

The European Commission's science and knowledge service

Joint Research Centre



The role of EU Soil Observatory in developing data, knowledge and indicators for science and policy

Panos Panagos

European Commission, Joint Research Centre

Outline

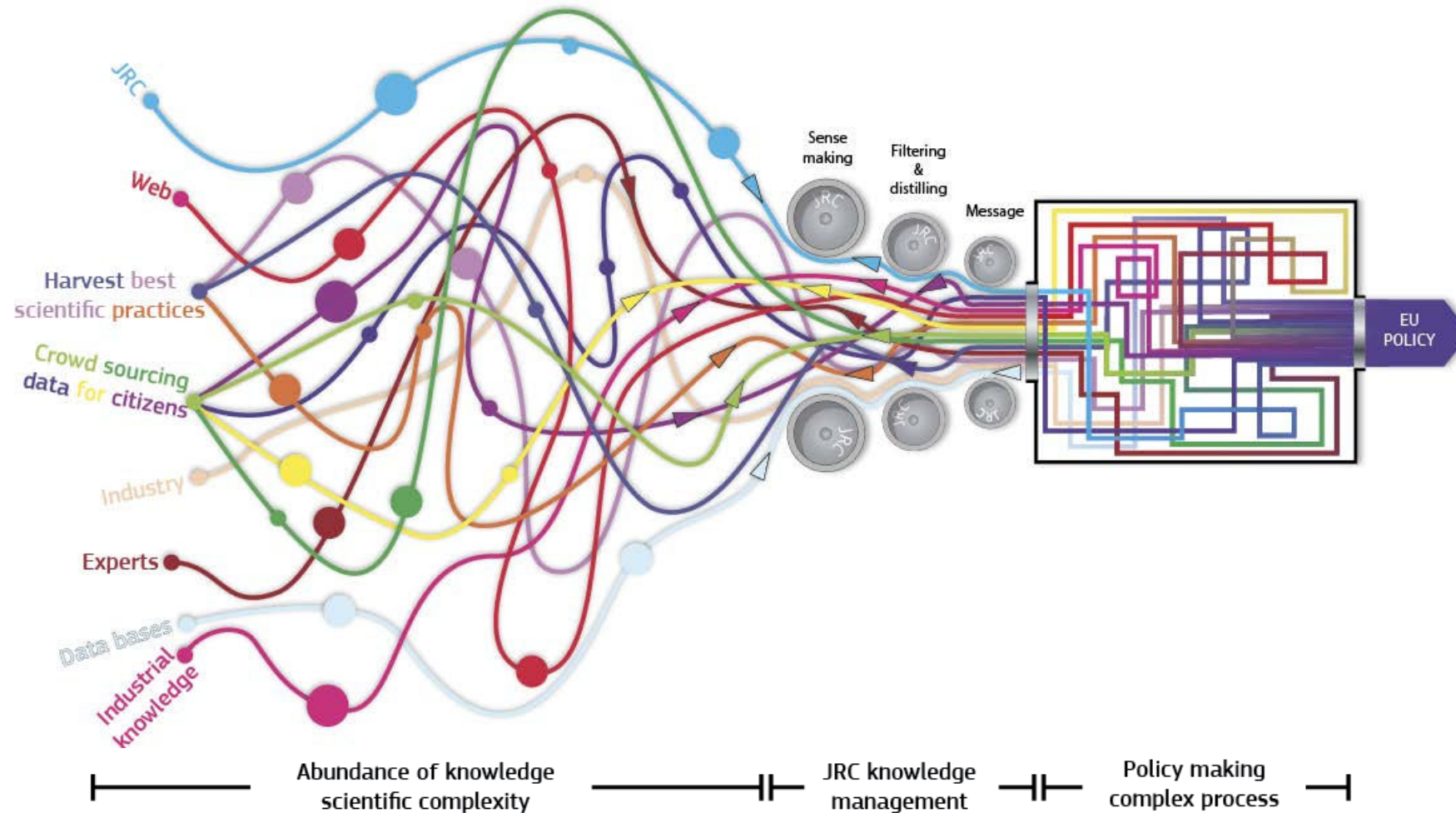
- **Who we are (JRC)?**
- **Main policies to drive our research**
- **EU Soil Observatory**
- **European Soil Data Centre (ESDAC)**
- **Examples of soil data in ESDAC**
 - **Soil erosion & Land degradation**
 - **Climate change and soil organic carbon**
 - **Soil diffuse pollution & nutrients**
 - **Global scale**
- **Soil Mission**

EC – the Joint Research Centre

***“ As the science and knowledge service
of the Commission our mission is to support
EU policies with independent evidence
throughout the whole policy cycle ”***



Dealing with the information overload



Soils in the European Green Deal



Policy framework under the Green Deal





Reaping the benefits of healthy soils for people, food, nature and climate

COM(2021) 699 final, SWD (2021) 323 final **adopted November 2021**

- Provides a long-term **framework for the protection, restoration and sustainable use of soils** with set of existing objectives and actions to achieve them.
- The Strategy answers to the **request of the European Parliament** to propose a legal framework for soil.
- **By 2050, all EU soil ecosystems are in healthy condition**



Soil Health Law objectives

- The Mission Board report '*Caring for soil is caring for life*' estimated **60-70% of “unhealthy soils”** in the EU
- Healthy soils by 2050
 - **Soil pollution** should be reduced to levels no longer considered harmful to human health and natural (i.e. a toxic-free environment)
 - **No net land take** by 2050 (voluntary intermediary MS targets on by 2030)
 - **Reduce nutrient losses** by at least 50% (no deterioration of soil fertility)
 - Soils are healthy when they are in good chemical, biological and physical condition, and thus able to continuously provide **as many ecosystem services as possible**
 - Achieve **a land degradation-neutral** world
 - **Restore degraded and carbon-rich** ecosystems



How to determine whether a soil is healthy?

- **Minimum set of parameters and descriptors for being healthy?**

Chemical

- **Acidification** (pH)
- **Salinisation** (Electrical conductivity)
- **Loss of carbon** (changes in SOC change)
- **Nutrient balance** (Total N + Extractable P)
- **Pollution** (metals, pesticides/organics, plastic, pharmaceuticals, emerging pollutants)

Physical

- **Subsoil compaction** (bulk density)
- **Soil erosion** (unsustainable erosion by water, wind, tillage, harvest)
- **Water holding capacity**

Biological

- **Soil basal respiration**
- **Metabarcoding of bacteria, fungi and animals (eDNA)**
- **Abundance and diversity of nematodes**
- **Microbial biomass**
- **Abundance and diversity of earthworms**





 #EUSO

<https://esdac.jrc.ec.europa.eu/euso>

EU SOIL
OBSERVATORY

EU Soil Observatory

Vision

Should become the principal provider of reference data and knowledge at EU-level for all matters relating to soil.



Research & Innovation



Stronger European Soil Data Centre (ESDAC)



EU-wide Soil Monitoring



Monitoring soil related policies



European Soil Forum



Geoderma Regional
Volume 29, June 2022, e00510



Soil priorities in the European Union

Panos Panagos^{a,*,}, Luca Montanarella^{a,}, Mirco Barbero^{b,}, Annette Schneesgens^{c,}, Laura Aguglia^{c,}, Arwyn Jones^a

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<https://doi.org/10.1016/j.geodrs.2022.e00510>

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EU Soil Observatory Working Groups

5 working groups were launched during the first stakeholder meeting in October 2021

Soil Monitoring

(Arwyn Jones, Anne Marechal, JRC)

Soil biodiversity

(Luca Montanarella, Alberto Orgiazzi JRC)

Soil data sharing

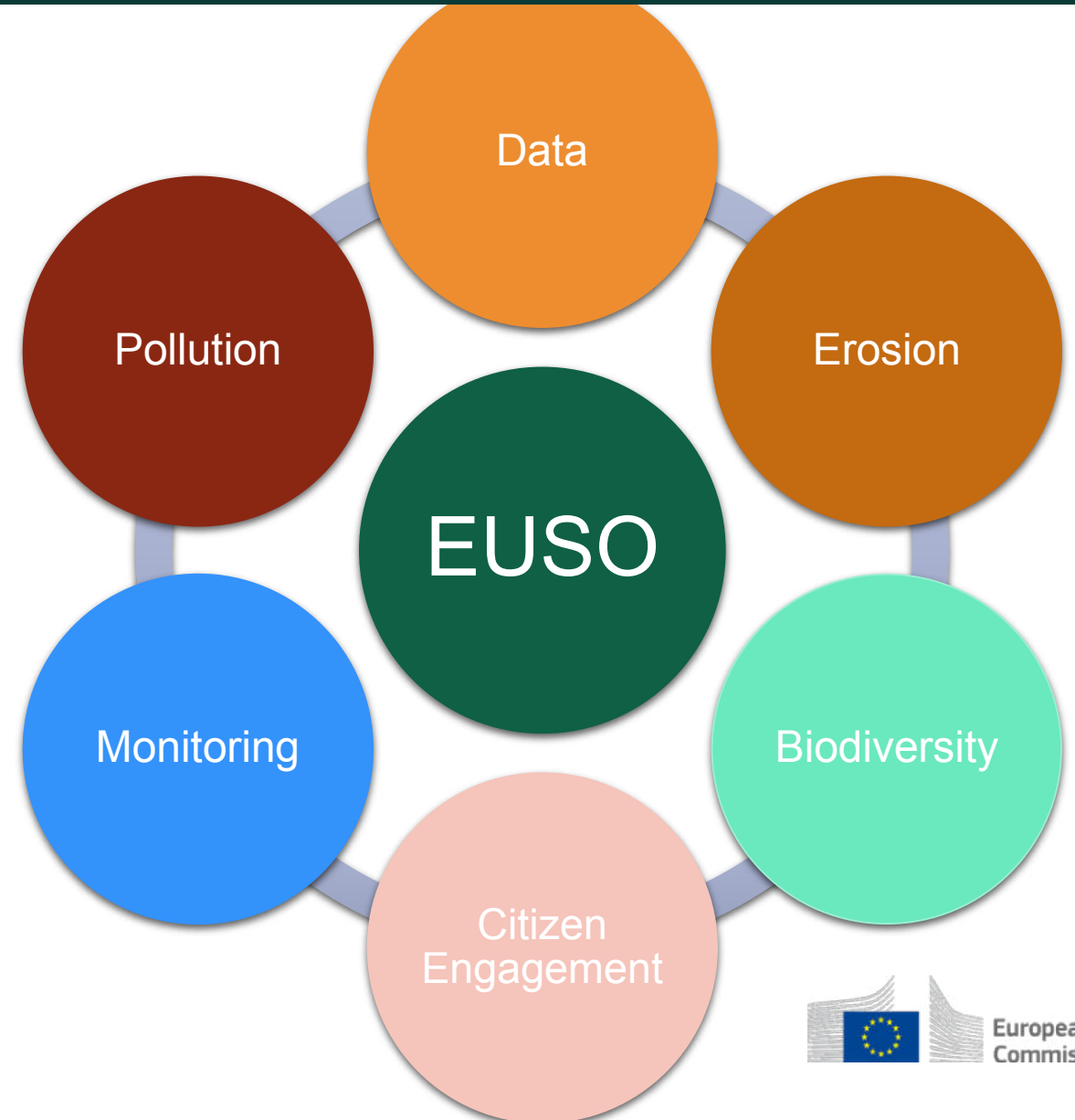
(Marc van Liedekerke, Calogero Schillaci JRC)

