Some elements on On-The-Spot Checks (OTSC) and area measurement

DSCG/2014/32 FINAL

Philippe LOUDJANI
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

Sorry for repeating and rehashing …
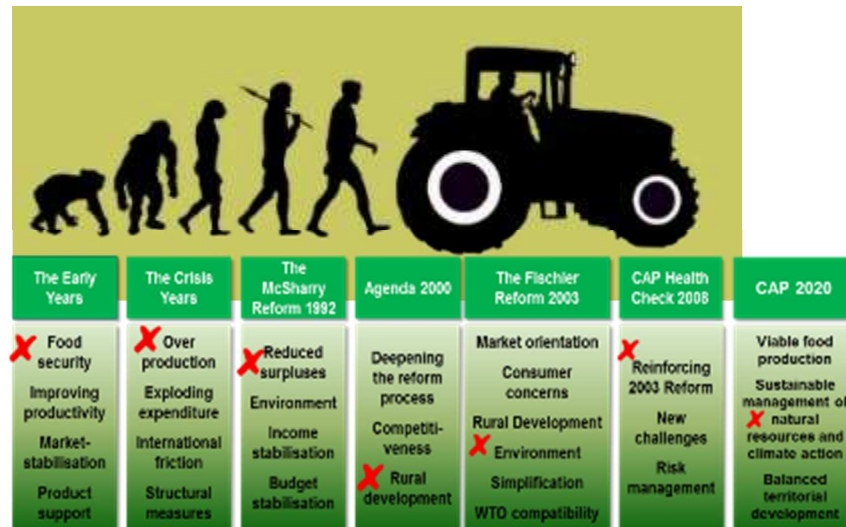
WHERE HAVE WE HEARD THESE WORDS BEFORE?

That awkward moment.. When you've already said "what?" three times and still have no idea what the person said, so you just agree.

On-The-Spot checks
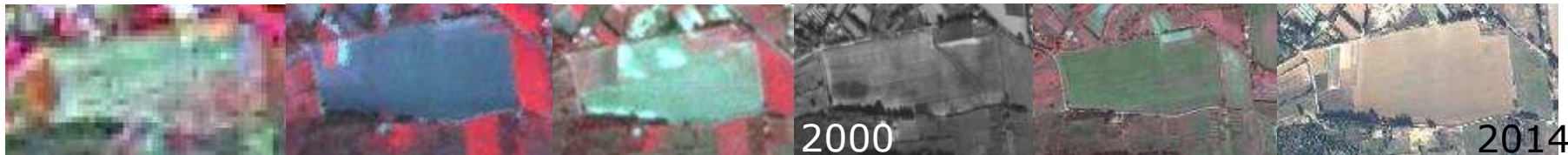

Objectives unchanged: check <u>all conditions</u> for which aid is granted

But <u>conditions</u> constantly <u>evolve</u>

Technology is also evolving

GSD 14,5m   GSD 8m   GSD 6,5m   GSD 1m   GSD 0,6m   GSD 0,5m

→ OTS checks methods constantly need update if not upgrade

What to check?

