Dr. Alan Belward, Knowledge for Sustainable Development and Food Security Unit
European Commission, Joint Research Centre, Directorate for Natural Resources

SDG 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture

SDG Goal 2

① 2.1 By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round

② 2.2 By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons

③ 2.3 By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal **access to land**, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment

SDG Goal 2

④ 2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that **increase productivity and production**, that help **maintain ecosystems**, that strengthen capacity for **adaptation** to climate change, extreme weather, drought, flooding and other disasters and that progressively **improve land and soil quality**

⑤ 2.5 By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed

SDG Goal 2

- 2.a Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries

- 2.b Correct and prevent trade restrictions and distortions in world agricultural markets, including through the parallel elimination of all forms of agricultural export subsidies and all export measures with equivalent effect, in accordance with the mandate of the Doha Development Round

- 2.c Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility

Percentage of agricultural area under sustainable agricultural practices

Emissions of greenhouse gases in agriculture (per hectare of land and per unit of output, separately for crop and livestock sectors)

The proposed alternative is to use one component of indicator 15.3.2, Area of land/soils under sustainable management

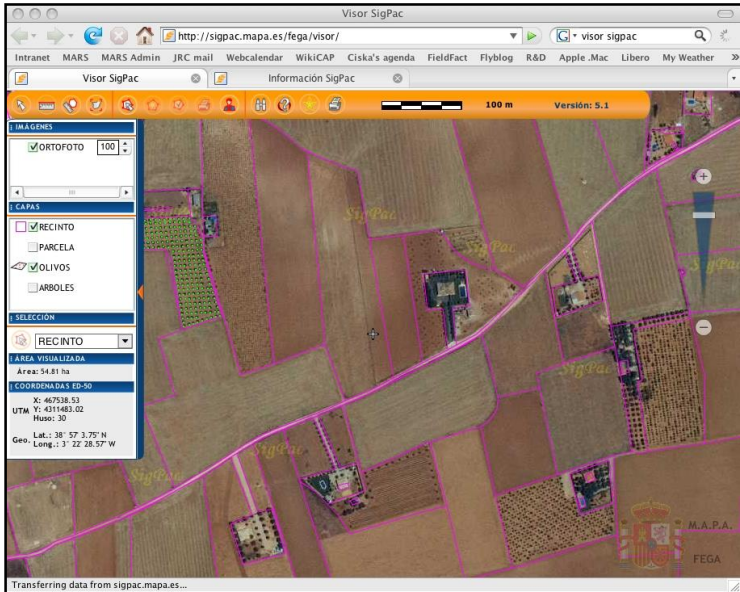
Common Agricultural Policy reform

- The 2003 CAP reform introduced a new single payment system per farm and separated aid from production - European Agricultural Fund for Rural Development (EAFRD)
- Farmers receive payments if they maintain their land in good agricultural condition and comply with the standards on public health, animal and plant health, the environment and animal welfare

Photos Simon Kay JRC

Geo-information and the CAP

- CAP legislation requires geo-referenced, on-line information, supported by up-to-date national image data
- Council Reg 1782/03, Art 20 requires GIS use from 1/1/2005; the **Integrated Administration and Control System** (IACS)



Simon Kay (text and photo) JRC

Integrated Administration and Control System

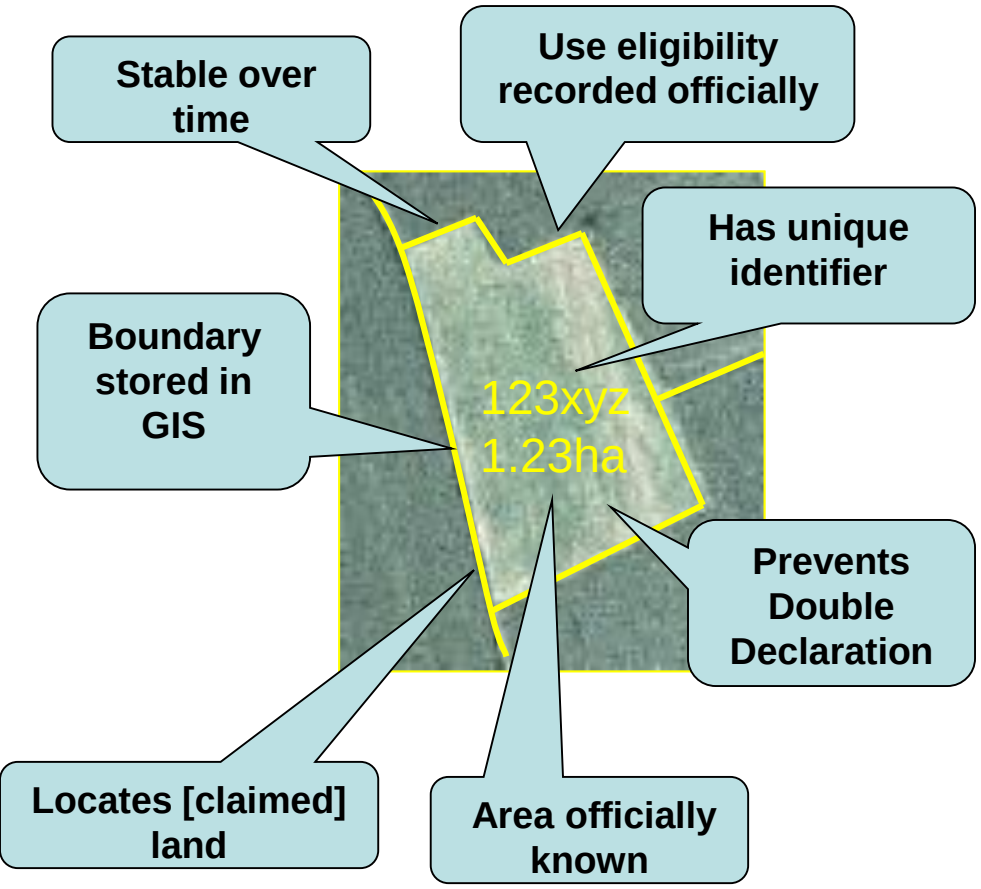
- A computerised database, where applications for assistance are recorded for each holding. Information held includes:
  - A Land Parcel Identification System (LPIS) that provides a unique code or identifier linked to the specific Land Parcel's area and owner (or claimant)
  - LPIS can be based on maps and documents from the national land register, cartographic data or aerial / satellite imagery
- Register of applications for payment and payments made

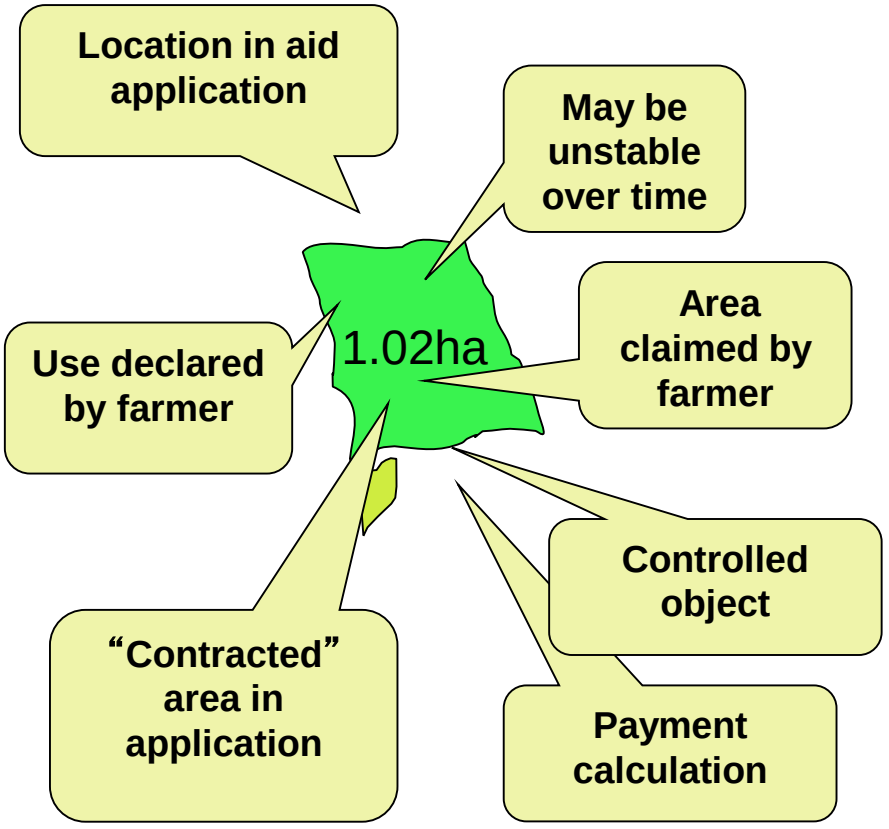
Transparency, consistency and traceability

Reference parcel – claimed parcel

In Integrated Administration and Control System -GIS Land Parcel Identification System

