La ricerca in Europa e in Italia per la conoscenza e la gestione sostenibile del suolo. La Missione Europea per Il suolo.

Maria Fantappiè, CREA-AA

Primo Tecnologo del Consiglio per la ricerca e l'analisi dell'economia agraria

Centro di Ricerca Agricoltura e Ambiente

Rappresentante per l'Italia

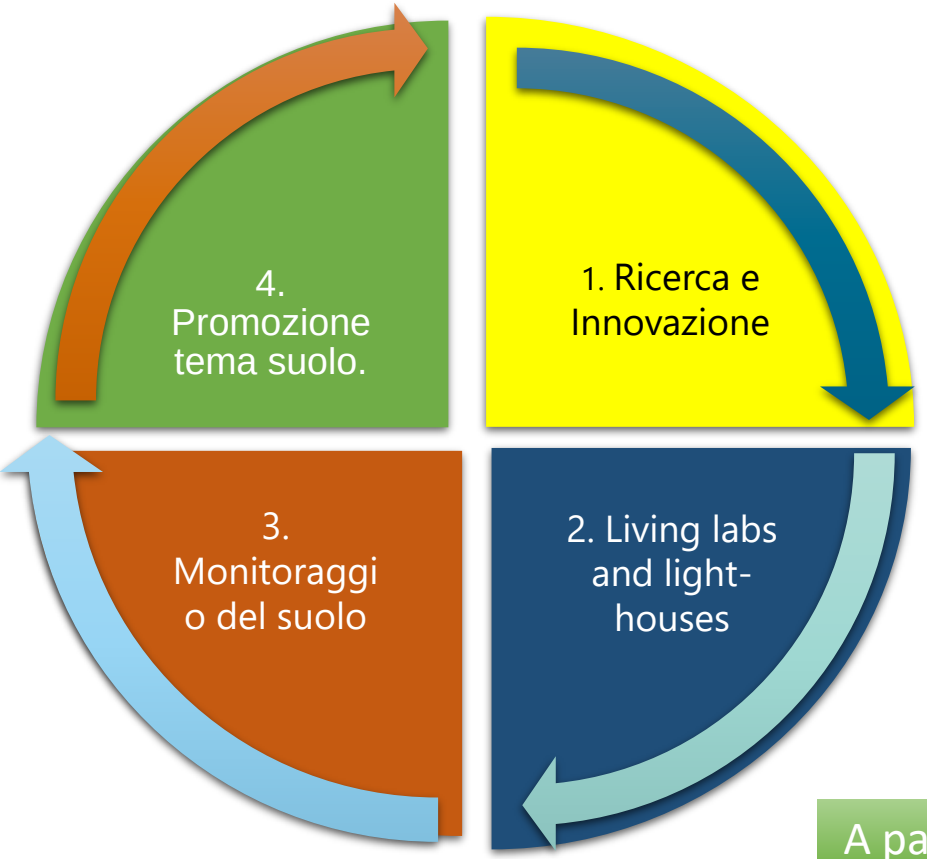
dell'International Network of Soil Information Systems della FAO-GSP

EUROPEAN UNION

EU MISSIONS
SOIL DEAL FOR EUROPE

Componenti della soil mission

Comunicazione e formazione dedicate a specifiche categorie. Ad esempio rivolta a agronomi e forestali, cittadini, decisori politici, agricoltori, ecc.



Conoscenze, dati, tecnologie e infrastrutture a supporto di pratiche di gestione del suolo e modelli di business per la salute del suolo

Armonizzazione dei **sistemi di monitoraggio e reportistica dello stato di salute dei suoli** in Europa.

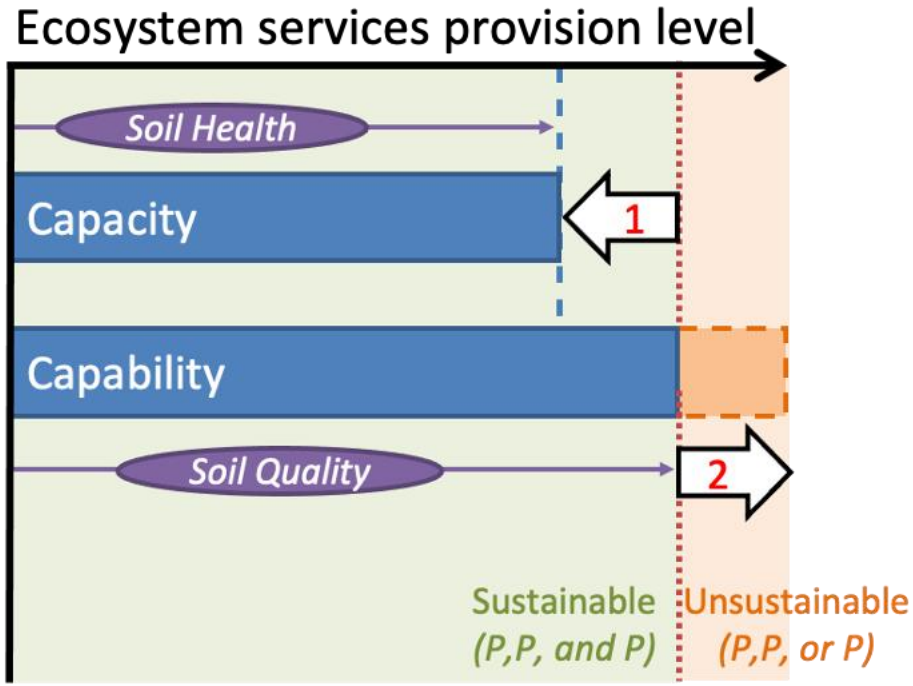
Rete di **siti reali per la sperimentazione**, validazione e adozione a più vasta scale, di pratiche innovative.

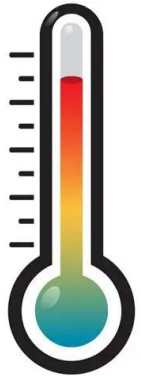
Implementazione collaborativa della missione da parte di: ricercatori, agricoltori, enti pubblici, decisori politici, cittadini

A partire dal 2021, verso il 2030 e oltre.
Visione: suoli sani nel 2050.

Il concetto di STATO di salute del suolo e INDICATORI di salute

Definizione proposta dal progetto EJP SOIL, per distinguere i concetti di **qualità del suolo**, intesa come capacità potenziale di svolgere funzioni in base al tipo di suolo, e **stato di salute del suolo**, inteso come stato attuale rispetto al teorico potenziale. (Faber et al 2022).





https://ejpsoil.eu/soil-research/siren

CRITERI PER LA DEFINIZIONE DEGLI INDICATORI DI STATO DI SALUTE

Qualsiasi sia la definizione di salute, important criteri di selezione per le proprietà del suolo che vanno a comporre tali indicatori di stato sono:

1) proprietà che variano: per impatto di diverse gestioni del suolo e/o per il variare delle condizioni ambientali;
2) proprietà che si collegano alla capacità del suolo di svolgere le sue funzioni.

Suoli sani, definizione nella Soil Monitoring Law

Suoli sani sono suoli che sono in buone condizioni chimiche, biologiche e fisiche e che quindi possono fornire **servizi ecosistemici vitali per l'uomo e per l'ambiente**, come

Cibo sano, nutritive e sufficiente,

Biomassa,

Acqua pulita,

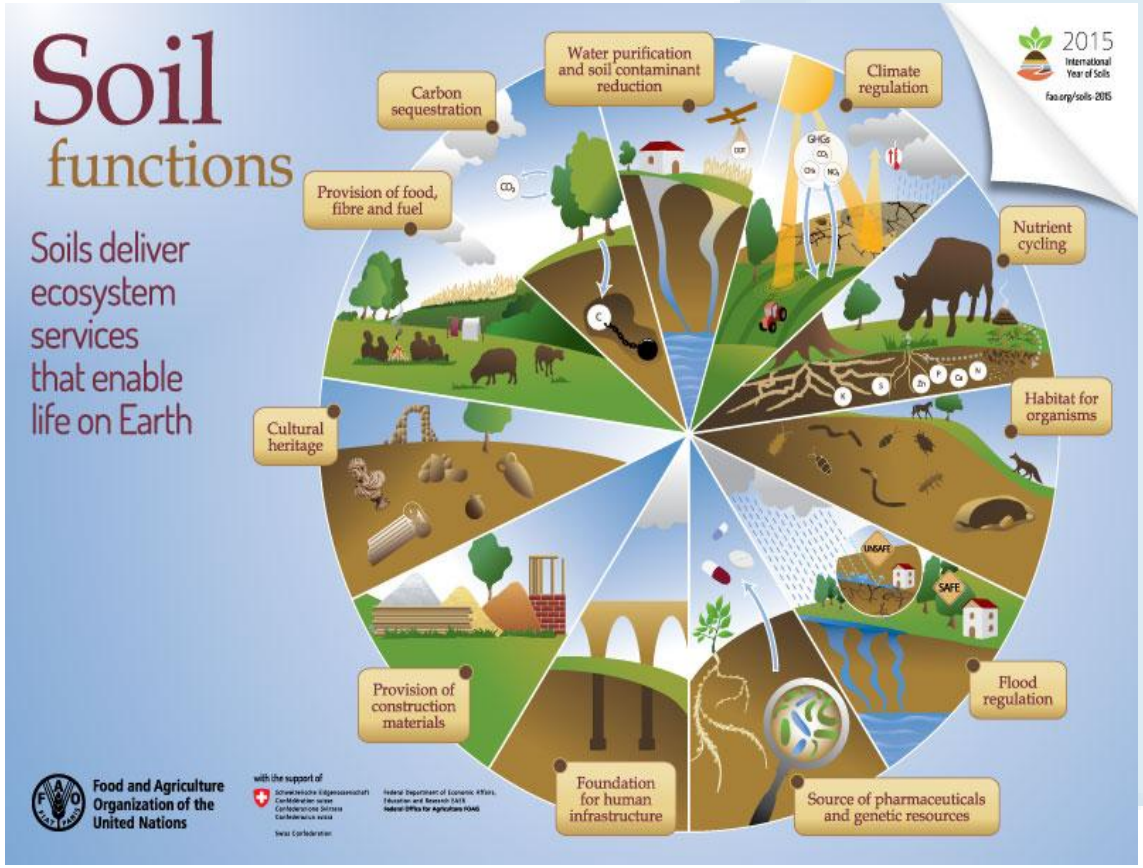
Riciclaggio dei nutrienti,

Stocchaggio del carbonio

Biodiversità del suolo.

I suoli sono essenziali per assicurare **la sicurezza alimentare.**

I suoli forniscono anche **altri servizi ecosistemici**, come essere la base delle infrastrutture, fonte di materali […]



Tali **altri servizi ecosistemici sono spesso gli usi prevalenti del suolo e causano la dei servizi ecosistemici vitali**.
Va Trovato dunque un bilanciamento fra la fornitura di queste due tipologie di Servizi ecosistemici.

DALLA DEFINIZIONE DELLO STATO

=

CARTOGRAFIA DEL SUOLO DI BASE (BASELINE)

…

AL MONITORAGGIO

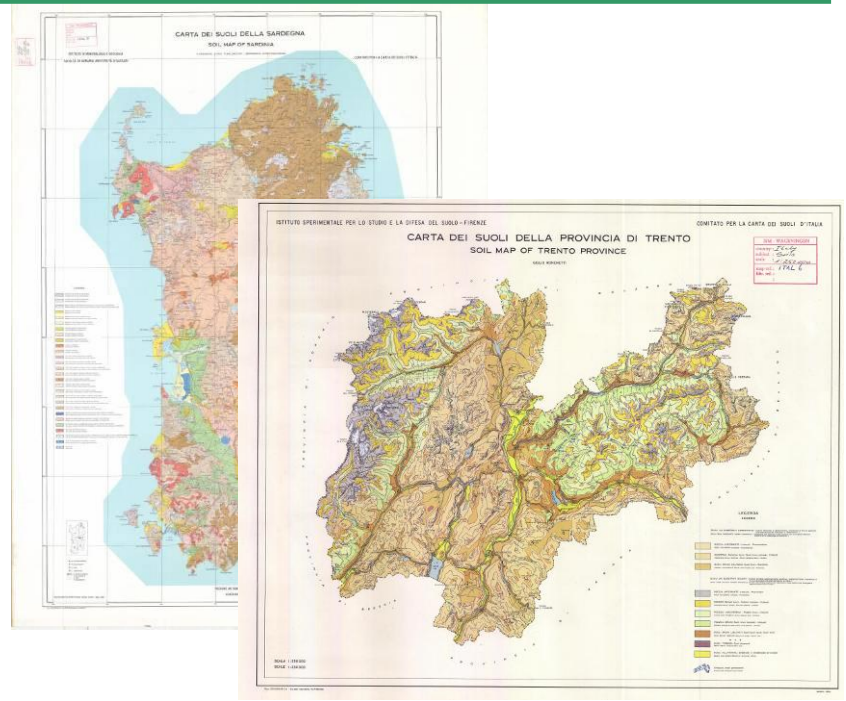
LA PEDOLOGIA IN ITALIA E NELLE REGIONI ANNI `60

