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(57) Abstract :
The integration of green roof systems with rainwater harvesting represents an innovative approach to sustainable urban development, aiming to address both environmental and infrastructural challenges. Green roofs, characterized by the cultivation of vegetation on building rooftops, offer multiple ecological benefits, including improved air quality, enhanced biodiversity, and urban heat island effect mitigation. When combined with rainwater harvesting systems, these roofs can significantly contribute to water management by capturing and storing rainwater for non-potable uses such as irrigation, flushing toilets, and cooling systems. This synergistic integration not only reduces stormwater runoff, thereby alleviating urban flooding risks, but also lessens the burden on municipal water supply systems. The harvested rainwater can be filtered and stored in tanks or cisterns, ensuring a sustainable water source during dry periods and promoting water conservation. Moreover, the use of collected rainwater for irrigation supports the health and longevity of the green roof vegetation, creating a self-sustaining loop. Implementing such systems in urban areas can lead to substantial economic benefits by lowering energy costs through improved insulation and reducing water bills. Additionally, the combined system can enhance the aesthetic and recreational value of urban spaces, contributing to the overall well-being of city dwellers.

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