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
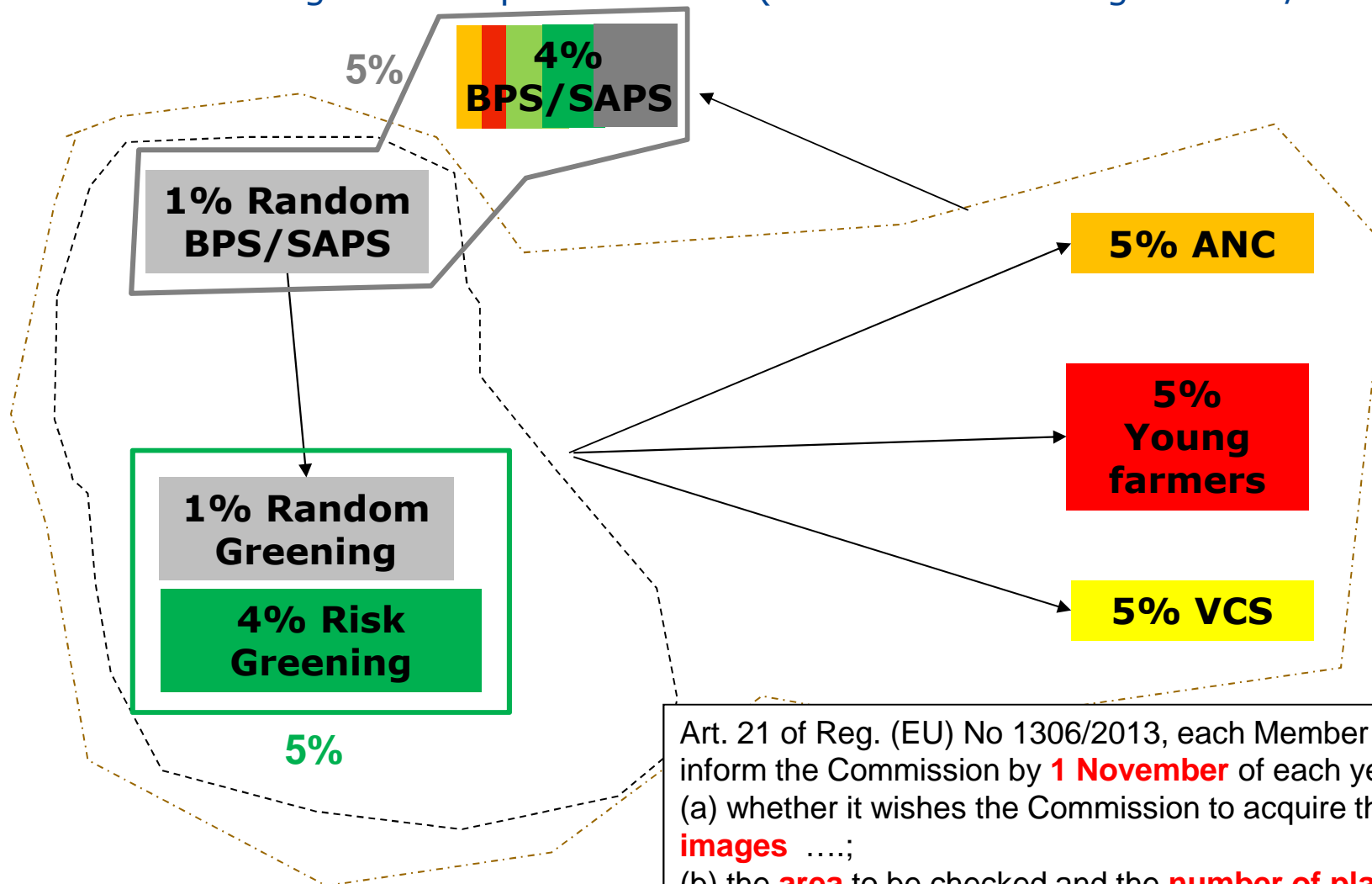   - Erosion, land abandonment, hedge-tree removal …
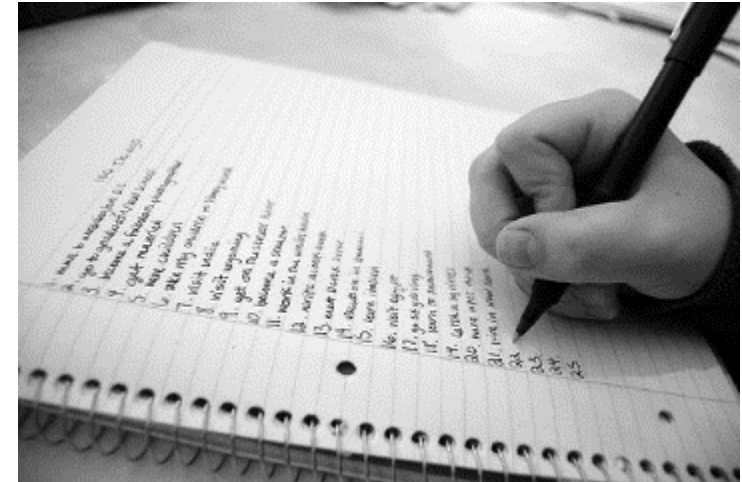
Ensure an exhaustive review and description of elements to check

Topics of the discussion groups

Sample selection

Substantial changes in samples selection (art. 30 to 34 of Reg. EU 809/2014)