1:1.000.000

1966 Carta dei Suoli d'Italia (Mancini)

1:250.000

- 1965 Carta dei Suoli di Trento
- 1967 Carta dei Suoli della Sardegna



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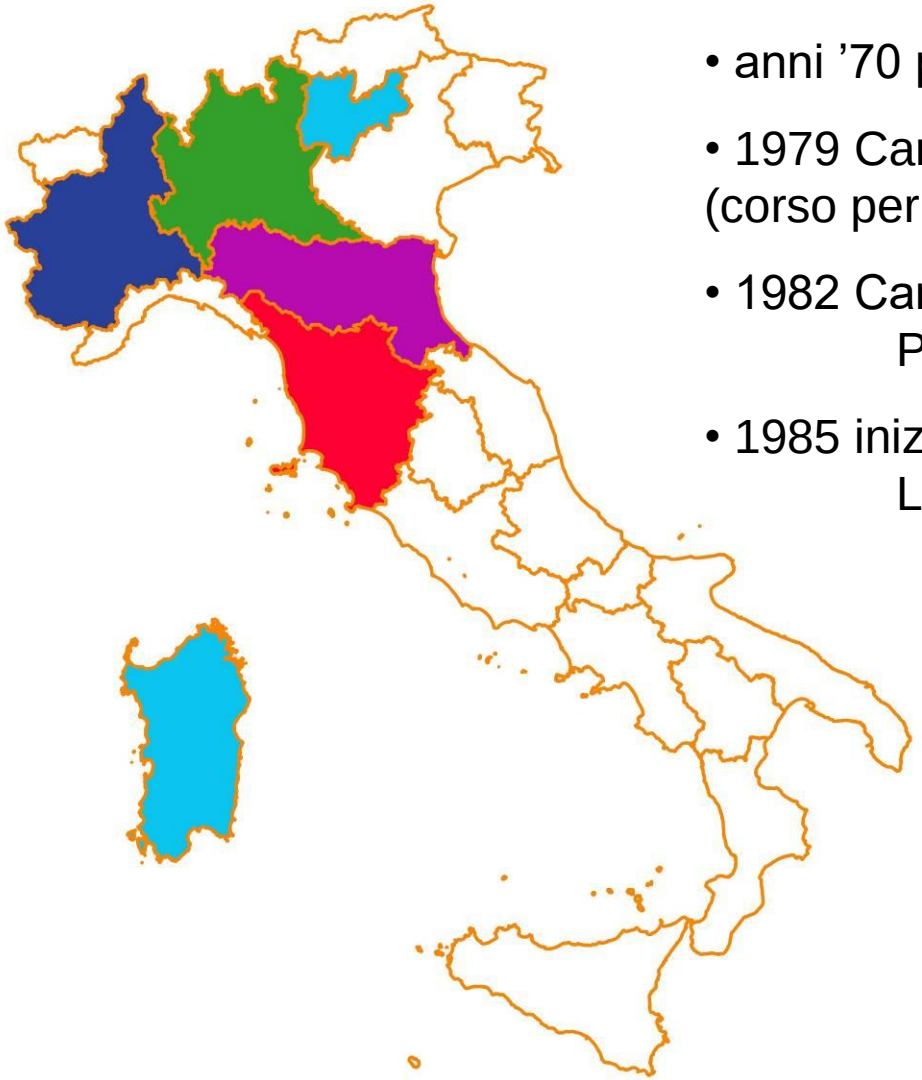
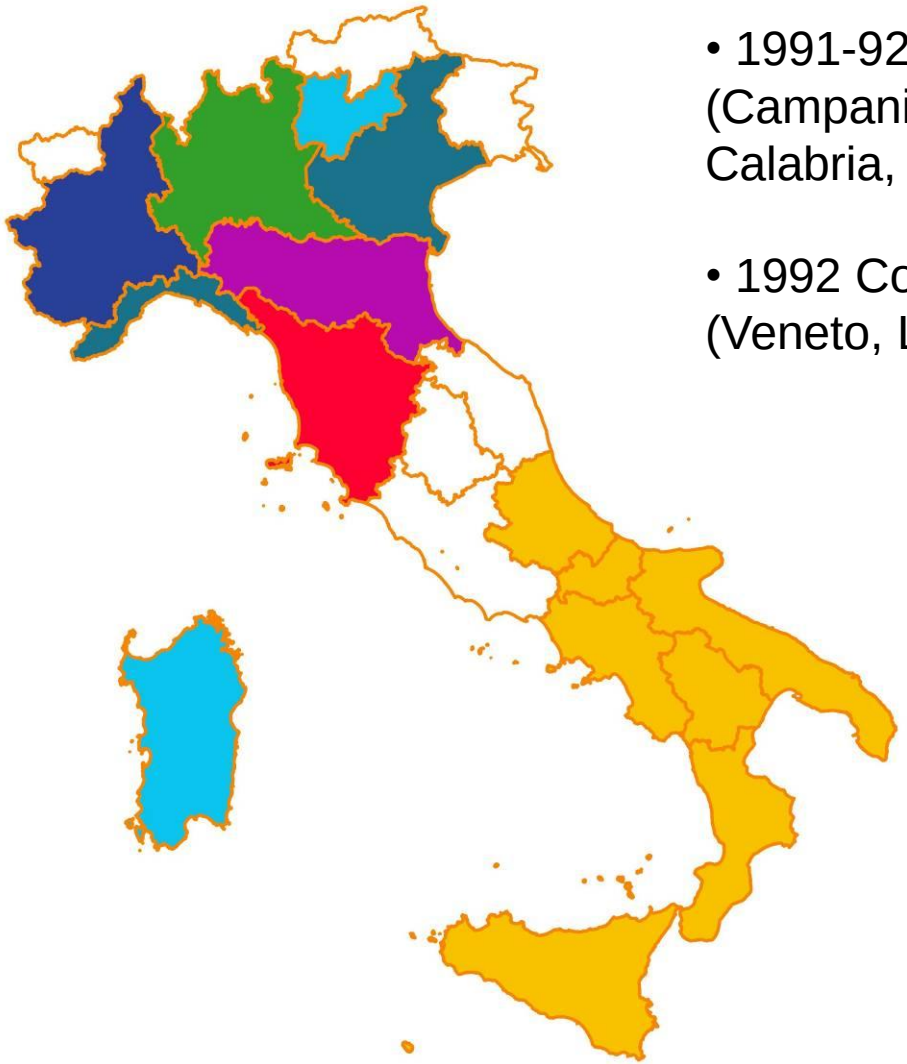
LA PEDOLOGIA IN ITALIA E NELLE REGIONI ANNI 70-80



- anni ’70 primi rilevamenti in Toscana
- 1979 Carta dei Suoli Emilia Romagna 1:250.000 (corso per rilevatori pedologi 1988)
- 1982 Carta della Capacità d’uso dei suoli del Piemonte 1:250.000
- 1985 inizio rilevamenti carta dei suoli 1:50.000 in Lombardia

LA PEDOLOGIA IN ITALIA E NELLE REGIONI ANNI 90



• 1991-92 Corso FORMEZ per divulgatori pedologi (Campania, Abruzzo, Molise, Basilicata, Puglia, Calabria, Sicilia)

• 1992 Corso CIFDA per divulgatori pedologi (Veneto, Liguria)

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Osservatorio Nazionale Pedologico 2005

- L'Osservatorio Nazionale Pedologico **ERA** stato ricostituito con **DM 10879 del 10 ottobre 2005**

rappresentanti di **MIPAAF**, **MATTM**, **CREA** (CNCP, che però non ha mai ricevuto un riconoscimento ufficiale), **CNR**, **ISPRA**, le **Regioni** (ARPAT, Agenzie Regionali di Sviluppo, ecc), e di esperti a livello universitario nel settore della pedologia e della chimica del suolo.

Progetti correlati:

- Progetto metodologie pedologiche
- Progetto BADASUOLI
- Progetto Rete Rurale – ARESVA (definizione delle aree svantaggiate per vincoli naturali)

Risultati:

- Metodi standard di laboratorio, di rilevamento e informatizzazione dei dati pedologici
- Struttura della banca dati nazionale (Cncp.mdb)
- Carta dei Suoli d'Italia 1:500.000 (2012) e webgis formato PostGIS/PostGRES (SISI)
- Carta delle Aree Svantaggiate approvata con decreto MIPAAF

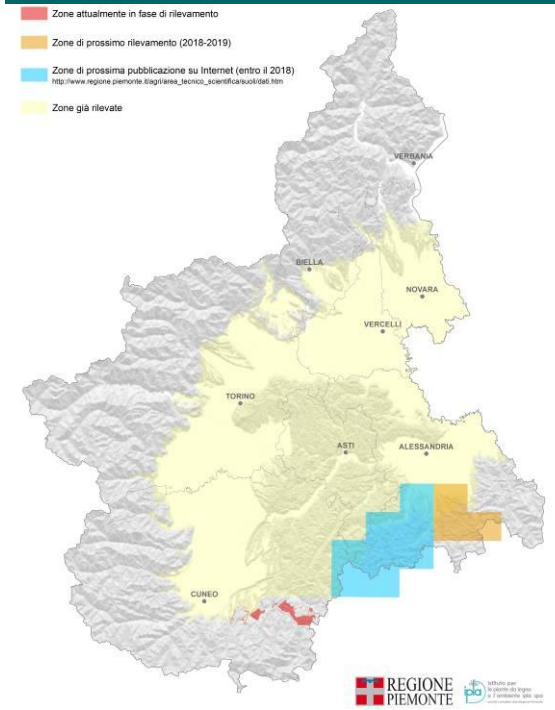
STANDARD METODOLOGICI NAZIONALI CONDIVISI E CARTOGRAFIA NAZIONALE

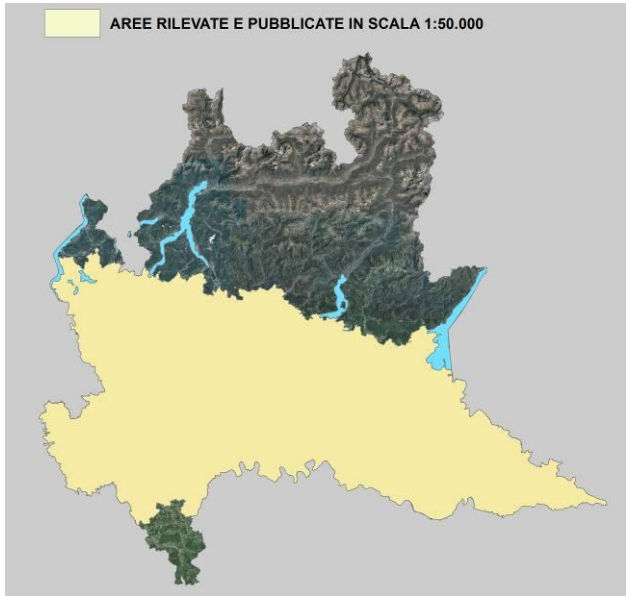
LA PEDOLOGIA IN ITALIA E NELLE REGIONI ANNI 2000

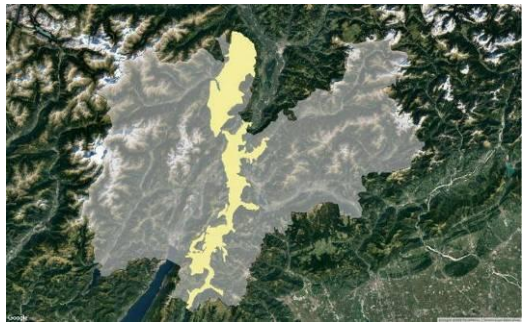
2000-2017
Carta dei suoli d'Italia in scala 1:250.000

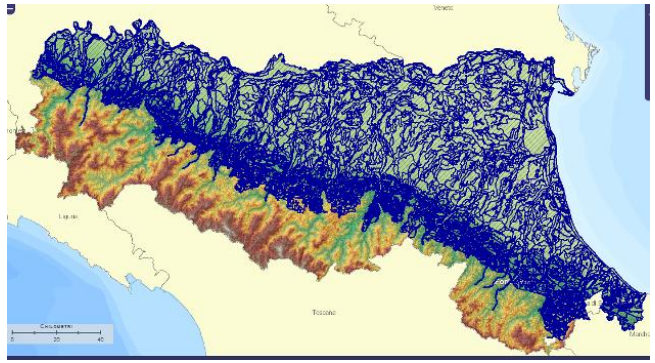
Le Regioni di Suolo Italiane in scala 1:1.000.000