Soil erosion

(Panos Panagos, Diana Vieira, JRC)

Soil pollution

(Piotr Wojda, Diana Vieira, JRC)



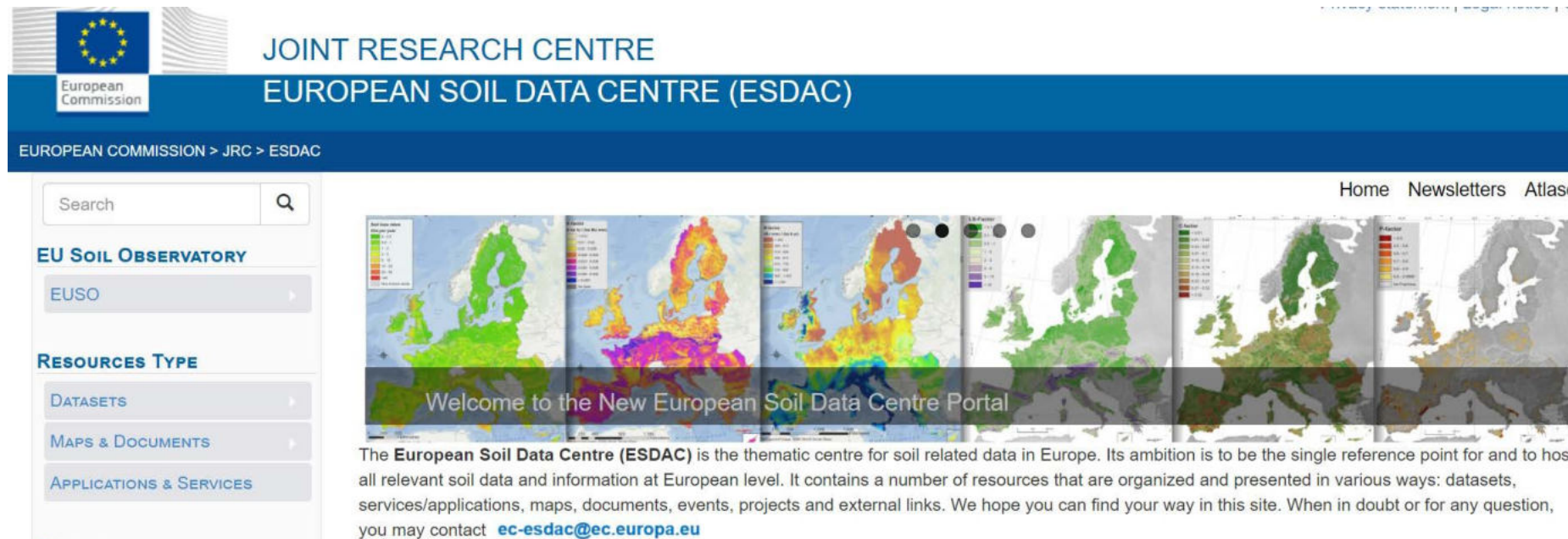
European Soil Data Centre (ESDAC)



- ESDAC as **group of datasets**
- ESDAC is **part** of the European Soil Observatory (EUSO)
- First release in 2006
- **Main focal point for soil data**, support to policy making and awareness raising for the European Union.
- **Hosts 90 blocks of data**, 6,000 maps, 6 Atlases and >500 publications

ESDAC : What makes the difference?

- A one-stop hub for soil data at EU-scale with a long-term commitment by JRC
- it is providing EU and European-wide datasets, and associated documentation
- Permanent and timely active helpdesk, continuous updates and news (Newsletters)
- wide audience; mailing lists (for ESDAC and EUSO) most visited website in JRC
- Data are FAIR (findable: try Google "European soil data etc"!)



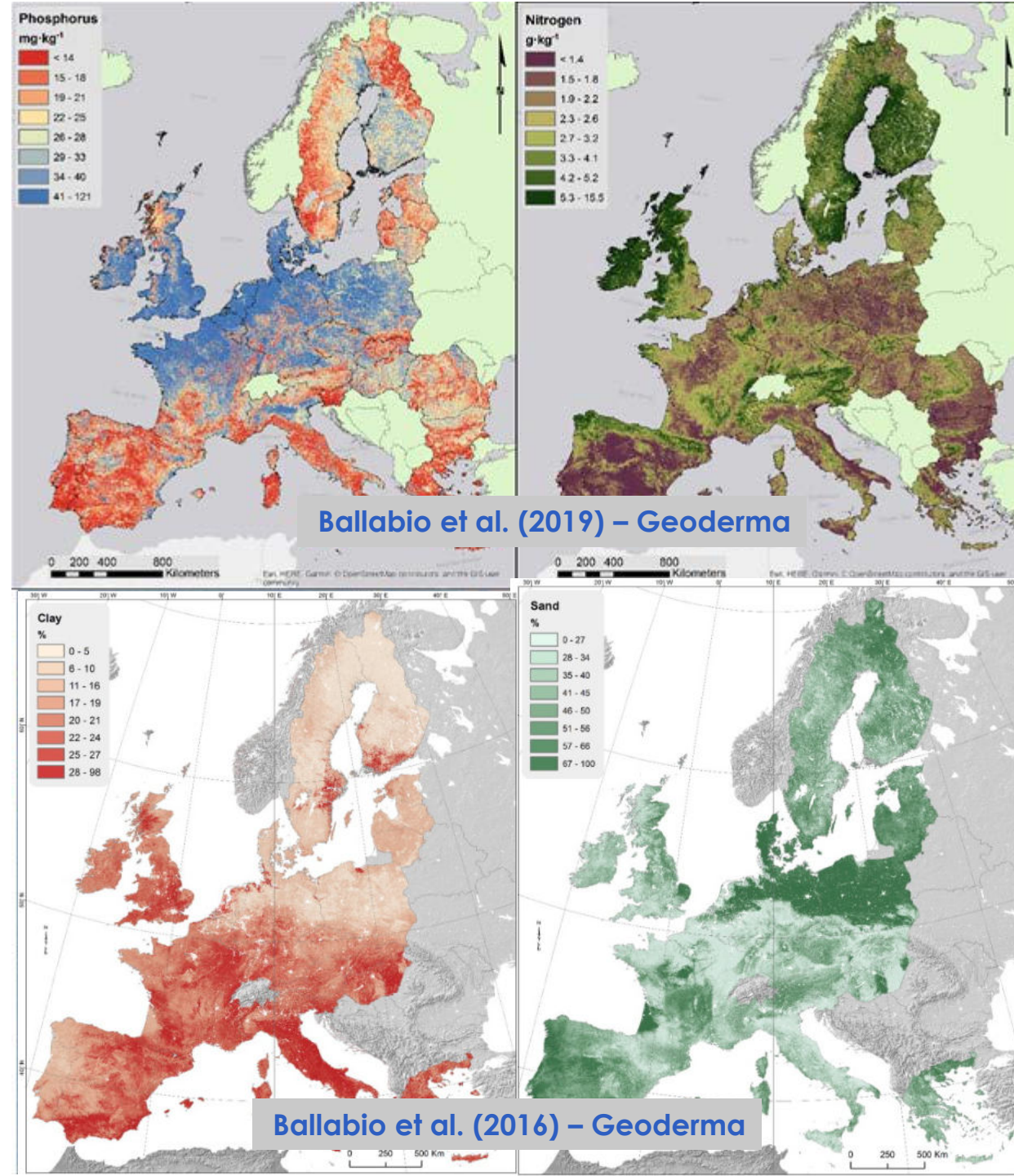
The screenshot shows the homepage of the European Soil Data Centre (ESDAC). At the top, there is a header with the European Commission logo and the text "JOINT RESEARCH CENTRE EUROPEAN SOIL DATA CENTRE (ESDAC)". Below the header, a navigation bar includes "EUROPEAN COMMISSION > JRC > ESDAC" and links for "Home", "Newsletters", and "Atlas". A search bar is located on the left side. The main content area features a row of six thematic maps of Europe, each with a different color scheme representing different soil data. Below the maps, a banner reads "Welcome to the New European Soil Data Centre Portal". At the bottom of the page, a paragraph of text describes the ESDAC's mission and provides contact information: "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 ec-esdac@ec.europa.eu".

Contributes to EU-Wide Soil Monitoring

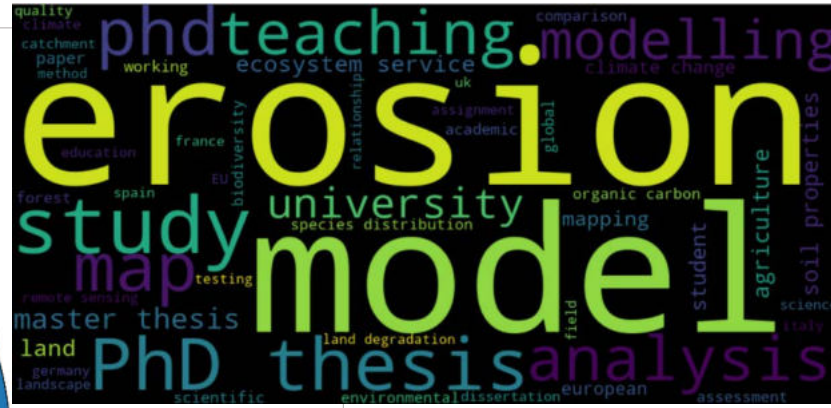
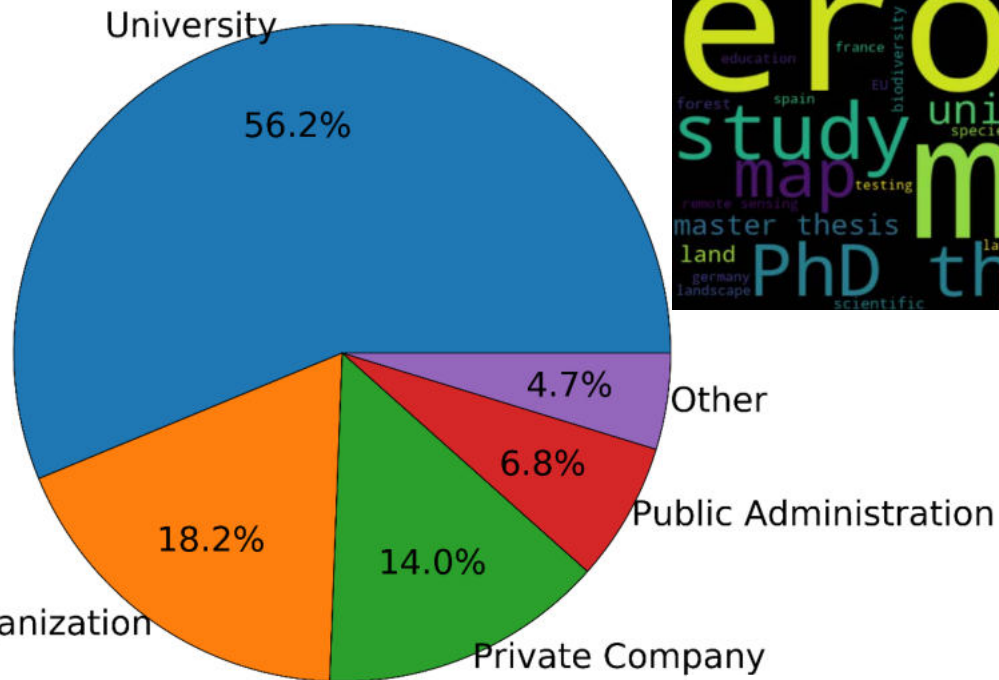
From monitoring chemical, physical and biological soil properties to modelling the spatial distribution of soil properties in the EU



