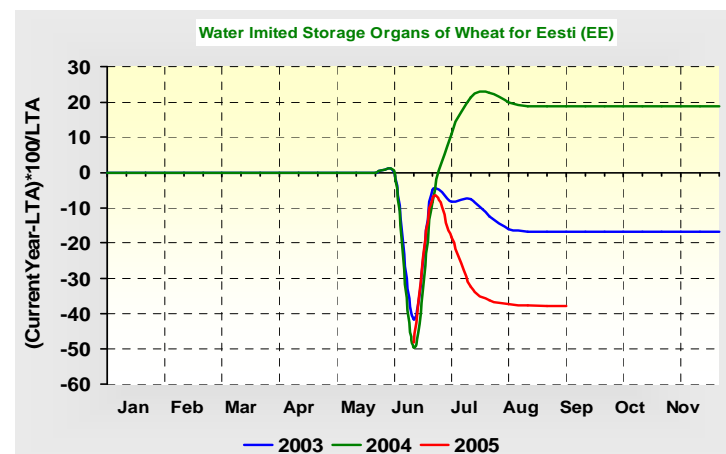
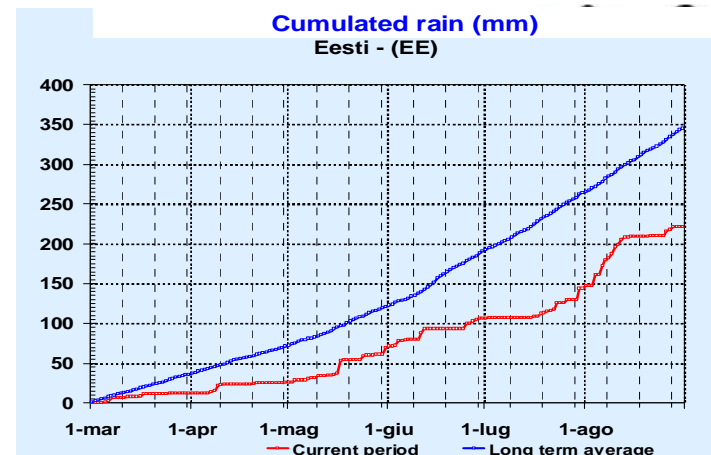


# •2005 July 15th Press Release:

- 30 Millions Tons decrease for Cereals.
- Detailed analysis for 10 crops and 25 countries

# •2005 Sept: Katrina disaster impact

- on Agricultural products (1 billion \$ of direct loses on Corn, soyabean, cotton)



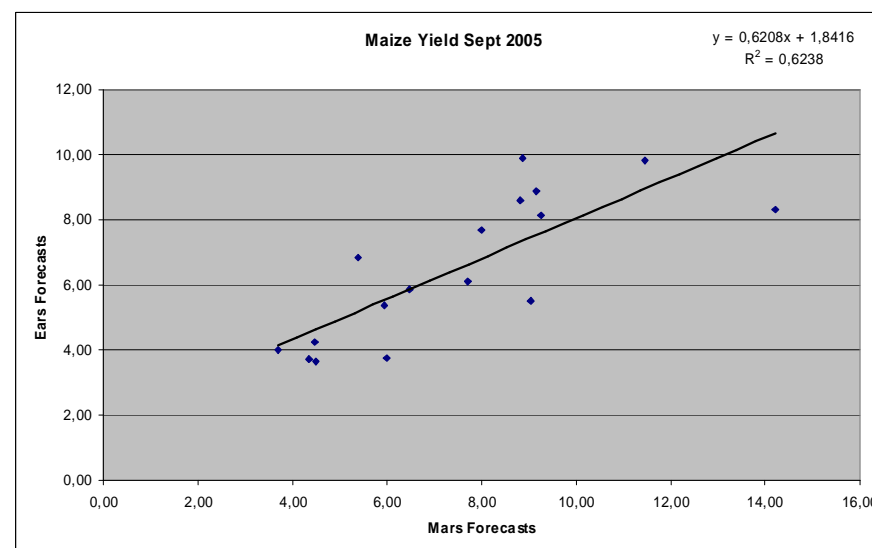
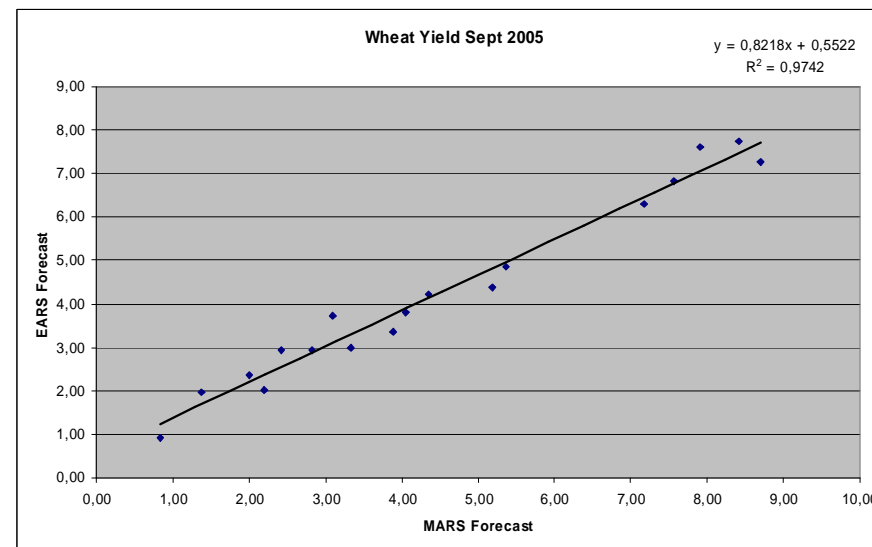
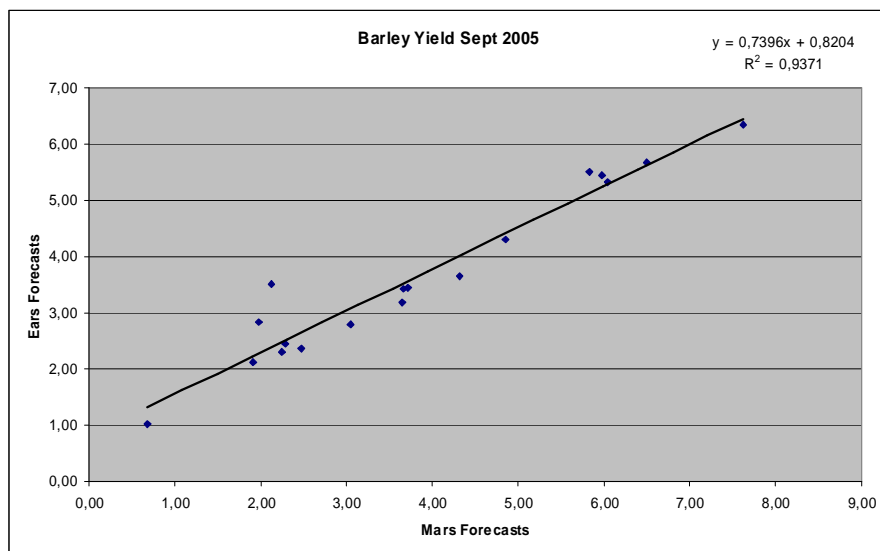
# Permanent challenge