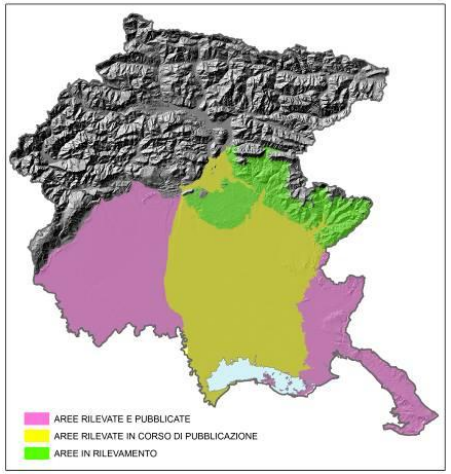
AREE RILEVATE AL 50.000

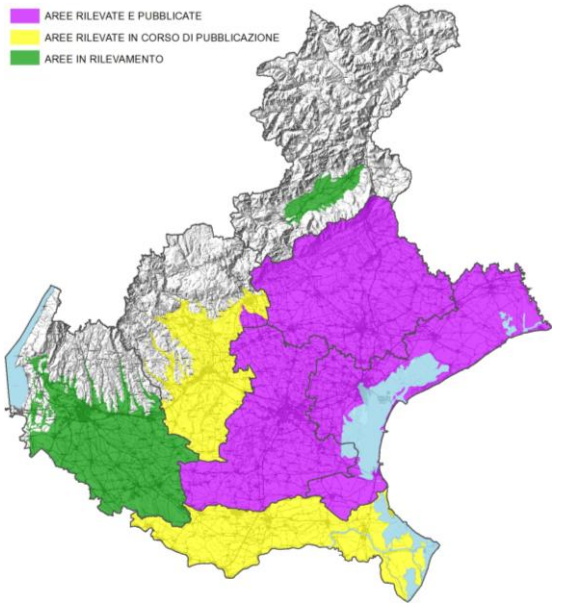












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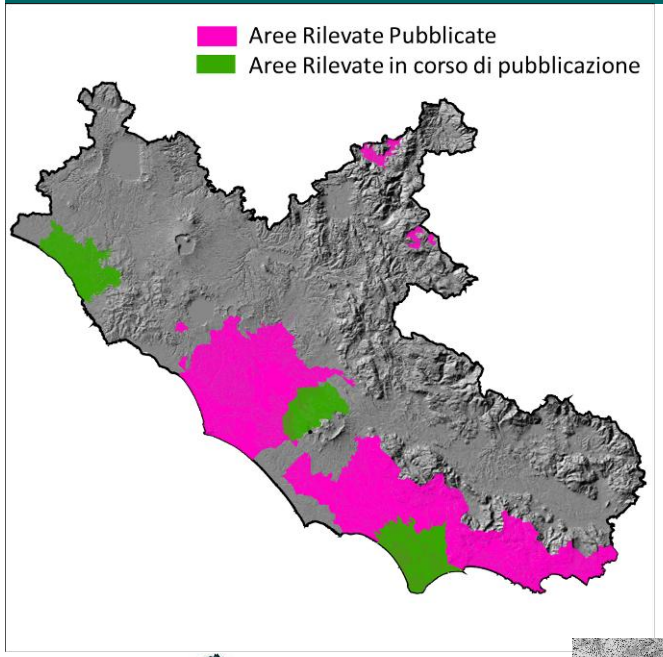
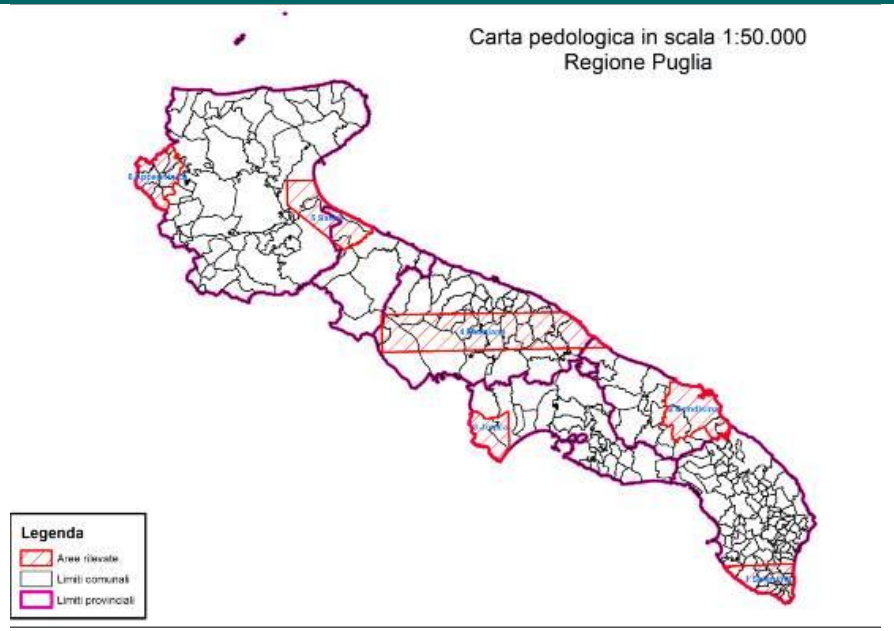
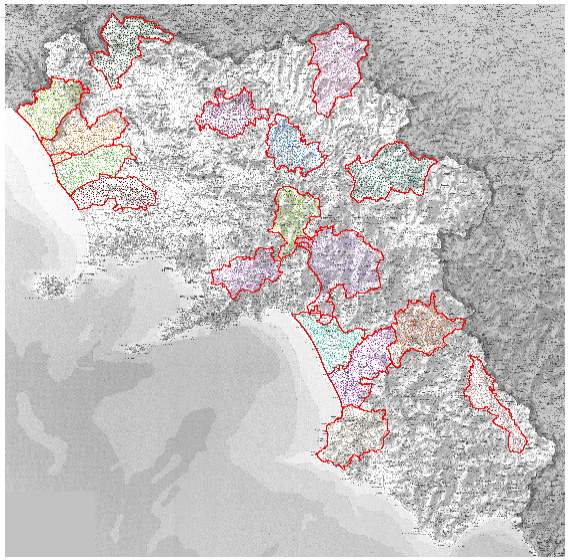
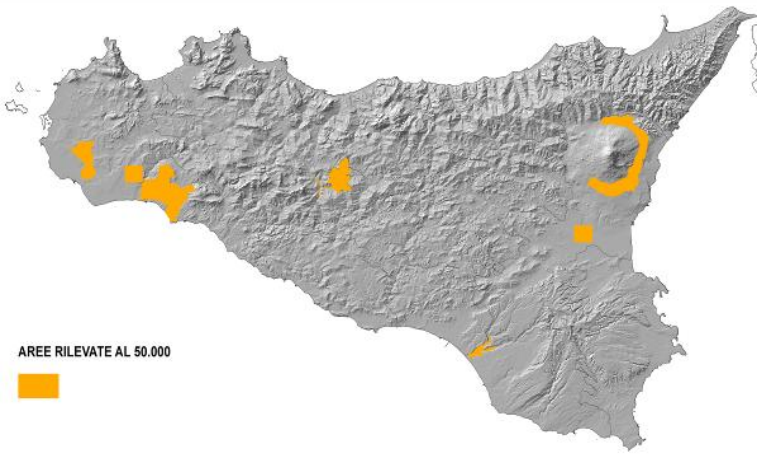
AREE RILEVATE AL 50.000









ESPERIENZE DI DIGITAL SOIL MAPPING PARTECIPATIVO NELL'AMBITO DELLA GLOBAL SOIL PARTNERSHIP (FAO)

Realizzazione della carta dello stock di carbonio organico nei suoli italiani

Coordinamento CREA-AA - Firenze

Porzione italiana della GLOBAL SOIL ORGANIC CARBON MAP (GSOCmap)

Obiettivo: produrre una mappa armonizzata a livello nazionale senza perdere la conoscenza regionale-locale.

Coordinate dal CREA 20 Servizi del Suolo Regionali hanno contribuito alla realizzazione.

Le varie fasi del processo

1.1 Struttura banca dati condivisa

1.2 Dati, metadati e covariate
CREA Firenze e CREA Roma, ISPRA, Enti regionali*, Università

1. Messa a disposizione dati e controllo qualità

2.1 Armonizzazione analisi SOC
Università di Reggio Calabria; Università di Foggia; CREA-Roma; CNR Firenze; ARPA Veneto

2. Metodi analitici e di stima
(in collaborazione con Pillar 5)

Determinant step to avoid transboudary issues

2.2 Stima densità apparente
CNR Firenze; CREA Firenze, ARPA Veneto

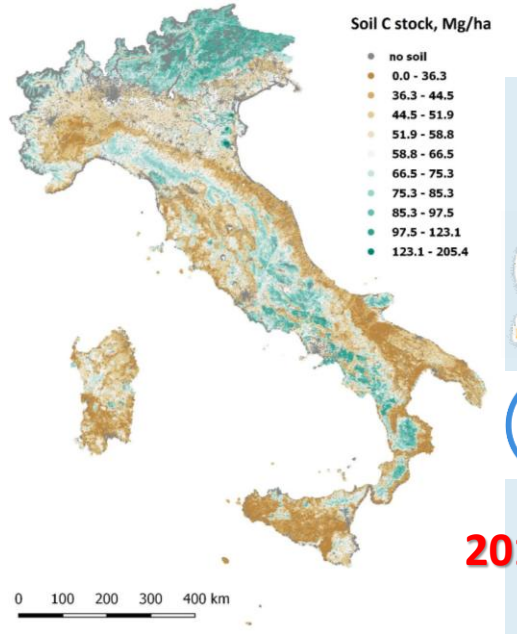
3. Digital Soil Mapping

3.1 Metodi DSM
CNR Firenze; CREA Firenze; CREA Roma

3.2 Validazioni regionali
SGSS-RER Bologna, ARPAV, enti regionali

Maps validation by **Regional Soil Services**

4. Allestimento e consegna carta/report
CREA Firenze



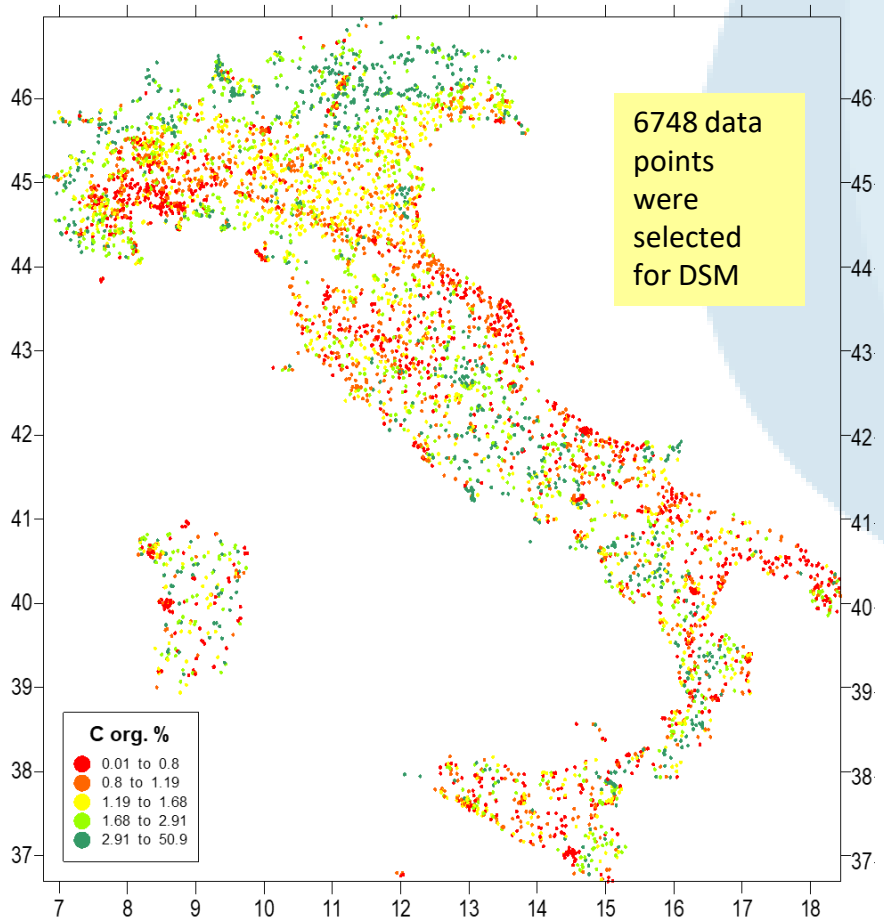
2017

* ARPAV, ARPA_FVG, ERSAF, SGSS_RER, ARSSA, Agris Sardegna, Liguria, Marche, Sicilia, Puglia, Lamma

SOC data selection

6748 soil sites selected: well distributed (between 28 to 68 km²/site) and representative for the following environmental covariates: land use, geomorphology, and climate. Soil surveys between 1990 and 2013 (to exclude the effect of the soil protection measures of the RDP 2014-2020)

