



**Programma di  
Sviluppo Rurale**  
dell'Emilia-Romagna  
2014 - 2020

# Soil C Monitoring & Support by Rural Development

*Giampaolo Sarno*  
Regione Emilia-Romagna

Brussels, March 31 2023



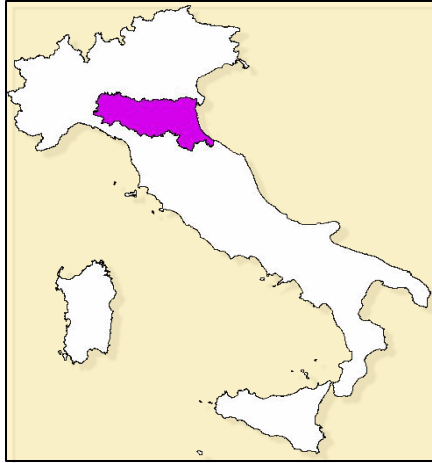
UNIONE EUROPEA  
Fondo Europeo Agricolo  
per lo Sviluppo Rurale



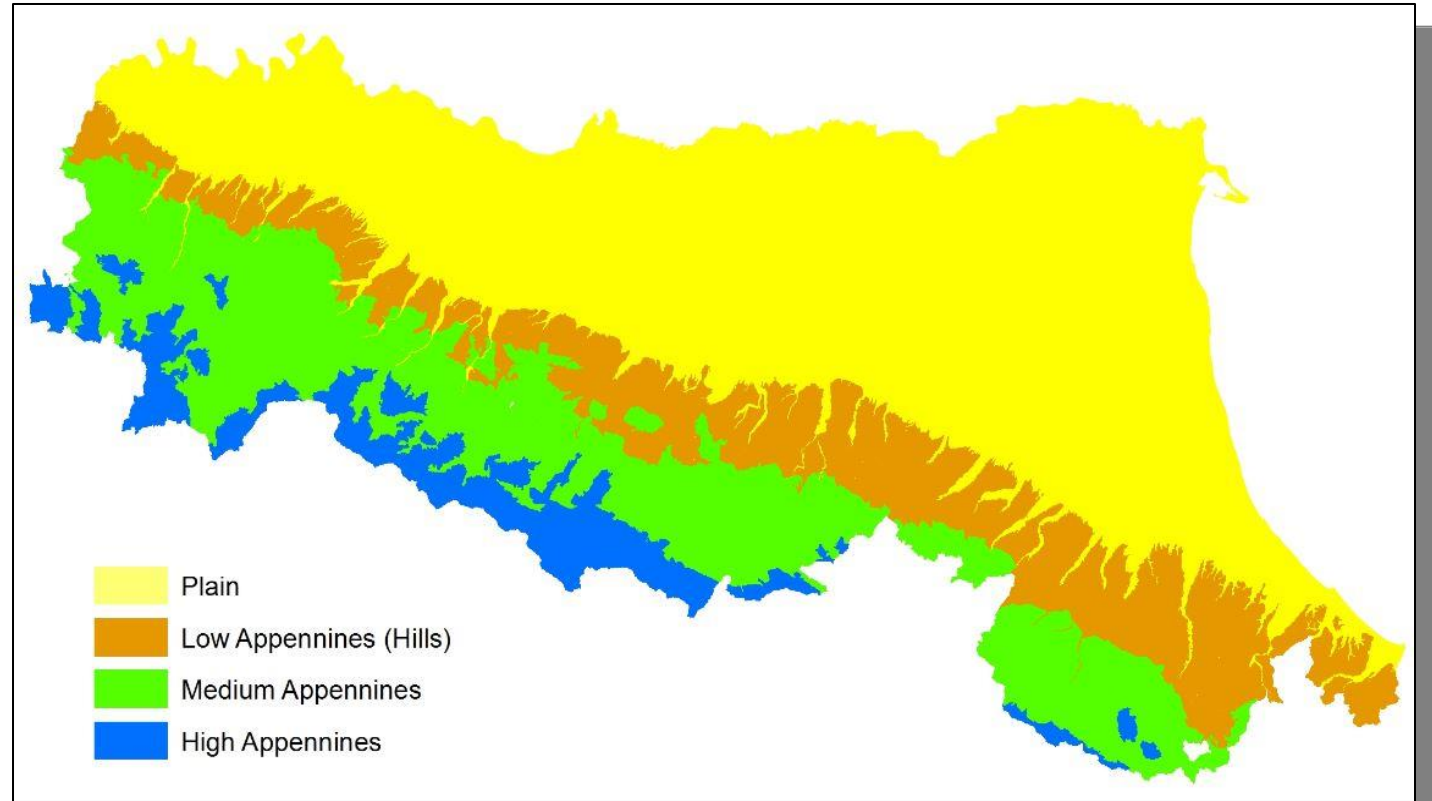
