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Developing a Decision Making Tool for Evaluating the Compatibility of Nature-Based Solutions to the Built Heritage

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Historical buildings, which play a major role in shaping the urban fabric, are facing challenges due to climate change. Today the cultural values are considered among the main goals of sustainable development much like the social, economic and environmental values. Therefore it is important to discover the sustainable ways of conservation and maintenance practices on mitigating the impacts of climate change, so that the historical buildings can play an active role in achieving sustainable development goals without compromising their cultural and heritage values.

Nature-based solutions (NbS) are considered as sustainable and effective solutions on mitigating impacts of climate stressors. Exploring their compatibility to conservation practices can bring mutual opportunities to the urban fabric and to the historical buildings. However, nature has been considered as a threat amongst the conservation practices due to potential biodegradation of materials, obscuring the heritage structure and requiring an additional cost of maintenance. Nevertheless, many uses of nature-based solutions come across in history, e.g. in the form of turf or sod roofs that provide thermal insulation on extreme climate conditions. Today, there are some attempts to integrate NbS to heritage environments within the scope of retrofitting projects. Nevertheless, a comprehensive methodology of performance assessment on mitigating climate challenges without compromising the cultural and heritage values has not been developed yet.

This project aims to develop a decision making framework for heritage actors on evaluating the compatibility of NbS to conservation and maintenance practices of historical buildings that are exposed to adverse impacts of climate stressors in the urban context. For developing a general outline of the framework, various NbS will be evaluated and categorized based on quantitative data in the literature according to their aesthetic fit to historic buildings, their structural feasibility and their performance on mitigating the effects of climate stressors. Throughout the project, process and value based research will be conducted on carefully selected case studies. The selected case studies will be evaluated within the scope of determining the severity of the prevailing climate stressors in their context, their structural sensitivity and their adaptability capacity to the new interventions. Based on the results, the compatible NbS and design measures can be identified. In the later stages of the project, the feasibility of the proposed nature-based design for the case studies will be tested by monitoring and comparing the results before and after the implementation.