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The Effect of Green Walls on the Urban Environment in the City of Nicosia

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Master Thesis

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Paphos, July 2022

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Abstract

Green walls are a natural-based solution (NBS) which offers the flexibility to re-introduce Nature to existing buildings. This study presents the application of a modular living wall and its data monitoring activity, in Nicosia (Cyprus). The response if this technology is implemented has been evaluated thanks to ENVIMET, a high-resolution meteorological simulation software.

The paper is aimed to investigate the difference between a space with and without green simulation in the public area, and the outcome of modular living walls in the Cyprus Institute. The results suggest that the reduction of temperature profile may be significantly more in the urban area since it is observed a reduction in the temperatures around the buildings during the summer period in Eleftheria square, an open public space.

Firstly, after the introduction and research statement is proposed the analysis of the Case study in Eleftheria square and the general context of Nicosia as an environmental playground accounted for this paper. Before the simulation process, an example of a green building which is located near the square is analyzed and the planting selection is according to this analysis. Different proposed scenarios were investigated in microclimatic simulations in the area. Then it is also presented the Cyprus Institute installation of this NBS solution designed by an Italian company and how it has been equipped with sensors to collect recordings in different positions. It will be presented and explained the phase of determination for the selection criteria of the plants, providing an insight into the choice made for the pilot case, with the issues that the authors ended up facing during the activities.

The results are presented starting with a focus on the variable and parameters assumed by the authors as significant, then the comparison between the model estimation achieved by ENVIMET simulation and the outcome of the data collection thanks to AIRCARE sensors is discussed and properly commented, trying to provide the clearest and concise overview for the thermal behaviour observed.

The future developments identified by the presented paper are highlighting the need of improving the quality of liveable spaces by implementing NBS solutions such as one of the case studies here above discussed. A proposal is to apply this technological new building product to a higher area, to assess a more accurate analysis and model validation since the current one installed being a pilot case might be not well enough to represent an optimal coverage. Additionally, the authors wish to clarify that the time rate of growth of the plants always plays a fundamental role and influences the thermal interaction between outdoor actions and the cavity of the panels.

Keywords: living modular walls, climate change, data acquisition, built environment, Mediterranean climate