 **Regione Emilia-Romagna**

L'Europa investe nelle zone rurali

# MORPHOLOGY OF EMILIA-ROMAGNA

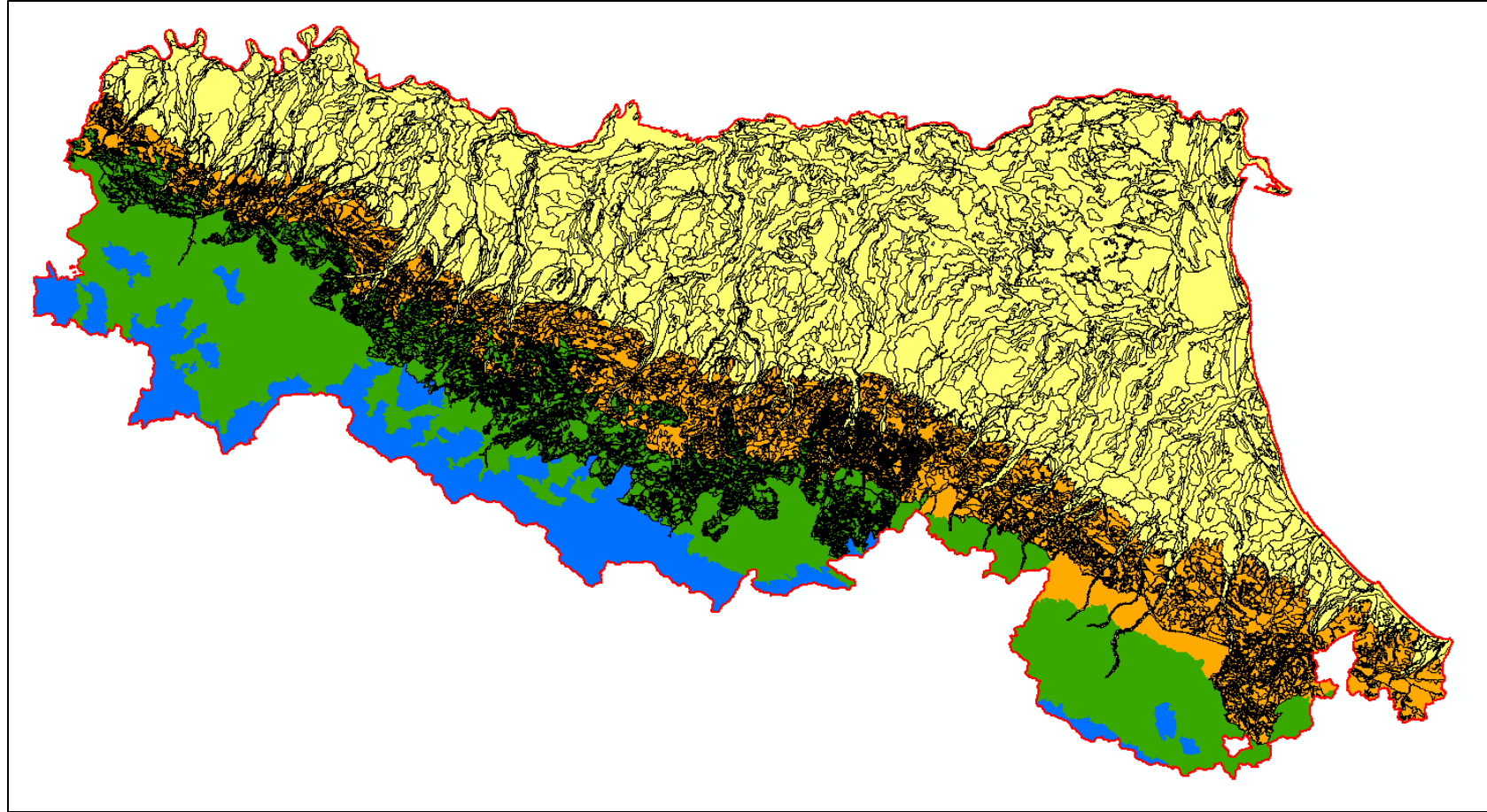


**The Apennine chain covers half the