Acts as reference frame for Aid application



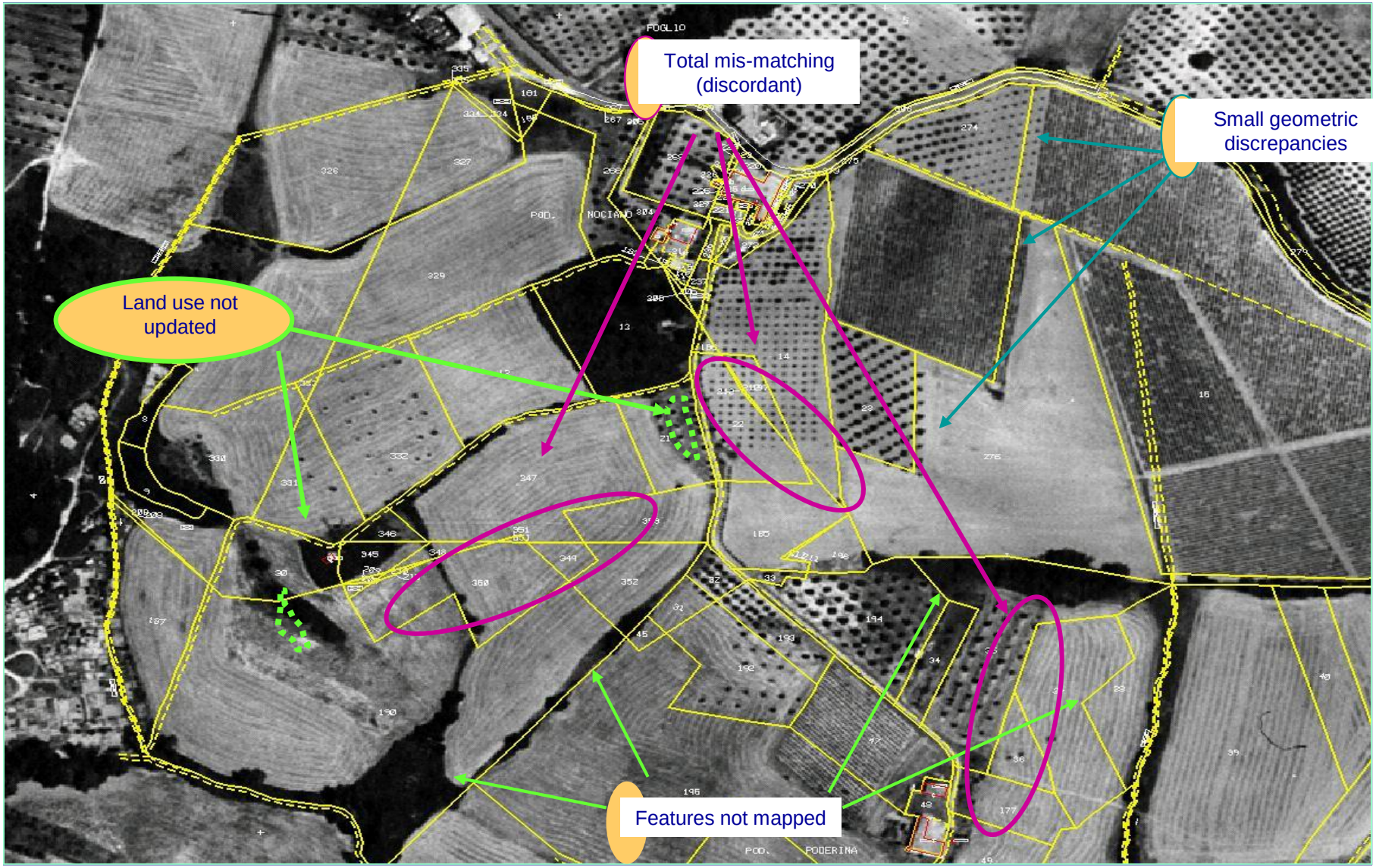


The Bedolina map, Valcamonica (Lombardia)

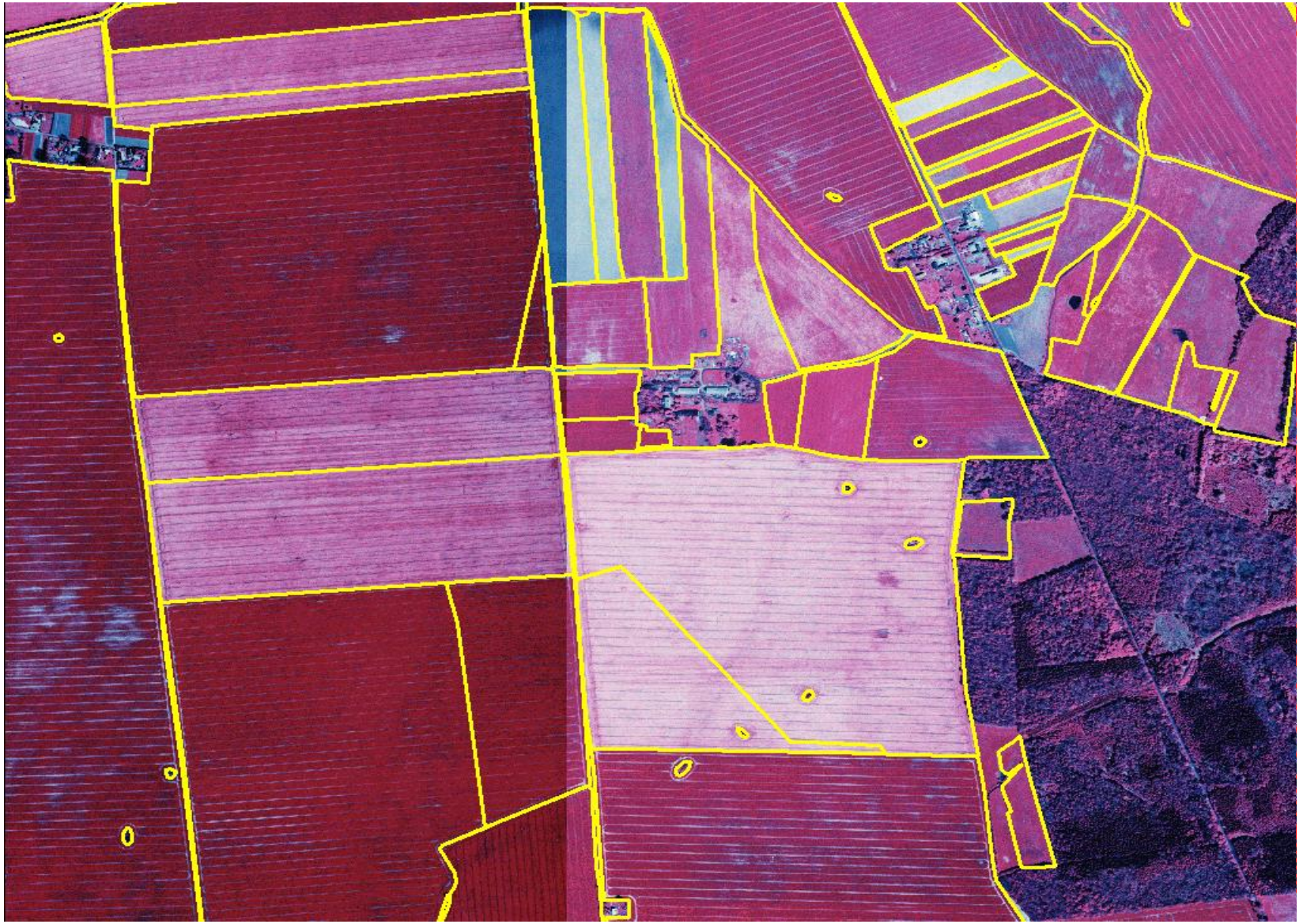
http://commons.wikimedia.org/wiki/File:Bedolina_map.jpg

2,000 – 1,500 *B.C.* 4.16 m X, 2.3 m Y

Establishing a Land Parcel Identification System



Land Parcel Identification System revision and update



Verification and validation

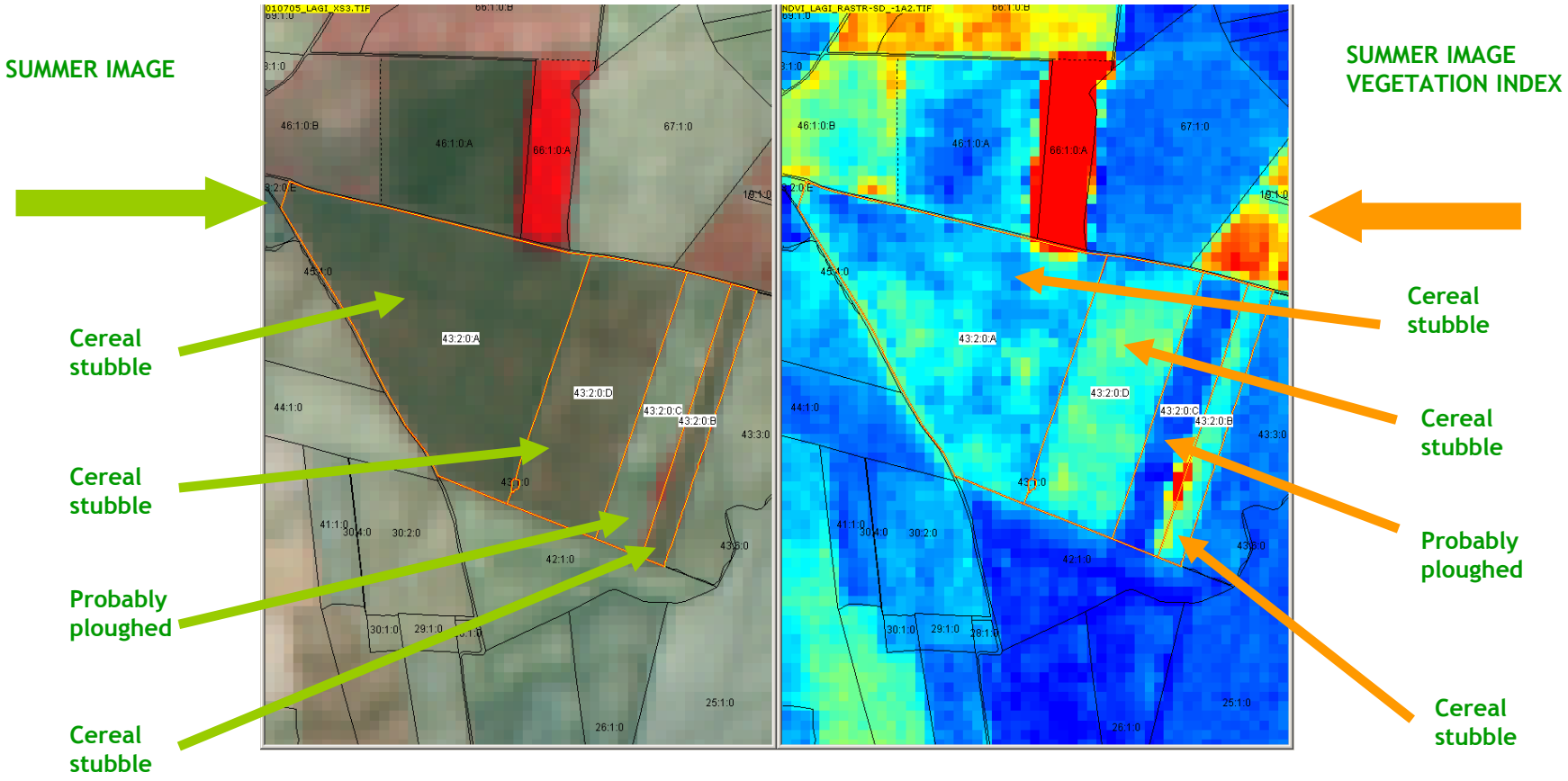
ANNEX IV

Good agricultural and environmental condition referred to in Article 5

Issue	Standards
Soil erosion: Protect soil through appropriate measures	— Minimum soil cover — Minimum land management reflecting site-specific conditions — Retain terraces
Soil organic matter: Maintain soil organic matter levels through appropriate practices	— Standards for crop rotations where applicable — Arable stubble management
Soil structure: Maintain soil structure through appropriate measures	— Appropriate machinery use
Minimum level of maintenance: Ensure a minimum level of maintenance and avoid the deterioration of habitats	— Minimum livestock stocking rates or/and appropriate regimes — Protection of permanent pasture ►**M3** — Retention of landscape features, including, where appropriate, the prohibition of the grubbing up of olive trees — Avoiding the encroachment of unwanted vegetation on agricultural land — Maintenance of olive groves in good vegetative condition ◄

