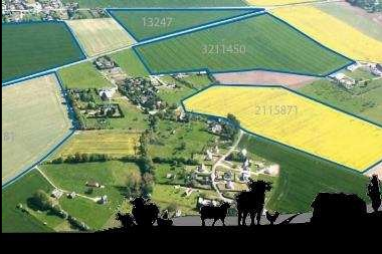

 European Commission

Considerations on imagery use and new On-The-spot Checks provisions


MARS (Monitoring Agricultural Resources) Unit
DG Joint Research Centre




Evidence-based scientific and technical support

Cooperation with policy Directorates-General

Sharing its know-how with the Member States



www.jrc.ec.europa.eu


 European Commission

On-The-Spot checks


Objectives unchanged: check all conditions for which aid is granted


But conditions constantly evolve

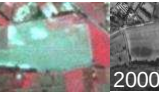



The Early Years	The Crisis Years	The McSharry Reform 1992	Agenda 2000	The Fischler Reform 2003	CAP Health Check 2008	CAP 2020
Food security Improving productivity Market-stabilisation Product support	Over production Exploding expenditure International friction Structural measures	Reduced surpluses Environment Income stabilisation Budget stabilisation	Deepening the reform process Competitiveness Rural development	Market orientation Consumer concerns Rural Development Environment Simplification WTO compatibility	Reinforcing 2003 Reform New challenges Risk management	Viable food production Sustainable management of natural resources and climate action Balanced territorial development