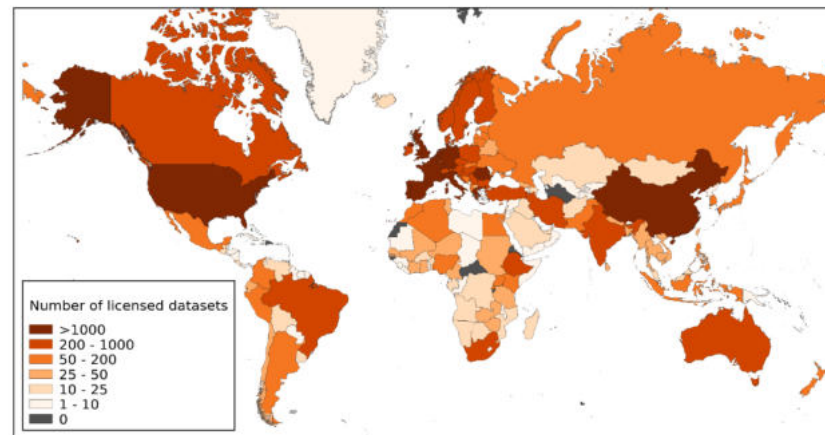
- Coarse fragments
- **particle-size distribution (clay, silt, sand)**
- pH
- Organic carbon
- Carbonate content
- **Total nitrogen content**
- **Extractable potassium content**
- **Phosphorous content**
- Cation exchange capacity
- Electrical conductivity
- Heavy Metals
- Multispectral properties
- Pesticides (90 substances)
- Neonicotinoid insecticides
- Fungicides (e.g. copper in soils)
- Herbicides
- Antibiotics
- Soil Biodiversity



ESDAC: Who are the users



- > **50,000 data downloads** during last 10 years
- 8,431 data downloads in 2021 (double to 2017)
- Support to policies: Soil Strategy for soils 2030, Common Agricultural Policy, Mission "Soil Deal for Europe, Zero pollution
- Mapping, database, developments, evaluation, planning, risk assessment, registration and modelling are the **most dominant uses**



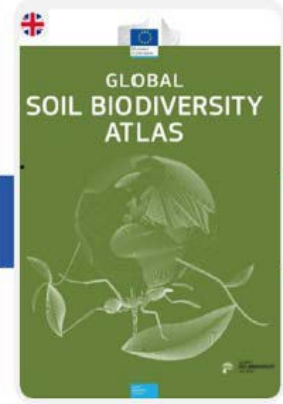
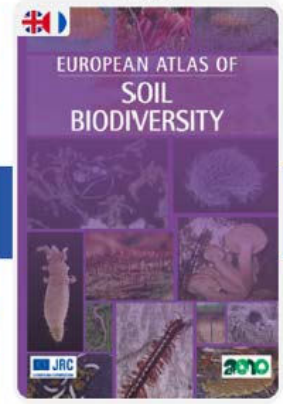
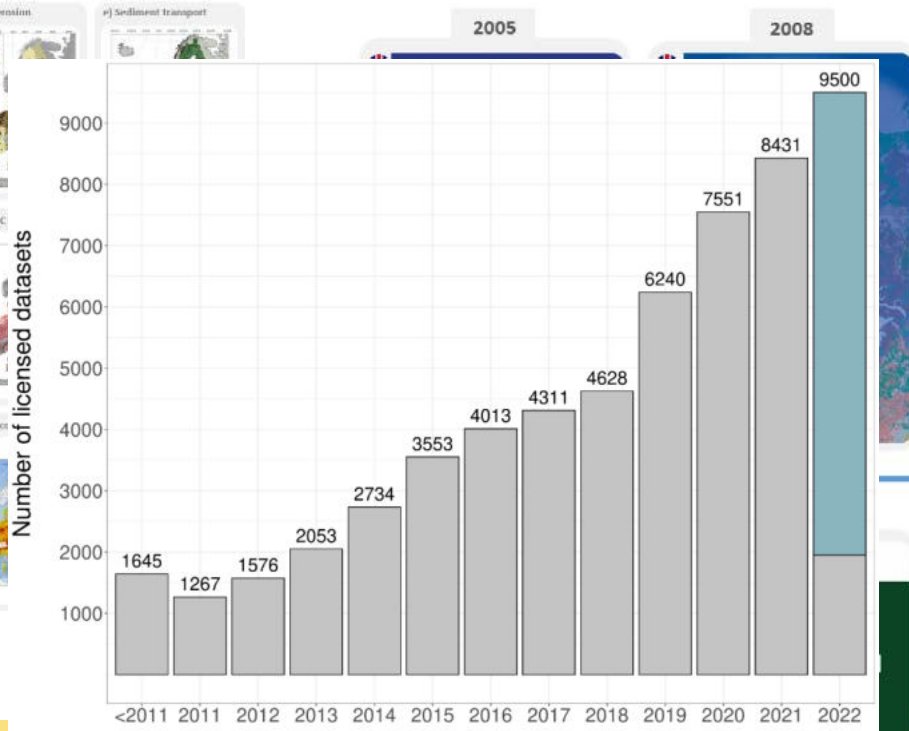
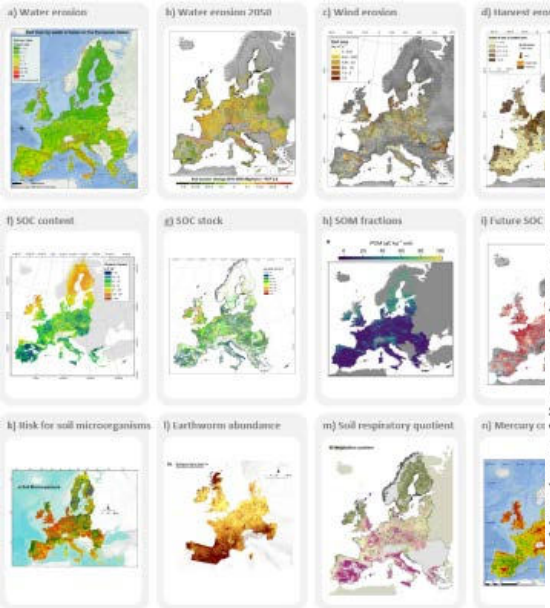
ESDAC: How to access the data?

<https://esdac.jrc.ec.europa.eu/>

The screenshot shows the ESDAC website interface. At the top, there is a header with the European Commission logo and the text 'JOINT RESEARCH CENTRE EUROPEAN SOIL DATA CENTRE (ESDAC)'. Below this is a navigation bar with links for 'Home', 'About Us', 'Newsletters', 'Atlases', 'Events', and 'Vacancies'. A search bar is located on the left side of the page. The main content area is titled 'Phosphorus plant removal' and includes a description: 'Phosphorus (P) plant removal is the amount of P removed by crop harvesting and plant residues. We provide shape files with assessments at EU, National and regional scale.' The page also displays a map of Europe with a legend for 'Total P output (kg ha⁻¹ yr⁻¹)' and 'P crop residue'. The 'Resource Type' is 'Datasets' and the 'Year' is '2022'. A 'Request Form' is visible, containing fields for 'email *', 'First and Last Name *', 'Organisation *', 'Country *', and 'Purpose for which the data will be used (min 30 characters) *'. There is also a checkbox for 'Subscribe to ESDAC Monthly newsletter'.

- Easy way to get the data
- Helpdesk
EC-ESDAC@ec.europa.eu
- Metadata
- Documentation & publication
- Dissemination through our networks

European Soil Data Centre (ESDAC) 2.0



JOINT RESEARCH CENTRE
EUROPEAN SOIL DATA CENTRE (ESDAC)
 ESDAC: <http://esdac.jrc.ec.europa.eu/> ESDAC Newsletter No 145 (September 2022)

Phosphorus budget and P stocks
 We estimate the Phosphorus (P) budget from agricultural lands of EU and UK (ca. 173 million ha). This takes into account the P inputs (fertilizers, manure, chemical weathering, atmospheric deposition) and the P outputs (crop production, plant residues removal, losses by erosion) for the period 2011–2019. The P budget and the P inputs/outputs are available at NUTS2 (Regional scale) and country scale. In addition, we estimate the P displacement and losses due to water erosion at catchment scale and aggregate them at sea outlet. We make also the datasets for both Total P and Available P (Olsen) concentration and stocks available. More details of the empirical model is given in the [published study](#). Data available: <https://esdac.jrc.ec.europa.eu/content/phosphorus-budget-and-p-stocks>

Second EUSO Stakeholders Forum, 24-26 October 2022
 The 2nd EU Soil Observatory (EUSO) forum will be a 3-days event in October. The first day will deal with "Recent EU policy developments in soil". The second day will discuss the concept of Soil Health Districts, and discuss the EUSO engagement with the Mission "A Soil Deal for Europe". The third day will be dedicated to look at the work done in the EUSO Technical Working Groups. The event is virtual and open to the public; it will also be broadcasted. Interested in an account of what EUSO accomplished during its first year since its start? JRC prepared the [EUSO 2021 review report](#). You can register your participation here: <https://ec.europa.eu/eusurvey/runner/EUSOFORUM2022>
 Find the [draft agenda](#) of the Forum.

PREPSOIL project
 PREPSOIL stands for Preparing for the 'Soil Deal for Europe' Mission. This EU-funded project will support the implementation of the Soil Mission by creating awareness and knowledge on soil needs among stakeholders in regions across Europe. PREPSOIL will widen the understanding of Living Labs as a vehicle for engaging stakeholders in soil improvements in different land use types (agriculture, forestry, urban, etc.). PREPSOIL will create understanding of how different approaches to soil monitoring may support the transition to sustainable land use; it will engage with soil ambassadors and collect information on soil education by establishing a one-stop-shop for soil literacy, communication and engagement as a state-of-the-art web platform. Project website: <http://www.prepsoil.eu>. JRC will actively participate in all project activities ensuring effective collaboration with EUSO.
<https://esdac.jrc.ec.europa.eu/projects/prepsoil>

Call for costs of sediments removal
 The EUSO Working group on soil erosion addresses the question on the costs of sediments removal. This WG will develop a study on estimating the off-site costs of soil erosion. Therefore, there is a call for data on the costs of removing sediments from dams, ports, rivers, etc. In case you are aware of studies or reports quantifying the costs of removing sediments (or energy revenue costs due to sedimentation), please contact the WG chair: panos.panagos@ec.europa.eu. The overall objective is to have a pan European estimation of sediments removal. The topic will be also addressed during the WG soil erosion session on 26th October 2022.