Region	Surface km²	Sites number	km²/site
Abruzzo	10794	257	42
Basilicata	9995	233	43
Calabria	15082	334	45
Campania	13595	259	52
Emilia-Romagna	22453	514	44
Friuli- Venezia Giulia	7845	251	31
Lazio	17236	490	35
Liguria	5410	124	44
Lombardia	23844	485	49
Marche	9401	206	46
Molise	4438	99	45
Piemonte	25402	912	28
Puglia	19345	345	56
Sardegna	24090	434	56
Sicilia	25711	522	49
Toscana	22994	338	68
Trentino Alto Adige	13619	334	41
Umbria	8456	214	40
Valle d'Aosta	3262	60	54
Veneto	18399	337	55
Totale	301371	6748	45



SOC data harmonization

SOC analytical methods considered:

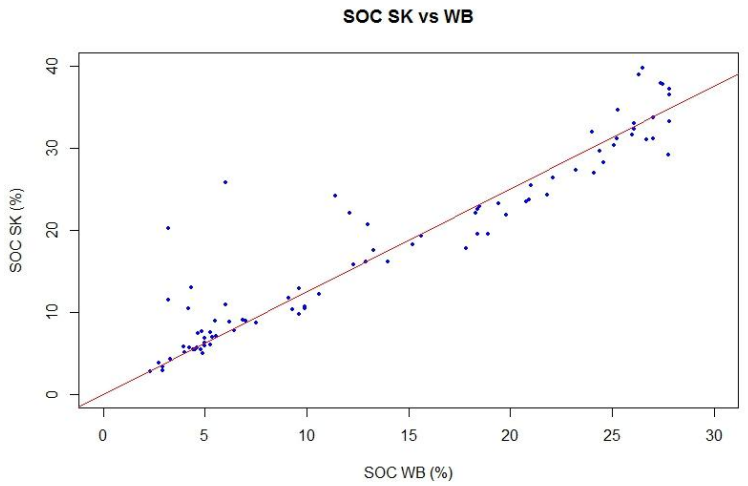
- SOC Dry combustion (ISO 10694:1995)
- SOC Wet chemical oxidation (Springer Klee, ISO 14235:1998)
- SOC Wet chemical oxidation (Walkley and Black, 1934)

ISO 10694:1995 and ISO 14235:1998 returned equivalent results

ISO 14235:1998

= 1.252 * SOC Walkey-Black (1934)

with R^2 = 0.9679



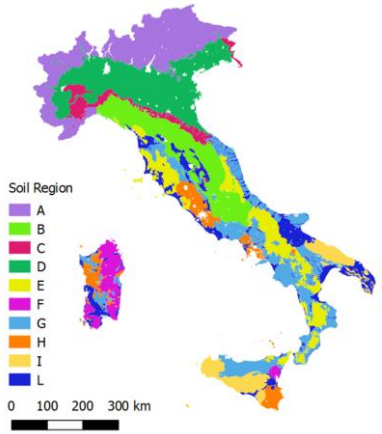
Calibration of pedotransfer functions for Bulk Density

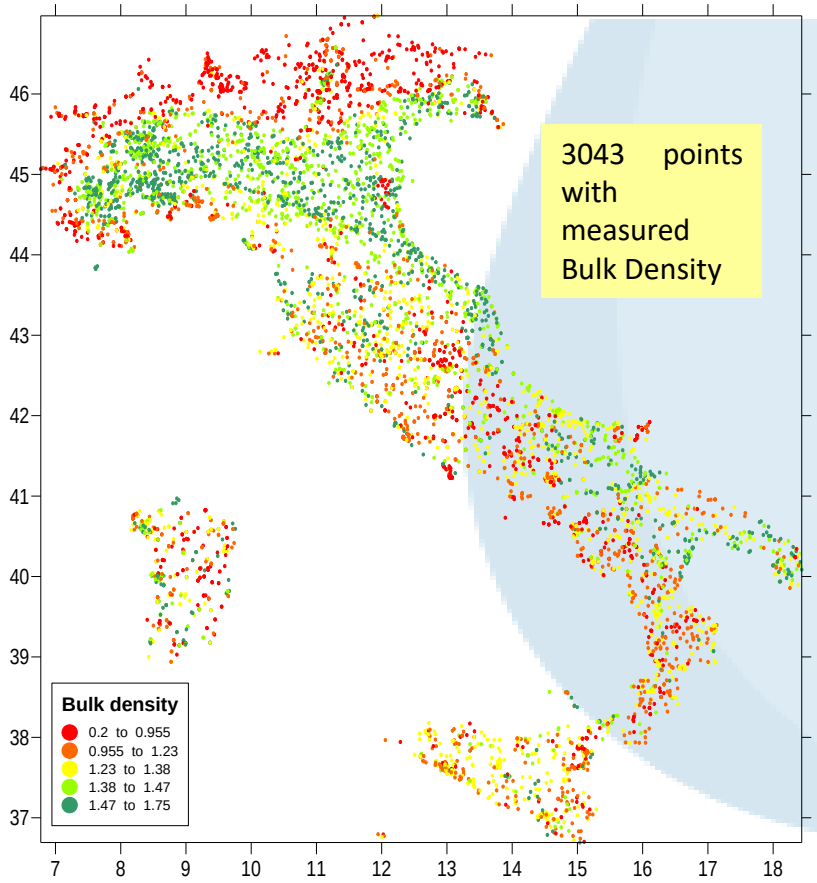
- Calibration of PTFs specific for different great groups of land uses, applying General Linear Regression models (GLM) with BD as dependent variable
- Auxiliary variables used in the GLM models: SOC and texture (clay content, the mean and standard deviation of the diameter of soil particles in the fine earth fraction, and the 10 Soil Regions of Italy).

Example of **PTF calibrated for arable lands** (N =1446)

BD = 1.468 + α - 0.0704 * SOC - 0.0006 * Clay - 0.00218 * Sg

where **BD** is the Bulk Desity estimation
1.468 is the intercept
α is a coefficient which varies depending on the Soil Region
SOC is Soil Organic Carbon Content
Clay is the clay fraction content
Sg is the standard deviation of the soil particles diameters





The **PTF calibrated for Organic Horizons** (N = 36) was common for all the land uses and Soil Regions

BD = 1.403 - 0.339 * ln (SOC)

DIGITAL SOIL MAPPING

CS of the first 30 cm depth was calculated as depth-weighted average to obtain **one value for each one of the 6748 points**. CS (Mg ha^{-1}) = 0.3 (m) * SOC (dag kg^{-1}) * fine earth fraction (1 - skeletal content expressed as daL m^{-3}) * BD (Mg m^{-3}).

Covariate's selection: a) autocorrelation check of **continuous variables** with Spearman Rank Order Correlations analysis. Among the autocorrelated we tested the most significant predictors in relation to CS with a multivariate test of significance of general discriminant analysis (higher F-test); **b)** multiple discriminant analysis performed for **categorical variables**, and the contributions to Chi-Square calculated. The categorical variables were selected with a contribution to Chi-Square which was higher than the mean contribution.

Auxiliary variables finally used: soil regions, soil subregions, Corine land cover 2006, lithology, soils affected by natural constrains (gleyic, histic, vertic, coarse, shallow, arenic, sodic, and acid), sand content, silt content, 30-m aster-DEM, distance from coast, distance from relieves, soil aridity index, annual mean precipitations, mean annual air temperature, soil inorganic carbon, and soil depth. (For the soil region of Po valley, also the land units at 1:250,000 scale were used).

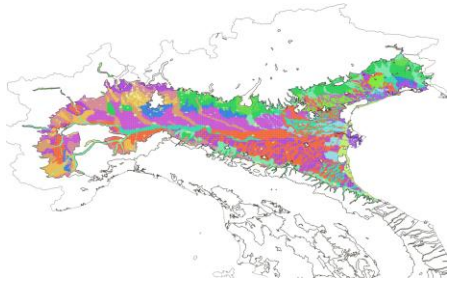
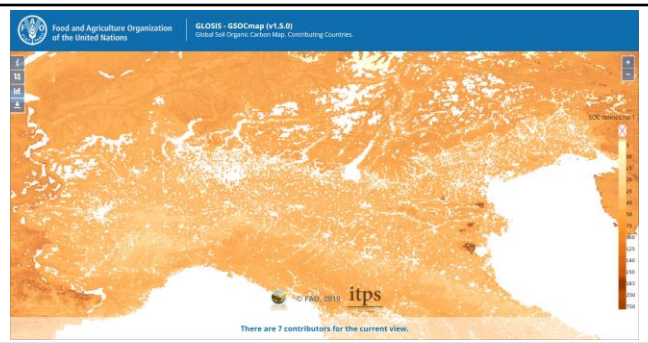
The 6748 points data divided (by spatial random sampling), into **10 subsets**. **10 interpolations**, leaving out each time 1/10 of the dataset, were performed. The **average value, standard deviation and confidence interval of these 10 interpolations were calculated**.

Spatial statistics methods applied: Neural Networks with Radial Basis Function. (For the soil regions of Po valley a General Linear Regression model)

10-fold cross-validation performed

ITALIAN COVARIATES WERE **RESAMPLED** ON THE **GSP-ISRIC-GRID**.
GLOBAL+ITALIAN COVARIATES ENTERED IN THE SELECTION PROCEDURE
PEDOLANDSCAPES (Soil Regions) GO BEYOND THE Administrative Regions

Same model and covariates adopted for different Adiministrative Regions inside the same Soil Region

	ITALY	SOIL REGION D
PEDOLANDSCAPE	The 10 ITALIAN SOIL REGIONS (1:5.000.000 scale) 	The soil map units of soil region D (1:250.000 scale) 
CATEGORICAL	• **Land use map** • Gleyic, Histic, Coarse soils as produced for the **Less Favoured Areas** mapping + • Sodic, Vertic, Arenic, Shallow, and Acid	• **Land use map** • Gleyic, Histic, Coarse soils as produced for the **Less Favoured Areas** mapping
CONTINUOUS	**Completely different continuous covariates were used**! Despite that, transboundary issues are not visible in the final result. 	

Armonizzazione nazionale

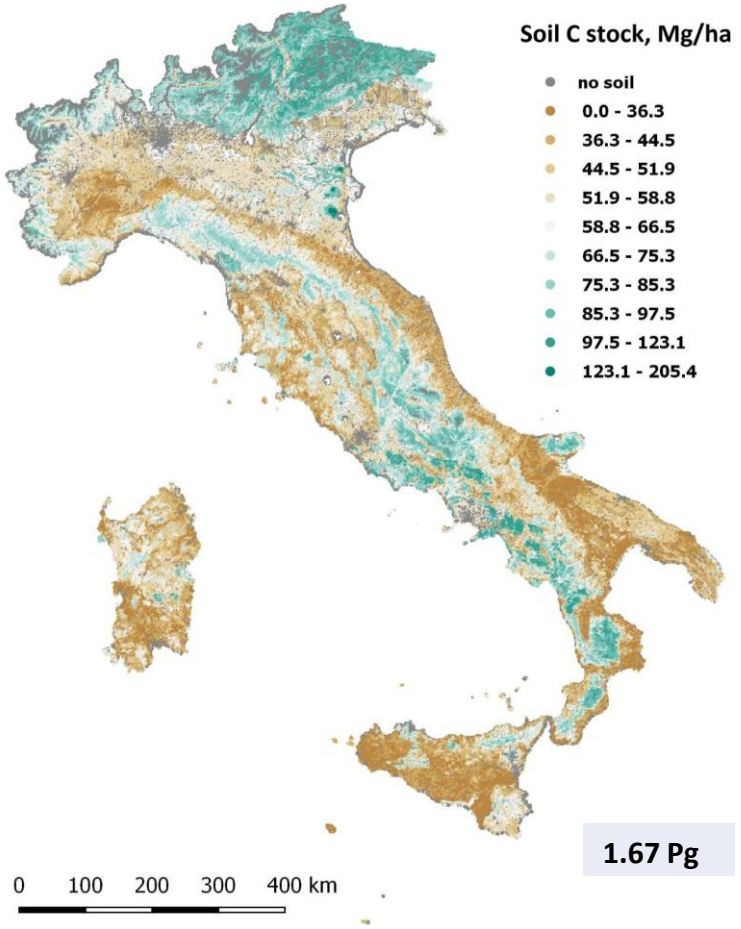
Regioni amministrative e Regioni di suolo

SPUNTO DI RIFLESSIONE SUL TEMA DEI

SOIL DYSTRICTS

IL RISULTATO FINALE

- An improvement in term of results'accuracy compared to previous experiences.
- A good experience of soil mapping collaboration inside the Osservatorio Nazionale Pedologico and Italian Soil Partnership.