Detailed models

Or

just Meteosat

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# Area Estimates

- Need of EU areas in February, July, Sept
- Need of low CV and detailed crop categories at country level

**Landsat: too low acquisition probabilities**

**SPOT, Radarsat: Too expensive, radar questionable**

**MODIS/MERIS: too few spectral bands and limiting resolution**

**DMC: not enough resources (1 Giga/day)**

**Envisat ASAR: more research than operational**

# GIS Management in Agriculture

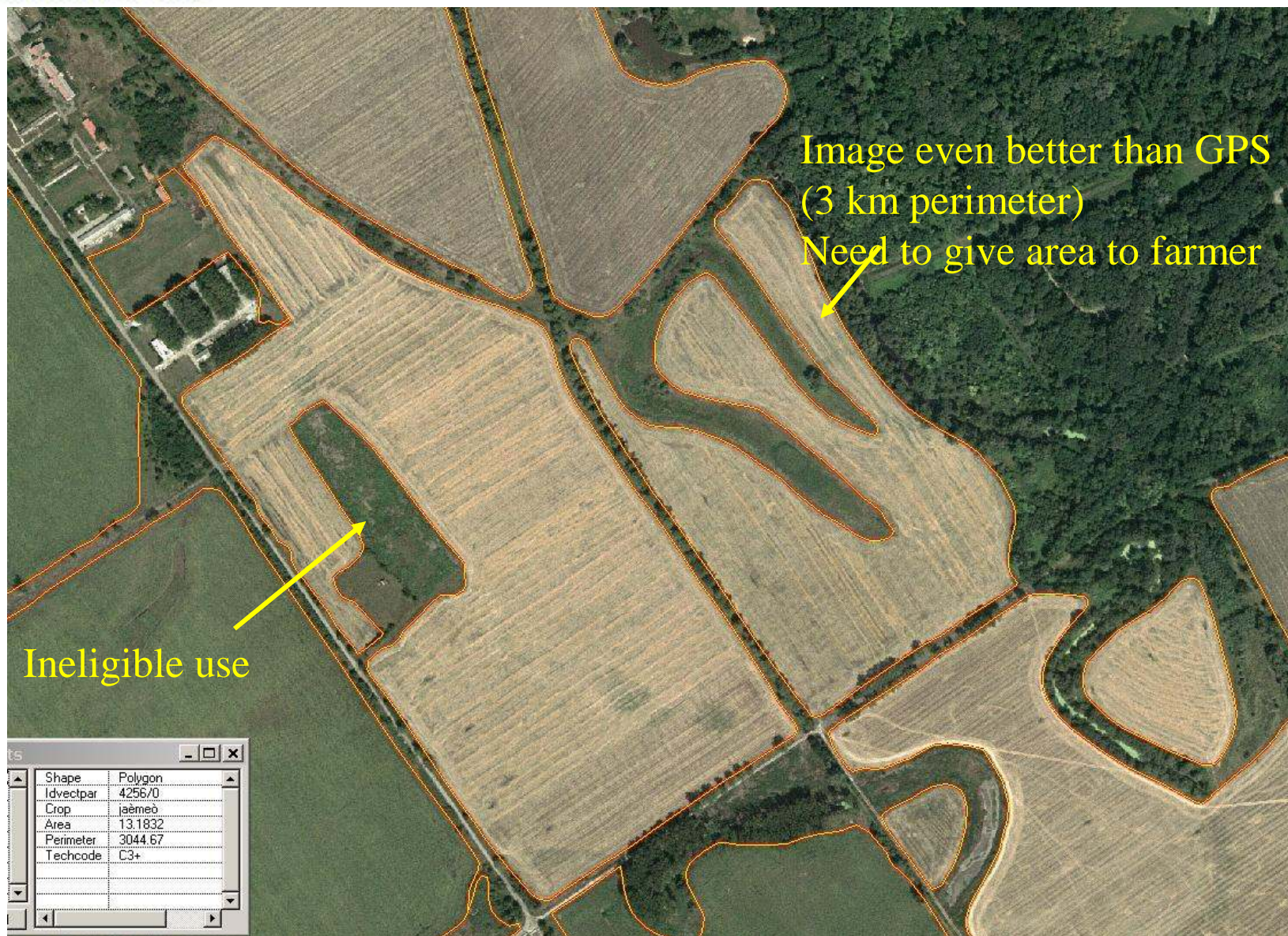
- Rural Resources Management:  
Agriculture represents 50% of the land use
- Interest of Image2000 / Corine Land Cover
  - Technical upgrades like Google.Earth
  - Africa Observatory for Sustainable Development
  - GMES Land Monitoring Fast Track Service

# Farm management

- Precision Farming
- Diseases prevention
- Farm Advisory System (2007)
- Private Softwares:  
Planification, Tracability, Resources Optimization, Accounting
- Integration of Imagery, GPS signal, GIS