Initiated in the 90's, CwRS also evolved with evolving technology

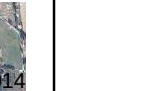

 1990
 GSD 14,5m



 2000
 GSD 8m


 2000
 GSD 6,5m

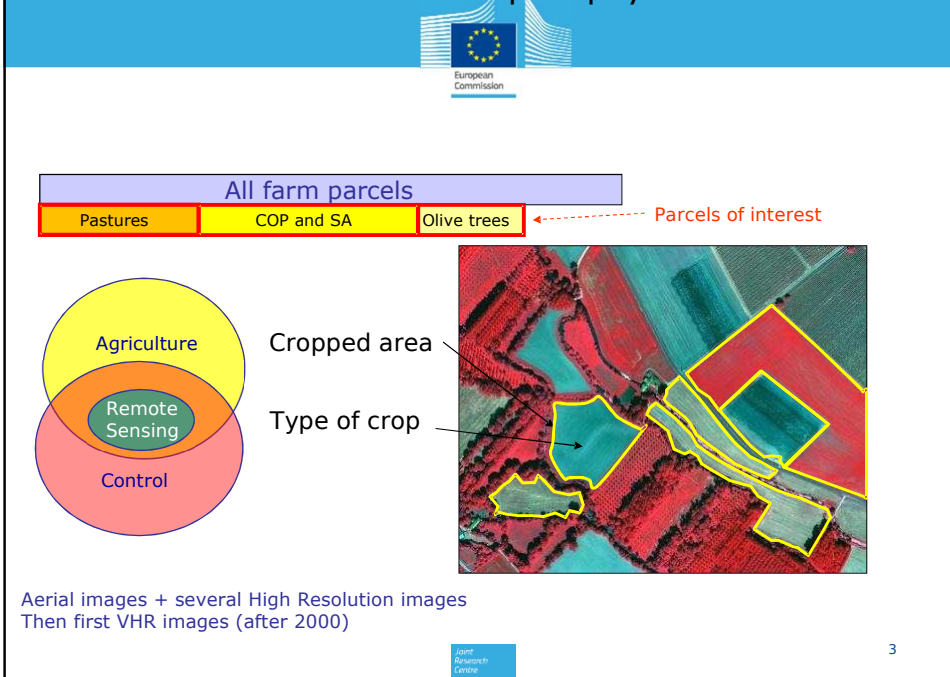

 2014
 GSD 1m


 2014
 GSD 0,6m

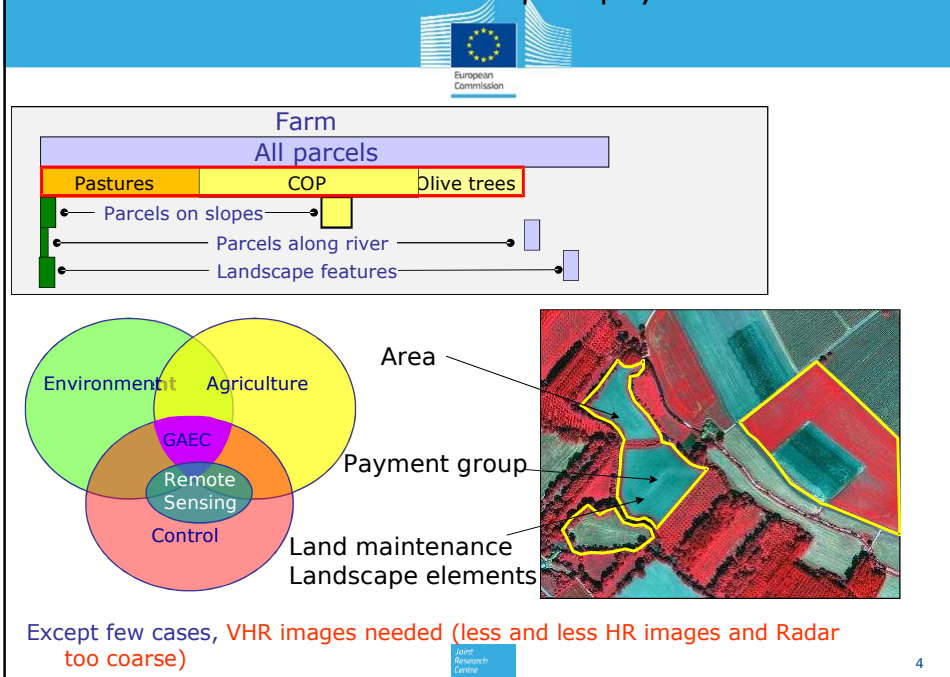

 2014
 GSD 0,5m


2

Before 2003 CAP reform = coupled payments

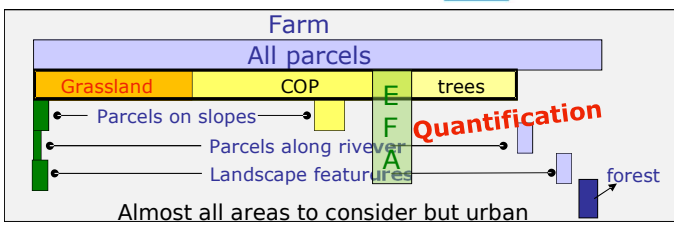


After 2003 CAP reform = decoupled payments



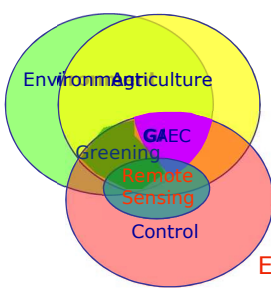
CAP 2020

European Commission



Greening of the CAP (crop diversification, winter cover, permanent grassland ...)

'Detailed' land use-land cover management




Area

Crop type

Land maintenance

EFA quantification



Increased VHR images need (at least 50 cm + maybe 3 D information)

5

New CAP checking list


- Area
- Lengths
- Different land use / land cover aspects
 - Eligibility of land ('minimum activity')
- Crop type
 - Voluntary Coupled Support
 - Diversification
 - Permanent grassland
 - 'Exemption thresholds'
- Landscape feature types
 - Traditional cropping practices
 - GAEC
 - EFA
- Tree counting
- Land maintenance
 - Erosion, land abandonment, hedge-tree removal ...



Never start a project without having checked you have all necessary resources

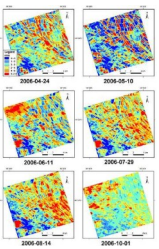
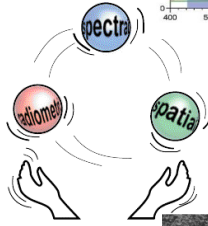
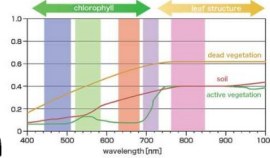
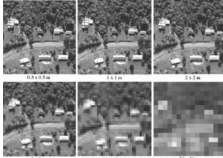


6



European Commission

Which type of imagery?