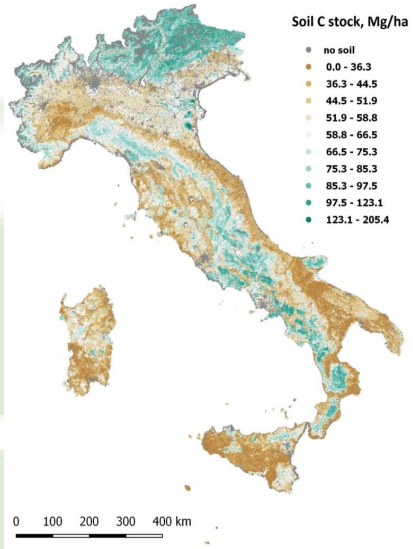


Maria Fantappiè, Costanza Calzolari, Fabrizio Ungaro, Ialina Vinci, Paolo Giandon, Adele Muscolo, Claudio Zaccone, Maria Teresa Dell'Abate, Giovanni L'Abate, Sergio Pellegrini, Stefano Brenna, Francesca Staffilani, Fabio Petrella, Lorenzo Gardin, Stefano Barbieri, Stefano Pini, Mauro Tiberi, Raffaele Paone, Luigi Scamarcio, … Edoardo A. C. Costantini. (2018). ELABORATION OF THE ITALIAN PORTION OF THE GLOBAL SOIL ORGANIC CARBON MAP (GSOCMAP) (1.2.0) [Data set]. Eurosoil 2020, Connecting people and soil (eurosoil2020), Geneva, Switzerland. Zenodo. https://doi.org/10.5281/zenodo.7746495

GSOCmap (0-30 cm)					Carbon stock Fantappiè et al., 2010 (0-50 cm)					Carbon stock SoilGrids1km (0-30 cm)				
CS	MAE	RMSE	IoA	R^2	CS	MAE	RMSE	IoA	R^2	CS	MAE	RMSE	IoA	R^2
57.38	25.51	36.43	0.55	0.183	**81.95**[a]	36.63	46.12	0.10	0.080	**107.37**	57.13	69.26	0.19	0.078

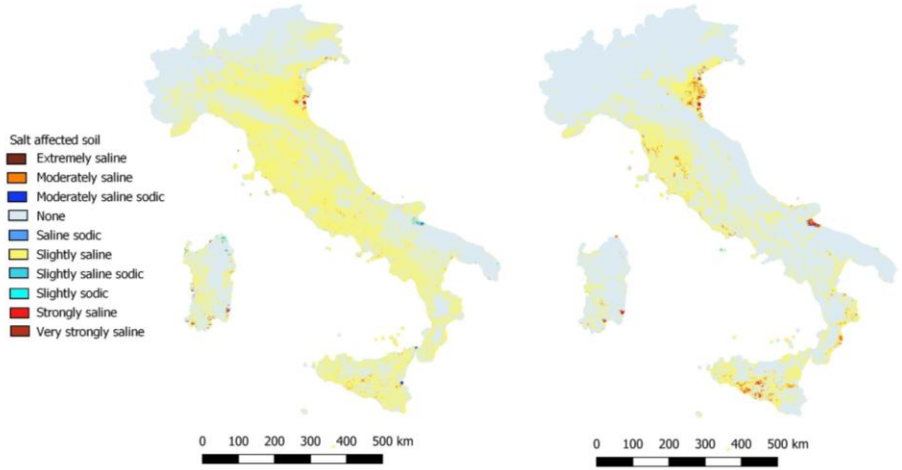
FAO - GSP – INSII NETWORK - International Network of Soil Information Institutions

GSOCmap



https://zenodo.org/record/7746495

GSASmap



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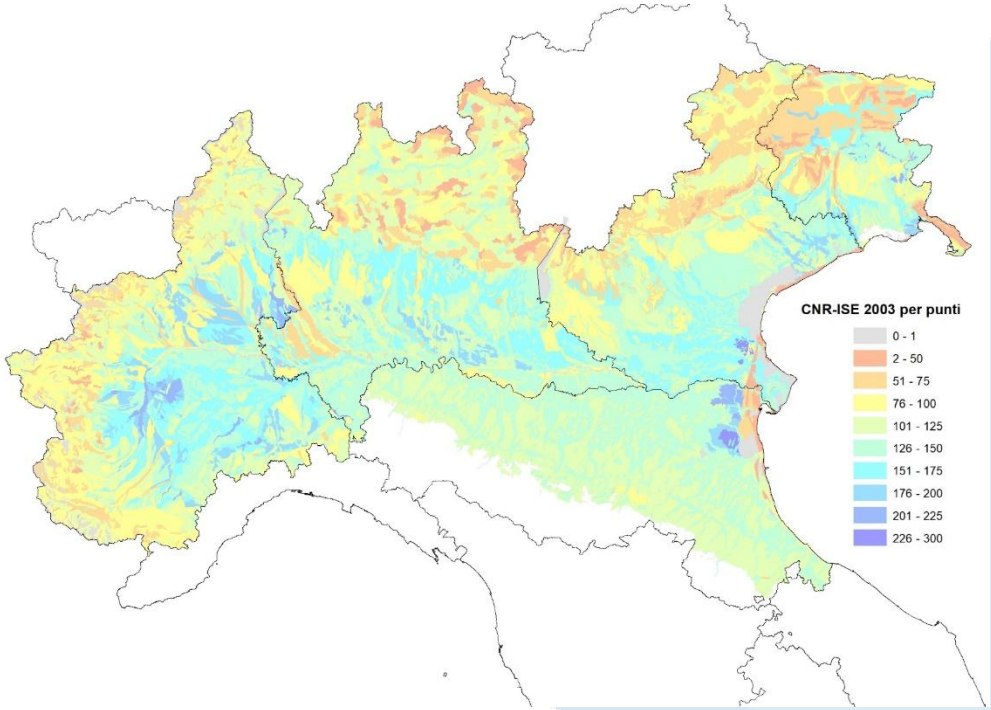
Per la Autorità di

Bacino del Po

Carta della capacità di acqua disponibile del bacino Padano-veneto



POSSIBILI CARTE DA PRODURRE SE SI DECIDE DI PARTECIPARE

5. **Global Soil Nutrient and Nutrient Budget Maps (GSNmap)**
6. **Global Soil Erosion Map (GSERmap)**
7. **Global Black Soil Distribution Map (GBSmap)**
8. **Global Soil Organic Carbon Sequestration Potential Map (GSOCseq)**
9. **Global Soil Pollution Map (INSOP & INSII)**

PROSPETTIVE FUTURE VERSO UN SISTEMA EUROPEO DI MONITORAGGIO DELLO STATO DI SALUTE DEI SUOLO A GUIDA NAZIONALE (COUNTRY DRIVEN)

EJPSOIL - WP6 "Supporting harmonised soil information and reporting"

Coordinamento

crea
Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria

EJPSOIL 24 EU countries of which 21 Member States

EU Soil Policies for soil protection

Request for soil indicators

MAPS&MONITORING

SITUAZIONE E VISIONE

CURRENT SITUATION

ESDAC EU-WIDE SOIL MAPS & LUCAS SOIL MONITORING

May not be representative

NATIONAL SOIL MAPS & SOIL MONITORING

Not EU-harmonised

Transboundary issues

EJP SOIL WP6

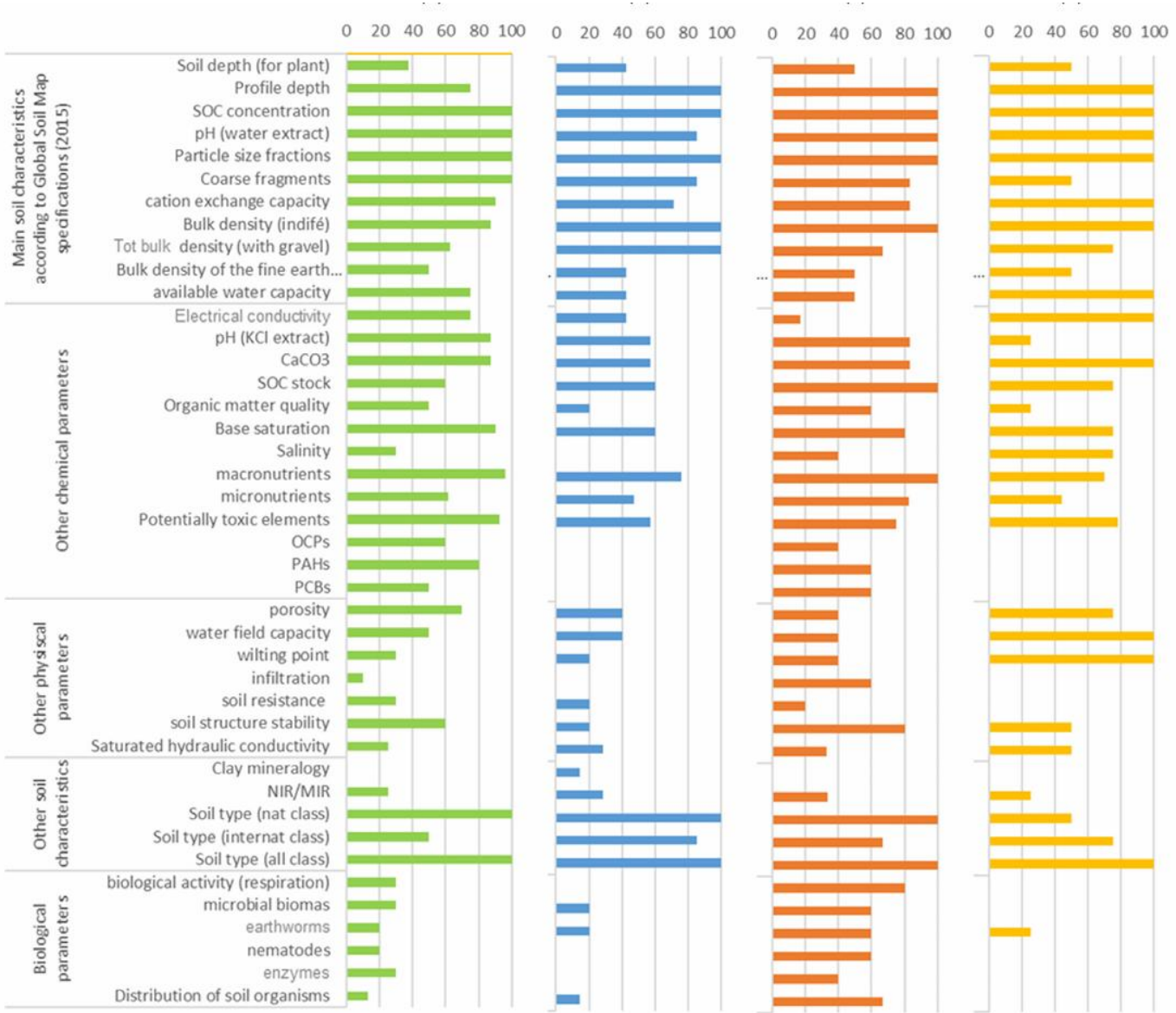
EJP SOIL TECHNICAL SOLUTION

EU-WIDE HARMONISED NATIONAL SOIL MAPS & SOIL MONITORING. WITH LUCAS AS *DE FACTO* STANDARD

MEMBER STATES IMPLEMENT

Stocktake: National soil data in EU countries: Where do we stand?

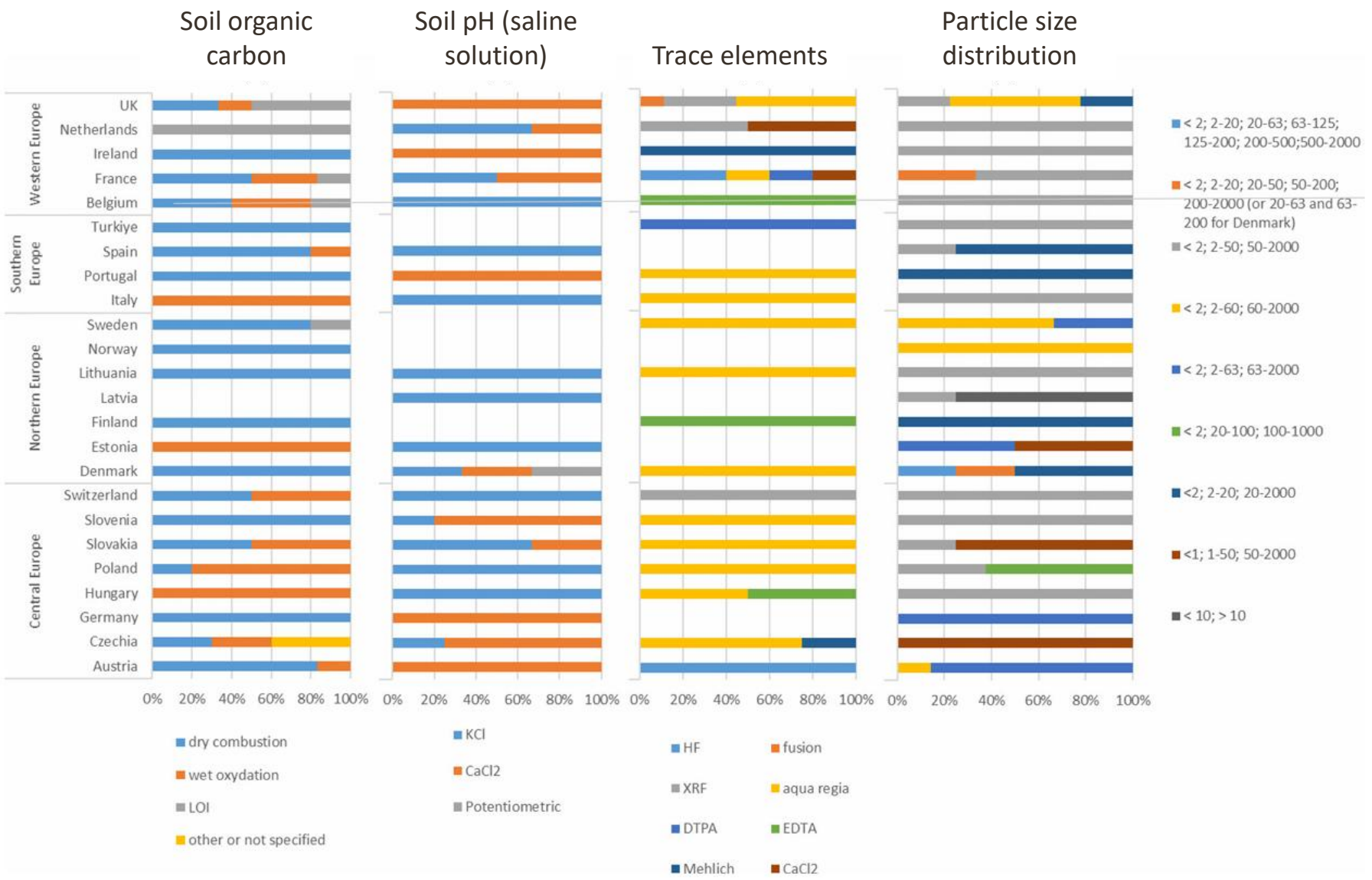
Data availability in different European regions (% of countries)



