

## **ABSTRACT FORMAT - COMLAND Field Meeting in Sardinia, Italy, Oct. 13-19, 2012**

A Grid based approach to support soil management and soil use in Sardinia (Italy)

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During recent decades the problem of soil degradation has been widely investigated in Sardinia (Italy) in the frame of national and international projects. The findings have shown anthropogenic factors to be the leading cause of soil degradation. Three main groups are identified: agriculture, forestry and pastoral activities, and industrial activity and urbanization. Land planning at different levels - based on an accurate inventory of the natural resources, including soils, on their evaluation and on the definition of alternative, suitable uses – is therefore viewed as the key issue in preventing and mitigating the effects of soil degradation in the island of Sardinia.

The extent and the complexity of the problem and its consequences on the ecosystem make necessary an integrated, cross-disciplinary approach to increase the technical knowledge and public awareness, to support the management of soil resources and to develop a systematic change in land uses. To tackle such complex problems, in environmental science and engineering, the Grid approach is emerging worldwide as a formidable tool allowing to provision a computational task with administratively-distant resources.

This paper aims to present the activities facing soil degradation foreseen within the GRIDA3 interdisciplinary project, recently funded by the Italian Research Ministry (Progn. 1433/2006 MIUR FAR D.Lvo 297/99). Designed to provide a holistic description of environmental problems and practical answers to questions of central importance, the project will result in an advanced problem-solving tool for the integration, through a computing portal, of human know-how, simulation software, instrumentation and resources for data communication, storage, visualization, and computation. The project will supply a Grid infrastructure for collaborative work, built for the sharing of data and applications located at multiple sites across federated domains, public and private. The project objectives will be pursued by 8 activities. The 7th activity, named AGISGRID (Access and query of a distributed GIS/Database within the Grid infrastructure), foresees the accessibility, through the project portal, to: a soil database (geographic and alphanumeric data), GIS applications, and manuals and guidelines for the proposed applications. Structure and standard of data and metadata take into account the input/output procedures demanded by the foreseen applications. Open source information technologies are used to manage the distributed GIS. Two main environmental applications are foreseen: 1) to predict the response of homogenous land units to changes induced by degradation processes, focusing mainly on the processes triggered by man, and 2) to study, validate, and apply pedotransfer functions.

Two study cases are presented here: the area of Monastir (1:10,000 scale) and the area of Muravera (1:50,000 scale). For both areas, all available soil information (soil maps, soil profile descriptions, analytical data, soil profile pictures, ecc.) was inputted in a GIS. For the area of Monastir, the evaluation and the comparison of soil/land suitability levels for different possible alternative uses resulted in the production of soil/land suitability maps useful for Municipal Urban Planning. For the area of Muravera, a pedolandscape map, as a basis to predict the response of homogenous land units to man induced changes at catchment basin level, was produced.