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BOOK OF ABSTRACTS

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Keywords:

spatial planning; carbon trading mechanism; participatory planning; community engagement

T_05 ENVIRONMENT AND CLIMATE (A) / 91

Pursuing climate neutrality through ecosystem services: Evidence from Campania Region, Italy

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In this study, a methodological approach that aims to implement climate neutrality through spatial planning policies is defined and applied. The measure of carbon sequestration (CS) is taken as a reference to estimate the status and evolutionary dynamics of this phenomenon, analyzed and evaluated as associated with the supply of certain types of ecosystem services (ESs), in relation to the reference spatial context. The study is developed as follows. First, the spatial framework of CS is characterized through density maps, utilizing the "Carbon Storage and Sequestration"model of the InVEST suite, which estimates the amount of carbon stored in reference spatial units using raster maps of land cover (Liquete et al., 2015). The model estimates the state of CS, allowing, also, to appreciate its variation over time (Sun et al., 2019). The spatial context addressed by the implementation of the methodology is Campania, an administrative region in southern Italy.
Second, a methodology for characterizing the supply of ESs is identified. The multifunctionality of the supply of ESs can be considered as an analytical reference for the definition of a system of measures oriented to the improvement of CS capacity and, therefore, of the contribution of local spatial planning policies to the effective pursuit of global climate neutrality. Based on previous studies (Isola et al, 2022) and in-depth analyses of environmental, landscape, and socio-cultural contexts, the provision of ESs in relation to the regional territory of Campania is characterized in this study by the following types: preservation of habitat quality levels suitable for sustaining the life cycles of plants and wildlife that can be useful to humans; climate regulation through mitigation of land surface temperature; production of agricultural crops and timber; protection and enhancement of the attractiveness of spatial contexts in relation to nature- and natural resource-based recreational and cultural activities (Zulian et al., 2014); preservation and enhancement of landscape values that ground regional identity.

Finally, the correlations between the spatial taxonomies of CS capacity and ESs supply with regard to the Campania regional context are detected and analyzed, in order to assess how the characteristics and specificities of the multifunctional ESs supply can be effectively used in order to maximize CS capacity, and, thus, the contribution of the Campania region to the improvement of global climate neutrality. The identification of these correlations allows, also, to identify specific recommendations in terms of plan policies in order to improve the quality of life of local societies in Campania.

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Keywords:

carbon sequestration; climate neutrality; ecosystem services;

T_05 ENVIRONMENT AND CLIMATE (A) / 803

Optimizing Carbon-Neutral Campus Renewal: A Case Study of Xi'an East Station Hub Core Area

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The dual challenges of climate change and environmental degradation place immense pressure on urban environments, making it critical to integrate carbon-neutral strategies into the early stages of planning and design. This study focuses on campus renewal, using the Xi'an East Station Hub Core Area as a pilot to explore innovative approaches for low-carbon, climate-resilient urban design. By leveraging intelligent evaluation platforms, nature-based solutions, and participatory governance structures, this research aims to establish scalable pathways for sustainable urban renewal.

Through the Urban Planning and Design Carbon Neutrality Intelligent Evaluation Platform, real-time assessments of carbon emissions and sinks were conducted, revealing a substantial gap of 100,000 tons CO_2 to achieve carbon neutrality. This shortfall was addressed through a multi-faceted approach combining renewable energy technologies, such as solar panels and ground-source heat pumps, with enhanced green infrastructure and industrial transformation. For example, three-dimensional greening and ecological corridors added 4,100 tons of carbon absorption, while converting 38% of high-density commercial areas into biopharmaceutical clusters reduced emissions by 30,000 tons. These interventions demonstrate how intelligent planning can dynamically balance carbon sources and sinks.