- Ground Sampling Distance
- Viewing angle
- Spectral resolution
- Radiometry (bit depth)
- Time of acquisition
- Type of image product (panchromatic, multispectral, pansharpened)

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Check of area

“measurement tools that are “proven to assure measurement of quality ..”
“with a homogenous standard guaranteeing accuracy at least equivalent to cartography at a scale of 1:10 000 to 1:5.000”

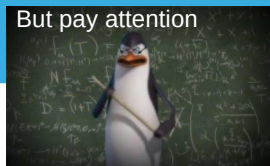
GSD or pixel size up to 70 cm would be appropriate for 1/5.000
But optimum is 50 cm

- Satellite VHR image profile
(< 0,7 m to comply with accuracy)
- Airborne imagery
- Remotely Piloted Aircraft Systems (RPAS)

8

But pay attention



To image processing quality

The ratio of the ortho-image pixel size to the GSD of the raw image is smaller than 1.3

The resampling of the ortho-image is applied correctly (DEM quality)

Absence of artifacts caused by the pan-sharpening

Absence of local artifacts caused by the ortho-rectification

Absence of saturation of the histogram and poor bit depth

Absence of artefacts revealed by the mosaicking (geometric discrepancies visible at seam lines; heterogeneous feature condition across tiles)

From LPIS QA experience

See JRC guidelines for ortho-rectification

To clearly define boundary, interpretation rules

Consistent with field measurements

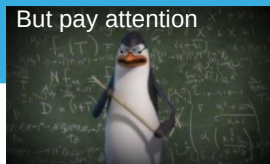
and shared (photo interpreter, field controller, farmer ...)



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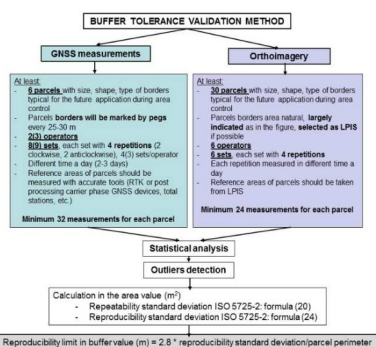
9

But pay attention



Validate area measurement tools

Determine the **Inherent tool error** (accuracy)