Cornu et al. 2023. EJSS. https://doi.org/10.1111/ejss.13398

European Journal of Soil Science

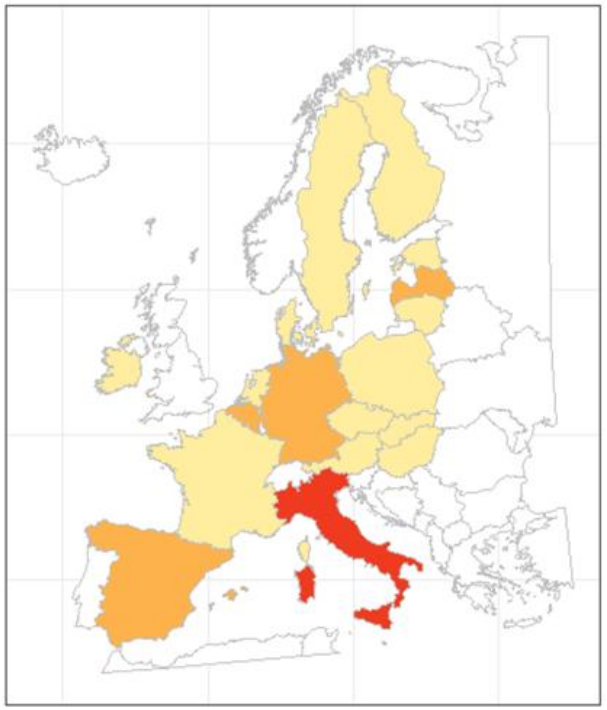
Variability of laboratory methods used in European countries



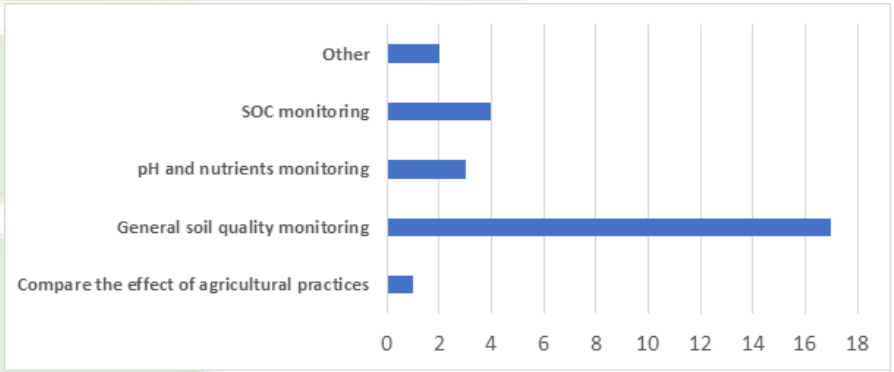
Cornu et al. 2023. EJSS. https://doi.org/10.1111/ejss.13398

European Journal of Soil Science

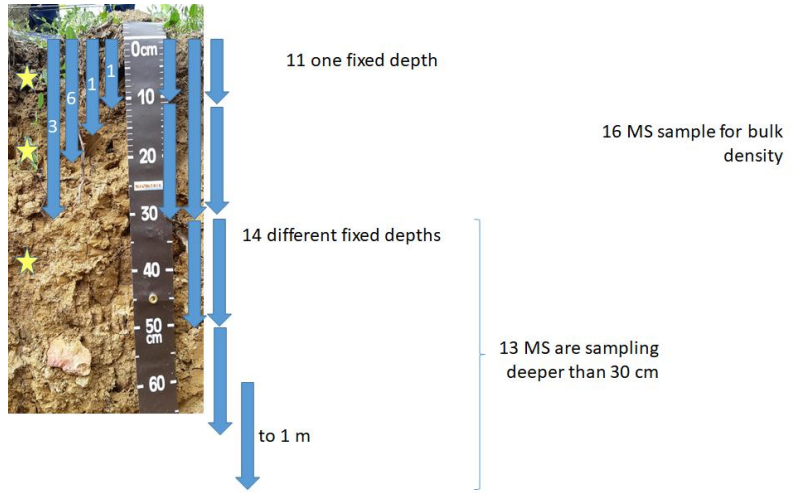
SURVEY OF NATIONAL SOIL MONITORING NETWORKS IN EJP SOIL COUNTRIES



- 21 countries answered out of 24 (ending with 28 declared SMS)
- Turkey and Portugal do not have SMS
- Five countries have 2 or 3 monitoring systems
  - SMS managed at regional scale
  - SMS with different purposes (e.g. agricultural *vs* forest, monitoring trace element *vs* agricultural parameters, monitoring a network of highly instrumented sites *vs* network agricultural soils)
- Caution: Not all countries declared their forest SMS



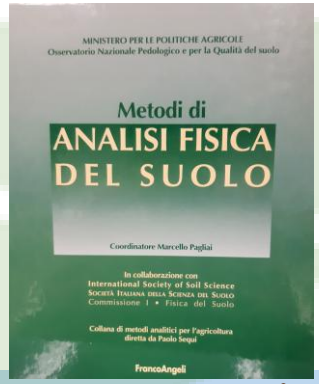
4 according to horizons



SMS with very diverse protocols and with different soil parameters monitored

STANDARIZZAZIONE DELLE PROCEDURE ANALITICHE, CONTROLLO DELLA QUALITA' DEL DATO, AGGIORNAMENTO METODI STANDARD DI ANALISI DEL SUOLO, RING TEST (PROFICIENCY TESTS)

In Italia http://www.silpalab.it/



Procedure standard elaborate dall'Osservatorio Nazionale

OBIETTIVO
UNA RETE
NAZIONALE DI
LABORATORI DEL
SUOLO CERTIFICATI

arpav

In Europa e nel Mondo

WEPAL QUASIMEME

International Soil-analytical Exchange Programme – ISE (Wageninghen University)

https://www.wepal.nl/en/wepal/Home/Proficiency-tests/Soil/Proficiency-tests/ISE.htm

GLOSOLAN
GLOBAL SOIL LABORATORY NETWORK

https://www.fao.org/global-soil-partnership/glosolan/en/

EJP SOIL European Joint Programme
INSII SoilWise KNOWLEDGE & DATA FLOWS

World Soil Day 05/12/2025 – Venezia – Giornata di Studio
Il Monitoraggio del Suolo, ARPAV - Veneto

SOILHUB
SOILHUB2 GESTIONE SOSTENIBILE DEI SUOLI
crea Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria

Double sampling exercise within LUCAS Soil 2022 to check the impact of sampling protocols and analytical methods and support the development and/or validation of transfer functions

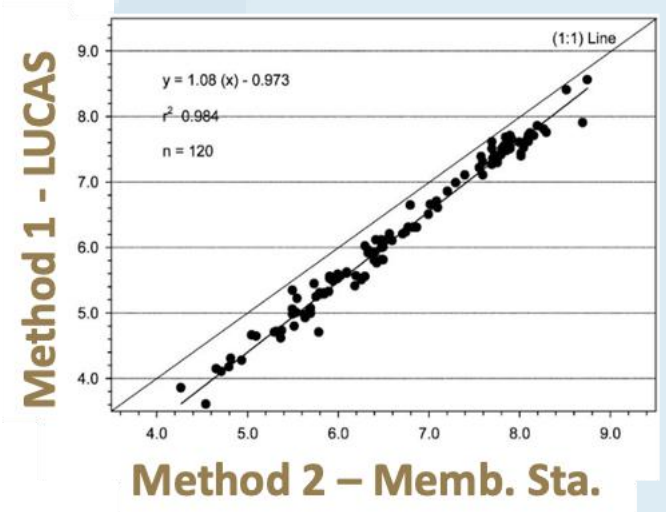
Analytical procedures

- Double samples obtained from LUCAS 2022 samplers
- Between 100 and 200 sites will be analyzed depending on the countries
- 17 countries involved
- Comparison of EU and national results

Sampling and analytical procedures

- Sampling (on national SMS and/or on LUCAS 2022 points) according to national and LUCAS sampling protocols
- 6 countries involved
- Compare the overall process

