



Soil sealing and Land Degradation - A methodological proposal for a Mediterranean country

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Soil serves as a platform for human activities and landscape. It can be considered essentially as a non-renewable resource (Commission of the European Communities 2006) because of its formation is an extremely slow process. Soil is subjected to multiple degradation processes: these include erosion, salinization, local and diffused contamination, compaction, decline in organic matter, flood and landslides, as well as decline in biodiversity. Sprawl-driven soil sealing is a typical cause of soil consumption in suburban areas possibly determining land degradation. Following the standard definition provided by the European Environmental Agency (2006), a soil can be considered as sealed when irreversible changes in its natural conditions of permeable layer have occurred. Soil sealing especially due to urban sprawl is a common trait of several modern city regions. This phenomenon recently spread over Mediterranean areas thanks to the changing shape of residential and commercial settlements and the growing diffusion of the related infrastructures. Drivers of the Mediterranean sprawl are multifaceted and involved both social aspects and economic issues. Monitoring sprawl-driven soil is a crucial task in both the analysis of natural resources and sustainable planning of suburban systems.

The aims of this work are to illustrate an original procedure estimating the rate of soil sealing and evaluating the main factors that determine the geographical distribution of soil sealing. The methodology proposed consists of the diachronic evaluation of the soil sealing status through a dichotomic variable (0 = not sealed; 1 = sealed) obtained from the photo-interpretation of a wide sampling sites of the Italian territory. The analysis is based on the multi-temporal photo-interpretation distinguishing not sealed and sealed points at 1:1.000 and 1:4.000 geographical scale. The confidence limits of the sample were calculated with a probability level of 99%. The estimated indicators included the percent sealed surface, its the confidence interval at 99%, the annual growth of sealed surface, as well as the per capita sealed surface based on the resident population observed at each survey time. The spatial distribution of sealed areas was also studied with regard to physiographic variables like elevation, distance to the sea and urban areas. This work suggests the use of the illustrated evaluation for monitoring soil sealing trends at the local scale and soil consumption at different scales. The analysis, carried out at the country level from 1956 to nowadays, indicates that the highest increase in soil sealing rate was observed in northern Italy, while in southern Italy the rate of soil consumption was relatively low.