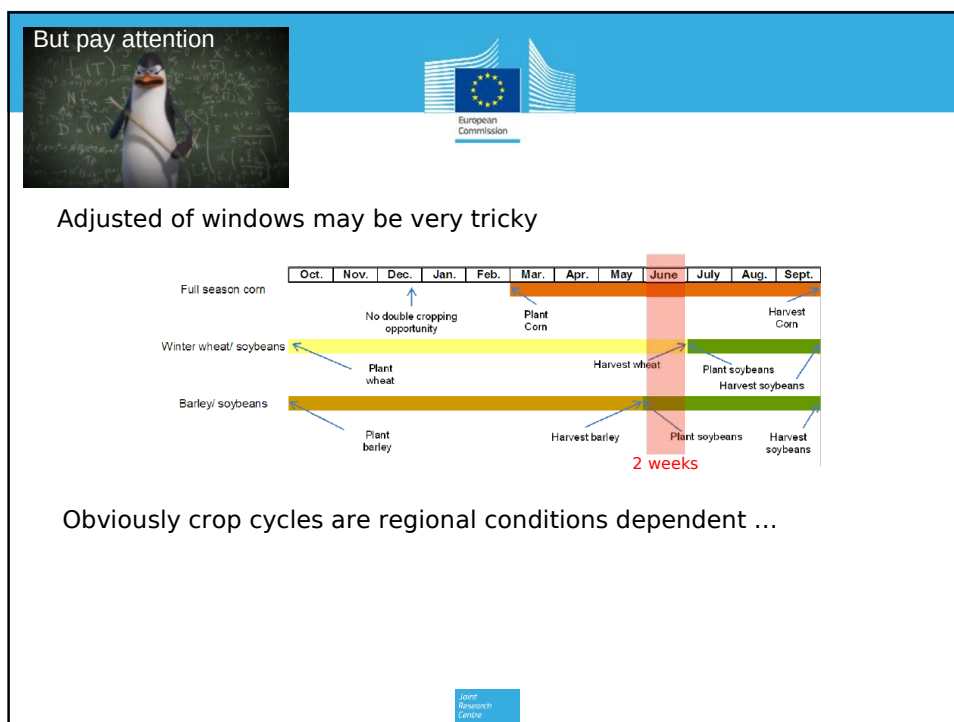
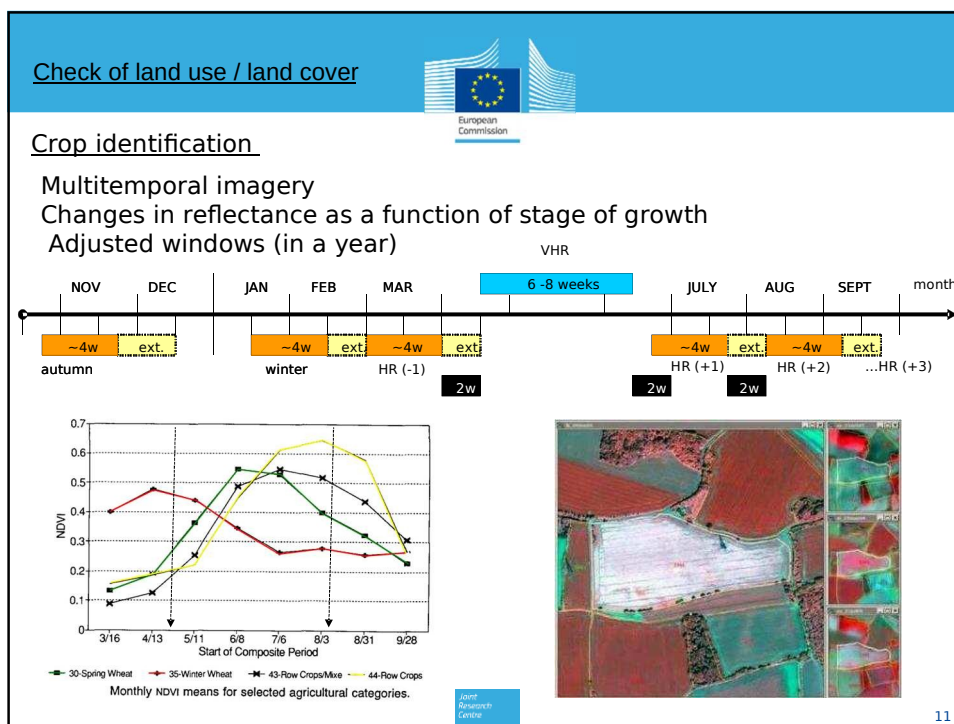
To be used in 'real conditions'



Single buffer tolerance value

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Check of land use / land cover



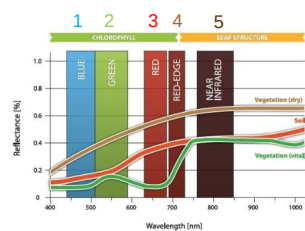
Features identification

Use of different spectral band combinations



Examples of pan-sharpened RapidEye products in RGB

321 (left column), RGB-451 (middle column) and RGB-543 (right column) color composites.



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Check of land use / land cover



Checks linked to persistence in time

Permanent grasslands (at least 5 years)
Retention of Landscape features

Combination of archive imagery and current year imagery



17/02/2008



30/03/2014

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Check of land use / land cover



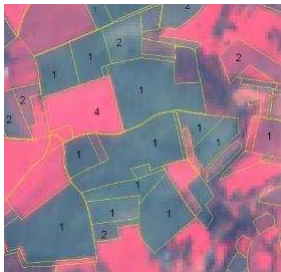
Soil erosion



Stubble management

RIGHT TIME





1 Bare soil
2 Sown parcel
4 Rape seed

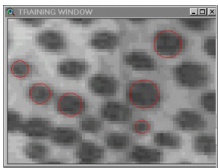
Minimum soil cover

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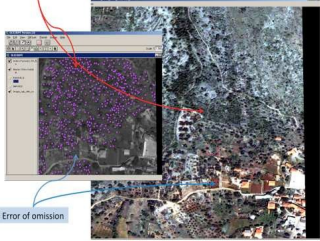
15

Check of land use / land cover

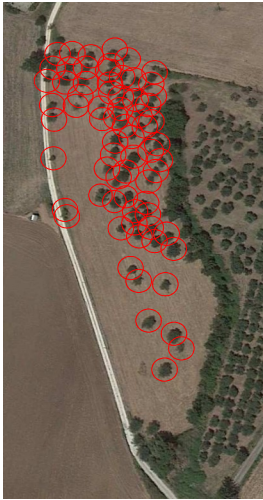

Tree number - tree density




Possible error of commission



Error of omission

4 trees ?



