



A web-based tool for the quantification of the soil health based on Ecosystem Services

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A formal definition and quantification of soil health is still a long way off. However, a broad consensus is based on the close connection between the soil capacity to provide ecosystem services and its state of health.

We propose an integrated assessment of multiple potential soil-based ecosystem services through the use of a process-based modelling, simulating the water flow and the crop growth in the soil-plant-atmosphere system.

Specifically, we evaluate the soil contribution to i) Food provision through the biomass estimation; ii) Nutrient and pollutants retention and release through the estimation of soil filtering capacity; iii) Water regulation/runoff and flood control through the number of days showing a potential runoff triggering; iv) Water regulation/water storage through the water yearly stored in the soil; v) Water regulation/groundwater recharge through its yearly value; and vi) Microclimate regulation through the total evapotranspiration. All of the above ecosystem services are combined into one indicator of soil health.

The proposed approach was framed in the context of the geospatial Decision Support Systems LandSupport (www.landsupport.eu) that, in the latest years, proved to be powerful instruments for the what-if scenario analysis in support of multiple stockholders and end-users.

Through the what-if scenario analysis the end-user can evaluate the soil health resilience of a specific soil by simulating the effects of some degradation processes occurrence: i) a compacted plow layer at a chosen ploughing depth, ii) a compacted soil surface, iii) a thickness reduction of the Ap horizon following an erosion process. Furthermore, the gain in soil health can be evaluated by simulating the effect of an increase of organic matter.

The Soil Health tool is designed to assist Public Authorities, such as regional environmental agencies, farmers and farmer advisors in designing plans and in evaluation of impacts of the

measures in order to ensure a good health of the soils.