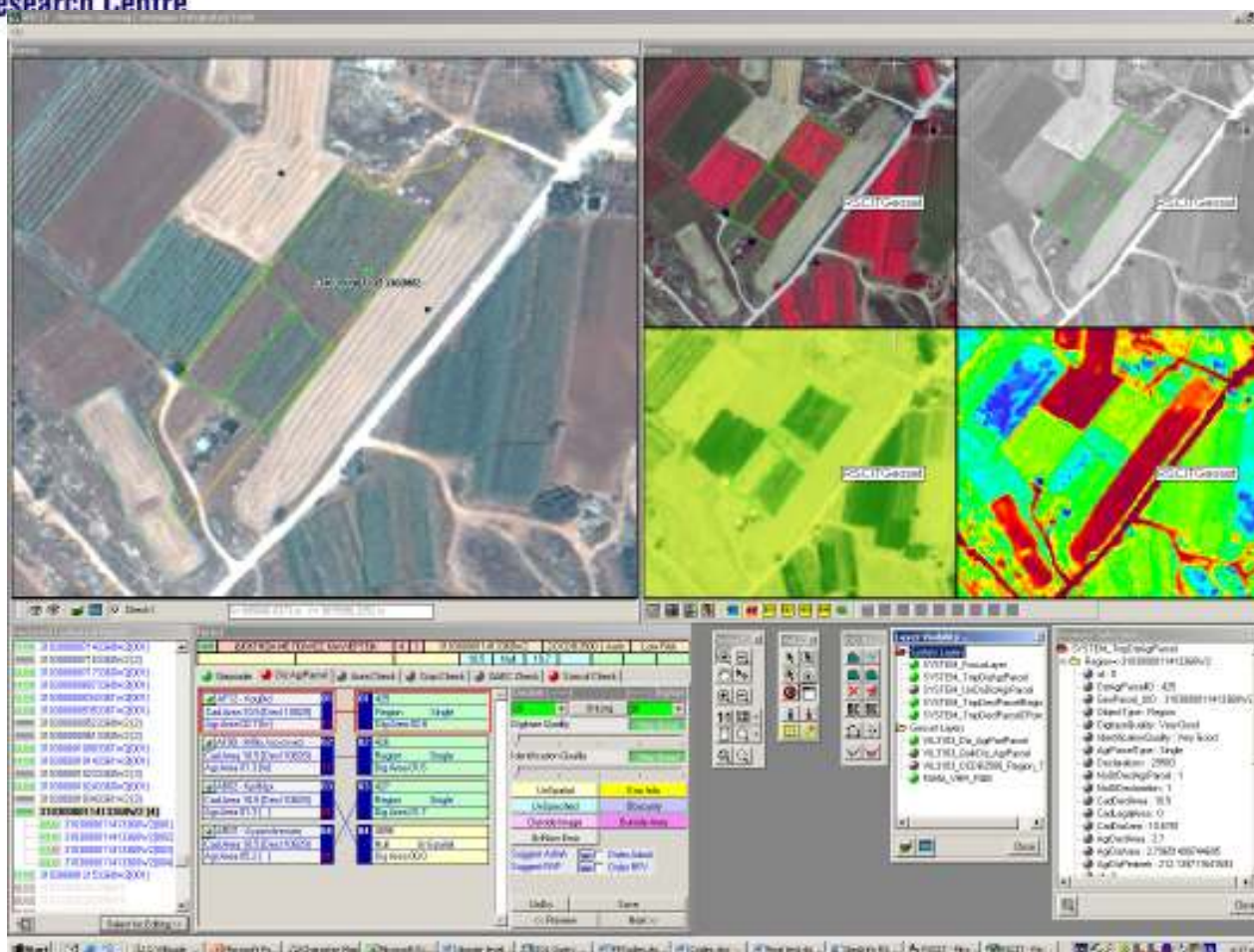
# GIS management of Direct Aids

- From 01.01.2005, all Member States have to use a Digital GIS Field Identification System
  - Wall-to-wall image layer
  - Raster DEM
  - Agricultural fields/blocks vector layer
- Should be multipurpose:  
Forestry, Environment, Animal diseases, Hazard Monitoring, Private Sector
- US follows our traces



# Controls of Direct Aids

- Annual EU budget of 6 MEUR
- Some 200 control sites
- Around 1000 HR images (SPOT, LANDSAT, IRS)
- 150.000 Km<sup>2</sup> of VHR acquired (IKONOS, QUICKBIRD)
- Backup: SPOT Supermode, RADARSAT, EROS
- New sensors in test: ORBVIEW, DMC
- Use of DIGITAL Orthophotos
- Not only area and crop but also GAECs...

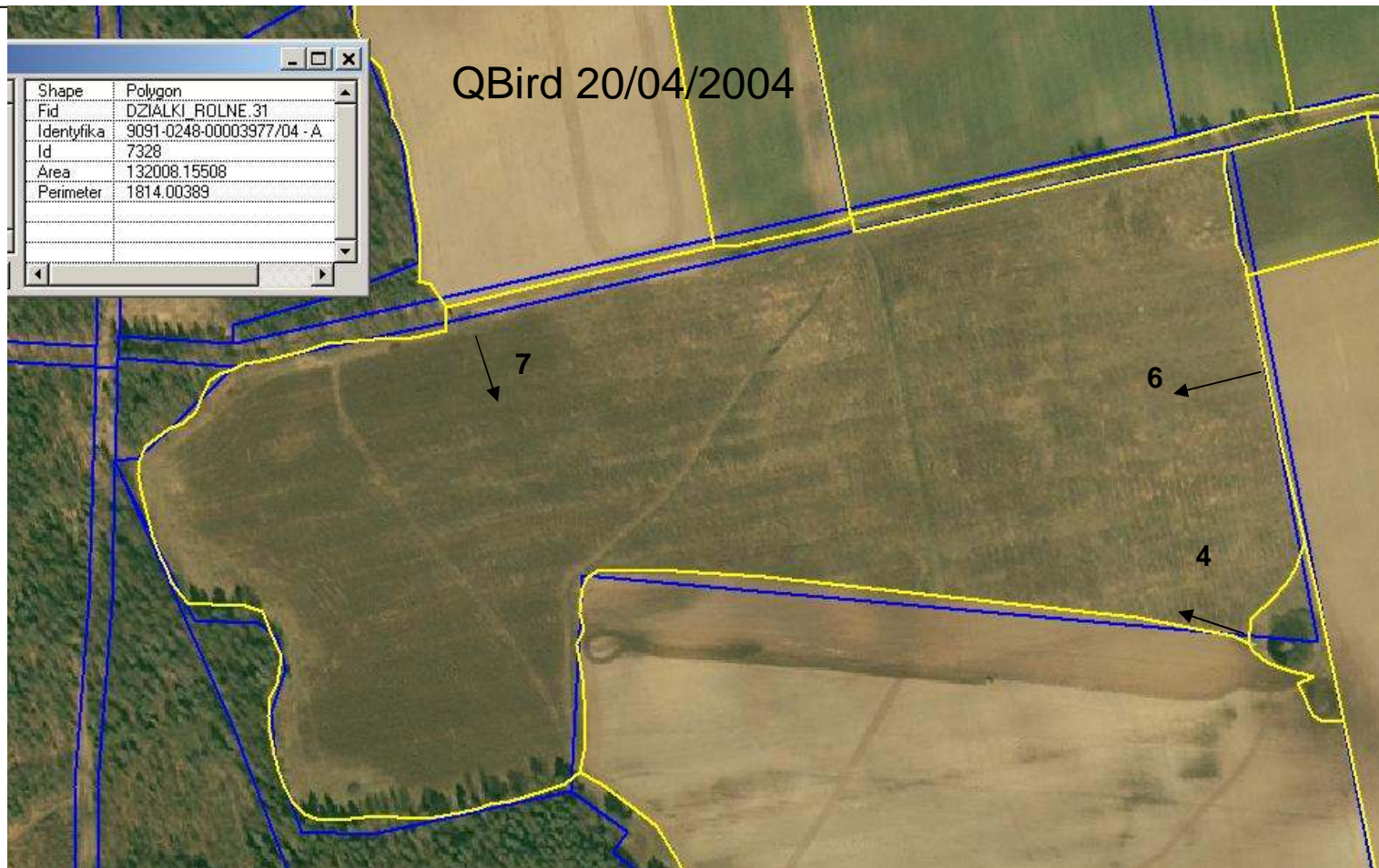


## CAPI interface from the CY 2004 contractor

The main window (top left) is used for digitisation of the parcel limits from the VHR image. The secondary window (top right) allows the user to display a selection of imagedettes, i.e. multi-temporal series, or a variety of band combinations, or NDVI, classification, etc

# Advantage of RFV method

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Parcel found not compliant with good agricultural conditions at 30/06/2003 during RFV in PL



Photo 4



Photo 6



Photo 7



Advantage of RFV % CAPI:  
Birch trees not obvious to detect  
by CAPI on VHR sat imagery

