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# The Role of Green Roofs towards Enhancing the Visual Appearance of Urban Neighborhoods

Ziba Kazemi<sup>1</sup>, Amirhosein Ghaffarianhoseini<sup>2\*</sup><sup>1</sup>Faculty of Architecture and Built Environment, Limkokwing University of Creative Technology, Cyberjaya, Malaysia<sup>2</sup>Department of Geography, Faculty of Arts and Social Science, University of Malaya (UM), Kuala Lumpur, Malaysia

\* Correspondence: dr.amirhosein@um.edu.my

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## ABSTRACT

In recent years, numerous researchers have examined the sustainable performance of buildings integrated with green roofs. The reviewed studies predominantly confirm the environmental, social and economic benefits of green roofs once efficiently designed and constructed in accordance with the micro-climatic attributes. Nevertheless, very few studies have evaluated the aesthetical potentials of green roofs. Accordingly, this study aims at exploring the potentials of green roofs for beautifying the urban neighborhoods and enhancing the visual appearance of mid-rise residential buildings' rooftops. Finally, findings highlight the current challenges of utilizing green roofs in building industry and put forward new solutions.

**Keywords:** Green Roofs; Urban Built Environments; Urban Neighborhoods; Visual Appearance; Visual Perception

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## THE ROLE OF GREEN ROOFS TOWARDS ENHANCING THE VISUAL APPEARANCE OF URBAN NEIGHBORHOODS

**Ziba Kazemi<sup>1</sup> & Amirhosein Ghaffarianhoseini<sup>2\*</sup>**

<sup>1</sup>*Faculty of Architecture and Built Environment, Limkokwing University of Creative Technology, Cyberjaya, Malaysia*

<sup>2</sup>*Department of Geography, Faculty of Arts and Social Science, University of Malaya (UM), Kuala Lumpur, Malaysia*

*\*[dr.amirhosein@um.edu.my](mailto:dr.amirhosein@um.edu.my)*

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### Abstract

*In recent years, numerous researchers have examined the sustainable performance of buildings integrated with green roofs. The reviewed studies predominantly confirm the environmental, social and economic benefits of green roofs once efficiently designed and constructed in accordance with the micro-climatic attributes. Nevertheless, very few studies have evaluated the aesthetical potentials of green roofs. Accordingly, this study aims at exploring the potentials of green roofs for beautifying the urban neighborhoods and enhancing the visual appearance of mid-rise residential buildings' rooftops. Finally, findings highlight the current challenges of utilizing green roofs in building industry and put forward new solutions.*

**Keywords:** *Green Roofs, Urban Built Environments, Urban Neighborhoods, Visual Appearance, Visual Perception*

Recent studies repeatedly report the rapid urban growth and increase of urban density in many large cities in both developed and developing countries. As a result of this rapid urbanization, various researchers have been arguing the negative impacts of the increased number of ongoing construction developments on users, society and environment. In this regard, looking at some of the key environmental challenges of the 21<sup>st</sup> century including climate change and global warming, with viewpoints to the crucial role of urban built environments, architects and urban designers should continuously draw adequate attention to the development of innovative approaches towards sustainable design of buildings.

Among the core existing sustainable design strategies in the context of building industry, this study looks at the growing attentions in recent years about the use of green roofs in various cities with different climatic conditions. Accordingly, the aim of this paper is to explore the current status of the implementation of green roofs as one of the key trends of sustainable design

in the city of Tehran in Iran. Furthermore, the study analyzes the potentials of green roofs for improving the aesthetical appearance of urban neighborhoods through exploring the visual perception of users.

In essence, green roofs are defined as the rooftops that are partially or completely covered by vegetation. There are generally two main types of green roofs namely intensive and extensive. Latest studies demonstrate several advantages of green roofs which can be categorized into social, environmental and economic dimensions. Reviewing recent key studies related to the impact of green roofs, it is proven that the vegetated rooftops can considerably improve the indoor and outdoor thermal comfort, air quality, and energy efficiency while they can contribute to the enhancement of biodiversity and stormwater management [1]. More recently, studies attempt to look at the large-scale benefits of green roofs towards decreasing the urban heat island (UHI) intensity in large dense cities [2]. From another viewpoint, among the social

benefits of green roofs, the study refers to their potentials for developments of new platforms for outdoor social activities, improvement of the visual appearance of buildings and city, and enhancement of users' health. The economic benefits of green roof are principally about the decrease of energy consumption, and increase of property values.

On the other hand, recent studies indicate that green roofs can result in highly diversified thermal performances depending on their technical configurations and relevance to the climatic characteristics. Therefore, there is a significant need to promote the climate responsive design of green roofs for achieving the maximum advantages. Furthermore, a key challenge of using green roofs is the high initial costs related to the design, construction and maintenance of this sustainable design strategy. While various studies have explicitly confirmed the long-term economic benefits and the pay back periods for the application of green roofs, many professionals are yet not fully aware of these research findings. The other

challenge of applying green roof is its diversified performance in different climatic conditions and accordingly, it becomes a complex and multifaceted task to efficiently design a green roof which can successfully perform in a city such as Tehran in both hot and cold seasons.

Finally, this study argues that the majority of scholarly studies and practical implementations related to green roofs are predominantly related to the energy-oriented objectives. As a result, considerably less attention has been paid to the visual benefits of green roofs. Looking at figure 1, it is criticized that many of the current rooftops in mid-rise residential buildings in Tehran city are not designed with viewpoints to the aesthetical principles. Hence, users, staying in their residential units, do not enjoy a visually appealing urban neighborhood. To respond to this criticism, the study evaluates the potentials of green roofs for beautifying the urban neighborhoods and enhancing the visual appearance of the rooftops while exploring the visual perception and satisfaction level of occupants.



**Figure 1. A Typical Visual Appearance of Urban Neighborhoods in Tehran City with Viewpoints to the Current Rooftops of Mid-Rise Residential Buildings**

To conclude, the study discusses that the consistent dialogues between architects, urban designers and urban policy makers, as proposed by previous studies, should

not be limited to the circumstances of achieving more energy efficient urban built environments. Therefore, many other parameters such as the above-mentioned

points about the neglected visual benefits of sustainable strategies should be taken into consideration.

### **Reference**

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