total Area of the region**



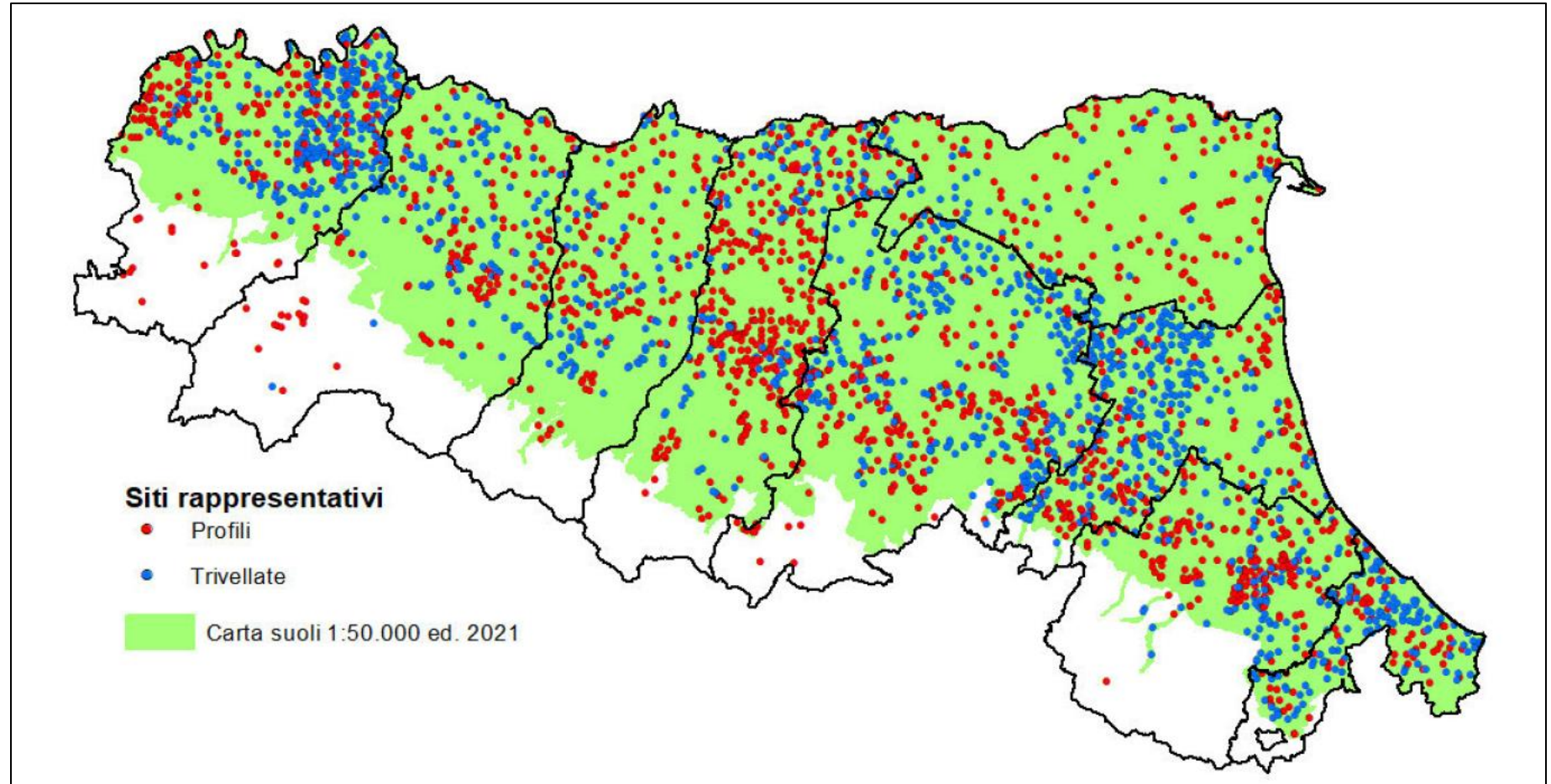
# SOILS of Emilia-Romagna

Soil MAP 1:50.000  
466 Soil types



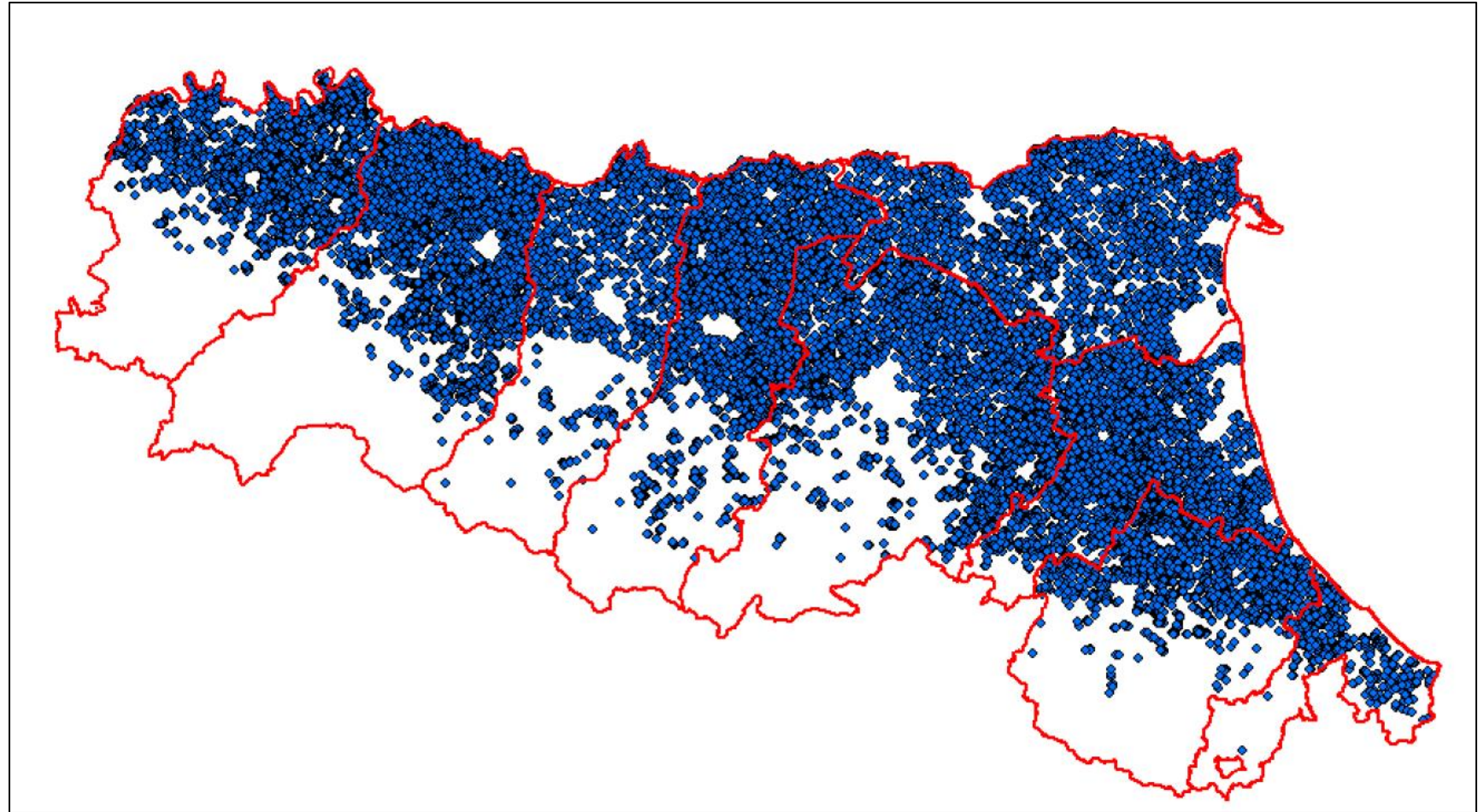