# MT: use of 15 cm orthophotos (in 2004)



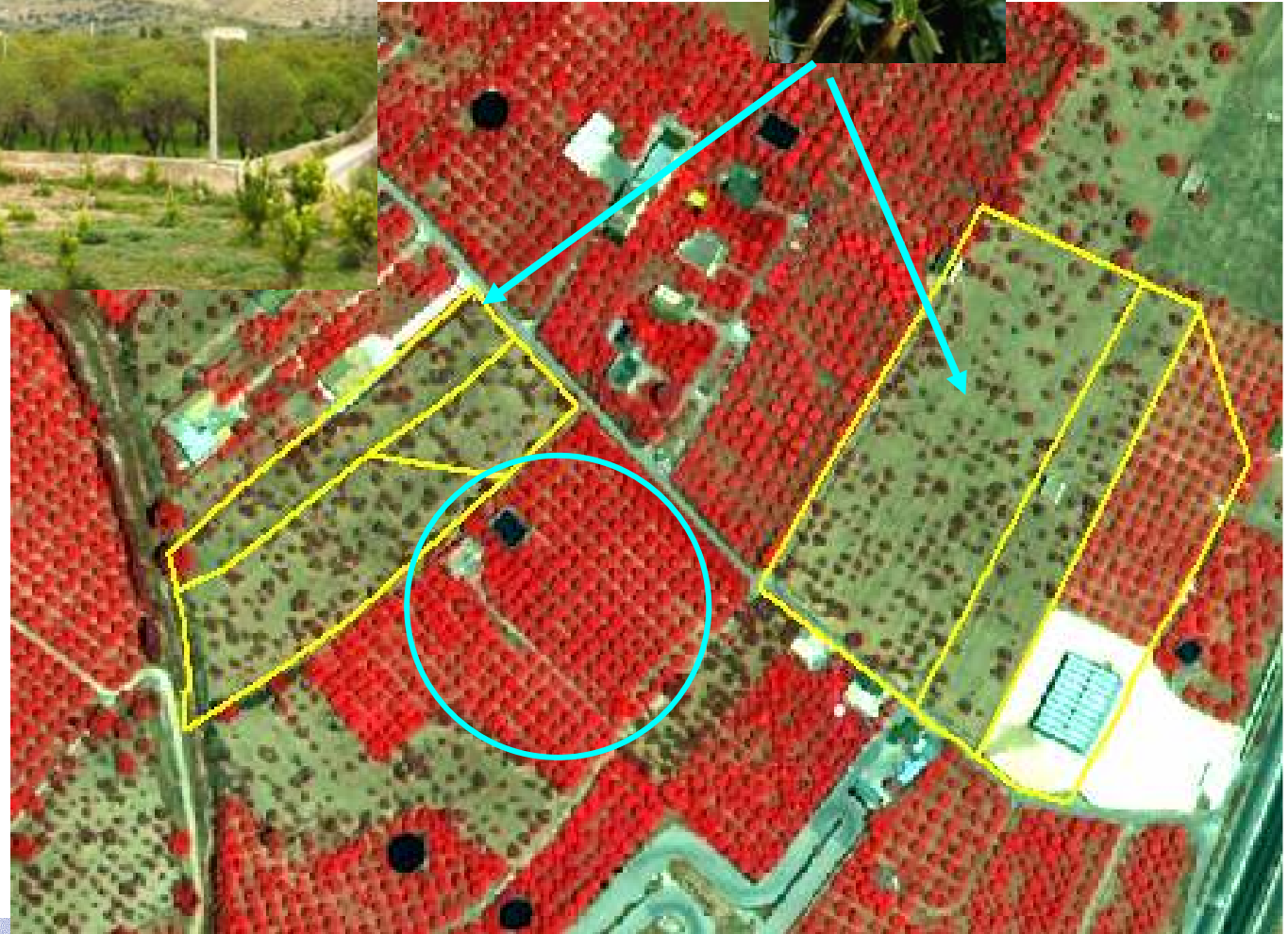
Garrigue removed

# Parcel of wheat and melon on 15 cm orthophotos

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# Siracuse, Avola: citrus-almonds differentiation