Conformity with GAEC03

STANDARD GAEC03: AVOID PLOUGHING BETWEEN HARVESTING AND PRE-SOWING, IN THOSE PARCELS CULTIVATED WITH WINTER ARABLE CROPS



SUMMER IMAGE IS USED TO CHECK THE EXISTENCE OF SHADES THAT CORRESPOND WITH STUBBLE AND NOT WITH BARE SOIL ACTIVITY. BY MEANS OF THE VEGETATION INDEX OBTAINED FROM THE XS3 SUMMER IMAGE, IT CAN BE CHECKED THAT THE CEREAL STUBBLE SUBENCLOSURES TEXTURE IS NOT AS HOMOGENEOUS AS THE PURE BARE SOILS TEXTURE. IN CASE OF DETECTION OF BARE SOIL, A FIELD VISIT IS CARRIED OUT TO CHECK THE LABOUR DEPTH. [Ref. Sardon, MARS PAC Annual Conf. 2007]

Conformity with GAEC08:

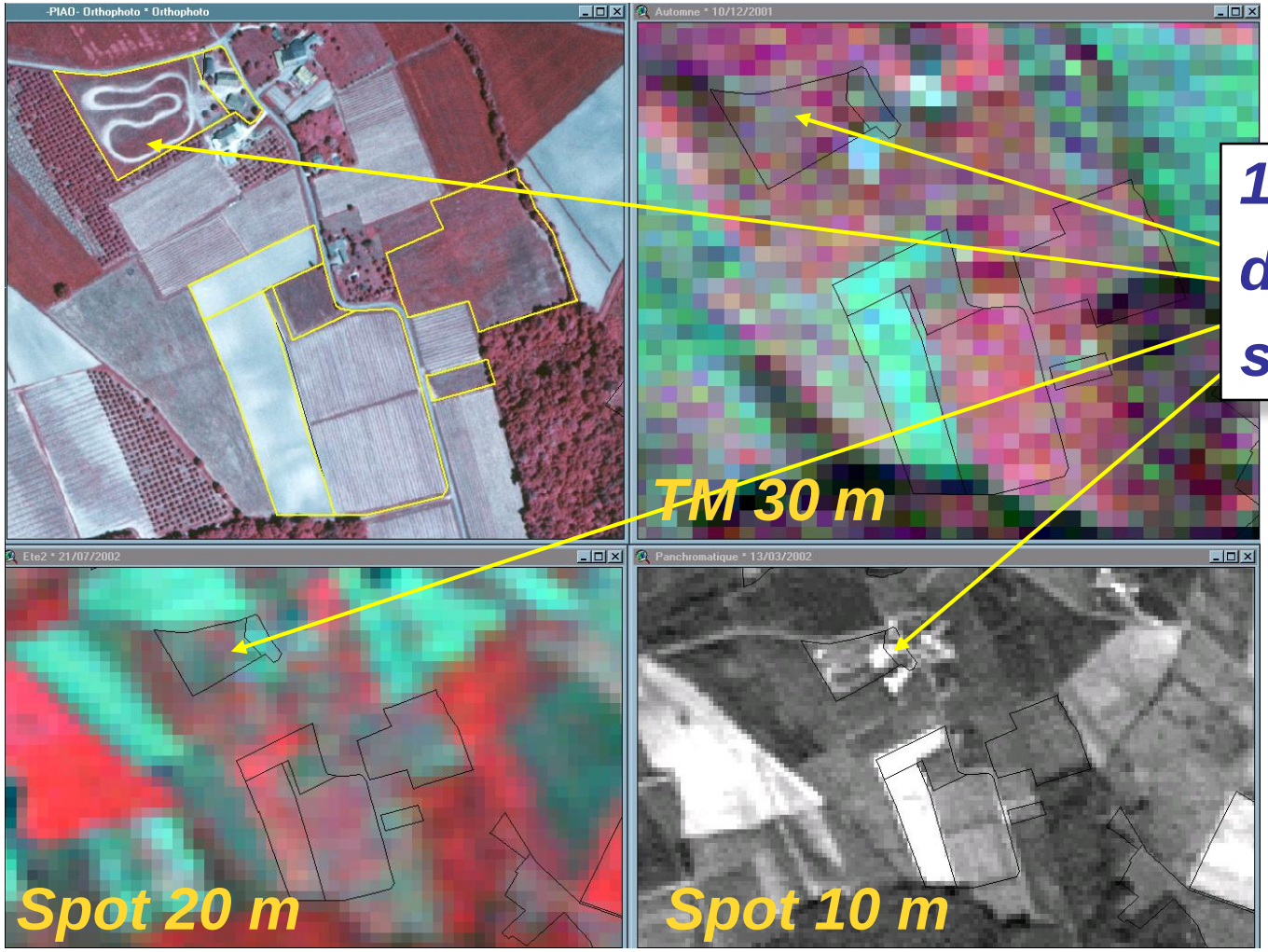
STANDARD GAEC08: MAINTENANCE OF RETAIN TERRACES, KEEPING THEIR DRAINAGE CAPACITY AND AVOIDING THE RISK OF SILTING UP AND GULLY FORMATION

ARCHIVE ORTHOPHOTO

VHR IMAGE OF THE CURRENT YEAR

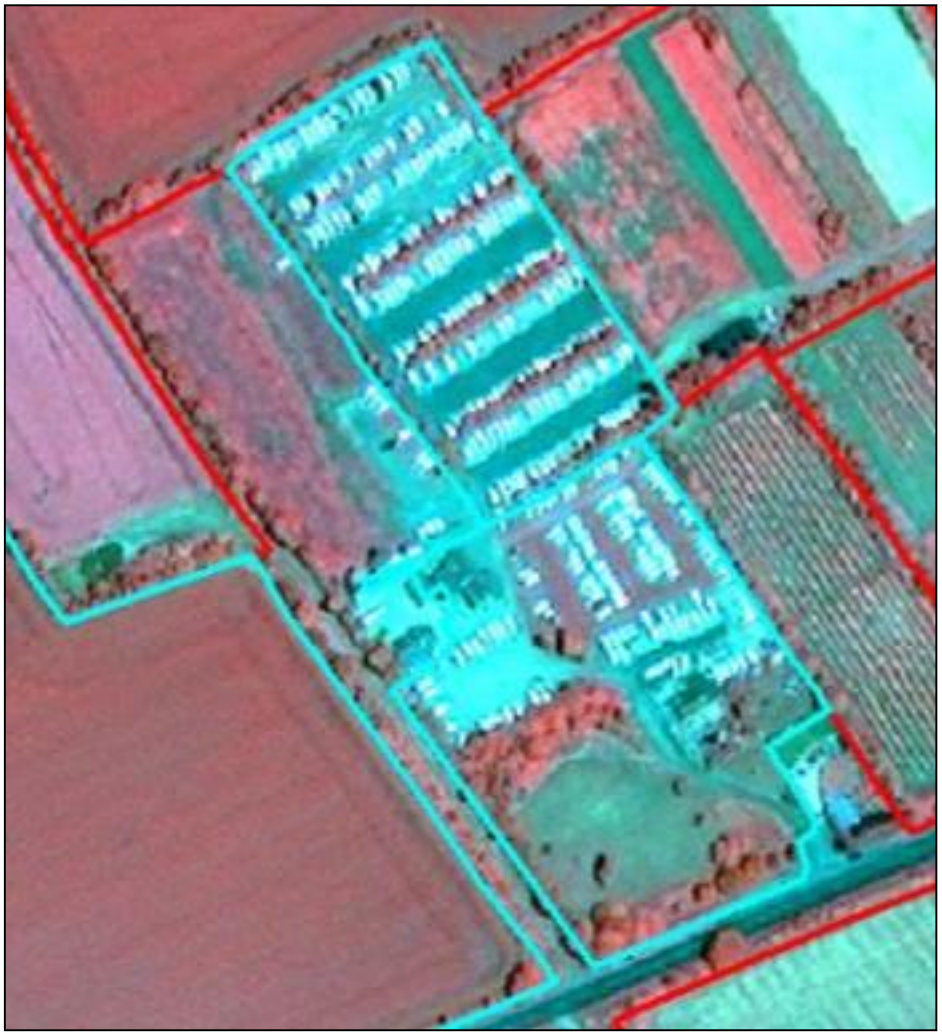
NON ELIMINATION OF TERRACES, BOUNDARIES, ETC IS CHECKED BY COMPARISION BETWEEN THE ORTHOPHOTO AND THE VHR IMAGE [Ref. Sardon, MARS PAC Annual Conf. 2007]