Download the ESDAC Newsletter: PDF Format. Feedback: panos.panagos@ec.europa.eu
 ESDAC Alerts are e-mailed to 12,400 scientists. Follow us @EU_ScienceHub: @Lulimolalbergo: @PanosPanagos33

95 blocks of data
 50,000 data distributions

Coverage: EU, European or Global
 Format: Point, shape or raster
 Documentation: Metadata, publications, web info

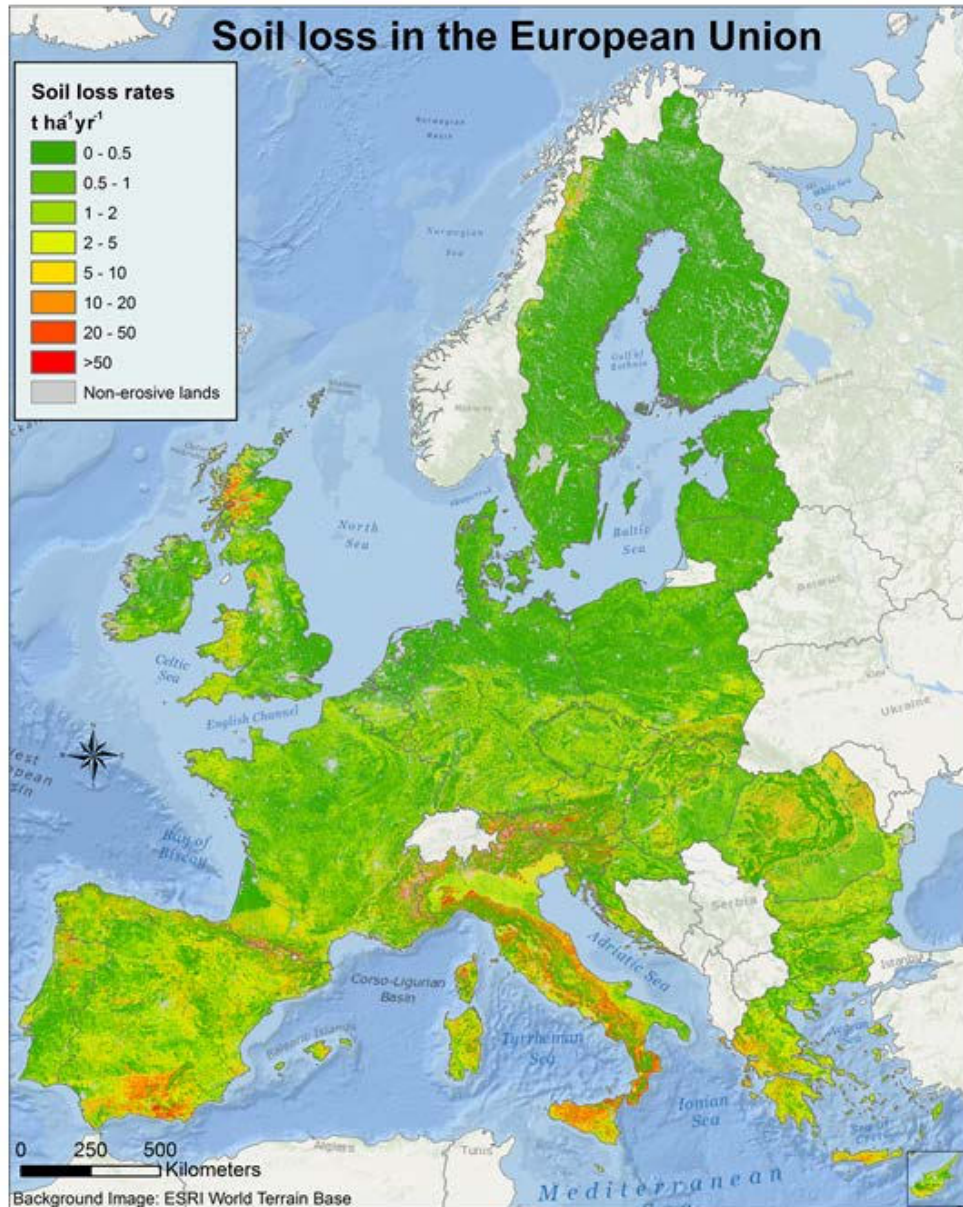


6,000 maps,
 6 Atlases
 >500 publications

145 newsletters
 12,000 followers/subscribers
 in our newsletter

Top JRC thematic portal with 300,000 unique visitors per year

Soil Loss by water erosion



Average EU-28: **2.45 t ha⁻¹ yr⁻¹** (in the erosive prone areas: 91% of EU)

Total Soil loss: 950 Mt annually

Data produced for years: **2000 – 2010 – 2016**

Mean erosion rate in agricultural areas: 3.2 t ha⁻¹ yr⁻¹

Soil formation rate: 1.4-2.0 t ha⁻¹ yr⁻¹

24% of EU lands have rates >2 t ha⁻¹ yr⁻¹

11% of total area contributes to almost 70% of total Soil Loss

2000-2012: decrease by 9% in erosion rates

- 1/3 due to increase of forestlands (decrease of croplands)
- 2/3 due to change of management practices (proposed by *CAP, Soil Thematic Strategy*)

2010-2016: decrease by 0.4% in erosion rates



Contents lists available at ScienceDirect

Environmental Science & Policy

journal homepage: www.elsevier.com/locate/envsci










The new assessment of soil loss by water erosion in Europe







Panos Panagos^{a,*}, Pasquale Borrelli^a, Jean Poesen^c, Cristiano Ballabio^a, Emanuele Lugato^a, Katrin Meusburger^b, Luca Montanarella^a, Christine Alewell^b



Crop distribution – Management practices

Low erosive		Medium erosive			High erosive		
0.05	0.15	0.20	0.22-0.25	0.30 -0.32	0.35	0.38	0.50
Permanent Grasslands	Other fodder areas (Alfa,etc)	Wheat, Barley	Olives, other Fruits..	Energy crop, sunflower	Sugar beets, Potatoes	Maize, Tobacco	
							

Modelled Management practices against erosion

-65%	-12%	-20%	-25%	-10-15%(density)	-40% - 5%(slope)
Reduced Tillage	Plant Residues	Cover Crops	Stone walls	Grass margins	Contour farming
					

Common Agricultural Policy (CAP)



1962 European farm policy
down the years 2012

Area	Main Issue	Requirements and Standards
Environmental, climate change, good agricultural condition of land	Water	GAEC 1: Establishment of buffer strips along water courses
		GAEC 2: Where use of water for irrigation is subject to authorisation, compliance with authorisation procedures
		GAEC 3: Protection of ground water against pollution: prohibition of direct discharge into groundwater and measures to prevent indirect pollution of groundwater through discharge on the ground and percolation through the soil of dangerous substances, as listed in the Annex to Directive 80/68/EEC in its version in force on the last day of its validity, as far as it relates to agricultural activity
	Soil and carbon stock	GAEC 4: Minimum soil cover
		GAEC 5: Minimum land management reflecting site specific conditions to limit erosion
		GAEC 6: Maintenance of soil organic matter level through appropriate practices including ban on burning arable stubbles, except for plant health reasons
	Landscape, minimum level of maintenance	GAEC 7: Retention of landscape features, including where appropriate, hedges, ponds, ditches, trees in line, in group or isolated, field margins and terraces, and including a ban on cutting hedges and trees during the bird breeding and rearing season and, as an option, measures for avoiding invasive plant species

New CAP 2023-2027

- GAEC 2: Protection of carbon-rich soils (*protection of wetland and peatland*)
- GAEC 3: Maintenance of soil organic matter (*ban on burning arable stubble*)
- GAEC 5: Minimum land management (*Tillage management reducing the risk of soil degradation including slope consideration*)
- GAEC 6: Minimum soil cover (*No bare soil in most sensitive period → cover crops*)
- GAEC 7: Preserve soil potential (*crop rotation*)
- GAEC 8: Minimum share of agricultural land to non productive features (*retention, ban cutting hedges*)

DEVELOPING RURAL AREAS
The CAP puts more focus on the economic, social and cultural development of rural Europe. At the same time, the reforms started in the 1990s are continued to make farmers more market-oriented.

INCOME SUPPORT
Farmers now receive an income support payment, on condition that they look after the farmland and fulfil environmental, animal welfare and food safety standards.

THE EU BECOMES THE WORLD'S LARGEST IMPORTER FROM DEVELOPING COUNTRIES, IMPORTING MORE THAN THE US, JAPAN, AUSTRALIA AND CANADA COMBINED. UNDER THE OVERLYING BUT STRICT REGIME THE EU HAS GIVEN FREE MARKET ACCESS TO ALL LEAST DEVELOPED COUNTRIES. NO OTHER DEVELOPED COUNTRY GIVES SUCH SPANNCES, COMMITMENT, AND REAL MARKET ACCESS TO DEVELOPING COUNTRY FARMERS.

FOLLOWING THE ENLARGEMENT
with 12 new countries. Eighteen years after the fall of the Berlin wall, the European Union numbers 27 member states and over 500 million citizens. EU's agricultural and rural landscape changes as well.

THE ECONOMIC AND ECOLOGICAL COMPETITIVENESS
of the agricultural sector, promote innovation, combat climate change and support employment and growth in rural areas.

Cross-compliance and GAEC (Good Agricultural and Environmental Conditions)

Farmer received an income aid, on condition that they respect strict food safety, environmental and animal welfare standards.



Indicators & policy support

UN Sustainable Development Goals

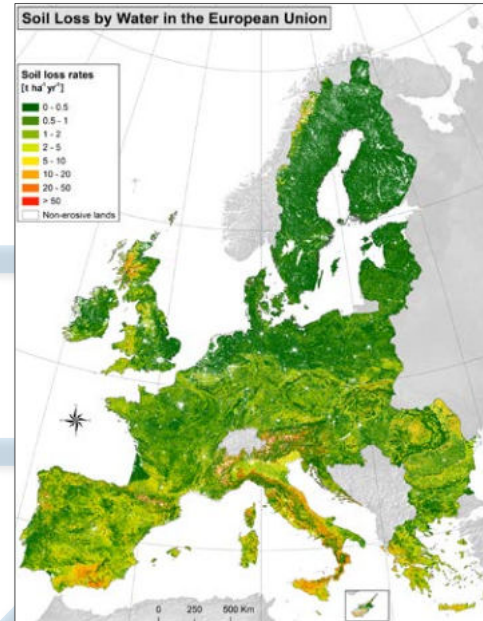
15 LIFE ON LAND

2 Zero hunger

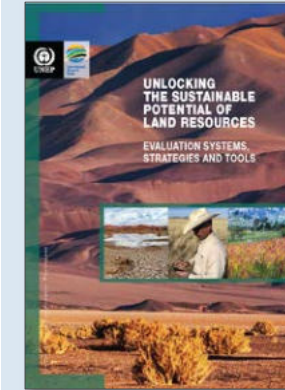
and water. Though erosion is a natural process, inappropriate land management and other human activities can cause it to accelerate to such an extent that soil can be irreversibly lost. The indicator on estimated soil erosion by water provides a measure of the area at risk of severe soil erosion leading to the loss of more than 10 tonnes per hectare per year. The Mediterranean region is especially affected, because it

201 885 km² of EU land was estimated to be at risk of severe soil erosion by water in 2012.

