

SOIL-ES (ID 31)

Soil ecosystem services under sustainable intensification of agriculture: looking for innovative mapping and monitoring at multiple scales

Coordinator

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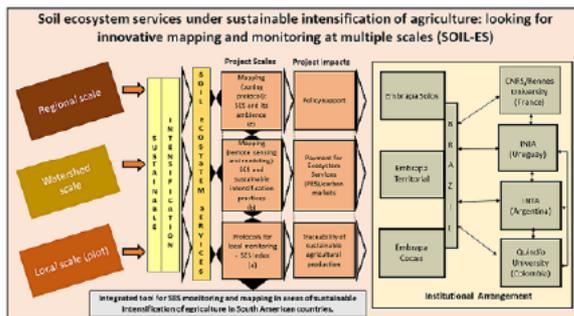
Project partners

Country	Organization
Uruguay	Instituto Nacional de Investigación Agropecuaria (INIA)
Argentina	National Institute of Agricultural Technology (INTA)
Colombia	Quindío University
France	French National Centre for Scientific Research (CNRS)

Summary

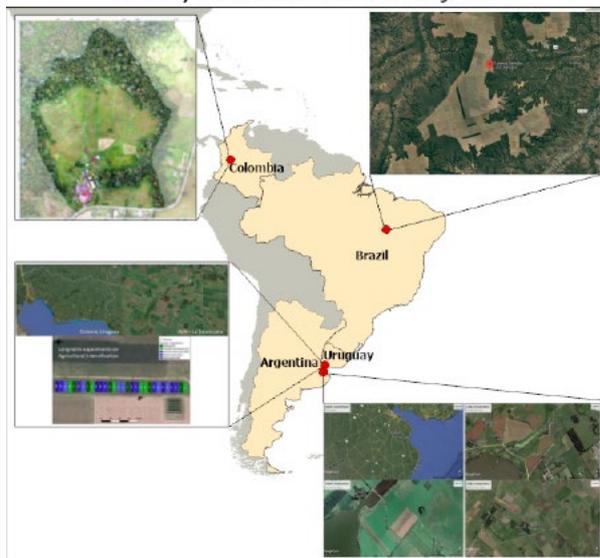
Although the conventional management practices (e.g. use of synthetic chemicals, fertilizers, tillage systems, monocultures) have been used to feed the fast-growing human population, their negative impacts on the ecosystem services (ES) that sustain human well-being created the need to move

towards more sustainable management practices. Adopting an ecosystem approach in agricultural production leads to sustainable production. However, soils have been frequently neglected when using an ES approach, despite their multifunctionality and their role in providing multiple ES. Soil management is a key factor for both ES maintenance by agricultural systems and for achieving sustainable intensification (SI), which is defined as a system where agricultural yields are increased without



adverse environmental impact and expansion of agriculture to new areas. The present proposal aims to develop and adapt tools for mapping and monitoring soil ecosystem services (SES) in agricultural and livestock systems, considering soil processes and landscape characteristics at multiple scale, in areas where there is SI (figure 1). The consortium is composed of researchers from different countries

Study areas of SOIL-ES Project



of South America that use different approaches to study the impacts of agriculture on ES, focusing on soils. The consortium will also receive the contribution of a team of French researchers, which has already been studying areas of large agricultural production in Brazil. The first study area is the Matopiba region, a growing agricultural production area, mainly grains and livestock in Brazil. The second and third study areas comprehend extensive livestock production in Argentina and Uruguay (Pampa). The fourth is a mosaic landscape with coffee and other crops, pasture and forest in the central Andes in Colombia. The (figure2) presents the location and illustration of these areas, where SI systems represent a promising alternative to the current agricultural systems that has historically

resulted in the loss of many ES. The proposal considers three scales: the first (a) is the local (plot) scale, where we seek to identify key indicators and integrate them into a single protocol (Index), capable of monitoring the impacts of SI in agricultural systems on SES. The second scale (b) is at watershed level, where the objective is to obtain a single protocol for mapping SES and sustainable intensification practices. At this level, remote sensing and modeling tools will be applied, aiming to support watershed land and water management, schemes of payment for ecosystem services (PES) and carbon markets. The third is (c) at regional scale, which seeks to develop a protocol for zoning SES and their ambience, gathering information from available soil surveys and landscape features, that can support rural landscape planning. Workshops are scheduled, at least one online (at the beginning of the project) and one in-person for validation of results with local actors (from the middle to the end of the project), as well as training throughout the project in tools applicable to different work scales. We will deliver an integrated, validated and auditable tool for SES monitoring and mapping. Protocols will be delivered together with guidelines for their application, whether by farmers at the local scale or by decision-makers and governments at the watershed and regional scales.