Subsidy control

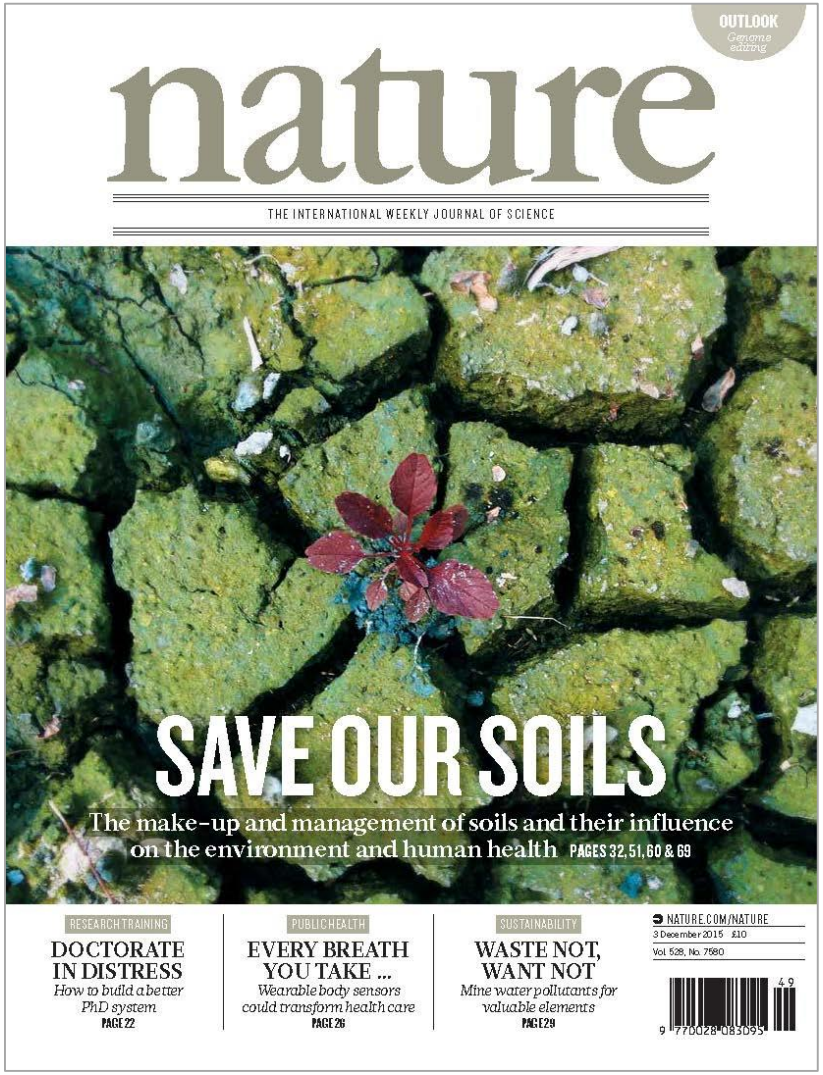


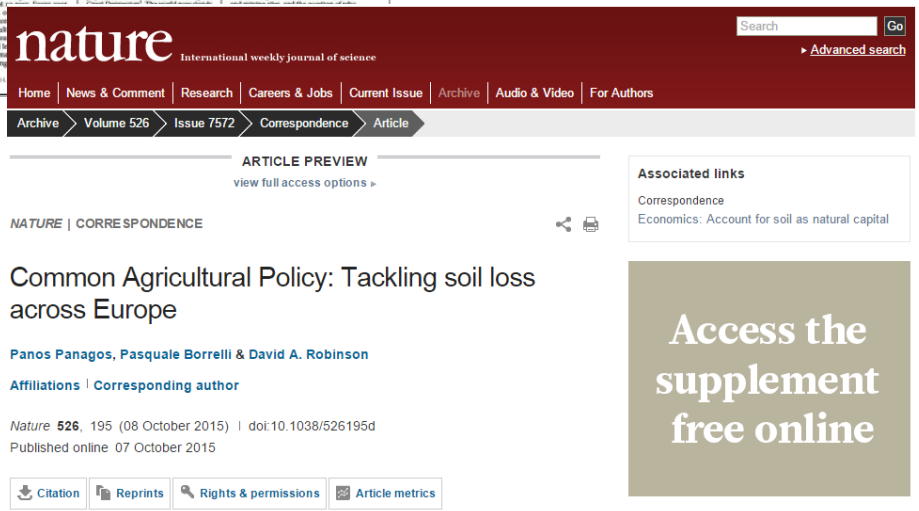
1.6 ha parcel declared as set aside…

Compliance failure



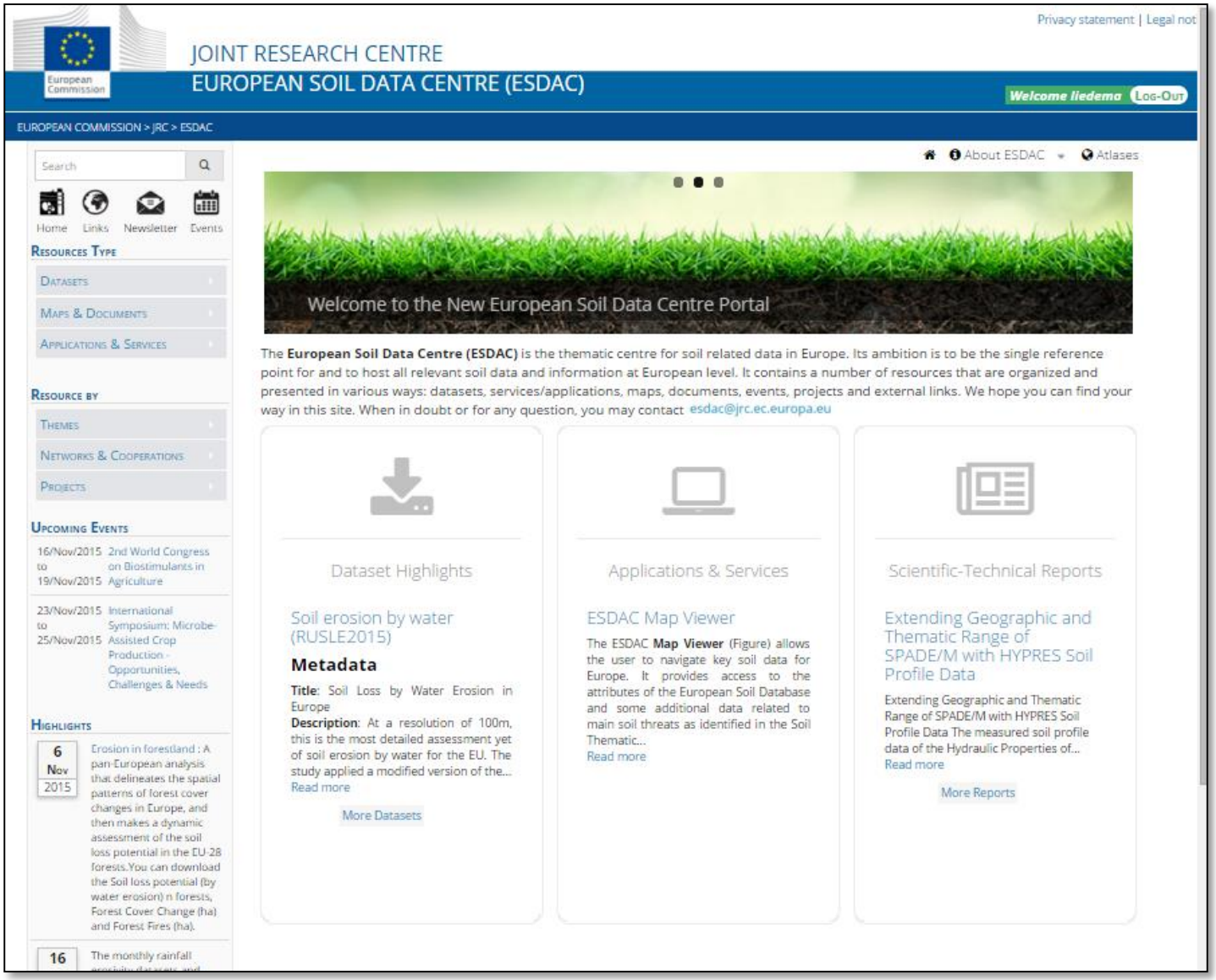
European Commission





Access the supplement free online

Joint Research Centre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JOINT RESEARCH CENTRE
EUROPEAN SOIL DATA CENTRE (ESDAC)
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Events
RESOURCES TYPE
DATASETS
MAPS & DOCUMENTS
APPLICATIONS & SERVICES
RESOURCE BY
THEMES
NETWORKS & COOPERATIONS
PROJECTS
UPCOMING EVENTS
16/Nov/2015 to 19/Nov/2015 2nd World Congress on Biostimulants in Agriculture
23/Nov/2015 to 25/Nov/2015 International Symposium: Microbe-Assisted Crop Production - Opportunities, Challenges & Needs
HIGHLIGHTS
6 Nov 2015
Erosion in forestland : A pan-European analysis that delineates the spatial patterns of forest cover changes in Europe, and then makes a dynamic assessment of the soil loss potential in the EU-28 forests.You can download the Soil loss potential (by water erosion) n forests, Forest Cover Change (ha) and Forest Fires (ha).
16
The monthly rainfall
Welcome to the New European Soil Data Centre Portal
The European Soil Data Centre (ESDAC) is the thematic centre for soil related data in Europe. Its ambition is to be the single reference point for and to host all relevant soil data and information at European level. It contains a number of resources that are organized and presented in various ways: datasets, services/applications, maps, documents, events, projects and external links. We hope you can find your way in this site. When in doubt or for any question, you may contact esdac@jrc.ec.europa.eu
Dataset Highlights
Soil erosion by water (RUSLE2015)
Metadata
Title: Soil Loss by Water Erosion in Europe
Description: At a resolution of 100m, this is the most detailed assessment yet of soil erosion by water for the EU. The study applied a modified version of the...
Read more
More Datasets
Applications & Services
ESDAC Map Viewer
The ESDAC Map Viewer (Figure) allows the user to navigate key soil data for Europe. It provides access to the attributes of the European Soil Database and some additional data related to main soil threats as identified in the Soil Thematic...
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Scientific-Technical Reports
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Extending Geographic and Thematic Range of SPADE/M with HYPRES Soil Profile Data The measured soil profile data of the Hydraulic Properties of...
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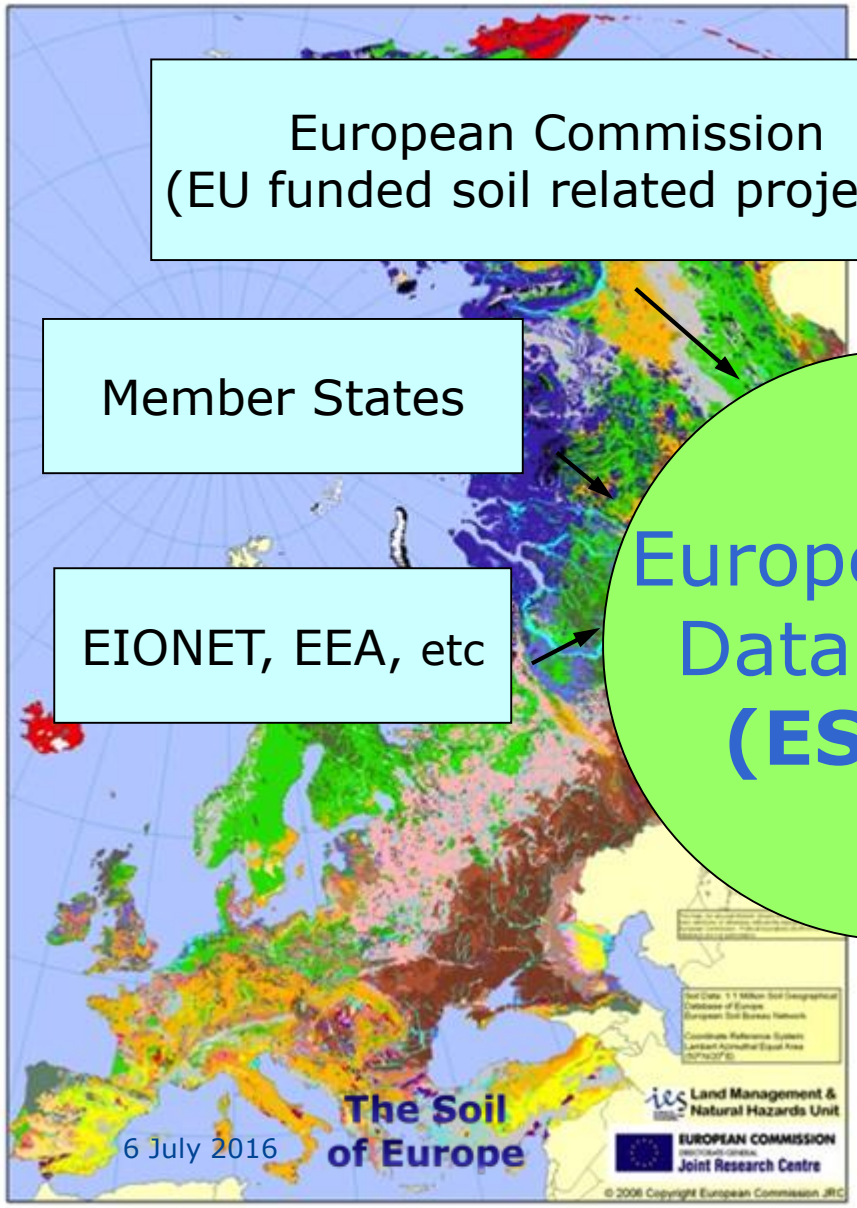
More Reports