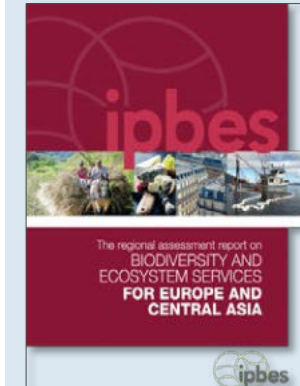
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UNEP



IPBES



DG AGRI: CAP context Indicator

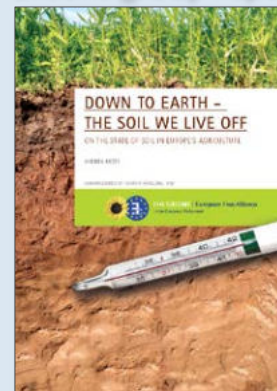
CAP CONTEXT INDICATORS 2014-2020

2018 update

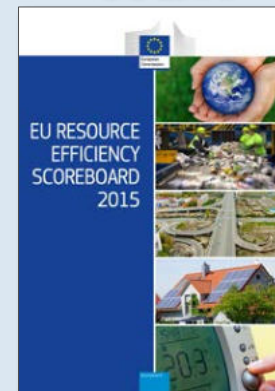
CAP post 2020 Impact Assessment

COMMISSION STAFF WORKING DOCUMENT
IMPACT ASSESSMENT
Accompanying the document
Proposals for a
Regulation of the European Parliament and of the Council establishing rules on support for strategic plans to be drawn up by Member States under the Common agricultural policy (CAP Strategic Plans) and financed by the European Agricultural Guarantee Fund (EAGF) and by the European Agricultural Fund for Rural Development (EAFRD) and repealing Regulation (EU) No 1305/2013 of the European Parliament and of the Council and Regulation (EU) No 1307/2013 of the European Parliament and of the Council

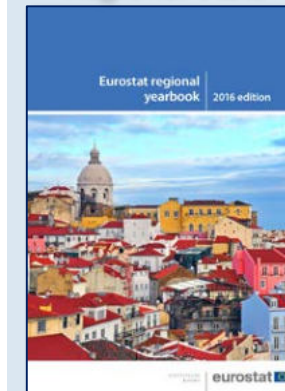
European Parliament Greens group report



DG ENV- DG ESTAT



DG ESTAT: Regional stats



DG AGRI: EU Agricultural

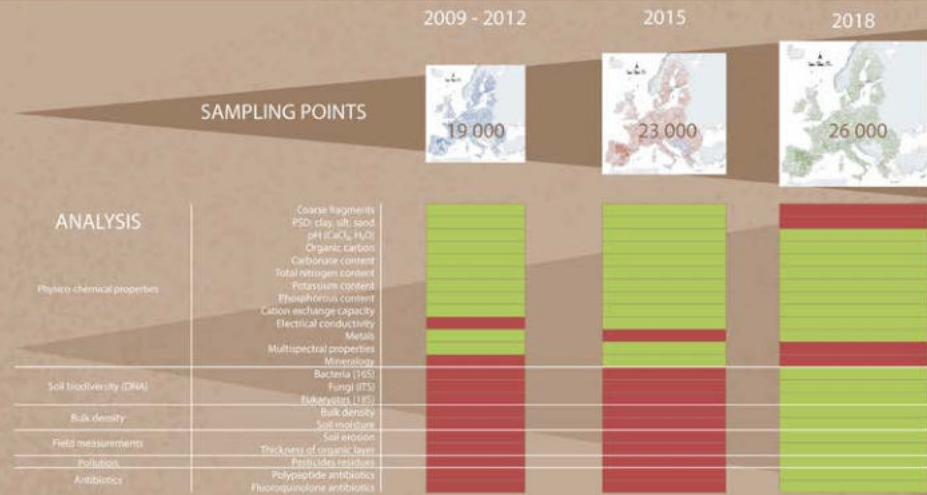


LUCAS: Land use / Land Cover Survey including soil

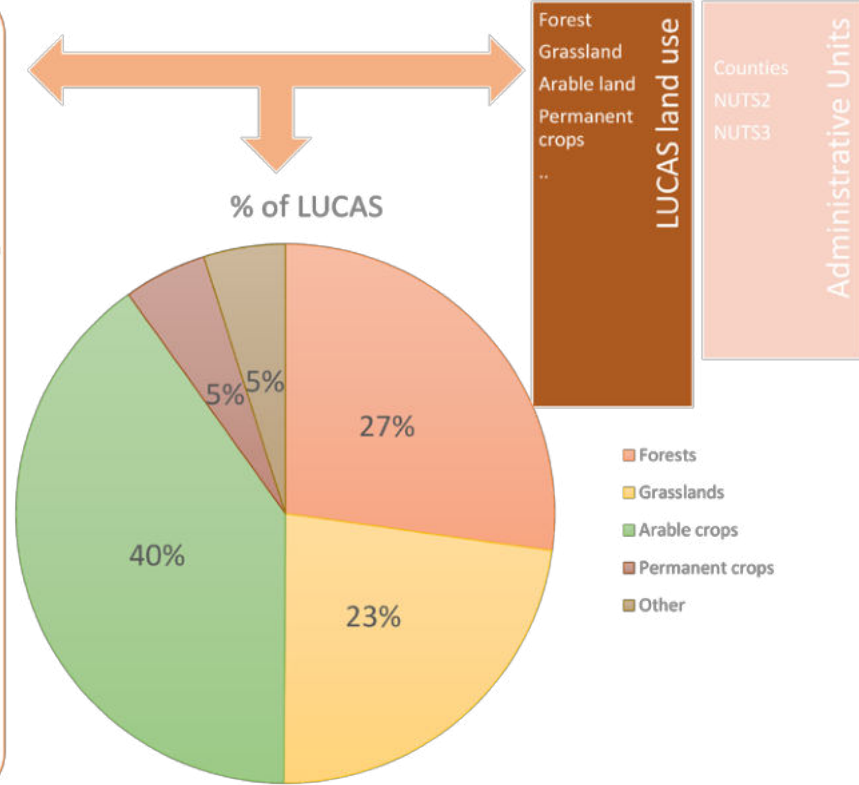
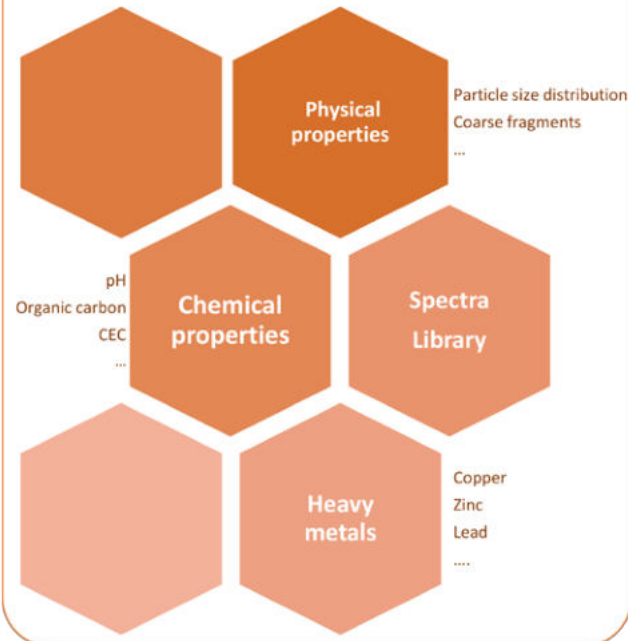
LUCAS SOIL

The largest expandable soil dataset for Europe

LUCAS SOIL is a survey repeated every 3 years for monitoring soil properties across Europe and coordinated by the Joint Research Centre of the European Commission



LUCAS database 21682 records



LUCAS SOIL IS

OPEN...

FREE DATA DOWNLOAD
European Soil Data Centre
<http://esdac.jrc.ec.europa.eu/>

REPRODUCIBLE LUCAS SOIL PROTOCOLS

JRC SOIL ARCHIVE ACCESSIBLE FOR TAILORED ANALYSES

...AND COMPOSITE

- ✓ Not just raw data
- ✓ More than 20 derived maps freely available
- ✓ Peer-reviewed

European Journal of Soil Science

European Journal of Soil Science, January 2018, 69, 140–153

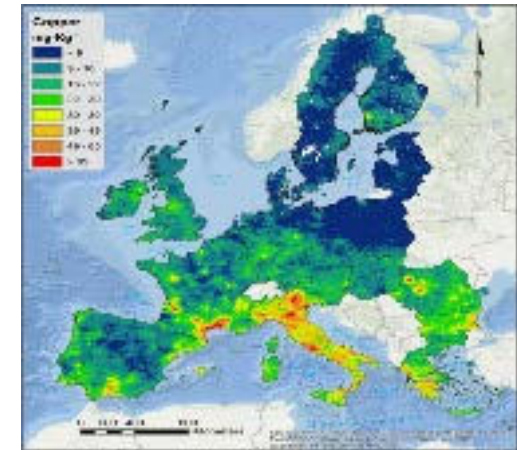
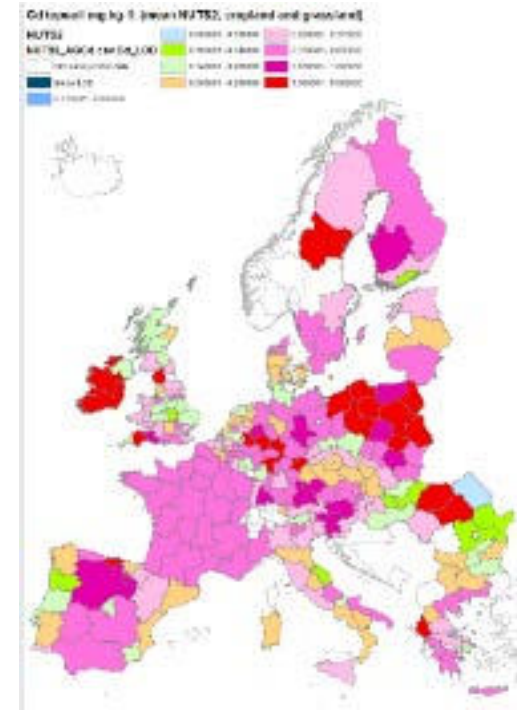
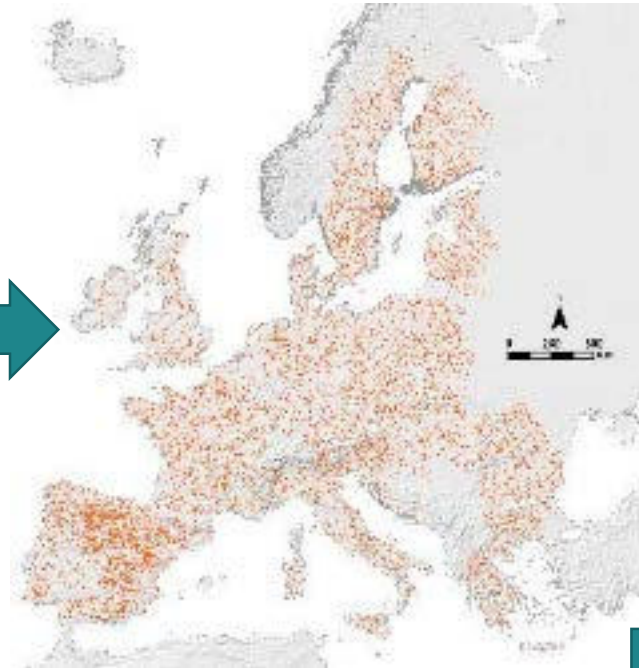
doi: 10.1111/ejss.