# Distribution of Soil benchmark sites

3.000+ sites  
Based on s.  
types



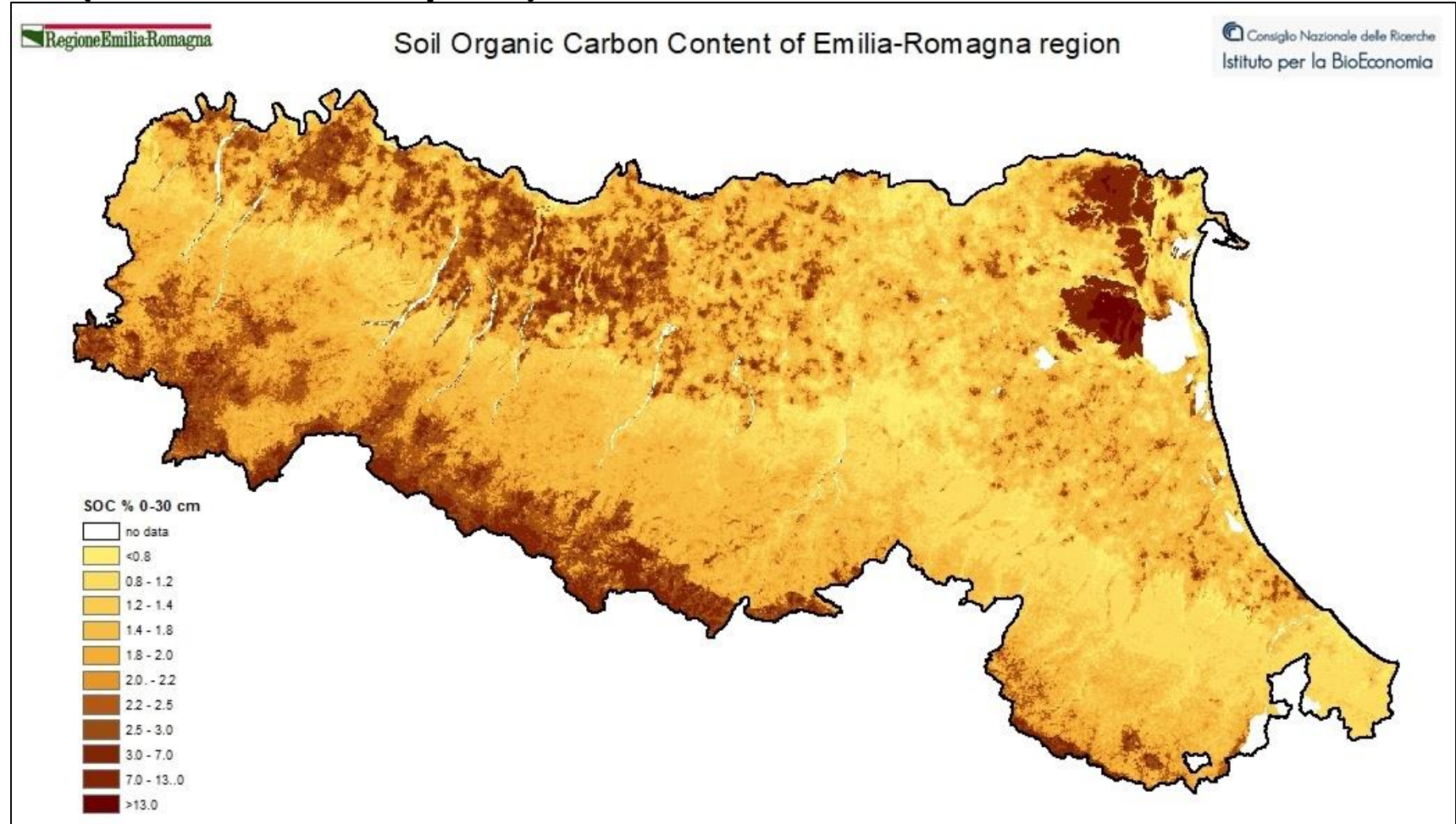
# Distribution of Soil analysis – fertilization advice