Lazio,  
Viterbo

hazelnut  
and  
walnut  
parcels



Research

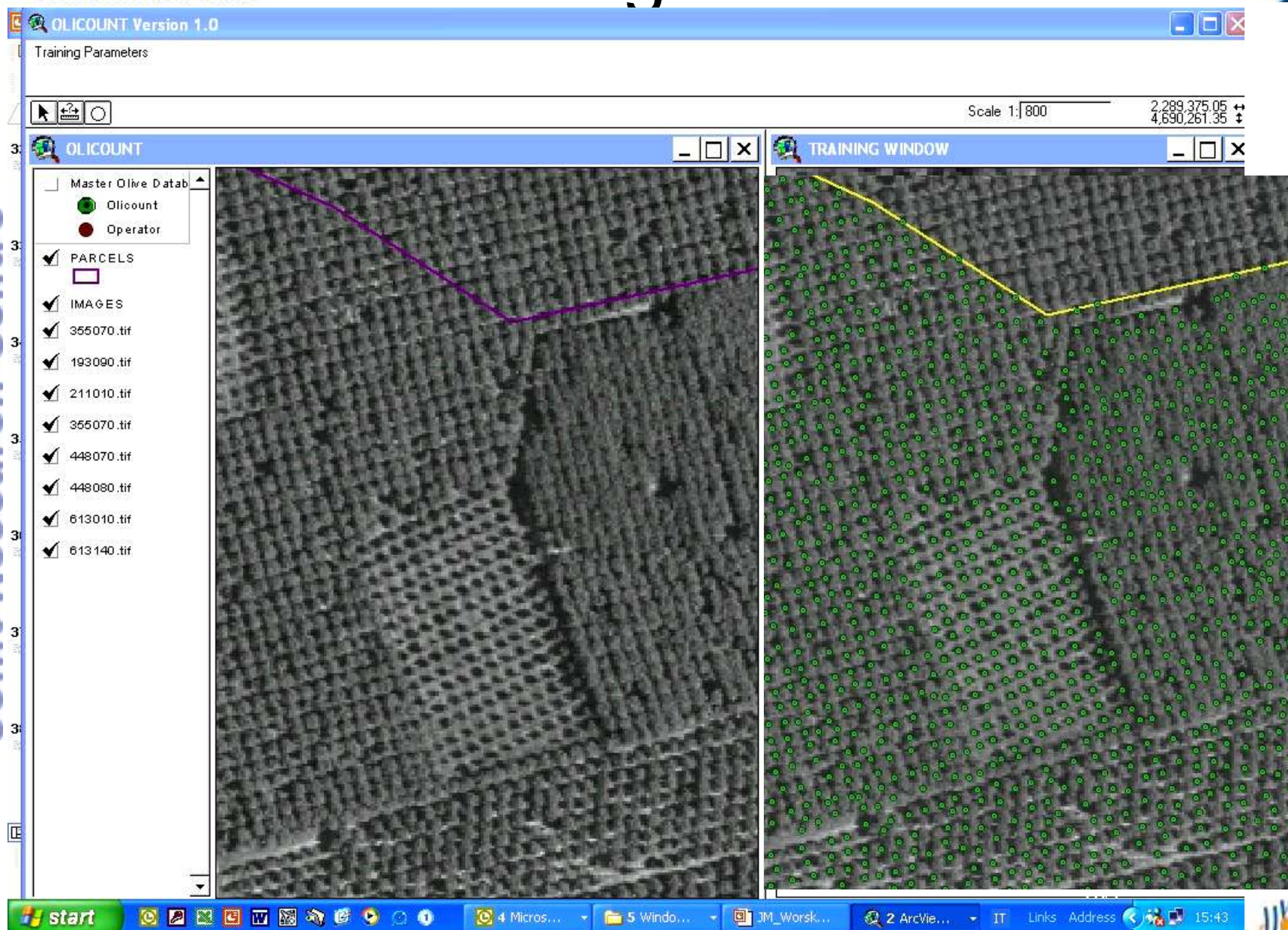


European Agriculture and R.S.: J. Delincé

Ortophoto June 2002



# Counting Nuts trees with



Spain

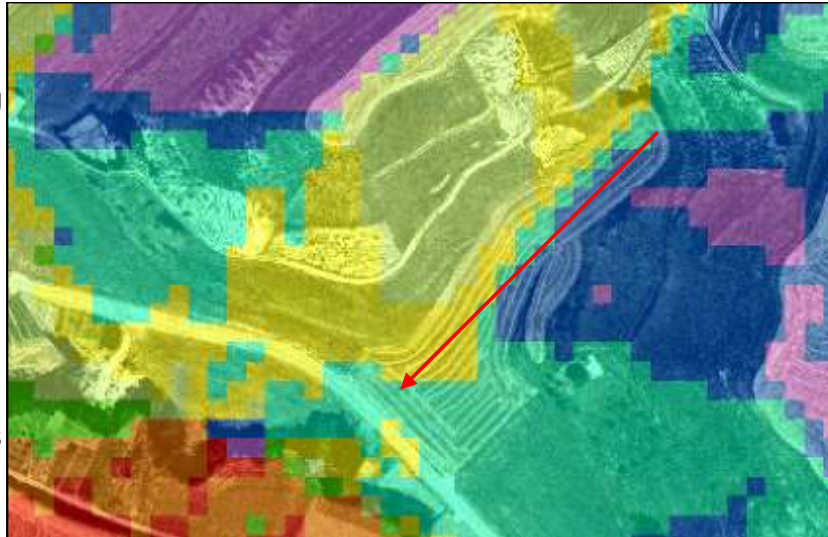
# Labours following the terrain slope

## ASPECT

aspect\_sdom.img

Value: degree

- N 0 - 22,5
- NE 22,5 - 67,5
- E 67,5 - 112,5
- SE 112,5 - 157,5
- S 157,5 - 202,5
- SO 202,5 - 247,5
- O 247,5 - 292,5
- NO 292,5 - 337,5
- N 337,5 - 360