LUCAS Soil, the largest expandable soil dataset for Europe: a review

A. ORGIAZZI, C. BALLABIO, P. PANAGOS, A. JONES & O. FERNÁNDEZ-UGALDE

JRC manages the LUCAS SOIL survey; sample design, measurement protocols through to integrated analysis and monitoring

DATA, TOOLS
and MODELS



- Surveys (and the resulting data) span multiple years 2009, 2015, 2018, 2022
- 42,000 observations
- Close cooperation with Member States

Soil Organic Carbon

The European
Green Deal

von der Leyen Commission

#EUGreenDeal

**NO NET
EMISSIONS OF
GHG BY 2050**

Process based models (CENTURY) and Geostatistical application in 20,000 LUCAS point data

17.63 Gt carbon stocks in agricultural lands (0-30cm)

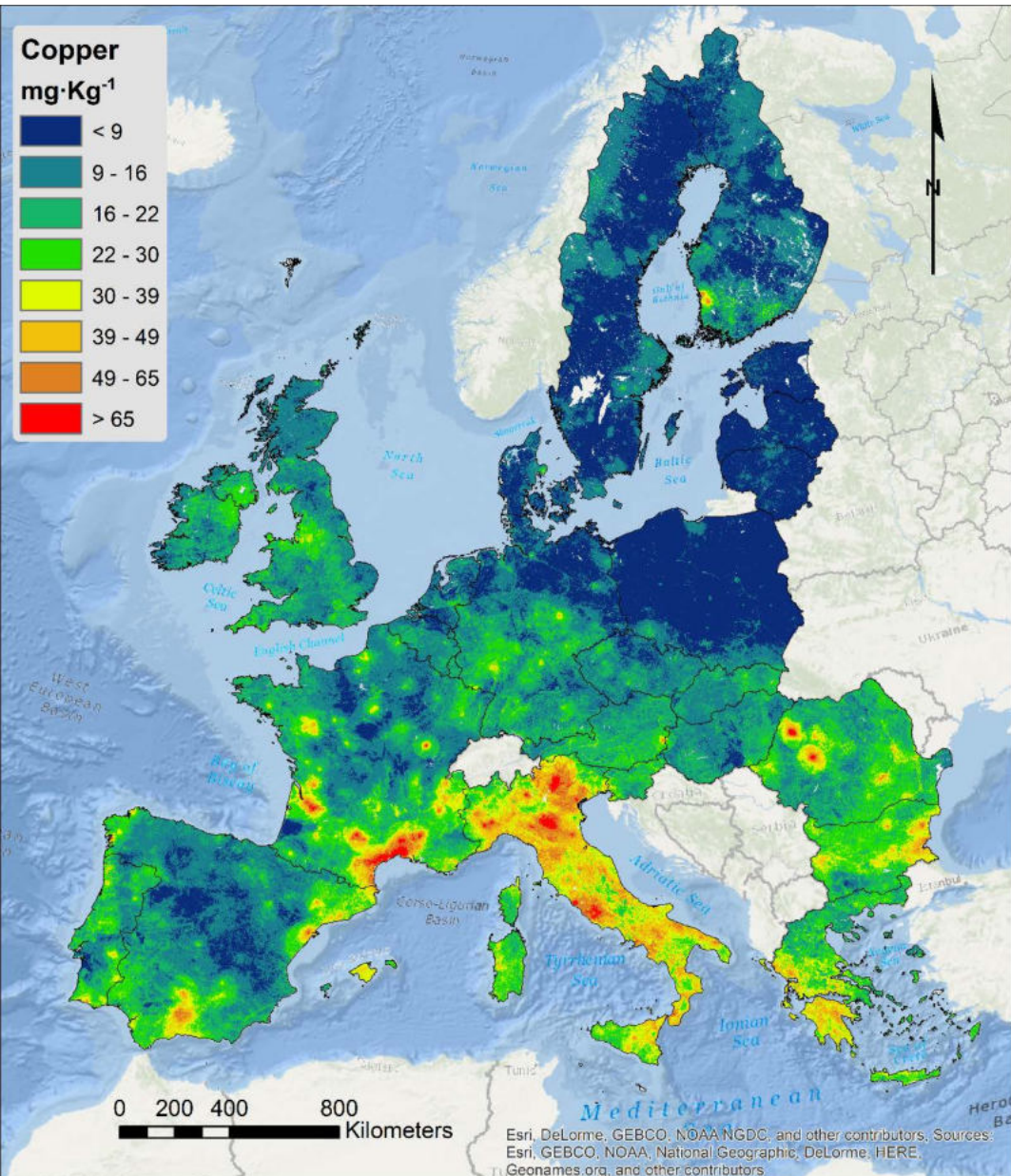
Agriculture still emits **10%** of total EU GHG emissions

No decreasing trend in the last years!

Need to reduce non-CO₂ emission and **sequester C in soils**

Scenario analysis on which are the best practices to sequester carbon

Copper distribution in European Union



21,682 LUCAS soil samples for an analysis of copper(Cu) in EU

Copper (Cu) is **correlated** to soil properties(pH, texture, Organic Carbon), climate, geology and management.

Vineyards has the highest mean Cu concentration: 49.3 mg kg⁻¹. Cu is relatively high also in **olive groves**(33.5 mg kg⁻¹) and **orchards**(27.3 mg kg⁻¹) [**Threshold: 100 mg kg⁻¹**]

Cu highest concentration is found in **wet areas** due to **frequent fungicide treatments**

Similar developments for Mercury (2021).

Under development: Cadmium, Zinc, Arsenic

Contents lists available at ScienceDirect

Science of the Total Environment

ELSEVIER journal homepage: www.elsevier.com/locate/scitotenv

Copper distribution in European topsoils: An assessment based on LUCAS soil survey

Cristiano Ballabio^a, Panos Panagos^{a,*}, Emanuele Lugato^a, Jen-How Huang^b, Alberto Orgiazzi^a, Arwyn Jones^a, Oihane Fernández-Ugalde^a, Pasquale Borrelli^b, Luca Montanarella^a