European Commission
(EU funded soil related projects)

Member States

EIONET, EEA, etc

European Soil Data Centre **(ESDAC)**

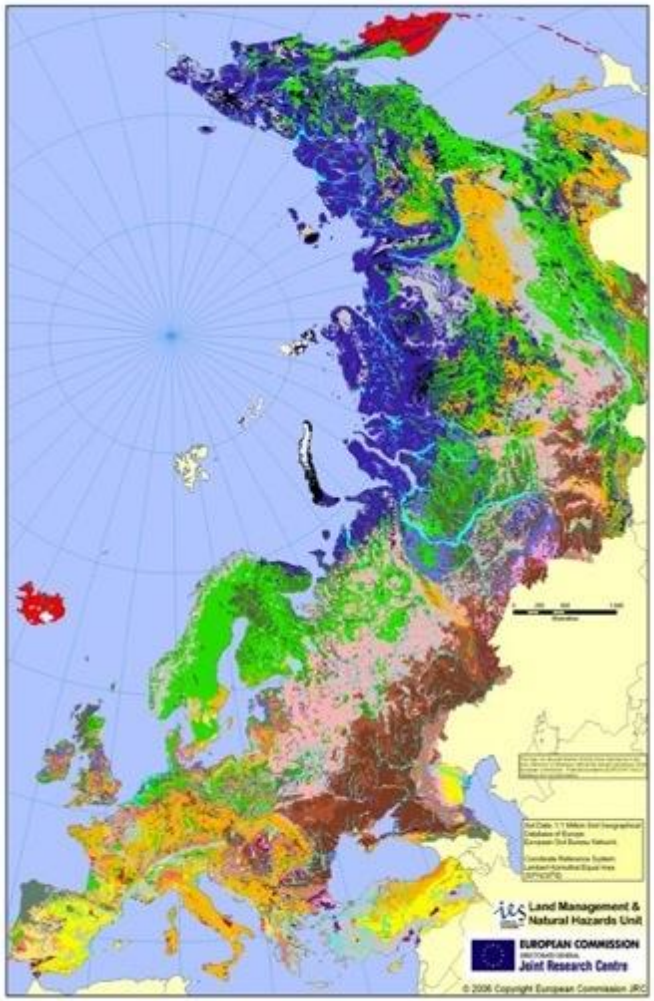
Data from specific in-house JRC actions (e.g. ESDB, SOTER)

Data from related JRC and EC actions (e.g. LUCAS, BIOSOIL)

Network of soil centres (e.g. ESBN)

Collaborative research (e.g. EuroGeoSurveys, FAO, ISRIC)

The Soils of Eurasia



Main source from which most DATA, INFORMATION, DOCUMENTS and SERVICES are derived 1:1.000.000

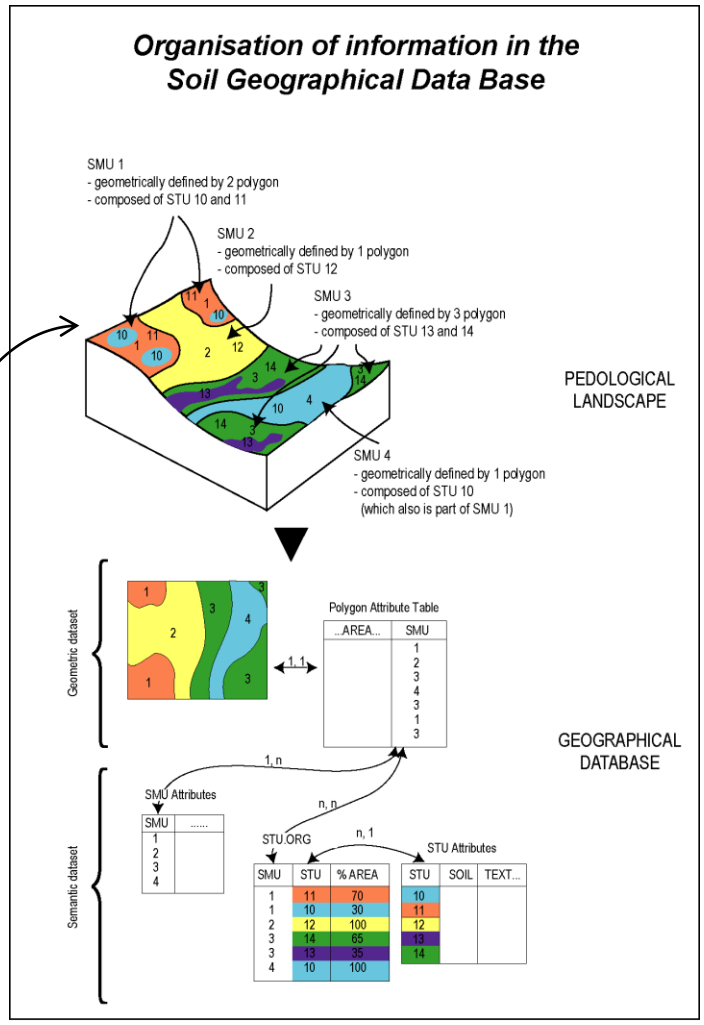
Vector (geometric) dataset:

> 50.000 polygons

9 ha minimum area

> 2.000.000 vertices (x,y)

