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CHALLENGES OF SOIL MONITORING AT LIVING LABS ON PERMANENT CROPS

- EU SOIL OBSERVATORY (EUSO) 5TH STAKEHOLDERS FORUM / GT 09. SOIL HEALTH

RUTH PEREIRA^{1*}, VERÓNICA NOGUEIRA¹, ANABELA CACHADA², SUSANA PEREIRA³, TATIANA ANDREANI⁴, ELEONORA BONIFACIO⁵, SILVIA STANCHI⁶, INES MARIA ALONSO-CRESPO⁷, JOSÉ JORGE DOMÍNGUEZ MARTÍN⁸, MARINA DACAL DE TOMAS⁹, JULIO CALERO GONZALEZ¹, JERZY JONCZAK¹⁰, ALEKSANDRA CHOJNACKA¹¹, DAVID LAFOND¹², JOÃO COUTINHO¹³, MARIA DE FÁTIMA GONÇALVES¹⁴, ANA COIMBRA¹⁵, MARTA REBOREDO¹⁶, MARIA LEONOR PEREIRA¹⁷, CRISTINA CARLOS¹⁸

¹ GreenUPorto/INOVA4Agro & Department of Biology, Faculty of Sciences, University of Porto, Rua do Campo Alegre s/n., 4169-007 Porto, Portugal

² GreenUPorto/INOVA4Agro & Department of Geosciences, Environment and Territory Management, University of Porto, Rua do Campo Alegre s/n., 4169-007 Porto, Portugal

³ CEGOT—Centre of Studies in Geography and Spatial Planning, Geography Department, Faculty of Arts and Humanities, University of Porto, Via Panorâmica s/n., 4150-564 Porto, Portugal

⁴ GreenUPorto/INOVA4Agro & Department of Biology, University of Porto, Rua do Campo Alegre s/n., 4169-007 Porto, Portugal

⁵ Department of Agricultural, Forest and Food Sciences, University of Torino, Largo Braccini 2, Grugliasco (to), Italy

⁶ Grupo de Ecología Animal (GEA), Universidade de Vigo, E-36310, Vigo, Spain

⁷ University of Jaén, Jaén, Spain

⁸ Department of Soil Science, Institute of Agriculture, Nowoursynowska 159, building 37, office 1/127, 02-776 Warsaw, Poland

⁹ 42, rue Georges Morel BP 60057, 49071 Beaucouzé, Angers, France

¹⁰ CITAB, Inov4Agro, Universidade de Trás-os-Montes e Alto Douro, UTAD, 5000-801 Vila Real, Portugal

* ruth.pereira@fc.up.pt

The Living Labs (LL) concept dates back the 2000's some having both a social and a physical dimension where it is possible to individuate objectives, perform research, test solutions, and exchange knowledge following a co-creation and multi-actor approach. The co-creation process should start early, be continuous, and include all the relevant actors, who will closely collaborate in identifying the problems and developing and implementing solutions (Bentzen, 2022). LivingSocial is a project addressing soil health on permanent crops (vineyards, olive and chestnut groves and, apple and hazelnut orchards), through the implementation of 50 experimental sites at 5 LL [Luso-Galician (North of Portugal-North of Spain), Andalusian (South of Spain), Loire Valley and Beaujolais (France), North-Western Italy – Piemonte and Grojéc (Poland)], and it brought several challenges, to all the actors, from the academia to the farmers.

Soil scientists need to be prepared to deal with and to communicate the limitations of tacit knowledge, uncontrollable variables (e.g., type of soil, unpredictable climatic events, unexpected crop diseases), and the difficulties or even the impossibility of replication. They also need to be available to build up the sampling designs and soil monitoring framework with the farmers, to integrate their perception and expectations, the relevance of the evaluations and solutions to be tested, and the possible transfer of methodologies for a long-term evaluation of soil health changes. Meanwhile, additional difficulties are brought by the standardization and harmonization of methods and procedures. Standard procedures or recommended soil monitoring protocols may, in fact, not be directly transferable to all real-life settings and to intensively managed soils. All these difficulties require continuous reflection and adjustment and must be transparently shared and discussed with all the stakeholders, as this could jeopardize bigger objectives such as transferring solutions to other regions. The aim of this presentation is thus to share the challenges faced, to promote discussion, and collaboratively find solutions. The experimentation under real-life conditions is a highly valuable learning process for everyone involved in LLs, as it truly enables the generation of significant knowledge on new management practices aimed at healthier soils, thus justifying all the efforts on its refinement, but also on the management of expectations.

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SPATIAL CHARACTERIZATION OF AGGREGATE STABILITY IN AN OXISOL UNDER NO-TILL SYSTEM IN THE BRAZILIAN CERRADO

- EU SOIL OBSERVATORY (EUSO) 5TH STAKEHOLDERS FORUM / GT 01. SOIL GENESIS, EVOLUTION AND CLASSIFICATION

NILTON EUGÉNIO MÁRIO¹, DANIEL CARLOS MACHADO^{2*}, RAFAEL MONTANARI³, LATEIRO SALVADOR DE SOUSA⁴, NEUSA DA EUFÉIA JORGE MÁRIO⁴, DEYSIELE OLIVEIRA ALVES¹, WANDERLEY JOSÉ MELO¹

¹ FCAV/UNESP, Jaboticabal, Brazil

² FCAV/UNESP, Jaboticabal, Brazil

³ Instituto Superior Politécnico de Gaza, Chokwe, Mozambique

⁴ Faculdade de Tecnologia Nilo de Stéfani, Jaboticabal, Brazil

* daniel.c.machado@unesp.br

Geostatistical analysis serves to minimize costs and environmental impacts in the field, allowing different management practices to be applied within the same area and only where necessary. The variability of soil attributes can indicate the types of management to be adopted, as it estimates the spatial dependence of each attribute and the extent to which it influences the soil. The objective of this study was to analyze the variability of aggregate stability in an Oxisol under a No-Till System (NTS) in the Brazilian Cerrado, aiming to identify the main factors influencing this variability and their implications for soil physical quality and sustainability in tropical agricultural systems.

Samples were collected at 60 points, spaced 10 meters apart, at two depths (0.00–0.20 m (1) and 0.20–0.40 m (2)). The attributes that exhibited spatial dependence were: geometric mean diameter (GMD1 and GMD2), mean weight diameter (MWD1 and MWD2), clay (CLY1), and silt (SLT1), ranging from moderate to strong. Using interpolation of the collected data, maps were generated using the kriging method. The highest spatial determination coefficient (r^2) for the adjusted semivariogram parameters was SLT1 (0.908), and the lowest was MWD2 (0.799). The geostatistical ranges obtained varied between 15.2 m (MWD1) and 53 m (SLT1).

The analysis yielded good results for both GMD and MWD, indicating that the soil is well-structured—meaning the No-Till System (NTS) has a direct relationship with soil aggregate stability, further highlighting the role of organic matter as its primary binding agent.

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Descriptive Analysis of the Physical Attributes of a Latossolo (Oxisol) Under No-Tillage System (NTS).