

Abstract

Vertical Greening Systems can help mitigate the urban heat islands, increase the thermal efficiency of the buildings, save cooling energy and enhance air quality by using the vegetation's natural processes. However, since vertical greening schemes need materials and energy to be built, there are questions about whether they actually deserve to be adopted and how their environmental efficiency can be improved. The study aims to evaluate vertical greening systems' environmental efficiency and to study essential factors for efficient and sustainable building construction.

Keywords: Vertical Greening Systems, Urban Heat Islands, Thermal Efficiency, Cooling Energy, Air Quality, Environmental Efficiency, Sustainable Building Construction.

Introduction: The rapid growth of urban areas has led to the emergence of urban heat islands (UHIs), which are areas of significantly higher temperatures compared to surrounding rural areas. UHIs are caused by the absorption and re-radiation of heat by buildings, roads, and other urban infrastructure. This phenomenon has a variety of negative impacts on human health, energy consumption, and the environment. One of the most effective ways to mitigate UHIs is through the use of green infrastructure, such as vertical greening systems (VGS). VGS are systems that use plants and other vegetation to cool buildings and surrounding areas. They can be used in a variety of ways, including hanging planters, wall-mounted planters, and green roofs. VGS can help reduce the amount of heat absorbed by buildings, which in turn reduces the amount of energy needed for cooling. Additionally, VGS can help improve air quality by filtering out pollutants and releasing oxygen. Finally, VGS can help reduce the amount of runoff from buildings, which can help prevent flooding and erosion. This study aims to evaluate the environmental efficiency of VGS and to identify the factors that influence their performance. The study will focus on the case of multistory residential buildings in Addis Ababa, Ethiopia. The results of the study will be used to inform the design and implementation of VGS in other urban areas.

Methodology: The study used a combination of literature review, field research, and data analysis. The literature review was used to identify the key factors that influence the performance of VGS. The field research was used to collect data on the environmental performance of VGS in multistory residential buildings in Addis Ababa. The data analysis was used to evaluate the environmental efficiency of VGS and to identify the factors that influence their performance.

Results and Discussion: The results of the study show that VGS can significantly reduce the amount of heat absorbed by buildings, which in turn reduces the amount of energy needed for cooling. Additionally, VGS can help improve air quality by filtering out pollutants and releasing oxygen. Finally, VGS can help reduce the amount of runoff from buildings, which can help prevent flooding and erosion. The study also identified several factors that influence the performance of VGS, including the type of plants used, the amount of water used, and the location of the building.

Conclusion: The study concludes that VGS are an effective way to mitigate UHIs and improve the environmental performance of buildings. However, it is important to consider the environmental efficiency of VGS and to identify the factors that influence their performance. The results of the study will be used to inform the design and implementation of VGS in other urban areas.

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Abstract: Vertical Greening Systems (VGS) are a sustainable building strategy that can help mitigate the urban heat island effect, reduce energy consumption, and improve air quality. This study aims to evaluate the environmental efficiency of VGS in multistory residential buildings in Addis Ababa, Ethiopia. The study uses a combination of literature review, field research, and data analysis. The results show that VGS can significantly reduce the amount of heat absorbed by buildings, which in turn reduces the amount of energy needed for cooling. Additionally, VGS can help improve air quality by filtering out pollutants and releasing oxygen. Finally, VGS can help reduce the amount of runoff from buildings, which can help prevent flooding and erosion. The study also identified several factors that influence the performance of VGS, including the type of plants used, the amount of water used, and the location of the building. The study concludes that VGS are an effective way to mitigate the urban heat island effect and improve the environmental performance of buildings. However, it is important to consider the environmental efficiency of VGS and to identify the factors that influence their performance. The results of the study will be used to inform the design and implementation of VGS in other urban areas.

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Table 1: Buildings with vertical green.

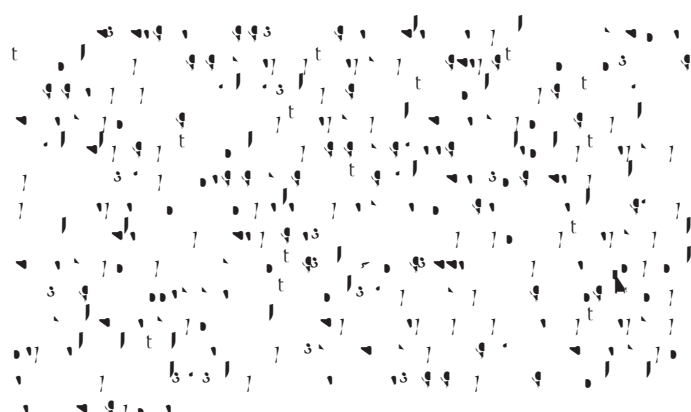


Figure 16



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