5 trees

Difficult to assess
Tree characteristics?

Olicount project

RFV, consistency checks

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But pay attention






Imagery cannot make miracles ...



Check grazable feature or minimum activity!!!
Information to collected by other means and recorded ...

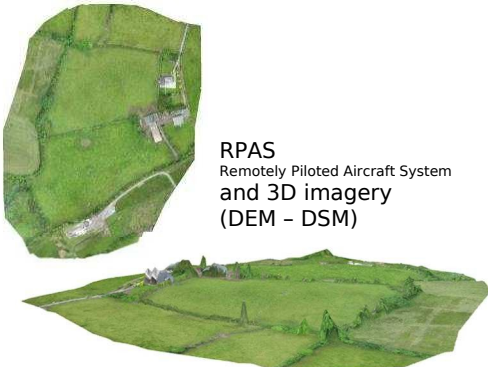


Check of land use / land cover




Other imagery, tools under benchmarking

RPAS
Remotely Piloted Aircraft System
and 3D imagery
(DEM - DSM)





Sentinel-1A SAR data (10 m)
Soon available for test but specific
skill needed



Right Eye Image Left Eye Image
*To view stereo pair above, cross eyes slightly until a third
white dot appears between the two. Now center image is 3D!*

Stereoscopic images

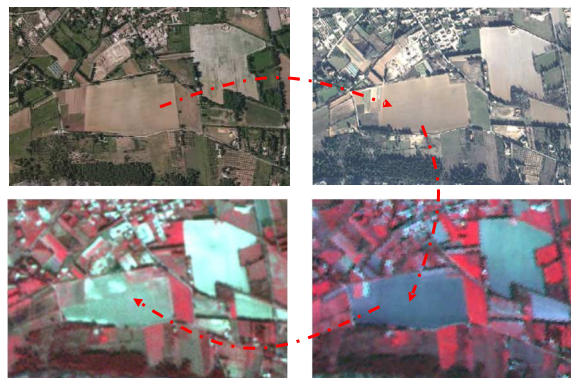



18



Substantial changes expected on OTS checks

Provision of satellite images



2 VHR to check areas,
measure lengths of
features

Check 'small' features
(e.g. isolated trees)

Map permanent EFA
elements

Several HR to give
diagnosis on land cover,
crop cover (check
diversification)

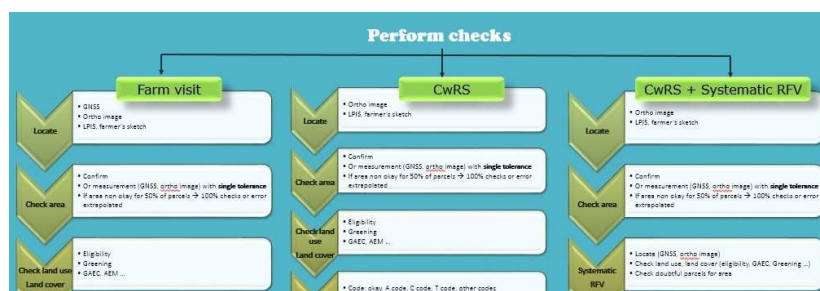
In discussion VHR <0.5m; HHR images <2 m
Launch new Quality check process

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Substantial changes expected on OTS checks



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Substantial changes expected on OTS checks


ADVICE

To ease the implementation

- Translate legal elements in conceptual, interpretable features (like "eligibility profiles")
Create PROTOCOL
- **Share** these concepts between all stakeholders (farmer, controller, photointerpreter ..)
- Create image interpretation **guidelines** (with field examples)
- Training
- **Report, record** findings during OTS check (100 trees, grazable features, ..)
- Use ancillary information

Focus on LPIS 'reference layers' and others



Land use layer
 Water bodies
 Permanent pasture
 Forest
 Urban areas
 LPIS layer
 Irrigation systems layer
 Road network
 Urban 2007 zones
 River network
 Future urbanization zones
 Digital elevation model

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