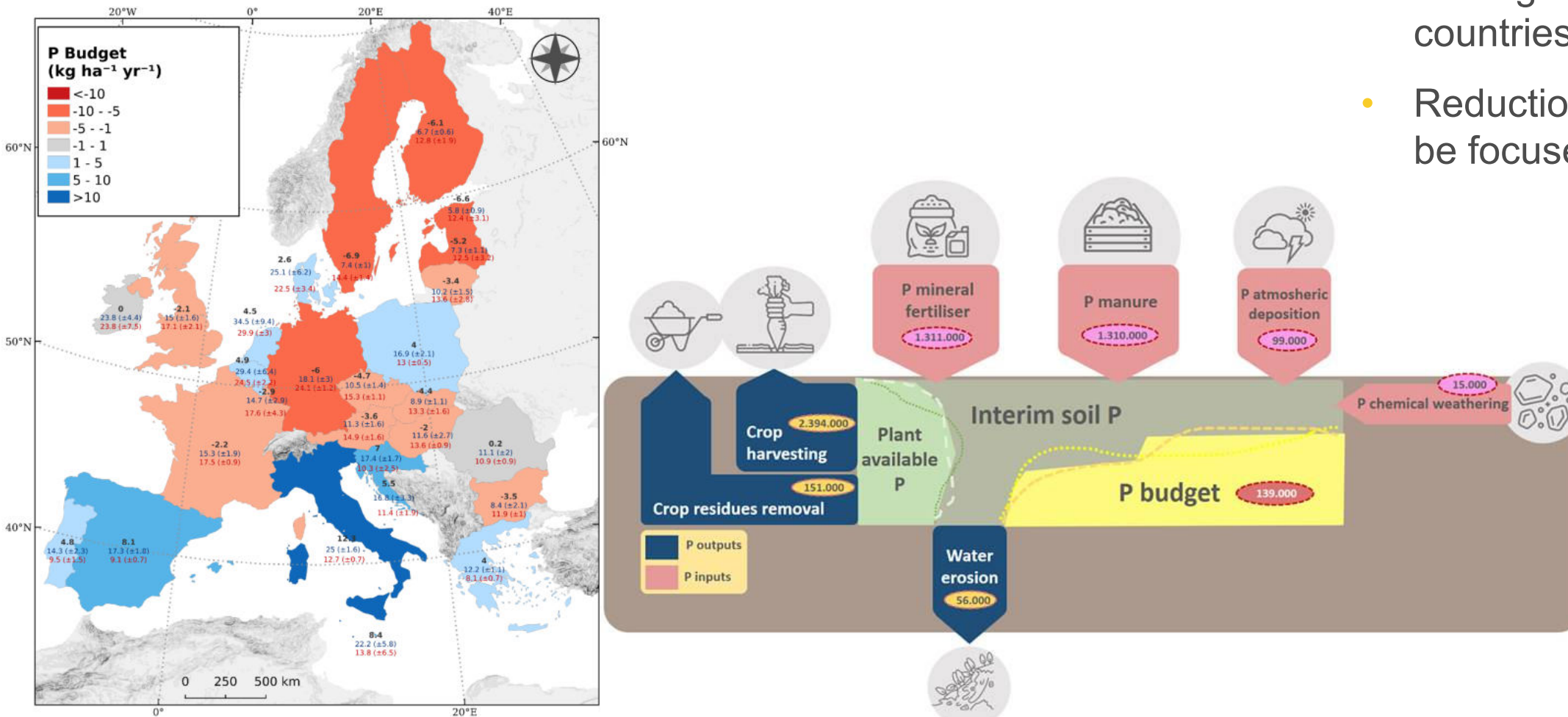
European Commission

Phosphorus budget in EU Agricultural soils

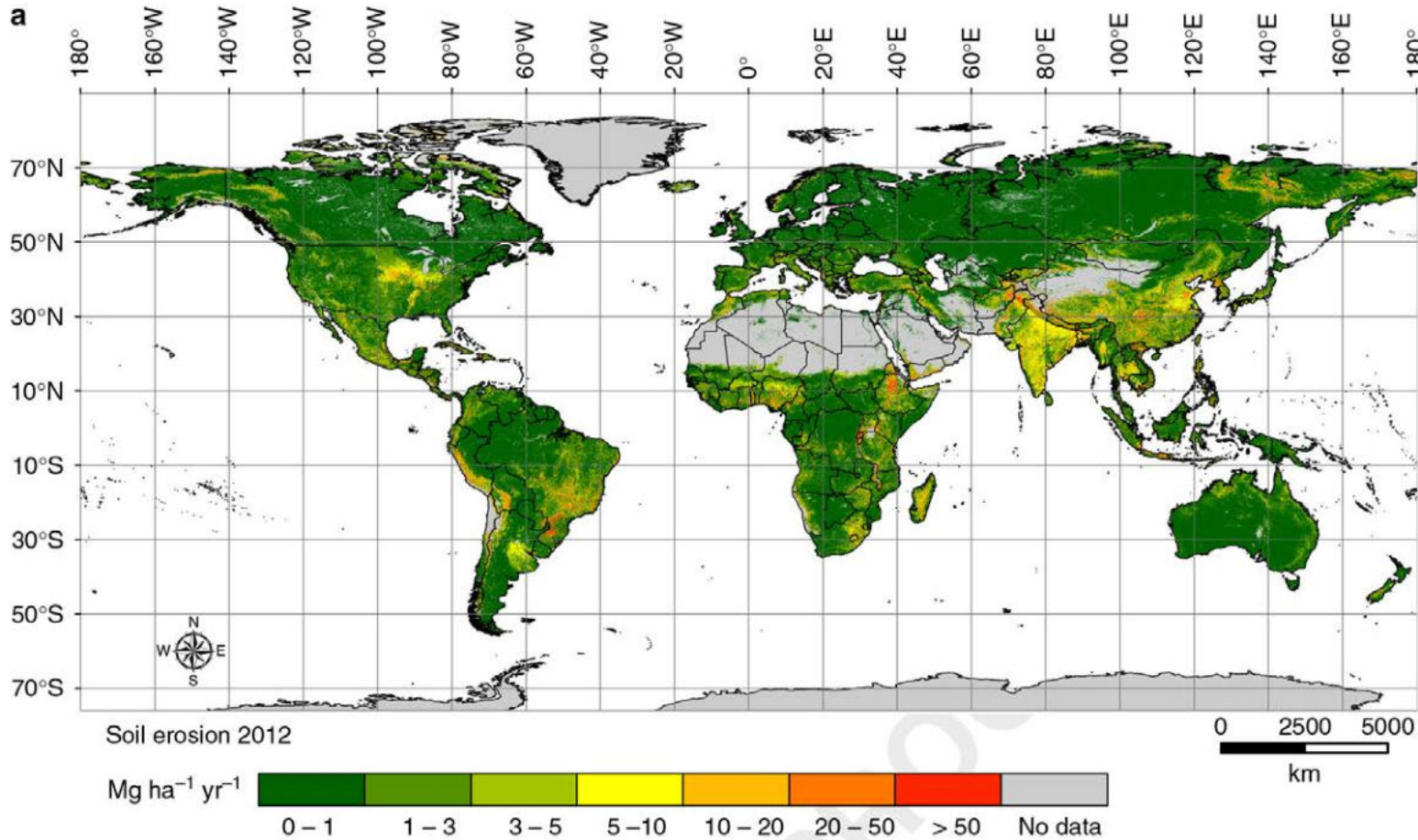
Inputs: inorganic fertilizers, manure, atmospheric deposition, and chemical weathering

Outputs: crop production, plant residues removal, losses by erosion

- High spatial variation of P budget across countries/regions.
- Reduction of P should be focused on specific



Global Soil Erosion



- 35.9 Billion tons of soil erosion (2012)
- 4 Million Km² change land use between 2000-2012
- Increase of total erosion by 2.5% due to decrease in forestlands (Africa has the highest increase +8%)

- Focus in croplands: $17_{-0.7}^{+1}$ Pg yr⁻¹
- Croplands are 11.2% of study and are responsible for 50.5% of soil erosion



ARTICLE

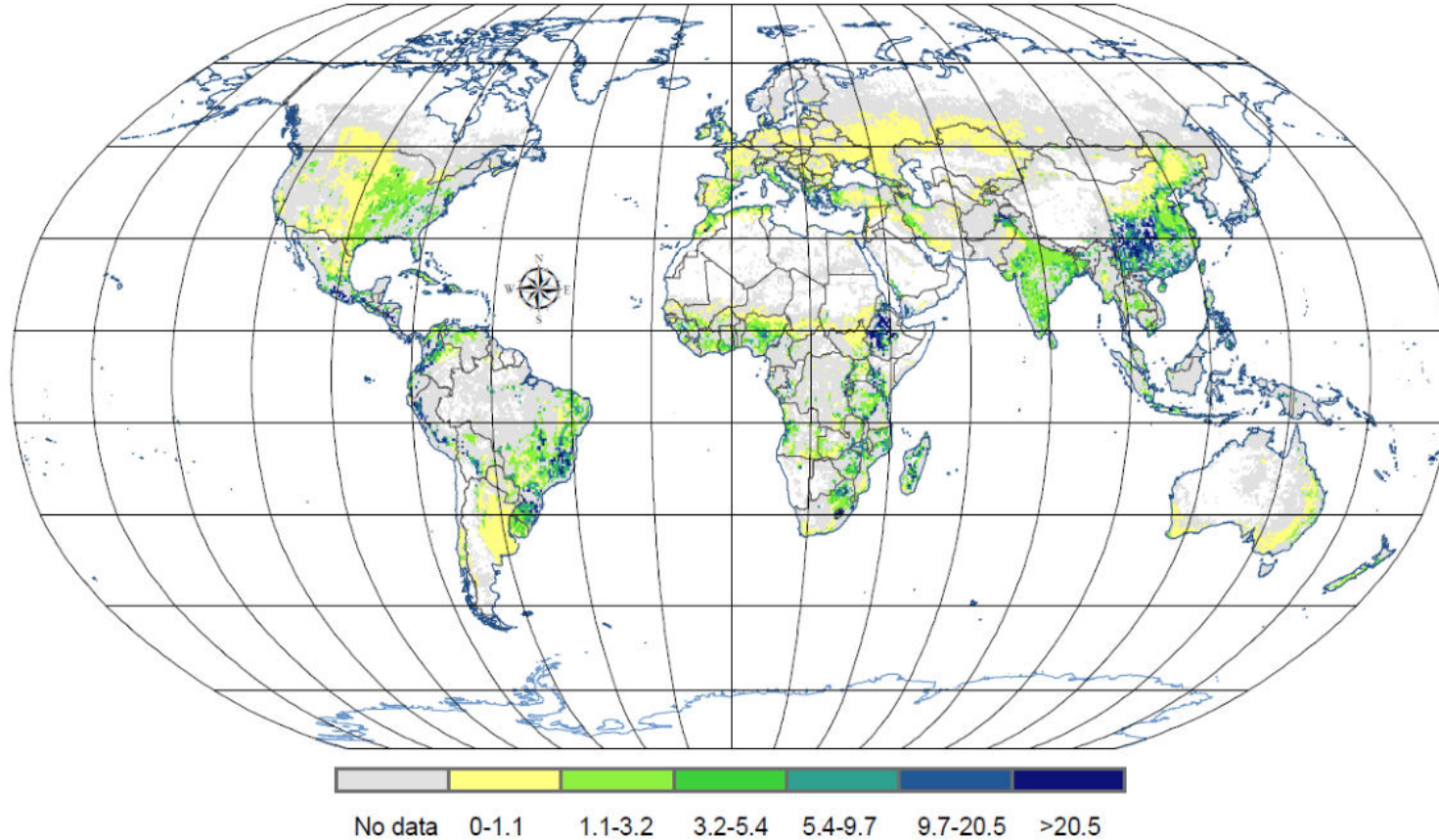
DOI: 10.1038/ncomms41467-017-02142-7

OPEN

An assessment of the global impact of 21st century land use change on soil erosion

Pasquale Borrelli^{1,2}, David A. Robinson³, Larissa R. Fleischer⁴, Emanuele Lugato⁵, Cristiano Ballabio², Christine Alewell¹, Katrin Meusburger¹, Sirio Modugno⁵, Brigitta Schütt⁶, Vito Ferro⁷, Vincenzo Bagarello⁸, Kristof Van Oost⁹, Luca Montanarella² & Panos Panagos²

Spatially discrete global soil P losses due to erosion



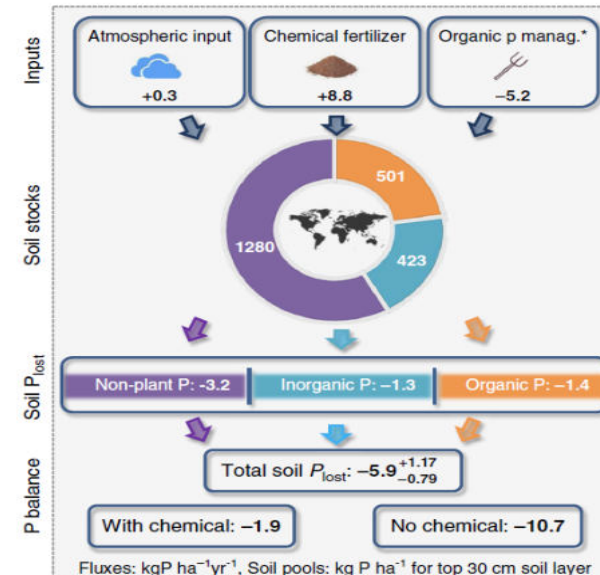
Global P losses due to soil erosion in kg P ha⁻¹ yr⁻¹

Alewell et al., Nature Comm (2020)

P loss from agricultural systems due to erosion is substantial (dependent on region and continent between 1 – 12 kg ha⁻¹yr⁻¹)

Very high losses: Eastern China, Indonesia, regions of south-eastern Africa, Central America and South America