5%

4% BPS/SAPS

1% Random BPS/SAPS

5% ANC

1% Random Greening

5% Young farmers

4% Risk Greening

5% VCS

5%

Art. 21 of Reg. (EU) No 1306/2013, each Member State shall inform the Commission by **1 November** of each year:
(a) whether it wishes the Commission to acquire the **satellite images** ….;
(b) the **area** to be checked and the **number of planned control zones**

Prepare the OTS checks

Data	Measurement tools	Land use / land cover identification tools	Controller Guidelines
· **Geospatial application** · **LPIS** · **Ortho image** · **Ancillary data** · ...	· **GNSS** · **VHR Ortho image** · ... VALIDATED	· **VHR image** · **HR image** · **HHR image** Image processing CAPI Guide Ground truth collection	

Prepare the OTS checks

Essential step of image processing

From LPIS QA experience

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)

Band	DN value
Blue	255
Green	316
Red	259

Control site: TORR, Spain
Linear Stretch

Pan-sharpened, Principal Component Method, 16 bit

Band	DN value
Blue	278
Green	370
Red	356

Band	DN value
Blue	282
Green	375
Red	352

Pan-sharpened, High-Pass Filter Method, 16 bit

Pan-sharpened, modified Intensity-Hue-Saturation method , 16 bit

IMPORTANT NOTICE

Move from 1/10.000 to 1/5.000

Prepare the OTS checks

Validate area measurement tools

BUFFER TOLERANCE VALIDATION METHOD

GNSS measurements

Orthoimagery

At least:
- **6 parcels** with size, shape, type of borders typical for the future application during area control
- Parcels **borders** will be marked by pegs every 25-30 m
- **2(3) operators**
- **8(9) sets**, each set with **4 repetitions** (2 clockwise, 2 anticlockwise), 4(3) sets/operator
- Different time a day (2-3 days)
- Reference areas of parcels should be measured with accurate tools (RTK or post processing carrier phase GNSS devices, total stations, etc.)

Minimum 32 measurements for each parcel

At least:
- **30 parcels** with size, shape, type of borders typical for the future application during area control
- Parcels borders area natural, **largely indicated** as in the figure, **selected as LPIS** if possible
- **6 operators**
- **6 sets**, each set with **4 repetitions**
- Each repetition measured in different time a day
- Reference areas of parcels should be taken from LPIS

Minimum 24 measurements for each parcel

Statistical analysis

Outliers detection

Calculation in the area value (m²)
- Repeatability standard deviation ISO 5725-2: formula (20)
- Reproducibility standard deviation ISO 5725-2: formula (24)

Reproducibility limit in buffer value (m) = 2.8 * reproducibility standard deviation/parcel perimeter

Determine the Inherent tool error (accuracy)

To be used in 'real conditions'

Single buffer tolerance value

Joint Research Centre

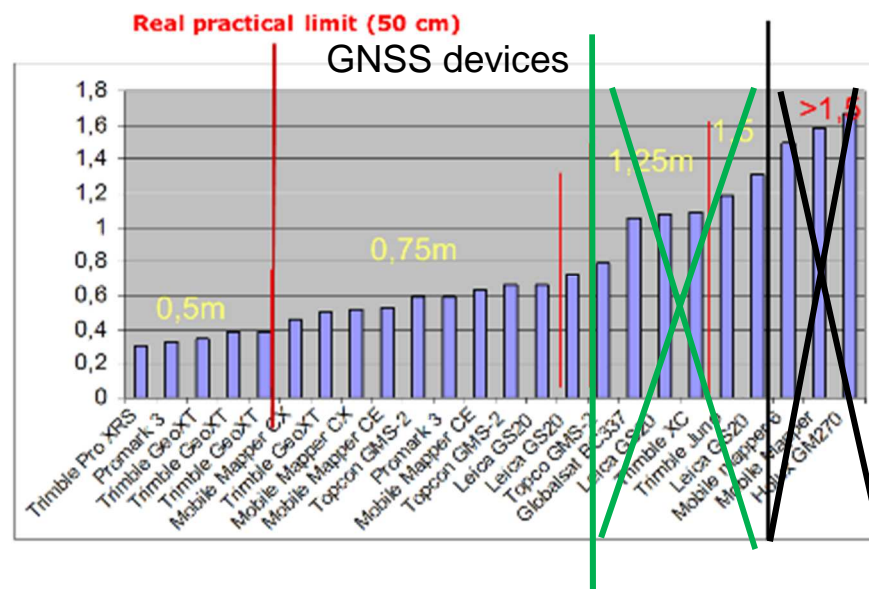# Prepare the OTS checks

Single buffer tolerance value

Please Note

<u>Only for parcel area measurement in the frame of OTS checks</u>

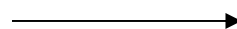### Up to 2014

- Maximum tolerance 1.5 m
- Use of tolerance value of tool used
- Tools with tolerance up to 1.5 m

