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Abstract

Planning and ecosystem services for urban regeneration in Collegno

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The study deals with the theme of the contemporary city and ecologically oriented urban regeneration, using as a case study the area of the ex-Acciaierie Mandelli (Collegno, TO), identified by the 'Collegno Rigenera' program, launched in 2015 by the local administration.
The former industrial area in fact represents the urban context suitable for testing a method of analysis and evaluation aimed at promoting urban regeneration projects and actions through the 'good use of the soil' that urban planning is able to provide.
According to these premises, to address the issue of ecological and environmental regeneration, we use the mapping and evaluation of Ecosystem Services (SE), in order to gain knowledge on the biophysical qualities of soils and to orientate the soil design to structural and spatial systems that maximize their ecological capabilities. To this end, the SE Habitat Quality (HQ) and Carbon Sequestration (CS) were selected, considered the most significant with respect to the given objective.
Using some models of the InVEST software, maps that are able to spatialize the values of the two SE were created, making it possible to understand *how* and *where* the ecological quality changes according to the variation of the use of the ground, starting from the basic cartography *Land Cover Piemonte* detailed at the design scale 1:2000.
The mapping operation considered the following time scenarios:
t0) state of fact;
t1) state of law of the current PRG;
t2) "Collegno rigenera" project;
t3) revision hypothesis 1;
t4) revision hypothesis 2.
The HQ is a support SE, that can be used as an indicator of environmental ecological quality of the urban context to be regenerated, as it can be traced back to the overall biodiversity of a given place and support base for the provision of other services.
From the simulations of the interactions between the different uses of the soil, the InVest HQ model is able to determine the quality and the degradation of a given place.
The results of the study show that the HQ of the different scenarios varies with changes in land use patterns, recording a continuous increase in the mean value of HQ from t0 to t4 (Fig.1).
This increase in HQ has shown that densification and compaction allow freeing up space in favor of land use (urban green) capable of guaranteeing better performances.

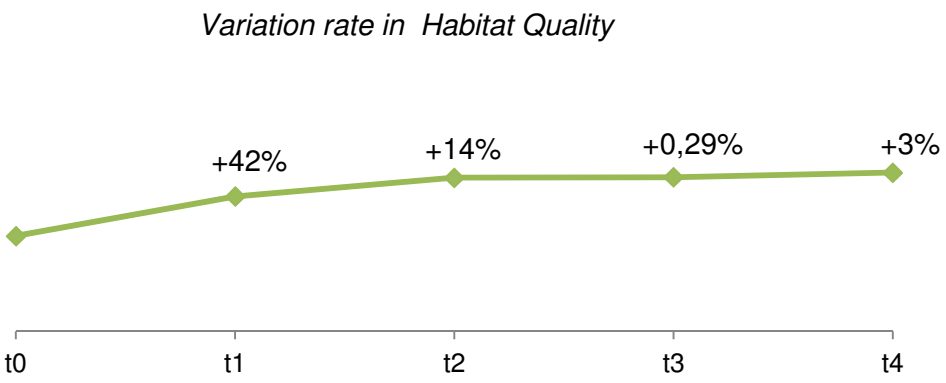

Fig. 1 Variation rate in HQ for different scenarios

The second SE analyzed is the CS, a regulatory service that, because of what it measures (quantity of CO_2 stored from the ground), can be used to approximate the air quality of the urban context considered.
As the carbon storage capacity is one of the main intrinsic properties of the soil, the value of this ecosystem service derives from the degree of naturality of the ecosystem considered.
The CS assessment, in biophysical terms, takes place through the spatialization of the absolute value of the tons of carbon stored for each unit of mapped surface.
The comparison between scenarios (Fig.2) shows the continuous increase in the quantity of stored carbon linked to the increase in the extension of uses and land cover with a greater degree of naturality (which store more carbon).

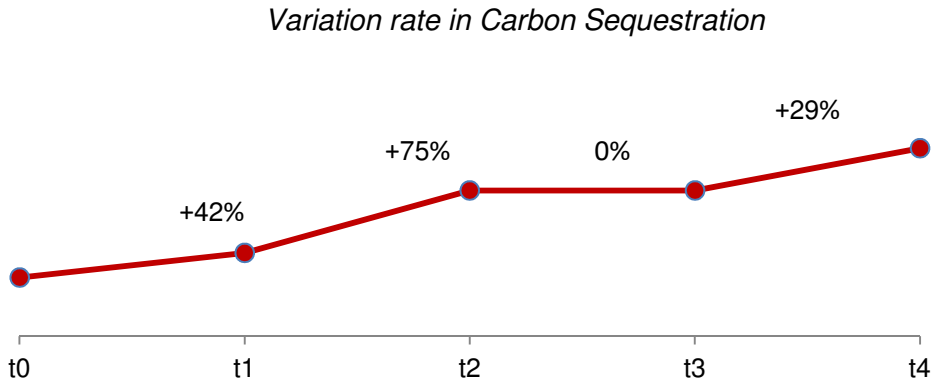

Fig. 2 Variation rate in CS for different scenarios

In conclusion, the analysis of the SE in support of urban regeneration has allowed to recognize the qualities of the ecological functions of the urban composition: according to the configuration of the transformation-regeneration area, it has been possible to recognize the interactions between the uses of the soils, evaluate them and identify the urban composition that maximizes the biophysical quality values of HQ and CS and demonstrate that the SE analysis can be a valuable support tool for the evaluation of urban regenerative interventions.

Mapping and evaluating SE to regeneration purposes means directing the project not only towards the improvement of urban morphology and construction, but also towards the environmental and ecosystem quality of the settlement structure.
The tested evaluation method, although referring to only one transformation area, has repeatability and applicability characteristics to different urban contexts and opens up fertile innovative perspectives for urban planning and development.

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