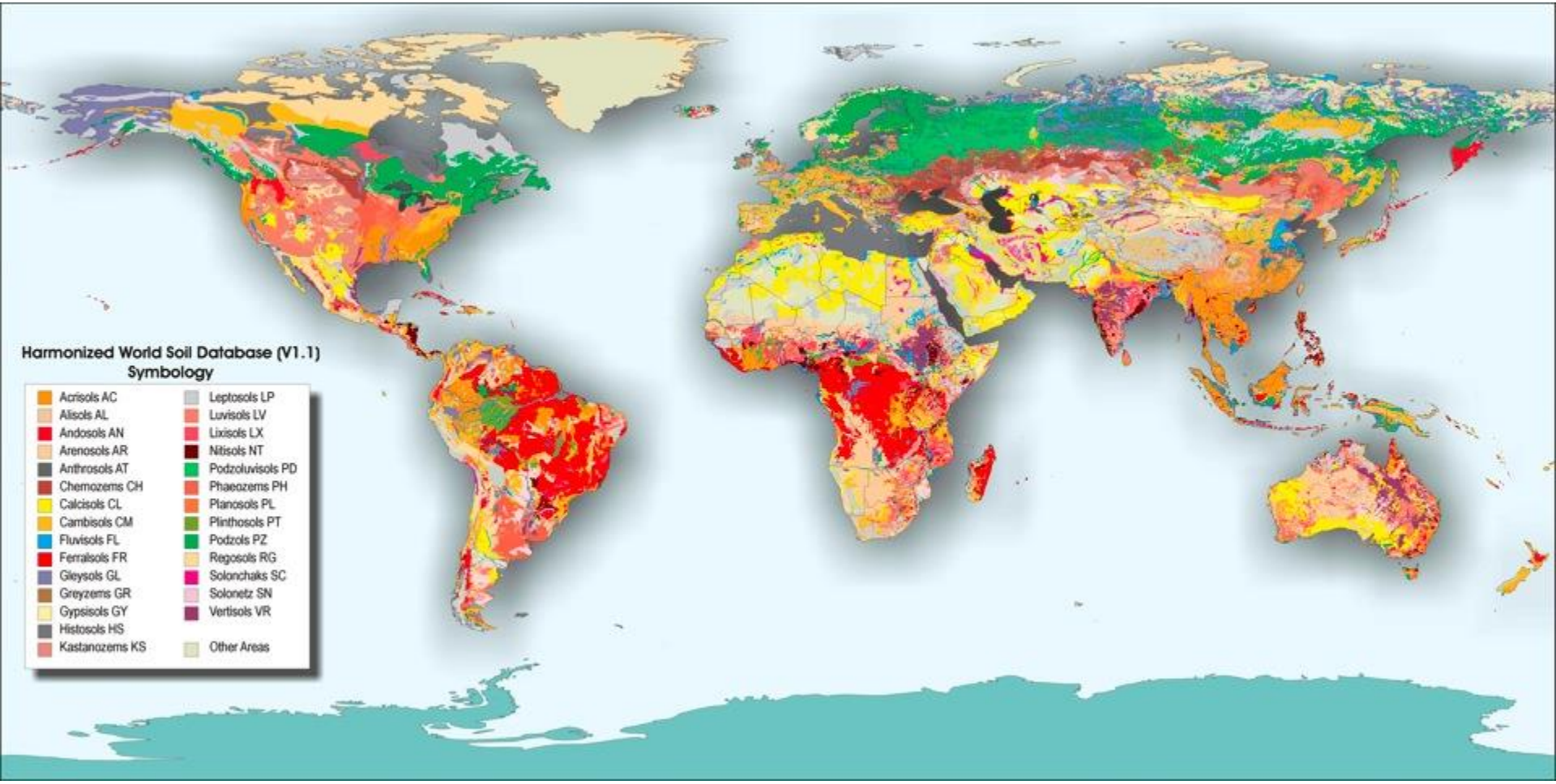
73 parameters



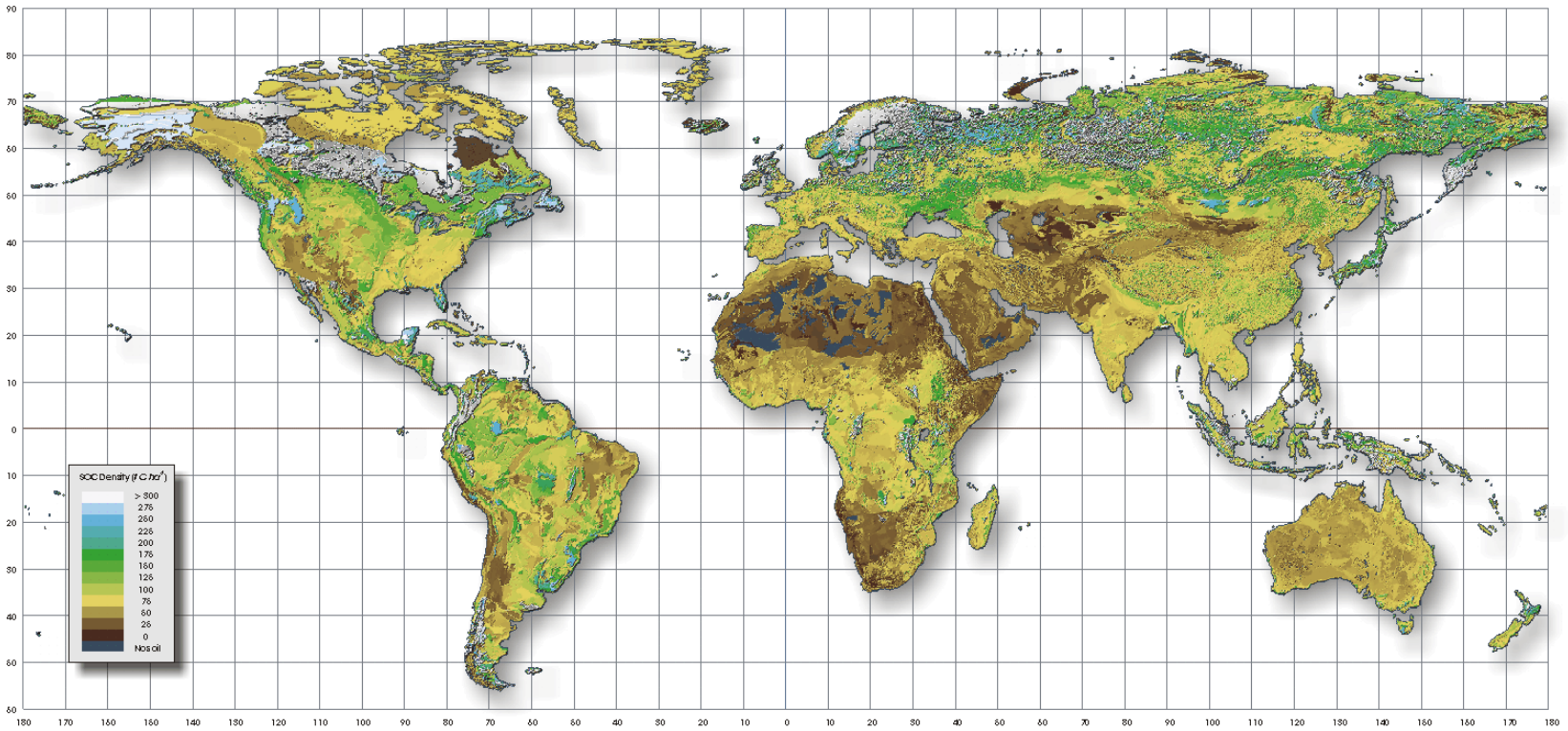
Full database documentation is available in the Soil Portal
http://eusoils.jrc.ec.europa.eu

European Commission

Harmonized World Soil Database HWSD



Global Soil Organic Carbon Stocks

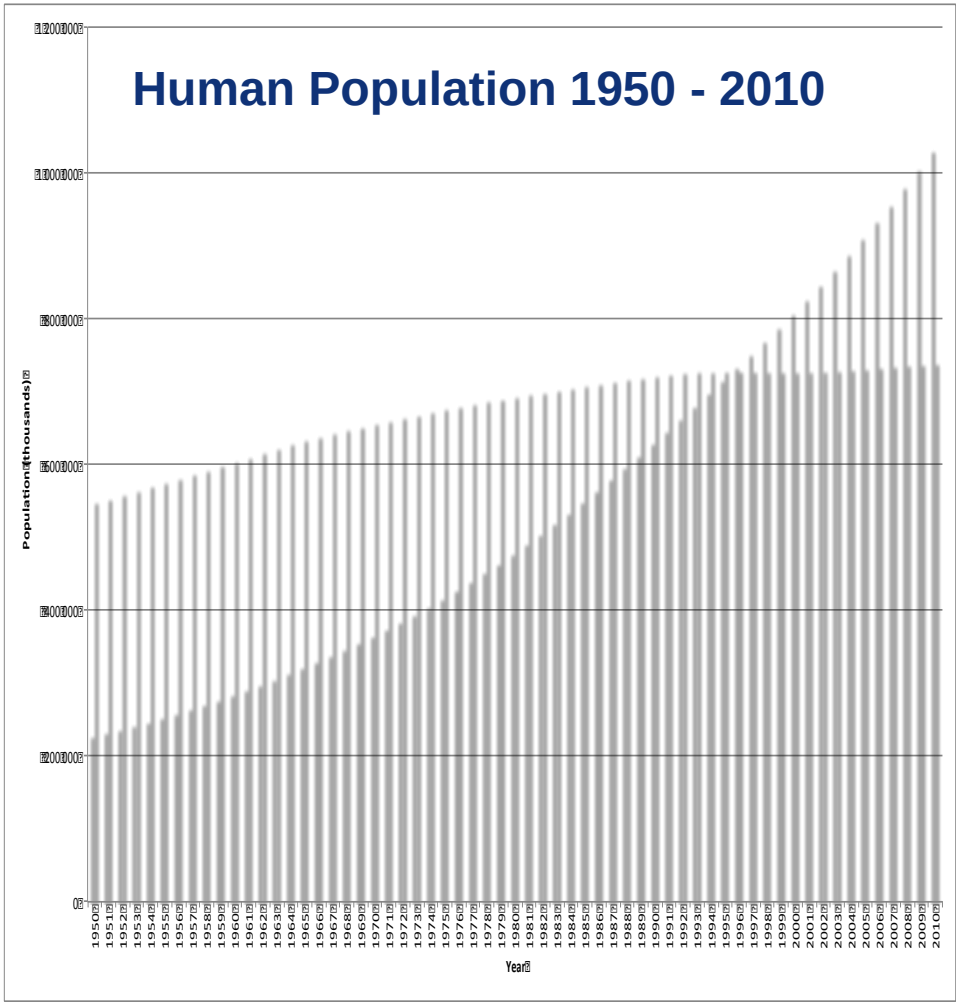


Estimates of Global Soil Organic Carbon Density from amended Harmonized World Soil Database (*t C ha*$^{-1}$)

Contact Details:
Roland Hiederer European Commission Joint Research Centre
Institute for Environment and Sustainability TP 261 21027
Ispra (VA) - Italy e-mail: roland.hiederer(at)jrc.ec.europa.eu

1950

2010



Africa
1,031,084,000

Europe
740,308,000

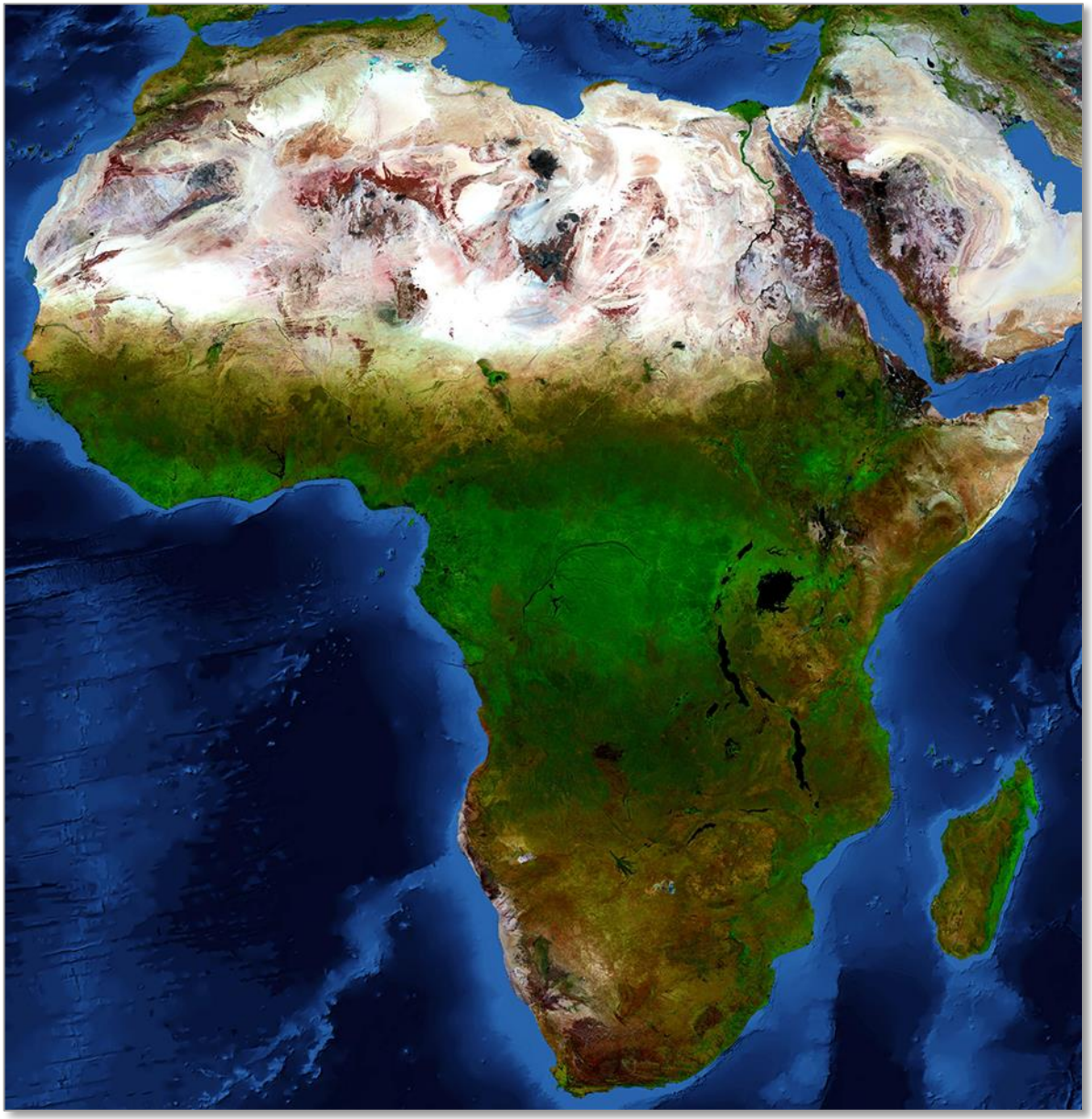
Europe
549,043,000

Africa
228,827,000

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2012). World World Population Prospects, the 2012 Revision
Population Prospects: The 2012 Revision, New York: United Nations.