Real practical limit (50 cm)

GNSS devices

From 2015

- Maximum tolerance 1.25 m
- One tolerance for all (single value)
- Tools with tolerance up to 1 m
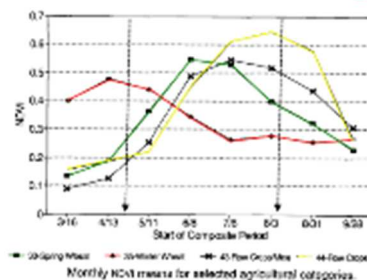
→

Ease measurement process

Better acceptance by farmers

Reflect 'real conditions' of checks

'Only' accurate tools

Prepare the OTS checks

Create image interpretation guidelines
(with field example)

Essential role of clear features' definition
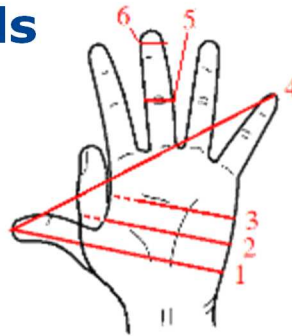Essential role of definition of common measurement rules

Top
PRIORITY

Same area on field and
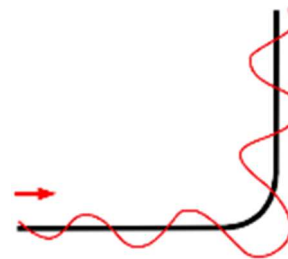on image

Perform checks

Use appropriate tools

GNSS yes

GNSS no

Use tools appropriately

Same conditions, settings as validated

"Stay on the line"
But define your line …

KEEP CALM AND PLEASE ON THE LINE, S IMPORTANT

Perform checks

- Use common rules
→ diagnosis CwRS and diagnosis field should be identical

- Measurements only if needed

- Use of Single buffer Tolerance

- Possibility to limit to 50% of parcels
→ Results extended to 100%

- Have imagery on field

- Ensure good timing of RFV

- Have digital OTSC manual on field (with examples)
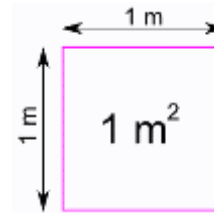
Please Note

Specificities of the Greening payment

The OTSC will determine the area of each crop based on the cropped areas' limits that are visible in the field (the crop itself or the crop residues) or on the imagery used in CwRS
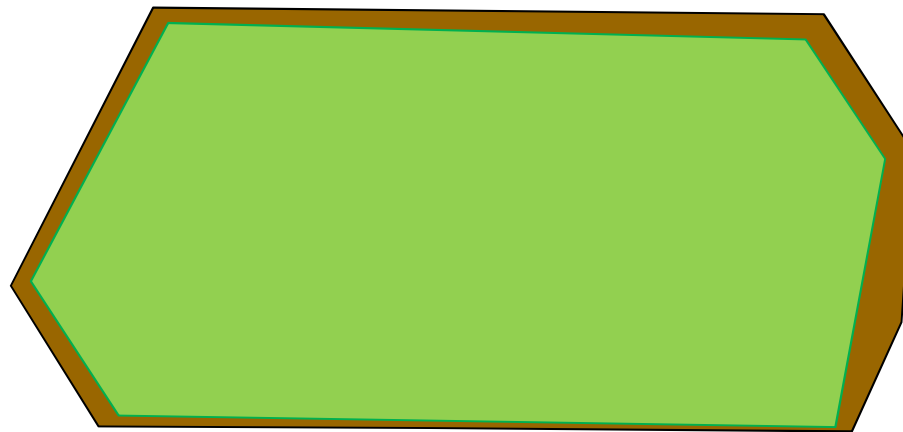
Produce OTS check REPORT

"In God we trust. All others must bring data".