## PENDENZA

slope.img

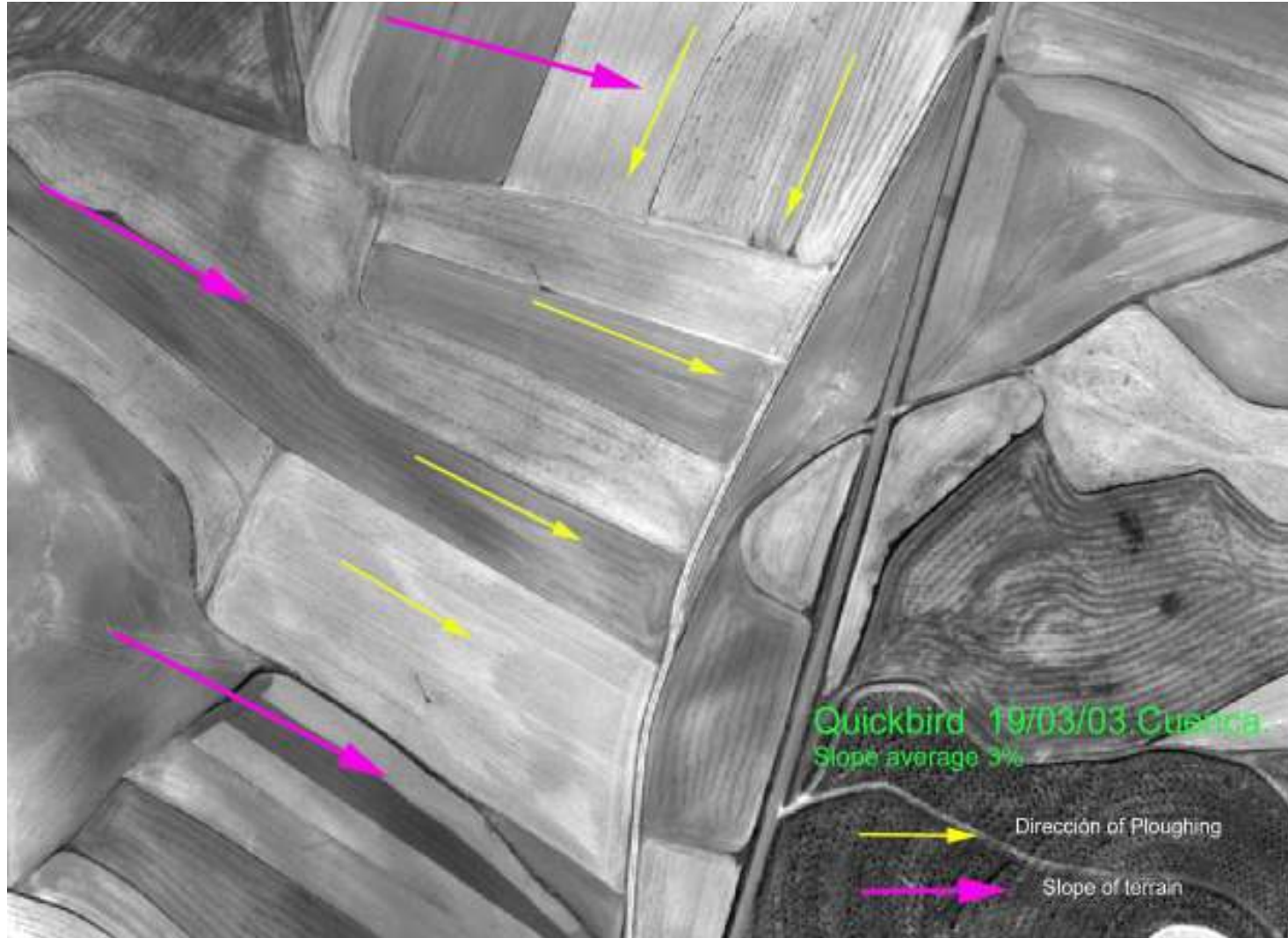
Value: percentuale

- 0 - 10 %
- 10 - 15 %
- 15 - 30 %
- 30 - 50 %
- 50 - 200 %



# Labours following the terrain slope

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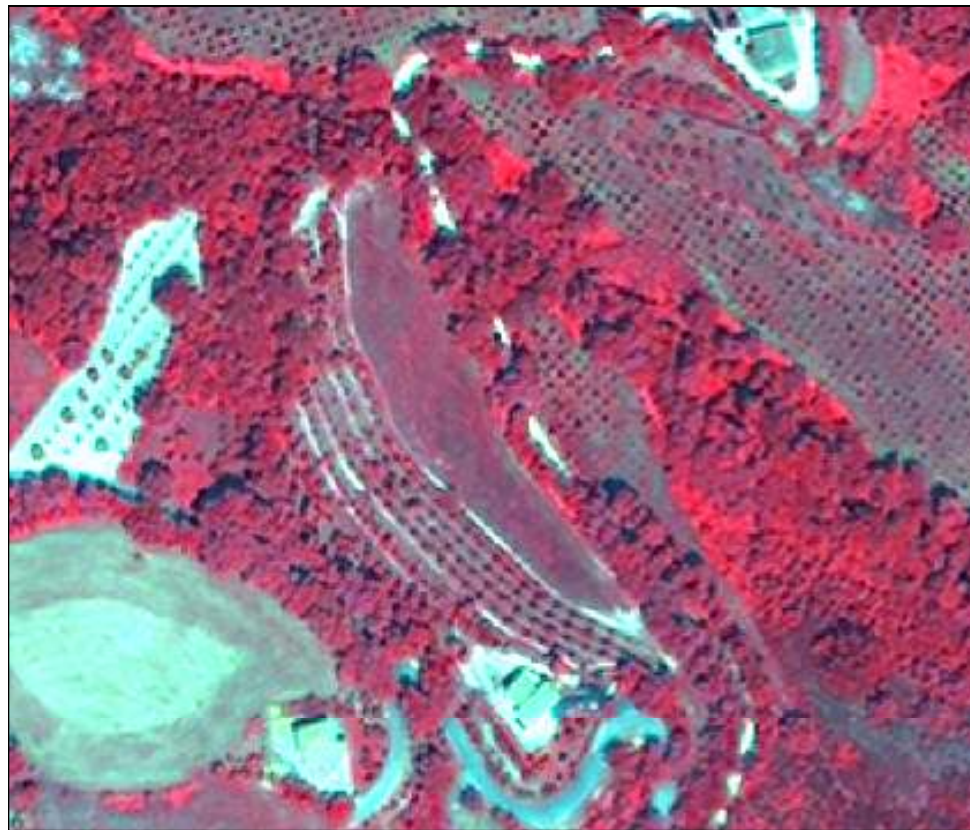


# Terraces maintenance

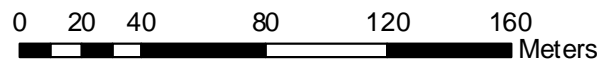


# Terraces maintenance

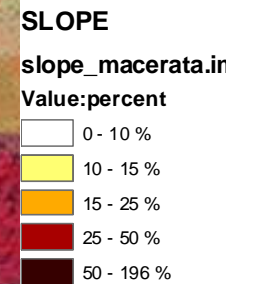
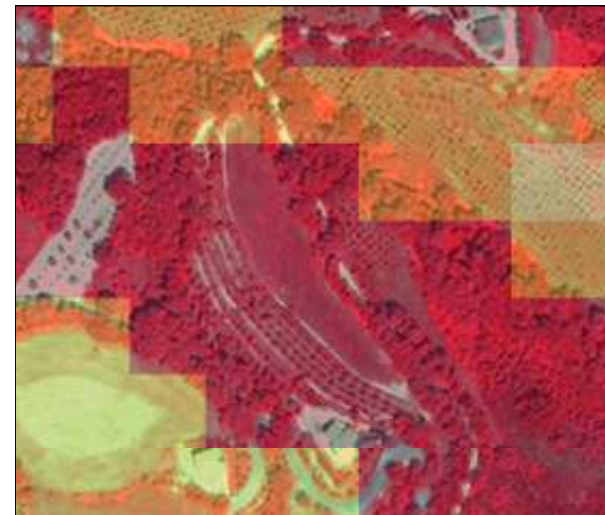
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Ikonos Pan+MS



Ortophoto



Slope from DTM 40x40



# Terraces maintenance

### Ortophoto



0 40 80 160 240 320 Meters

### Slope image



0 40 80 160 240 320 Meters

#### SLOPE

slope.img

Value: percentuale

- 0 - 10 %
- 10 - 15 %
- 15 - 30 %
- 30 - 50 %
- 50 - 200 %

Valori di pendenza percentuale  
ottenuti a partire da DTM 10x10 m



# Arable stubble management





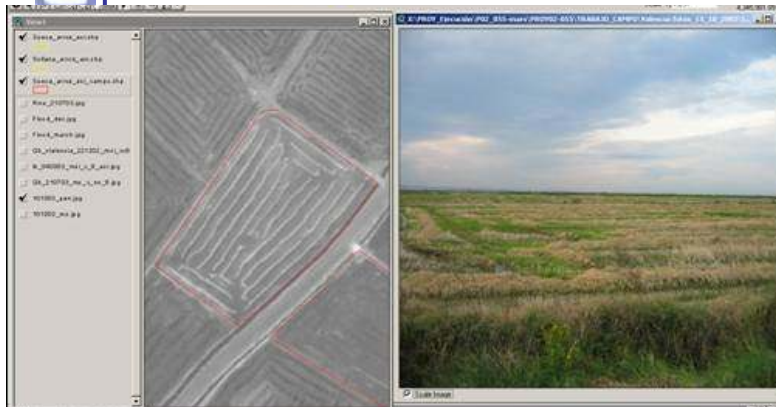
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burnt stubbles of wheat