An additional 27,031,000 per year since 2010, 1,312,142,000 by 2020
2,393,175,000 by 2050

Change in total land availability 1950 - 2050 (ha / per person)

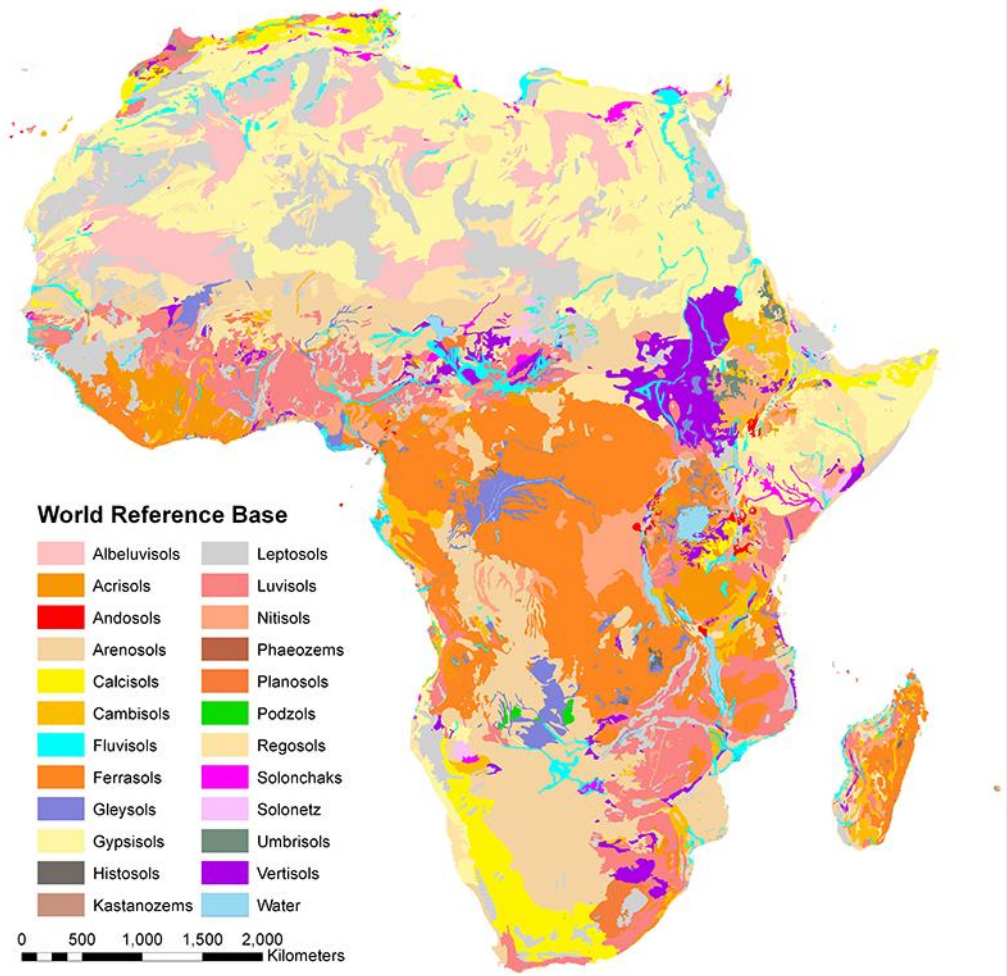


1950
13.2 ha

2010
2.93 ha

2050
1.26 ha

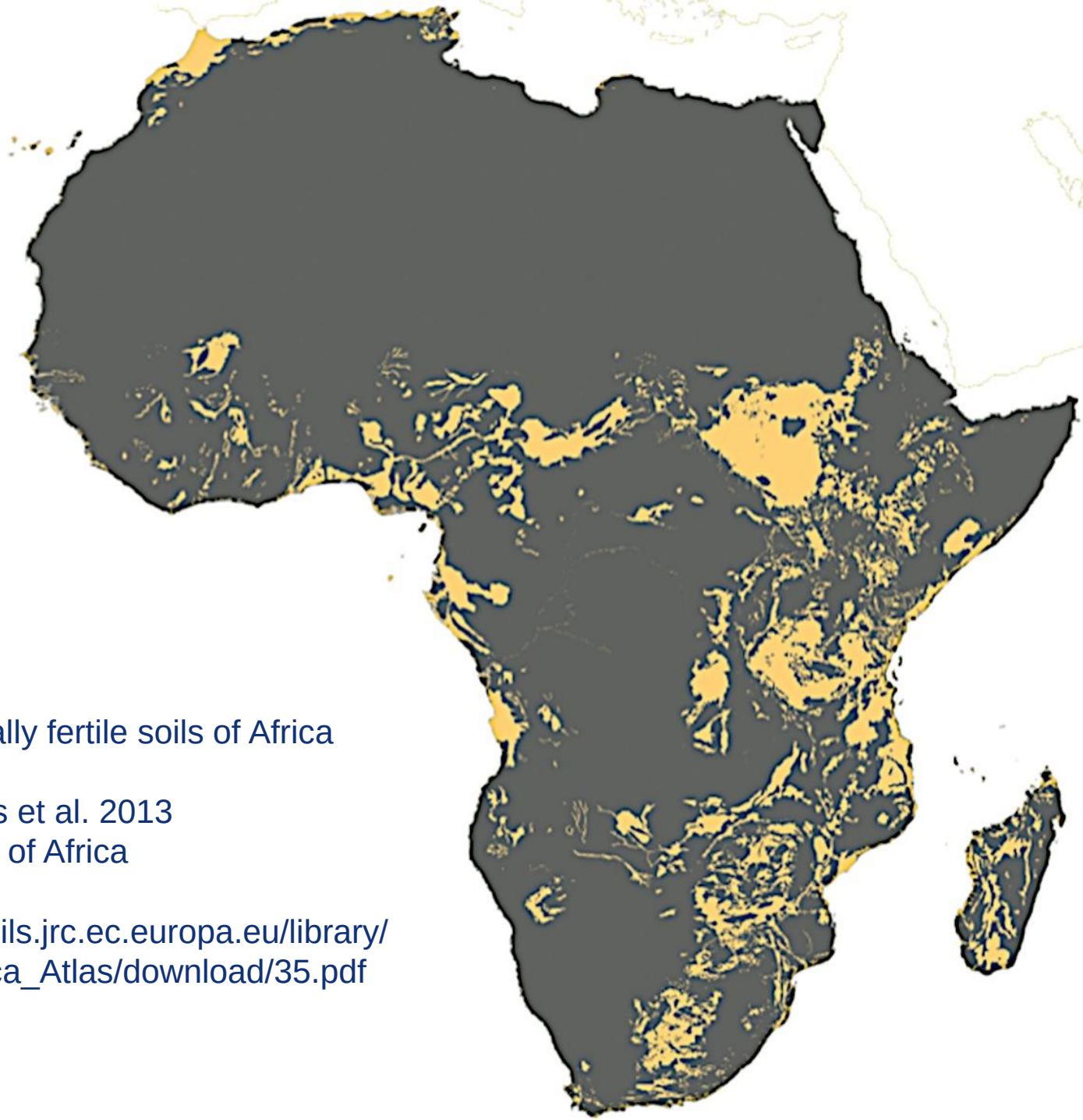
Dominant Soil Types of Africa



Source data 1:5,000,000 FAO/UNESCO Soil Map of the World (1974)

Reprocessed to WRB by
SOIL Action
Land Management & Natural Hazards Unit
Inst. for Environment & Sustainability
JRC Ispra
2007