W. Edwards Deming

Document (justify) and record every diagnosis

- Who, when, where
- Measurement conditions (N.B.: same as validation)
- Take pictures

Digital format reporting

- Scrolling menu, check list
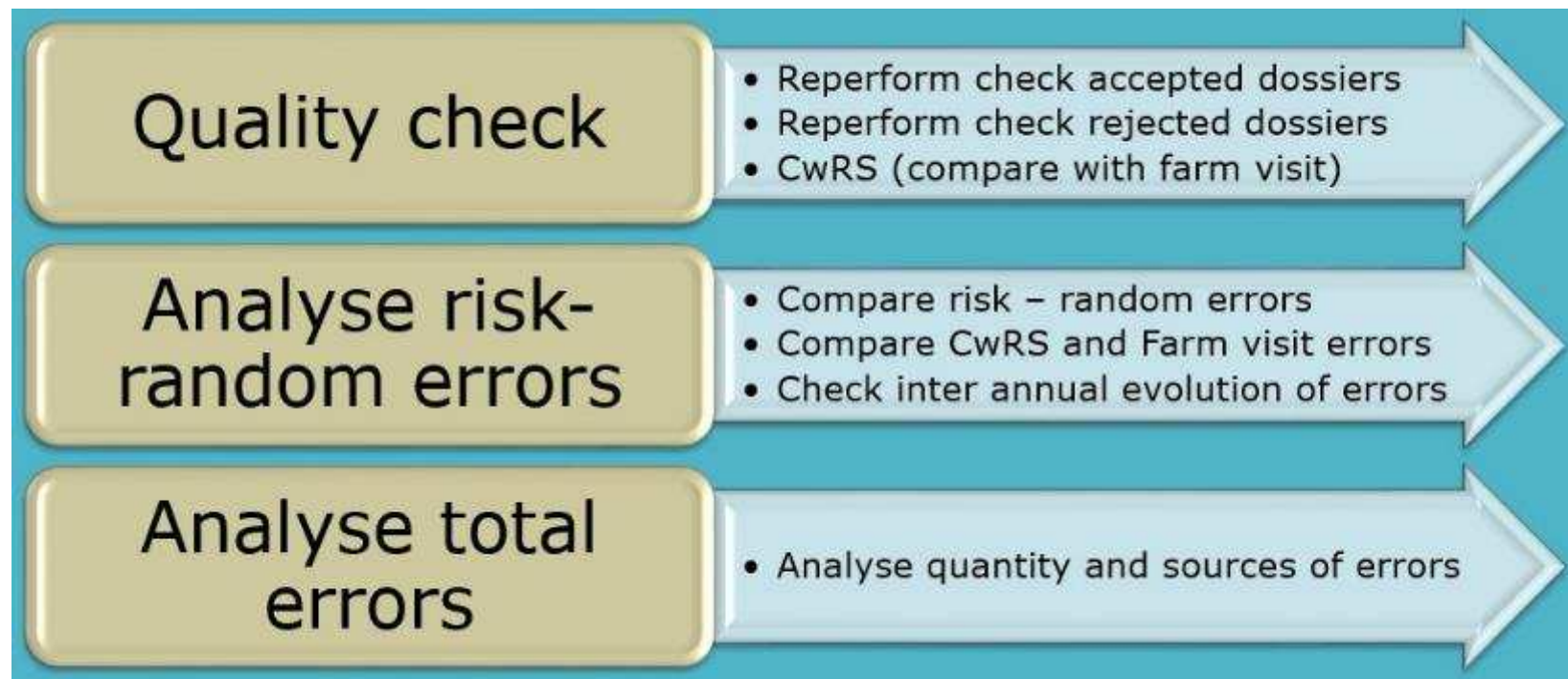- Common between CwRS and Field check (N.B. Mutual training field and screen)

Have a reporting section dedicated to follow-up

- LPIS, EFA layers needs for verification

Farmer protest

Check and Analysis of OTS checks results

Quality check	• Reperform check accepted dossiers • Reperform check rejected dossiers • CwRS (compare with farm visit)
Analyse risk-random errors	• Compare risk – random errors • Compare CwRS and Farm visit errors • Check inter annual evolution of errors
Analyse total errors	• Analyse quantity and sources of errors

See presentation on 'Quality Management'

Need for support ?

Need for new tools?

Use of RPAS as support to OTSC checks?

Pictures used as evidence by farmers?
Or others (sensors from precision farming)?

Method for "OTS Check Quality management"?