42.000+ sites  
Geo-referenced  
routine analysis



# Distribution of SOC (0-30 cm depth)

15.000 SOC  
analysis



# MONITORING AG. SOILS' QUALITY (chemical, physical and biological features)

1. Duration: 2018 - 2023
2. Financing: Rural Development Programme 2014-2020 (500.000 euro)
3. Co-ordinated by
  - DG Environment;
  - DG Agriculture.
4. Work execution: coop. I.ter. (field survey)  
laboratorio C.S.A. (soil analysis)

## Objectives

1. Soil quality evaluation
2. Evaluation of Rural Development measures
3. Indicators for SOC as related to C farming practices:  
**How far RDP contributes to SOC increase?**



# MONITORING AG. SOILS' QUALITY

## TASK 1

### 1. Soil quality evaluation in 123 sites.

1st Sampling campaign 2019;

2nd Sampling campaign 2022.

Repetition of chemical, physical and biological analysis

Sites choice

- 60 couples: conventional vs. sustainable (eco./int./conservation) + 3 permanent meadows
- Main soil types
- Main cropping systems.



## TASK 2

### 2. Soil routine analysis in 2.270 sites (refresh s. analysys DB).





**Programma di  
Sviluppo Rurale**  
dell'Emilia-Romagna  
2014 - 2020

# Support by Rural Development to enhance Soil quality



**UNIONE EUROPEA**  
Fondo Europeo Agricolo  
per lo Sviluppo Rurale



 **Regione Emilia-Romagna**

L'Europa investe nelle zone rurali

# Agri-climate-env. Direct Measures for SOC

MEASURES	(2014-2022)		
	planned	delivered	area
	Meuro	Meuro	ha
10.1.3 Soil improvers	6,7	11	12.103
10.1.4 Conservation ag.	5,4	1,8	1.221
<b>Total</b>	<b>12,1</b>	<b>12,9</b>	<b>13.553</b>





# AGRI-CLIMATE-ENVIRONMENT MEASURES SOM/SOC INCREASE

Operations	Area	SOM increase			SOC increase	
	ha	kg · ha <sup>-1</sup> anno <sup>-1</sup>	t·anno	Variazione annua stock SOS (%) (a)	kg·ha <sup>-1</sup>	Mg·anno <sup>-1</sup>
10.1.01 Integrated	112.674	21	2.331	0,0005	12	1.353
11.1/2.01 – Ecological	148.511	31	4.973	0,0008	18	2.886
10.1.03 Soil improvers	12.103	996	11.168	0,0255	578	6.482
10.1.04 Conservation agriculture	1.221	1.311	1.601	0,0336	761	929
10.1.07 Permanent Meadows	8.124	960	7.799	0,0246	557	4.526
10.1.10 Environmental set aside	5.710	451	2.575	0,0116	262	1.495
Cover crops	645	606	391	0,0155	352	227
<b>Total</b>	<b>288.098</b>	<b>106</b>	<b>30.838</b>	<b>0,0027</b>	<b>61</b>	<b>17.898</b>