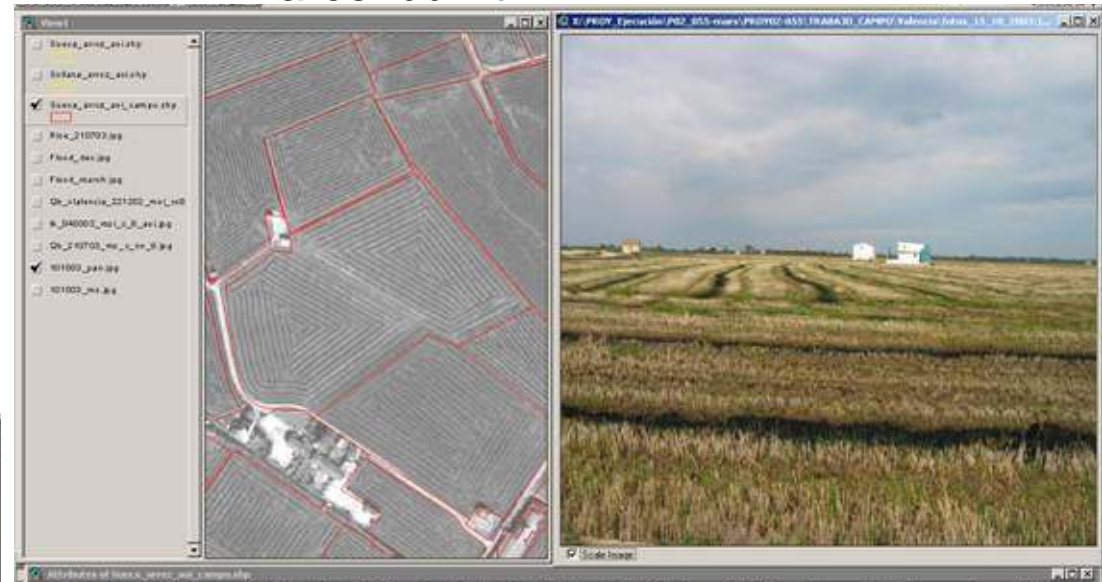
# Spain La Cuenca

Centre

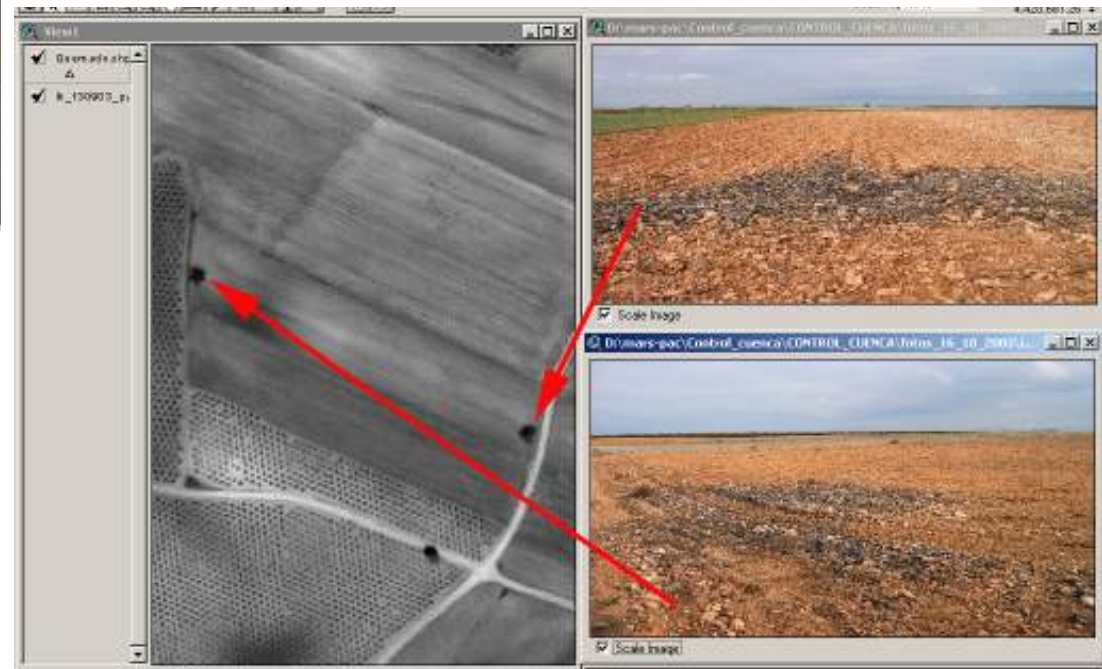
Parcel non-burnt

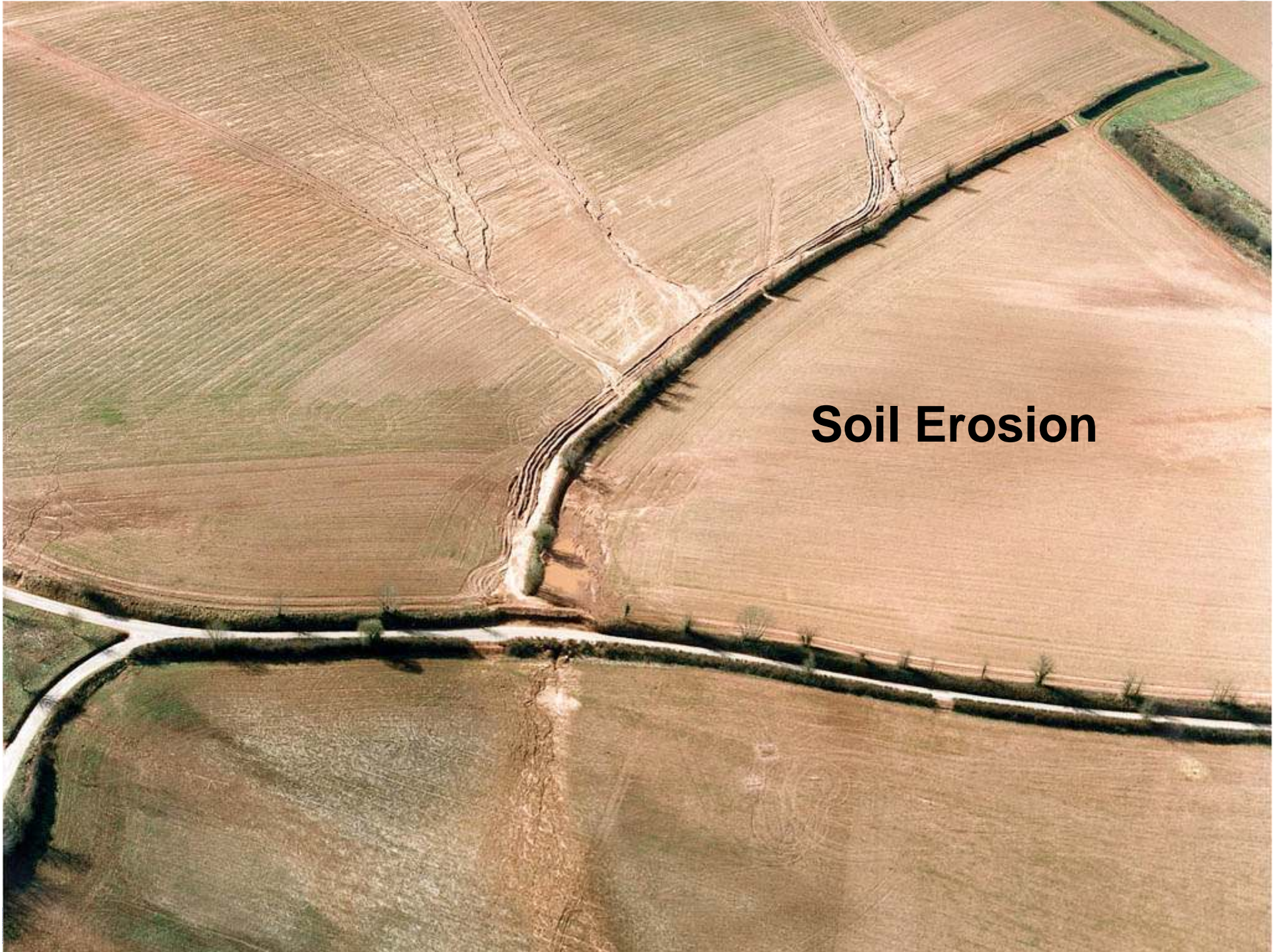


Parcel burnt



Join





**Soil Erosion**



Camp.	Coltura	Var. A	Var B.	Cod Grup...	Supe Util.	Supe cata dich	Supe cata vali	Num. Piante	Codi dich	Settore
2004	005	999	000	059	24300 mq	24500 mq	24500 mq	0	4111033...	1 - SEMI...