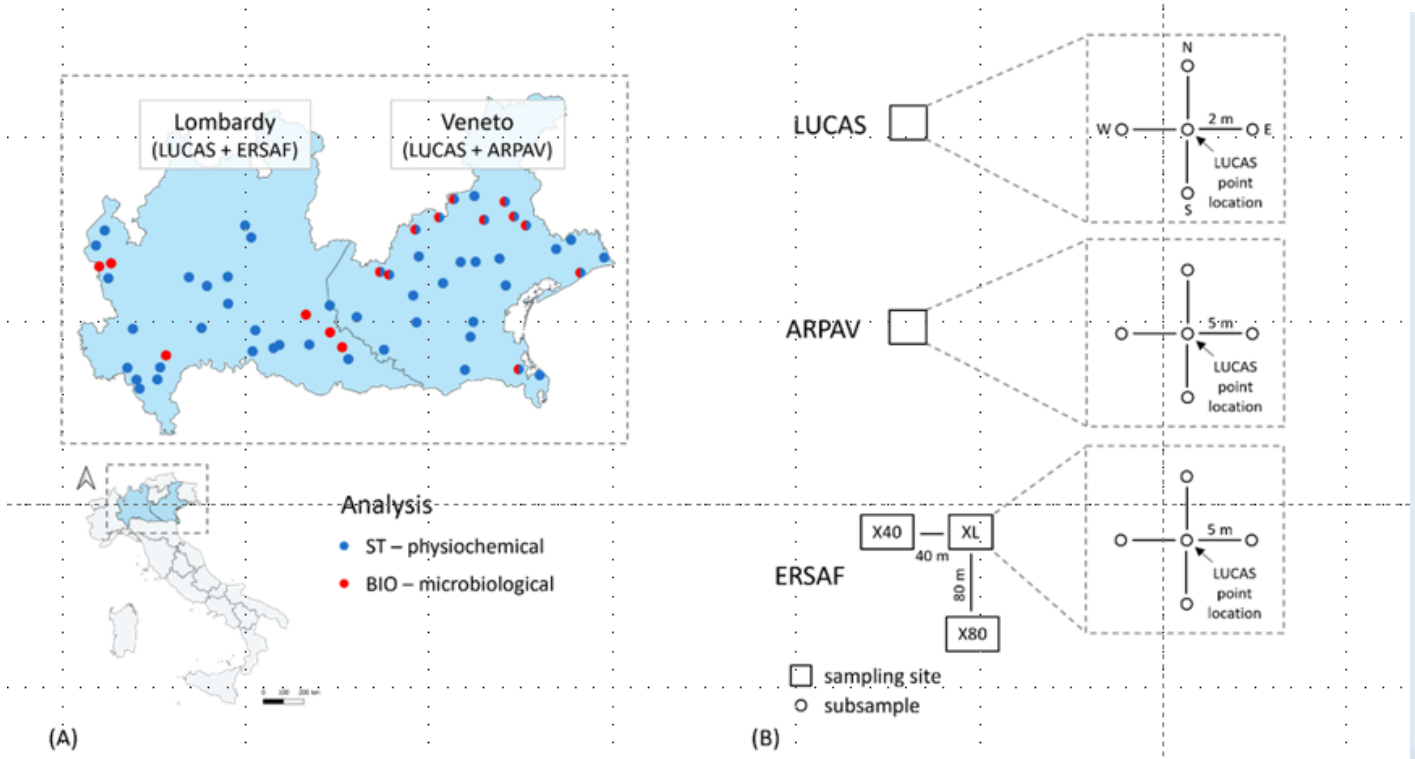
Transfer functions



Soil Mission Call

=> Un progetto di ricerca specifico inizierà da metà anno 2026

EJPSOIL LUCAS 2022 DOUBLE SAMPLING CAMPAIGN – IN ITALIA



Two italian regions involved

Physicochemical soil properties analyzed in 52 sites by ARPAV

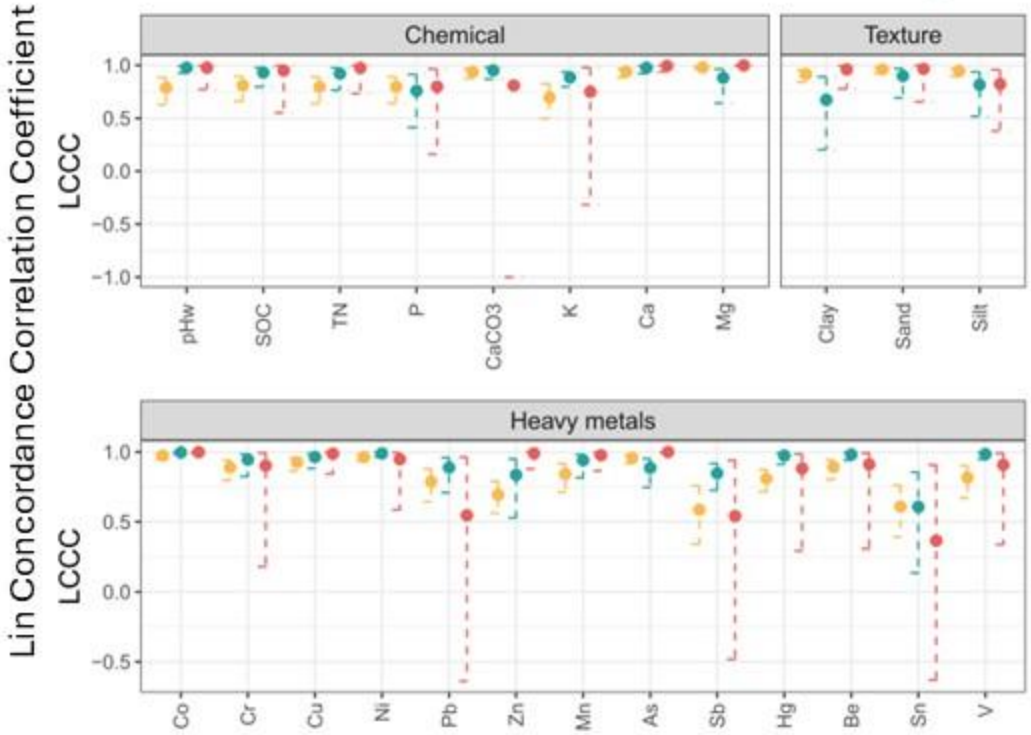
Microbiological soil properties analyzed in 17 sites by CREA

Joint Research Center

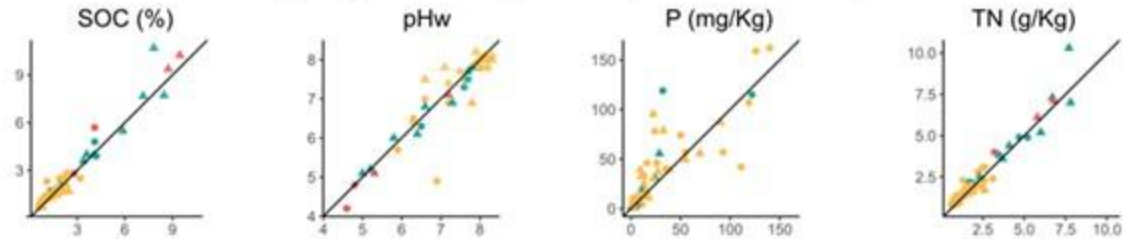
Del Duca et al., 2025. https://doi.org/10.1111/ejss.70108

Double sampling exercise within LUCAS Soil 2022 in Italy: effect of the sampling procedures

Physicochemical soil properties



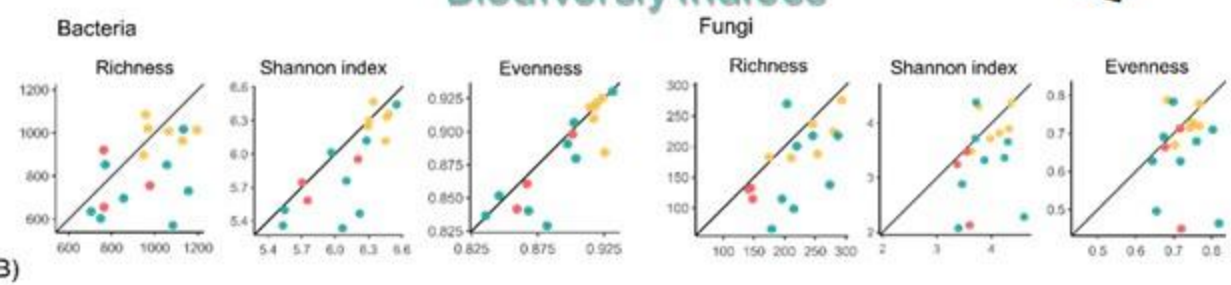
XY graph showing the relationship between the results of the Italian protocol (x axis) compared to the one of the LUCAS (y axis). The 45° degree line represents the ideal perfect concordance.



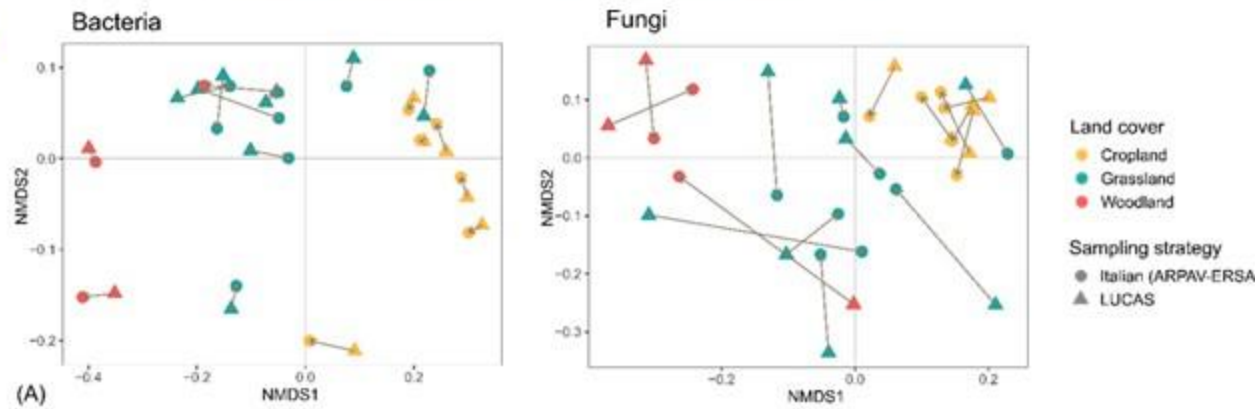
- Concordance among LUCAS and Italian sampling protocol varied depending on the physicochemical parameter being considered and on land cover
- Overall , good concordance was detected, but some key soil health indicators (eg.SOC; P; pH) showed significant differences

Biodiversity indices showed low concordance, but community composition was proved to be comparable among sampling strategies

Biodiversity indices



Bacteria and Fungi communities



Set di indicatori biologici suggeriti

Minimum set of indicators to be used (less than 1,000 euros/sample)

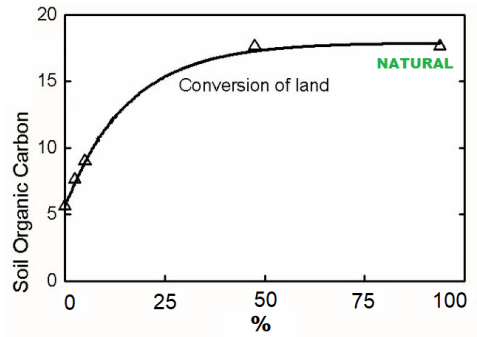
Priority level	Recommended indicators		Brief description	Methodology	Cost
Tier I	Functional Indicators	Microbial biomass C	Amount of microbial biomass per gram soil	ISO 14 240-1 / -2 EN ISO 11 063	20-30€/sample
		Microbial respiration	Production of CO2 per amount of soil	ISO 16072:2002	20-30€/sample
		Enzyme activity	Measurement of several hydrolase activities in soil	ISO 14 238 ISO/TS 22 939 ISO 23 753-1 ISO 23 753-2	20-80€ for each enzyme
	Structural indicators	Ecosystem engineers (Macrofauna)	Structural and functional diversity (earthworms)	ISO 23611-1:2018	30-140€
		Biological regulators (Mesofauna)	Structural and functional diversity	ISO 23611-2:2006 QBS-ar (Parisi et al., 2005)	75-140€
		Biological regulators (Microfauna)	Structural and functional diversity (nematodes)	ISO 23611-4:2006	30-140€
		Chemical engineers (Microorganisms)	Structural diversity of soil microbiota (bacteria, archaea, fungi)	DNA metabarcoding (ISO 11063:2020) and Plassart et al., 2012	75-100€ for each target group

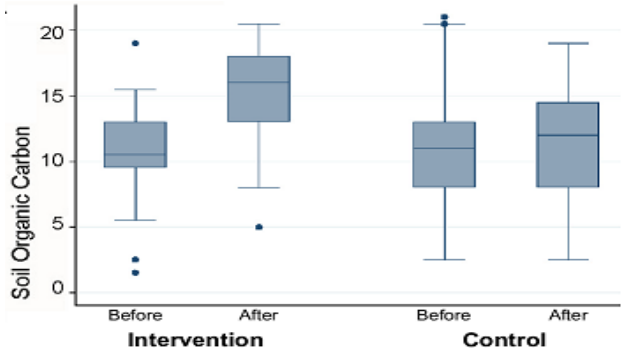
EJP SOIL ANALISI DEI DIVERSI APPROCCI PER VALUTARE GLI INDICATORI DI STATO DI SALUTE DEI SUOLI

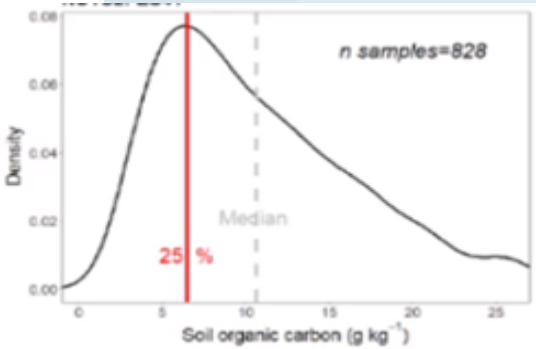
FIXED VALUE	RELATIVE TO NATURAL LAND USES	RELATIVE CHANGES	DISTRIBUTION
One static value, based on best available research/knowledge, stratified as required	One static value, calculated as a percentage of what would be found under 'natural' land uses (stratified as required). Based on modelling	A value calculated based on the local state of the soil and static only for a given period of time (i.e. target is an increase/decrease of y% of current value within x years), after which the value may change)	A value calculated based on the regional state of the soil (i.e. target/threshold is a certain percentile of the current range of values), static only for a given period of time (until distribution is re-measured), after which the target/threshold may change

Matrix of mean SOC minimum and maximum thresholds for cropland soils (% soil mass)

