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Green Roofs' Benefits in Urban Context: a tool for designing roofs as health promoters

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Densely-built urban areas are affected by high air pollution levels, whose are caused by vehicle traffic, which represents the main pollutant into the atmosphere, but also by combustion processes of buildings' heating. Smog and fine particles are responsible for health problems, especially for weak population.

Starting from the State of the Art, green, in all its forms, and especially plants are able to absorb toxic substances by filtering polluted air, releasing oxygen into the atmosphere and, where it is possible, reducing noise pollution.

A research group gives rise to a tool that quantifies the capability of green roofs as an instrument for reducing air-pollutants in urban contexts, investigating the positive effects on population health status.

Methodology

The first phase of the study analyses the green areas' effects of citizenship's health, through a systematic review of the scientific literature. Subsequently, the research work has been developed a calculation model in order to quantify the pollutants cut down in relation to an increase of green surfaces on the flat roofs of an urban area examined. In conclusion, through the calculation model, it has been estimated benefits of a hypothetical intervention of cover green roofs' transformation, in a neighborhood of Milano city.

Results

The project of conversion in green roofs through the application of the tool, according to the percentages defined by the morpho-typological analysis of the buildings examined, could reduce the pollutants up to 18,09 $\mu\text{g}/\text{m}^3$ of PM_{10} , 13,56 $\mu\text{g}/\text{m}^3$ of $\text{PM}_{2.5}$ and 7,24 $\mu\text{g}/\text{m}^3$ of O_3 each year.

Conclusions

Considering a large-scale urban redevelopment project, in addition to psychological and perceptive benefits, with positive influences on housing quality and life of population, it should be contemplated the benefits of environmental sustainability, such as reducing noise pollution, the absorption of electro-smog, microclimate mitigation and fixing fine particles.

