The European Commission's science and knowledge service

Joint Research Centre

JRC Activities on Landscape features

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Outline – JRC activities on Landscape features State of play

- Previous JRC work (examples)
- Current activities – Support to DG AGRI (iMAP)
- Research & development

Types of landscape features in agricultural areas




Hedgerows, field margins, trees in groups, isolated trees and trees in line

Types of landscape features in agricultural areas



Ditches, hedges, terraces, stone walls

A large variety of features / types:

- With various environmental effects
- Very heterogeneous objects to delineate

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Previous JRC work (examples)

- IRENA project, COM(2006)508

Development of AEI.28 (Landscape state and diversity)

- Support to LUCAS survey (from 2006)

in partic. Transect module (methodology …) (2006 -> 2015)

2015 last EU Landscape Feature dataset available => CAP Impact Assessment [SWD(2018)301]

Source of data on Landscape features

- Copernicus Small Woody Features layer (cf EEA presentation)
- LUCAS Transects Last survey in 2015 (not done in 2018)
- IACS / LPIS data (availability according to MS policy on administrative data)
- EMBAL project (DG ENV) – similar to LUCAS approach but for qualitative assessment (less than 2000 points – mapping on 25 ha plots)
- National/regional data in MS: own nomenclature, typology, specifications

Lack of pan-EU data covering all landscape features types consistently

Current support - iMAP workprograme
Task 7: Methodology for Landscape features

from AGRI, with ENV, ESTAT, CLIMA involved

iMAP: a specific scientific and technical support from JRC to DG AGRI

with a detailled workprogramme, among which:

- State of play of existing info on landscape features in the EU

at EU level (LUCAS, IFS, Copernicus layers) and MS level (GAEC7/9, EFA, LPIS, national or regional landscape mapping and monitoring systems, others …)

- Propose a methodology for indicator on landscape features

homogeneous across EU, at least MS level, possibly regional (roadmap / guidance until 2022)
Reviewed quantification of an indicator from the relevant data sources taking into account MS reporting obligations in the PMEF

What is LUCAS (Land Use and Coverage Area frame Survey)

LUCAS to collect and produce harmonised land use/cover data and agro-environmental indicators (soil, grassland, landscape) for the EU

LUCAS is a statistical survey (field + Photo-Interpretation samples)
Organised every 3 years (next survey in 2022, results in 2023)

Basics: Point survey (Land-cover / Land use)
2 phases sampling (master 2 km, stratified sample)
Mix of in-situ and office PI sample ≈ 340,000 points (in situ-240,000 – PI 100,000)

https://ec.europa.eu/eurostat/web/lucas/overview

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Proposal for LUCAS Landscape Features module in 2022

Methodology:

- Based on LUCAS core survey, but using agricultural points only
- Photo-interpretation in office on aerial ortho-photo (≈ 20 cm), validation ground survey
- Observation unit: points in 1 ha square, centered on LUCAS sample (see next slide)

Benefit:

- Homogeneous pan-European dataset & nomenclature
- Estimation of Landscape Feature area using LUCAS sampling scheme
- Very relevant to detect changes in time (evaluation ex-post, policy impact) (next slide)

