



## **Application of a participative process for DSS development in soil remediation**

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A wide range of current legislation concerning environmental protection and public health at the national and international level include mandatory actions related to site characterization and the implementation of effective soil remediation measures. The efficiency, in terms of reliability and costs, of this kind of assessment, involves the development and linkage of integrated-harmonized databases, simulating models and specialization tools. So far, no data/knowledge engineering technologies in the academy or market provides the possibility for simulating soil remediation processes for hypothetical spatio-temporal scenarios in a harmonized manner across Europe. In this context, under the framework of RECARE (Preventing and Remediating degradation of Soils in Europe through Land Care) project, we are designing a Decision Support System (DSS) comprising a large database of knowledge including soil, climatic and socio-economic attributes, focused on soil remediation techniques that allows the user to automatically perform a more accurate quantifying of soil pollution, spatial identification of vulnerable zones and formulation of action programs to deal with the particular problem under scenarios of climate and land-use changes. The pilot study area is the Guadiamar valley (SW Spain) where the main threat is soil contamination, after a mine spill occurred on April 1998. About four hm<sup>3</sup> of acid waters and two hm<sup>3</sup> of mud, rich in heavy metals, were released into the Agrio and Guadiamar rivers affecting more than 4,600 ha of agricultural and pasture land. Consequently, the area was subjected to a large-scale phyto-management project, including the removal of sludge and topsoil, the addition of amendments, and plantation of native shrubs and trees. The objective of this research is to test the feasibility of the DSS concept as well as the likelihood to establish a solid high-potential innovation tool, aligned with the scientific and market strategy and within a European dimension. To this aim, we used a participative process during a workshop carried out in 2016, to validate the tool concept through stakeholder involvement. The target group was composed of representatives from the public administration, academic and private sectors and enabled a transdisciplinary learning process for the DSS implementation. The most interesting and valued issue of the DSS was the capacity to simulate the evolution of physical and chemical characteristics of soil at diverse spatio-temporal scales. On the other hand, it was stated that this approach could be useful to estimate economic criteria, but not to predict socio-cultural patterns. The results obtained from the workshop help to organize the base of knowledge for the DSS according to the main associated users. In the next workshop, further criteria related with the evaluation of ecosystem services predicted by the DSS is being carried out. In addition, a multilingual open source survey is being used to encourage and facilitate wider involvement of stakeholders in other case studies across Europe.