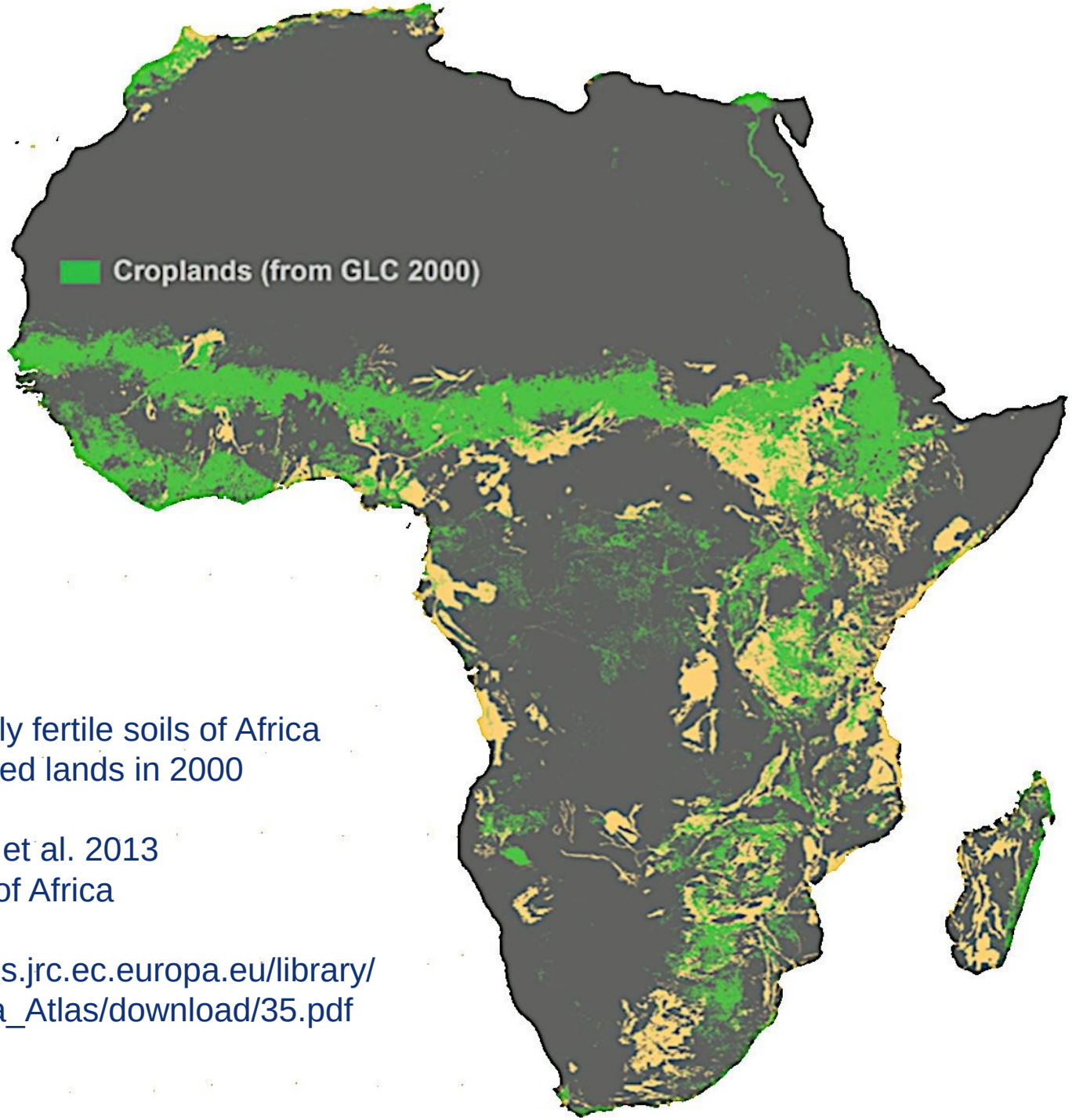
JRC EUROPEAN COMMISSION



The naturally fertile soils of Africa

A.R. Jones et al. 2013
Soils Atlas of Africa

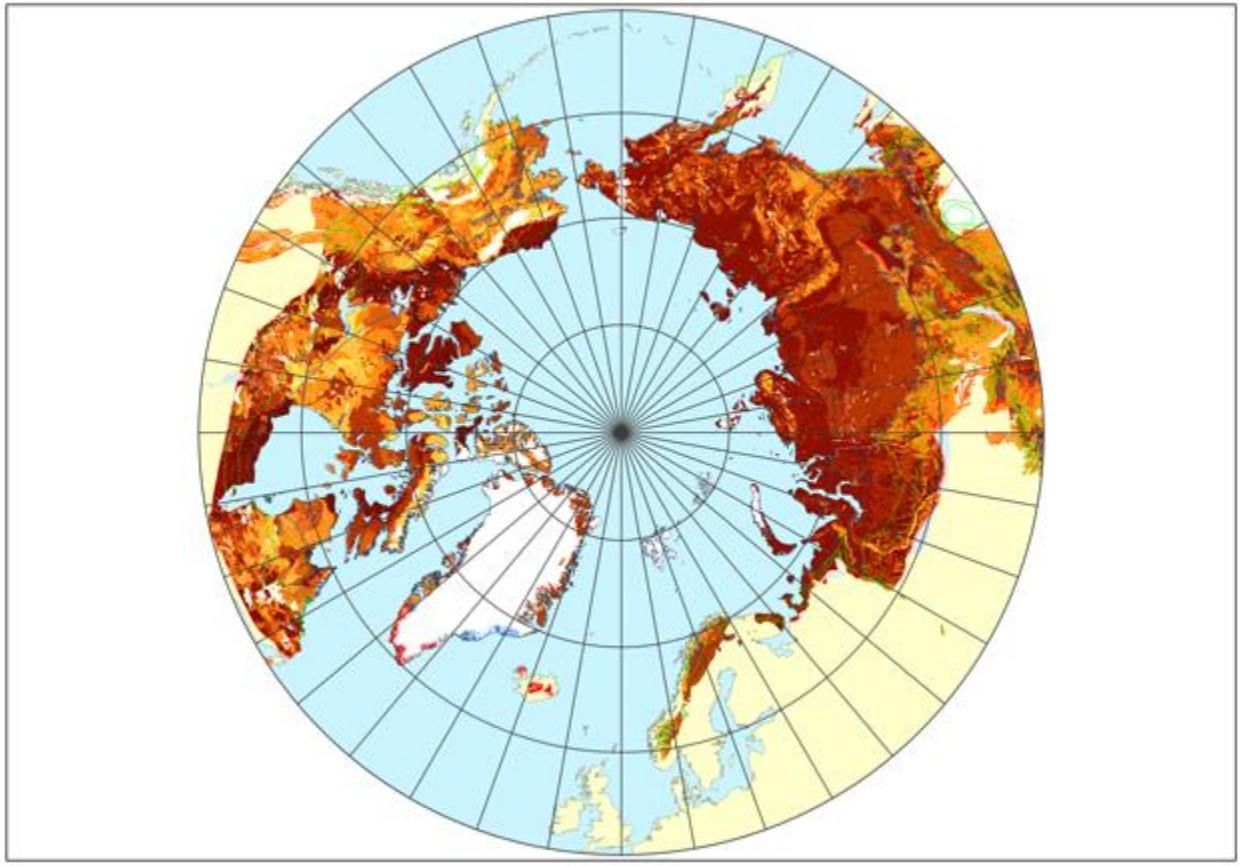
http://eusoils.jrc.ec.europa.eu/library/maps/Africa_Atlas/download/35.pdf



The naturally fertile soils of Africa
and cultivated lands in 2000

A.R. Jones et al. 2013
Soils Atlas of Africa

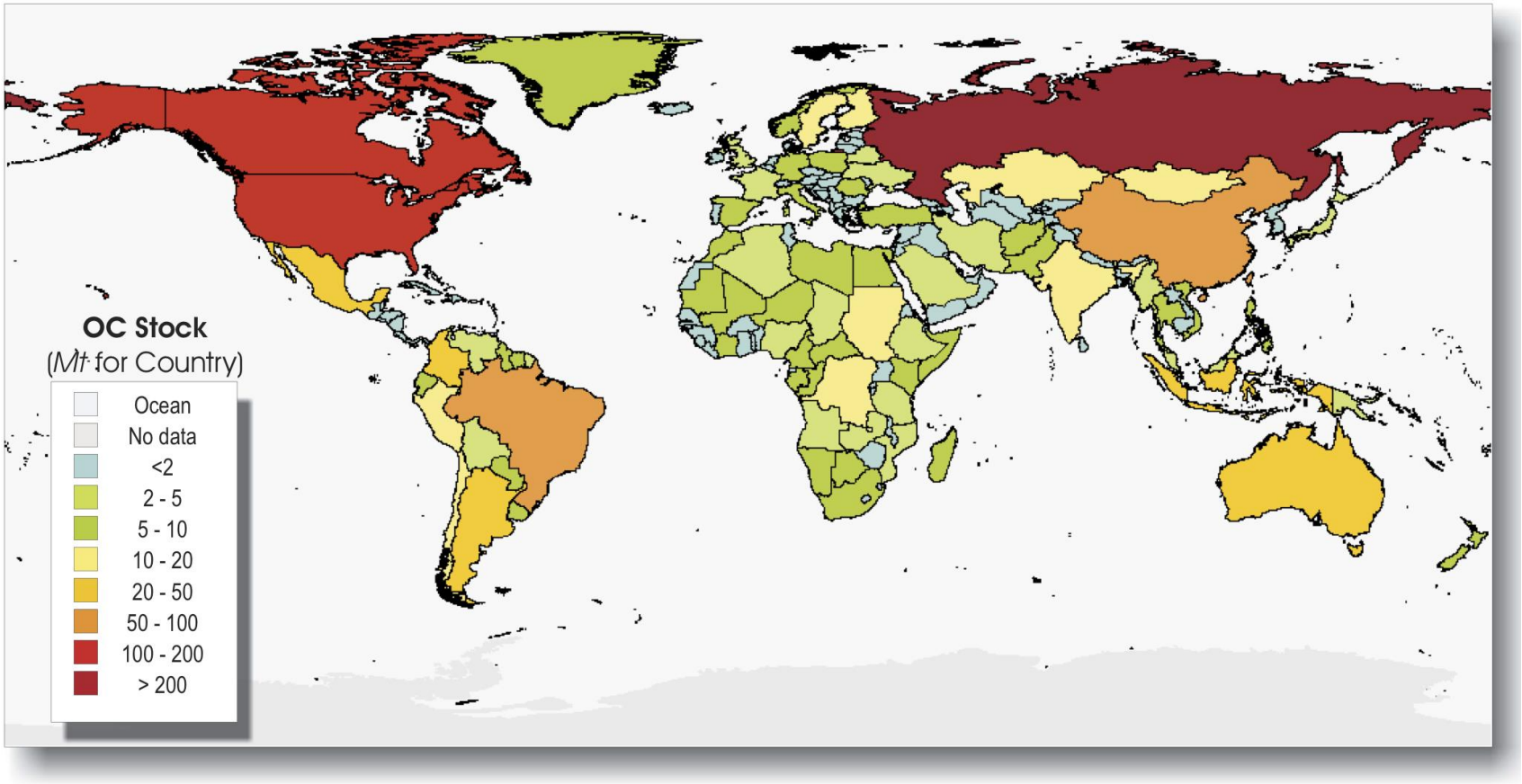
http://eusoils.jrc.ec.europa.eu/library/
maps/Africa_Atlas/download/35.pdf



Carbon pools were estimated to be 191.29 Pg for the 0–30 cm depth, 495.80 Pg for the 0–100 cm depth, and 1024.00 Pg for the 0–300 cm depth. Carbon pools in layers deeper than 300 cm were estimated to be 407 Pg in yedoma deposits and 241 Pg in deltaic deposits. In total, the northern permafrost region contains approximately 1672 Pg of organic carbon, of which approximately 1466 Pg, or 88%, occurs in perennially frozen soils and deposits. This 1672 Pg of organic carbon would account for approximately 50% of the estimated global belowground organic carbon pool.

Distribution of Soil Organic Carbon in the Northern Circumpolar Region

Tarnocai, C., J. G. Canadell, E. A. G. Schuur, P. Kuhry, G. Mazhitova, and S. Zimov (2009), Soil organic carbon pools in the northern circumpolar permafrost region, Global Biogeochem. Cycles, 23, GB2023, doi:10.1029/2008GB003327.



Soil Organic Carbon Stocks by Country 0 - 100 cm (*Pg* C)

LUCAS

Soil component

Survey 2015: monitoring of changes in soil properties over time and expansion of survey to other European countries

- ✓ Circa 27000 soil samples collected in 2015
- ✓ Analyses expected for 2016

Survey 2018: proposal to extend the Topsoil Survey measuring new soil properties that are relevant to evaluate the ability of soils to provide ecosystem services

- ✓ Soil biodiversity, bulk density, soil erosion, electrical conductivity, contaminants

Summary

- Operational use of EO for policy
- 24 MS involved in the program (exceptions AT, FI, LU)
  - 30 contractors
  - ~338,000 farms checked (over ½ of all farm checks)
  - ~800 HR images over ~244 zones, (avg. 740km2)
  - VHR: ~170,000km2
  - >4 million ha checked
- Budget for imagery: €6.5M
- LPIS has broader value for tenure and ownership issues