Joint effort (DGs AGRI, JRC, ENV, CLIMA, DEFIS) coordinated by ESTAT

LUCAS Landscape features methodology - 2022

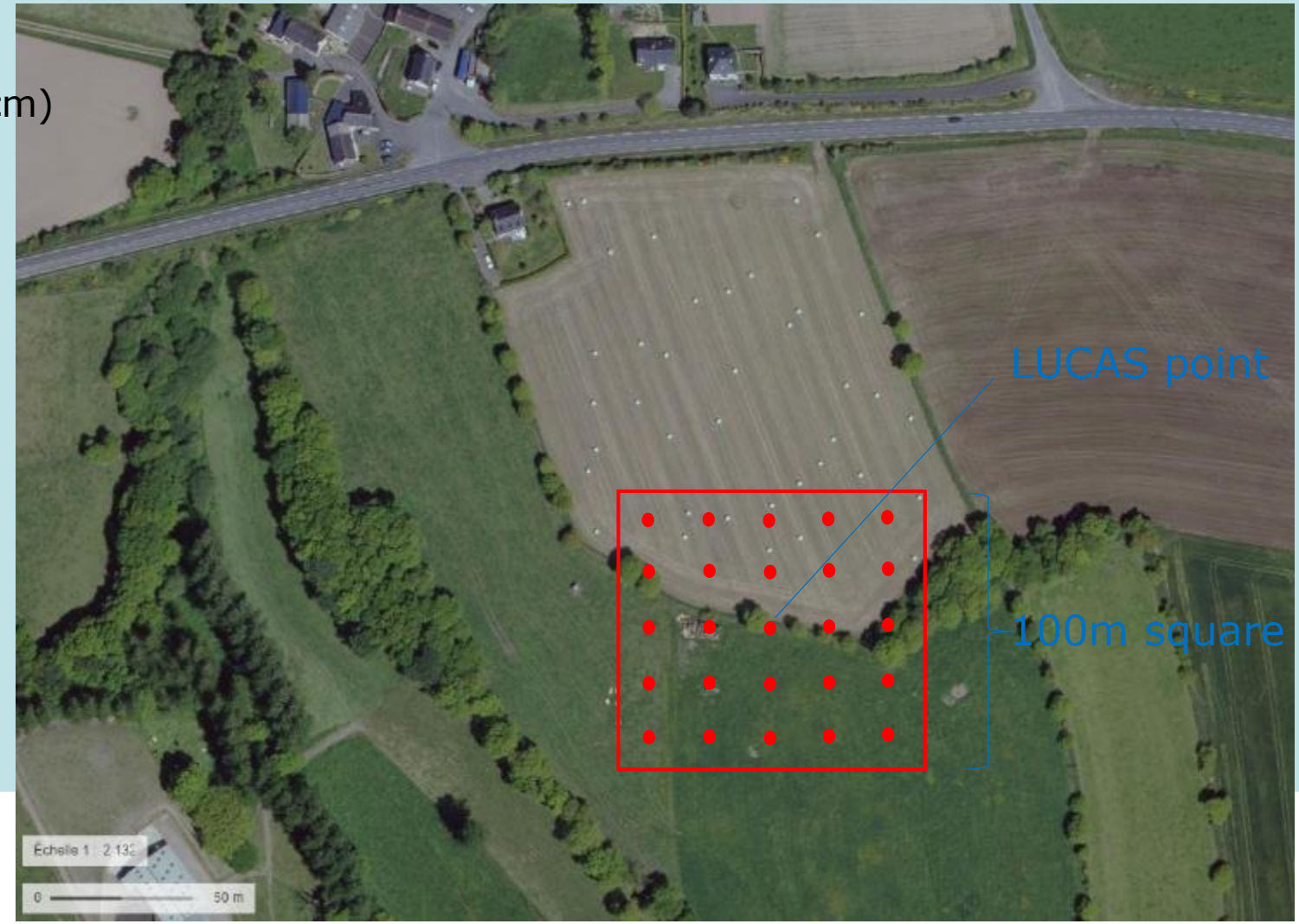
Photo-interpretation of LF on points
on Very High Resolution ortho-photo (20cm)

Sampling strategy:

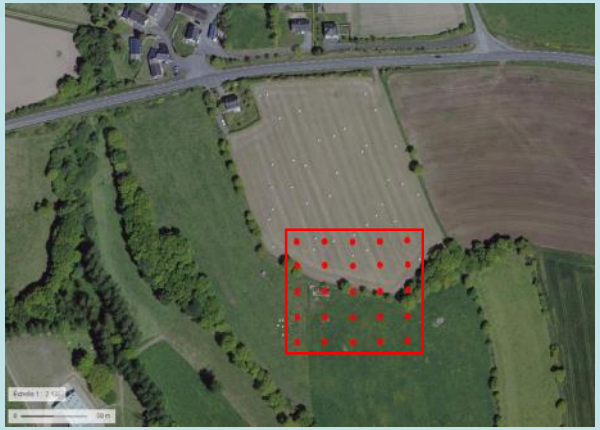
100m squares centered on LUCAS points
Land use: agriculture

A simplified nomenclature:

- Woody/Riparian vegetation
- Grass/herb
- Ditches
- Small ponds
- Stone walls, terraces
- Other landscape features