High losses: most of India, regions of Southern Africa and South America



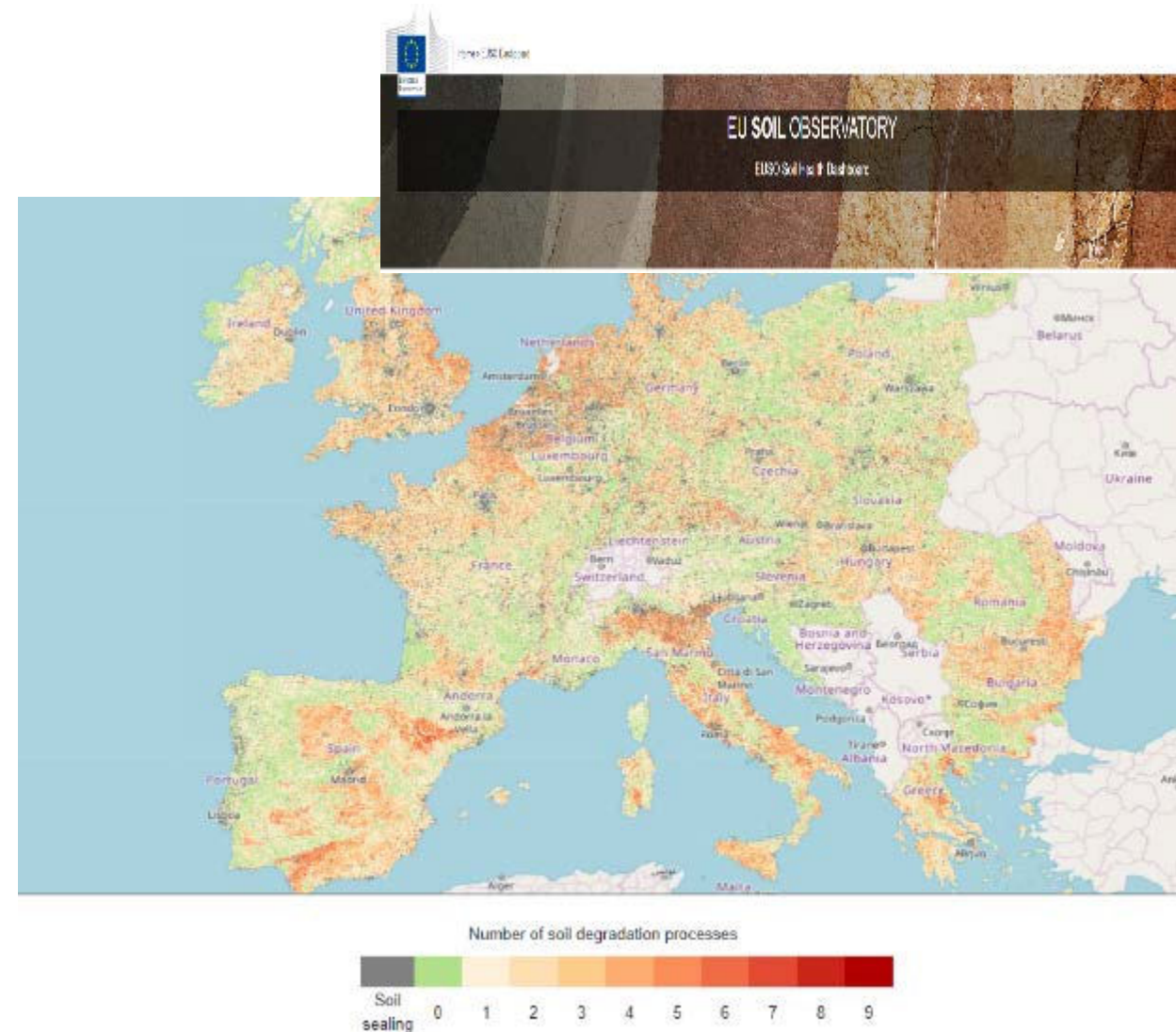
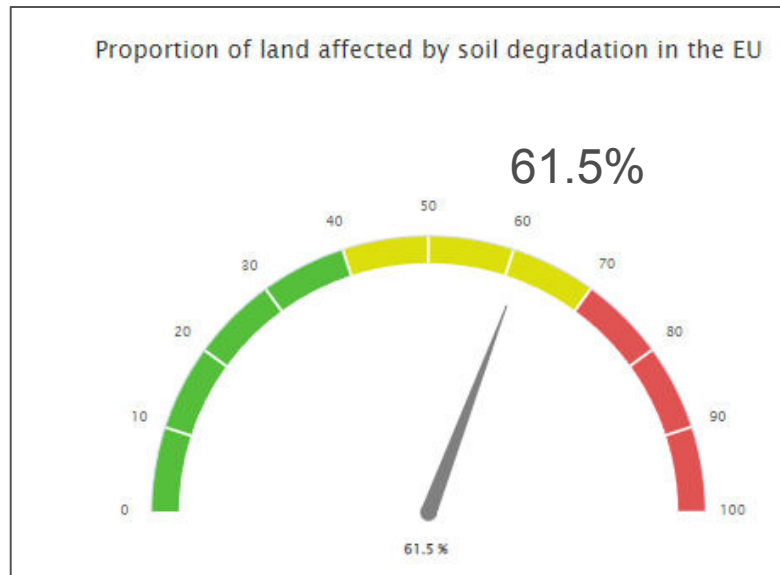
Soil Health Dashboard

- Nitrogen inputs (refined) for the dashboard

EUSO Soil Health dashboard:

- At least 61.5 % of unhealthy soils
- Dashboard shows location and different types of soil degradation in the EU

→ Launch in March



EUSO Stakeholders Forum 2021-2022



- 1,000 participants per Forum
- High level participants
- 70+ presentations over three days
- 2022 Forum: first presentation of Soil Mission funded projects
- Establishment of 6 Technical Working Groups
- Lead to a more complete knowledge base for policy
 - Soil pollution
 - Soil monitoring
 - Soil data sharing
 - Soil erosion
 - Soil biodiversity
 - Soil Carbon MRV
- 2023: jointly with SOIL Mission Conference



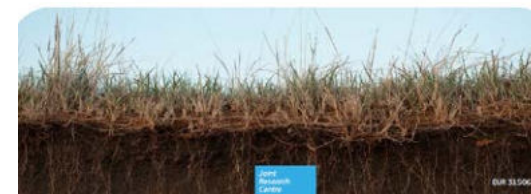
European Soil Forum



EUSO Annual Bulletin

A review of 2022 activities

Manichal, A., Panagos, P., Jones, A., Arco Navarro, C., Bellasio, C., Beltrandi, D., Dreure, T., De Medici, D., De Rosa, D., Fardoux, A., Kowalczyk, J., Labouze, M., Lukić, L., Martín Jimenez, J., Mätzler, F., Montanarella, L., Mouny, A., Orzi, A., Scopa, S., Schab, E., Simões Vieira, D., Van Erp, E., Van Liedekerke, M., Wajda, P., Turiel Mezquita, F.

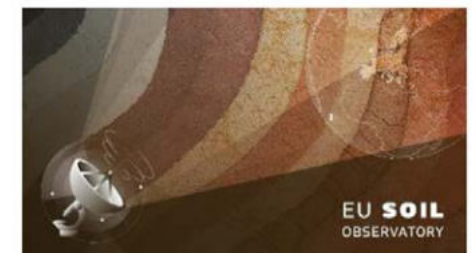


JRC TECHNICAL REPORTS

EU Soil Observatory 2021

Review and reflections

Manichal, A., Jones, A., Panagos, P., Beltrandi, D., De Medici, D., De Rosa, D., Jiménez, J.M., Kowalczyk, J., Labouze, M., Lukić, L., Lugato, E., Mathiesen, F., Montanarella, L., Mouny, A., Orzi, A., Scopa, S., Schab, E., Wajda, P., Van Liedekerke, M., Viera, D.



A supportive framework for soil protection in the EU

The new EU Soil Strategy and upcoming Soil Health Law (2023), European Soil Observatory and Mission A Soil Deal for Europe together are the main **framework for soil protection and restoration in the EU.**



Mechanism for research and innovation, Knowledge gaps, citizen engagement and wide outreach



Mission “A Soil Deal for Europe”: Goal: 100 living labs and lighthouses to lead the transition towards healthy soils by 2030

Specific objectives

1. Reduce desertification

2. Conserve soil organic carbon stocks

3. Stop soil sealing and increase re-use of urban soils

4. Reduce soil pollution and enhance restoration



5. Prevent erosion

6. Improve soil structure to enhance soil biodiversity

7. Reduce the EU global footprint on soils

8. Improve soil literacy in society

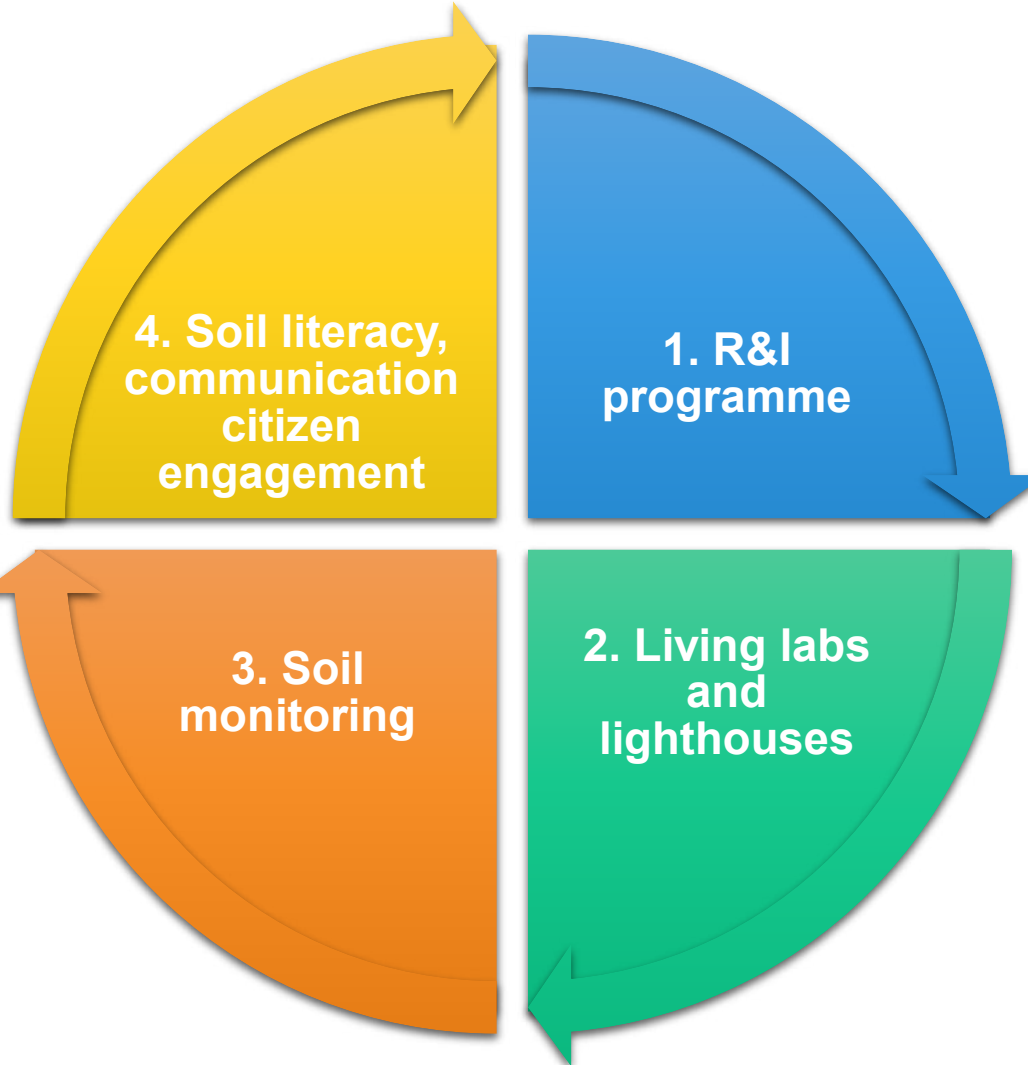
Each specific objective is backed by **one or more quantified targets** and **measurable indicators**. Objectives apply to **all types of land use**.



Soil Mission Building Blocks

- Support to citizen science initiatives for soil monitoring
- Promote self-assessment of soil health by land managers and citizens

Building on JRC Awareness and Education WG



- **Knowledge, data, technologies and infrastructures** to support soil health
- Support validation of soil health indicators;
EUSO as beneficiary

- Harmonisation of indicators, measuring and reporting for soil health across Europe;

Managed by EU Soil Observatory

- A network of real-life sites to
- test and validate novel measuring techniques

Living Labs Portal on EUSO



The emerging landscape of Mission projects

WP 2021

Topics on e.g.

soil monitoring and soil health indicators, businesses models for soil health, link between soil health and food quality and safety, engagement of municipalities and regions

Budget: 67 M€

11 grant agreements signed



WP 2022

Topics on e.g.

remediation strategies for contaminated sites, soil biodiversity, use of biowaste for soil improvement, carbon farming, soil literacy

Budget: 95 M€

17 grant agreements to be signed in June '23



WP 2023

Topics on e.g.

Living Labs, spatial planning, soil and cultural and creative industries

Opening of call: 17 January '23

Deadline for applications:

20 September 2023

Budget: 139 M€

≈ 19 grant agreements expected



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Thank you for your attention!



EU SOIL
OBSERVATORY