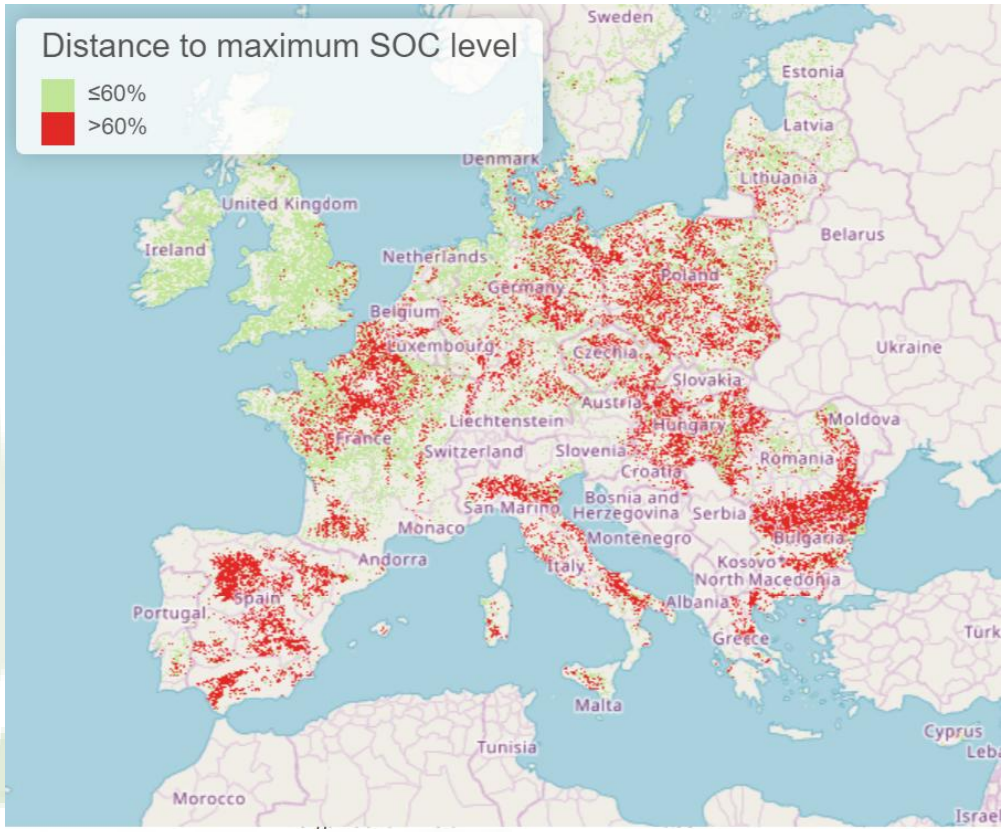
Soil texture class	Climatic water balance (mm) summer					
	Less than -100		-100 to 0		More than 0	
	Min.	Max.	Min.	Max.	Min.	Max.
Sand	0.5	1.23	0.9	1.73	1.2	2.23
Silt	1.5	2.53	1.0	2.07	0.8	1.59
Loamclay	0.6	1.47	0.9	1.92	1.9	3.23







Soil Health Monitoring – EUSO Dashboard and the SoilWise project



https://esdac.jrc.ec.europa.eu/esdacviewer/euso-dashboard/

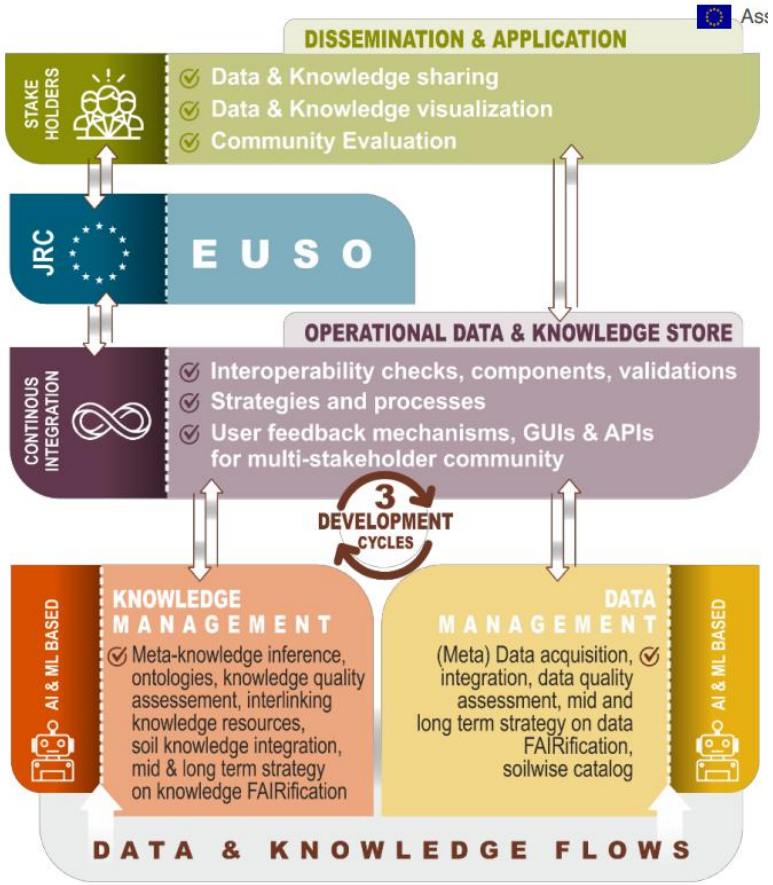


Figure 1 Overview of SoilWise methodological approach.

https://soilwise-he.eu/

EUSO

SoilWise KNOWLEDGE & DATA FLOWS

ILVO Flanders State of the Art

ISRIC World Soil Information

we transform

WAGENINGEN UNIVERSITY & RESEARCH

crea Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria

MASARYK UNIVERSITY

gaia EPICHEIREIN

BioSense INSTITUTE

cirad AGRICULTURAL RESEARCH FOR DEVELOPMENT

INRAE

ELO European Landowners' Organization

NEUROPUBLIC

zalf Leibniz Centre for Agricultural Landscape Research (ZALF)

L'ITALIAN SOILHUB - LA RETE NAZIONALE PER LA PROTEZIONE DEL SUOLO

Dal 2020 al 2024 è stato attivo il progetto SOILHUB, finanziato da MASAF e coordinato dal CREA (Roberta Farina) e Adesso rifinanziato come SOILHUB2, che ha come principale obiettivo proprio la messa a sistema (rete) della complessa realtà di competenze, conoscenze, esperienze in tema di protezione del suolo presenti in Italia.

SOIL HUB
CREA CREA-AA CREA-PB UniPA CNR-IBE ENEA ISPRA ERSAF AGRIS

SOILHUB2
GESTIONE SOSTENIBILE DEI SUOLI

Tavolo tecnico a supporto dell'implementazione SML in Italia convocato da MASE

https://soilhub.crea.gov.it/homepage/

Obiettivo del WP2
Criteri per l'istituzione e la gestione di un osservatorio sui suoli.

Maria Fantappiè CREA Francesca Assennato ISPRA

LO STATO ATTUALE E PROGETTI CORRELATI

dove

PNRR –SIM MASE-ISPRA con **partecipazione MASAF-CREA**

CSI-100K MASAF-CREA

sono

PROGETTI EUROPEI e.g. SOILWISE MONNALISA ecc

PROGRAMMI DI SERVIZI DA SATELLITI e.g. COPERNICUS IRIDE …

Progetto Registri di Carbonio ??? MASAF-CREA

Le regioni

RETE DELLA PAC 2023-2027 (MASAF-CREA)

1) **Analisi dei benefici ambientali della PAC attraverso l'uso di modelli**
2) **Supporto alle regioni per la valutazione dell'impatto delle politiche di sviluppo rurale sullo stato dei suoli agricoli e forestali italiani.**

SEMPRE MAGGIORE LA NECESSITA' DI INTEGRAZIONE BANCHE DATI E CONOSCENZE PER FORNIRE SERVIZI ACCURATI IN RISPOSTA A NUMEROSE RICHIESTE

Concorrenza dai privati oppure loro integrazione nei servizi pubblici?

Annosa questione della condivisione dei dati e della suddivisione ruoli

Nel tavolo tecnico stiamo lavorando per la definizione dei …

(8) ‘**soil district**’ means a part of the territory of a Member State, which has been delineated by that Member State in accordance with this Directive;
(9) ‘**soil unit**’ means a spatially discrete area within a soil district resulting from the intersection of sets of spatial data used as factors for statistical homogeneity within that soil district;

Costantini and Dazzi (eds.), The Soils of Italy, World Soils Book Series.
DOI: 10.1007/978-94-007-5642-7_6

Alterra Report

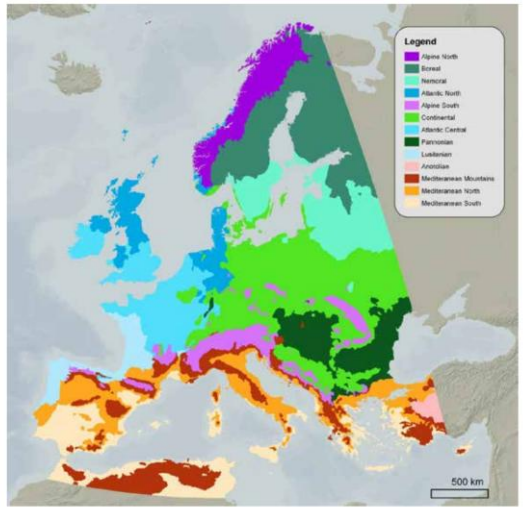


Figure 1
The thirteen Environmental Zones (EnZs) of the Environmental stratification of Europe (Metzger et al., 2005).

Climatic Regions of Italy

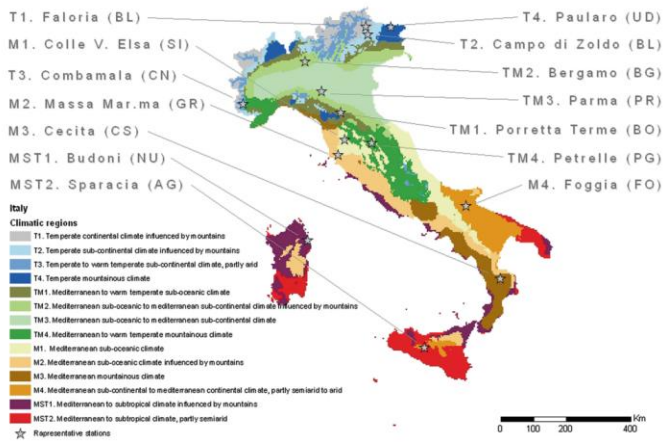
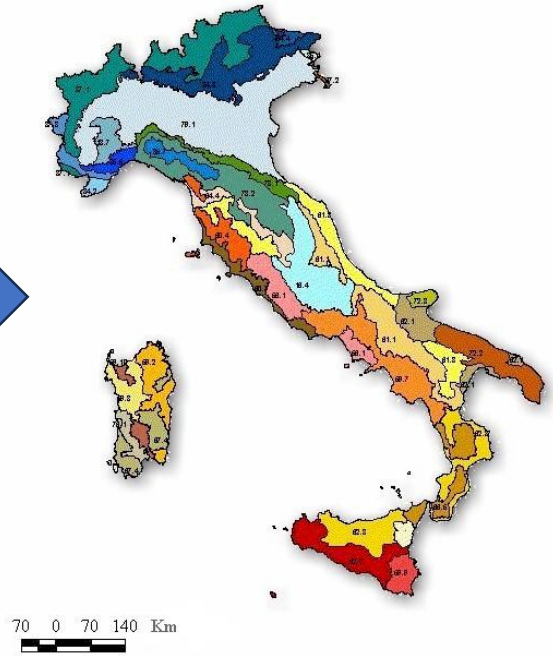


Fig. 2.10 Climatic regions of Italy and representative meteorological stations



The Italian Soil Regions
1:5,000,000 scale

Defined by WRB soil types and climatic conditions

Table 6.1 Hierarchy of soilscapes and databases of Italy

Soilscape	Reference scale	Reference polygon size (ha)
Soil region	1:5,000,000	10^5–10^6
Soil sub-region	1:1,000,000	10^3–10^5
Soil system	1:500,000	10^3–10^4
Soil sub-system	1:250,000	10^2–10^3
Soil unit	1:50,000	10^1–10^2
Soil element	1:10,000–25,000	10^{-1}–10^1

	Soil regions of the Italian hills			**100347**	**33.2**
	18.7	Langhe, Monferrato and “hills of the Po” on Tertiary marine deposits	Cambisol - Luvisols - Fluvisols	3963	1.3
	35.4	Hills of Friuli on calcareous sedimentary rocks	Leptosol - Cambisol - Regosols - Luvisols	468	0.2
	56.1	Hills of central and southern Italy on effusive volcanic rocks	Cambisol - Andosol - Regosols	8702	2.9
	59.1	Hills of Sardinia on basic rocks	Cambisol - Leptolsol –Vertisols - ArenosolFluvisol	2434	0.8
	59.7	Hills and mountains on limestone covered by volcanic ashes of southern Italy, and included alluvial and coastal plains	Cambisol - Leptosol - Luvisols	15226	5.0
	59.8	Hills of Sardinia on basalt and trachyte	Cambisol - Leptolsol - Vertisols	5261	1.7
	59.9	Hills and mountains on limestone and igneous rocks of Sicily	Cambisol - Leptosol - Andosols	3398	1.1
	61.3	Hills of central and southern Italy on Pliocene and Pleistocene	Cambisol - Regosol - Vertisols	16292	5.4
	62.2	Hills of Sicily on Tertiary clayey flysch, limestone, sandstone and gypsum, and coastal plains	Cambisol - Luvisol - Vertisol - Leptosols - Regosols	12089	4.0
	62.3	Hills of Calabria and Sicily on Tertiary calcareous rocks and sediments, with included alluvial and coastal plains	Cambisol - Vertisol - Luvisol	15021	5.0
	67.2	Carso	Leptosol - Cambisol - Luvisols,	400	0.1
	72.2	Hills of Murge and Salento	Luvisol - Regosol - Cambisol	10082	3.3
	72.3	Hills of Gargano	Luvisol - Cambisol	1524	0.5

GRAZIE PER L'ATTENZIONE

Maria Fantappiè

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