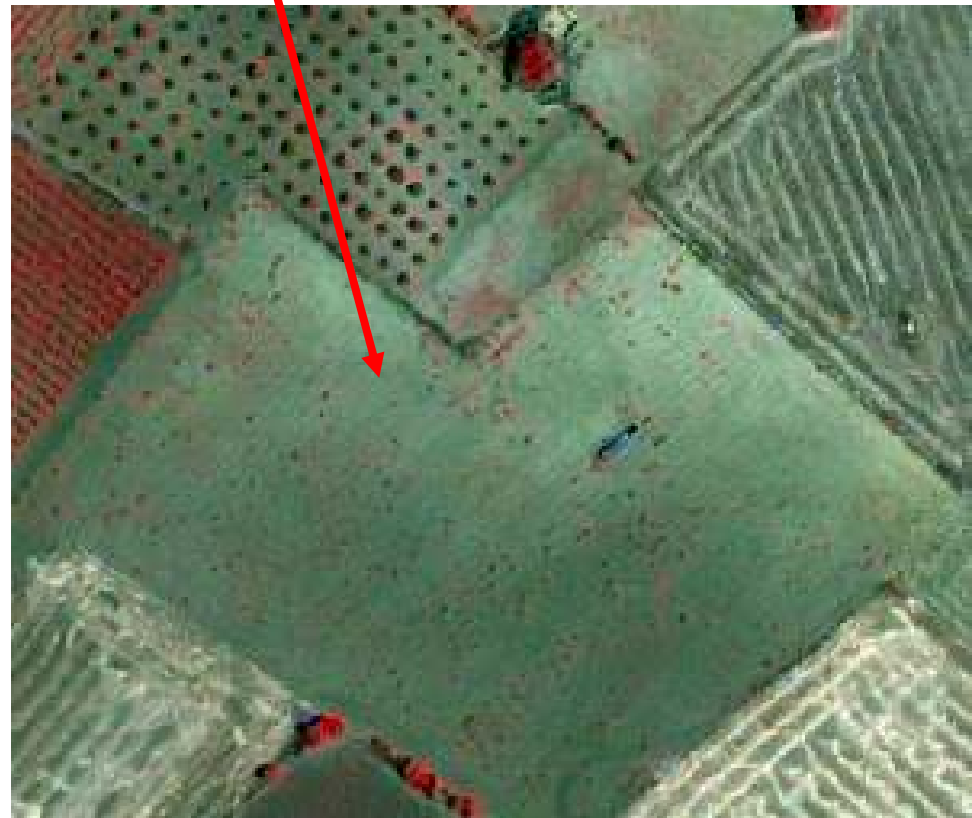


A wide-angle photograph of a field filled with tall, green grasses. Scattered throughout the field are numerous bright red flowers, likely poppies. The field extends to a line of trees in the distance. The sky is filled with large, white and grey clouds, suggesting an overcast day. The text "Other Requirement" is overlaid in the center of the image in a white, sans-serif font.

**Other Requirement**

# Crop regrowing or set-aside?

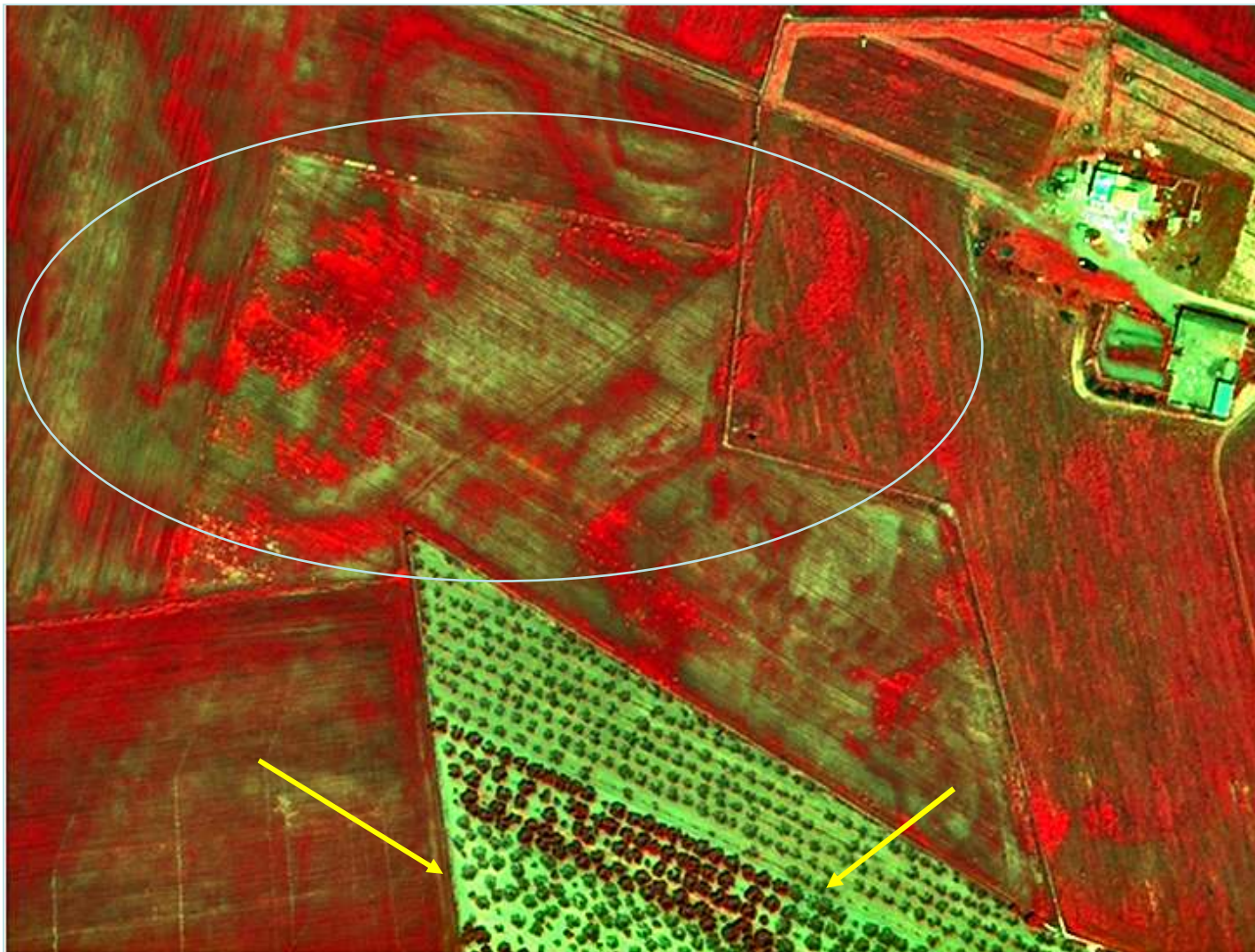
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Italy

# Soil maintaining and correct olive groves pruning activity

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# Some Conclusions

- The needs exist
- The technique is operational
- Expertise is well spreaded
- GMES initiative should offer unique opportunities
- Europe needs civil Very High Resolution Satellites
- EU Space policy should be reinforced