Statistical quantification of area of Landscape features in EU / MS



Survey – Statistical processing

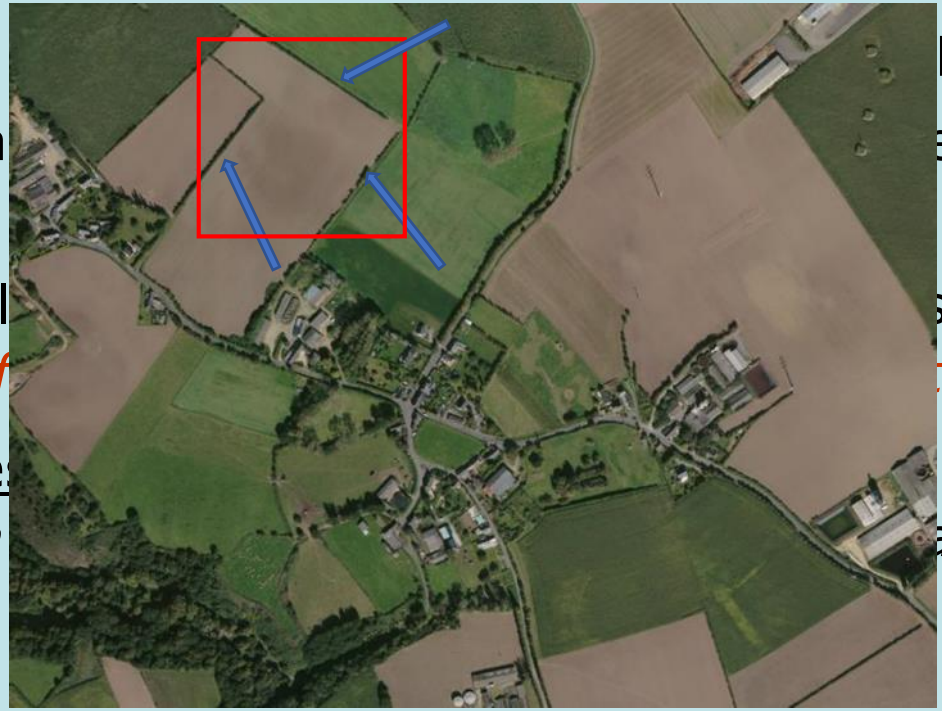
MS	woody features	Grass / herbs	Ditches	Small ponds	Stone walls, terraces	Other landscape features	Total
EU							
BE							
BG							
CZ							
DK							
DE							
EE							
IE							
EL							
ES							
FR							
HR							
IT							
CY							
LV							
LT							
LU							
HU							
MT							

Area of landscape features in agricultural land

Estimation of changes between 2 dates

- Impa ges period
- Preli e ra es:
  Less 6 %
- Estim sual s
  => e *diff te*
- It is nge
  => e tion *al year*

1998



2015

Example with photo-interpretation of changes between 2 dates - only changes to be detected
On a sampling scheme

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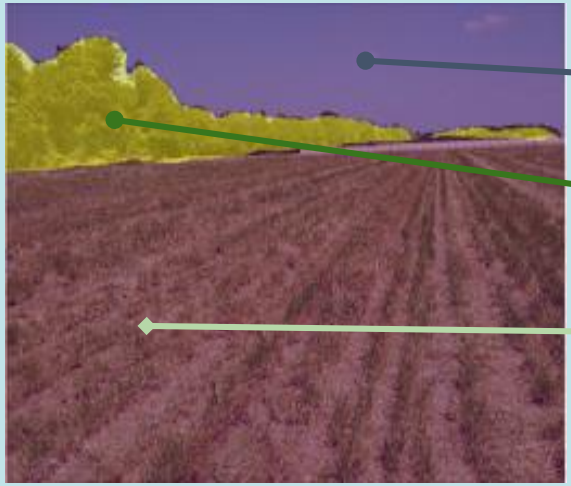
Research & development
Computer vision applied to Landscape features

Exploratory Research: can computers recognize objects on pictures?

e.g. LUCAS pictures

Multinet – nested models
Deep learning process



Sky

Landscape features

Hedges
Ditches
Terraces

Crops

Computer vision AI model:
Image segmentation in generic classes trained with million pictures

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Take home message

- Landscape features in agricultural land may have high positive impact on environment, therefore their quantification is needed for improved policy targeting & evaluation
- Given the typology, heterogeneity, and size of Landscape features at stake for the CAP, a specific module for landscape features in LUCAS 2022 is foreseen (collaboration inter DGs
- The methodology shall be able to estimate changes between 2 dates accurately
- Integration of efforts (AGRI, JRC, EUROSTAT, ENV, CLIMA, EEA) to provide means for a complete assessment, taking into account all available data
- Collaboration needed with MS to investigate data availability and methodologies

Any questions?

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Satellite images vs aerial ortho-photos

Sentinel 2 – 10m resolution

Aerial ortho-photo – 20cm resolution

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