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Using the Nature-Based Solutions for Applying Circular Economy for the Construction Materials Sector in Egypt

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Abstract

The challenges posed by the growth of urbanization in Egypt and the development of new cities play an essential role in applying the circular economy (CE) in the construction materials sector and the priorities for promoting sustainable construction activities in the future. Therefore, the construction sector has many adverse environmental impacts on energy and natural resources consumption. Starting from materials production, operation until disposal to landfills. Consequently, the industry is considered one of the most consumers of non-renewable resources and producer of CO₂ emissions. On the other hand, applying Nature-based solutions (NbS) to enhance sustainability by protecting the ecosystems and maintaining economic benefits plays a vital role, especially for new Egyptian cities. The research aims to investigate the role of applying NbS for achieving CE in construction materials and eliminate its negative impact in the scope of three factors: green building materials, waste management systems, renewable energy use. The current research attempts to answer how NbS can improve the CE and reduce environmental impacts of the construction materials sector. Therefore, the SOWT analysis investigated the strengths, opportunities, weaknesses, and threats of using the NbS strategies for three different construction sites in Egypt. Furthermore, the survey questionnaire was applied to identify the interactions between the parameters derived from 40 participants such as consultants, architecture engineers, civil engineers, site engineers, project managers and review the previous research efforts. As a result, a conceptual framework was created for the construction materials considering reduce, reuse, recycle, recovery, and disposal, to identify the impact of the implementation of NbS on achieving sustainable development strategies in the Egyptian construction sector. The result showed that the NbS could effectively promote the construction sector and achieve environmental and economic benefits, which consequently help the transition to CE. Therefore, there is the necessity for developing new sustainable policies and cooperation between public and private sectors to support the investments of sustainable strategies in the construction materials market and increase Egyptian society's awareness of the benefits of NbS in economic, environmental, and social aspects.

Keywords, Nature-based solution, Construction materials, Circular Economy, Egypt