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REVIEW

Sustainable Architecture from a One Health Approach

Arquitectura sostenible desde el enfoque una UnaSalud

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ABSTRACT

Introduction: sustainable architecture is a design and construction approach that seeks to reduce human impact on the environment and promote a more sustainable future. It is based on the use of environmentally friendly materials, energy efficiency, and adaptability to the changing needs of users and the environment. The One Health approach views sustainable architecture as a fundamental pillar in the ambition to achieve a comprehensive and holistic approach to minimize the environmental impact of buildings and improve the quality of life of their occupants.
Objective: to analyze sustainable architecture from a One Health approach.
Method: 67 articles were identified, of which 25 were included, more than 75 % from the last 3 years. These articles were sourced from academic search engines such as PubMed, MedLine, Ovid, ResearchGate, and Google Scholar.
Development: green building strategies, the use of non-toxic materials, and the integration of green spaces not only reduce environmental impact but also promote the physical and mental health of residents while preserving surrounding ecosystems. However, their implementation requires multidisciplinary collaboration, coherent public policies, and greater social awareness to scale effective solutions.
Conclusions: the review highlights how sustainable architecture, aligned with OneHealth, can mitigate global crises such as climate change, biodiversity loss, and emerging diseases.

Keywords: Architecture; Urban Biodiversity; Bioclimatic Design; Sustainability; Onehealth.

RESUMEN

Introducción: la arquitectura sostenible es un enfoque de diseño y construcción que busca reducir el impacto humano en el medio ambiente y promover un futuro más sostenible. Se basa en la utilización de materiales ecológicos, la eficiencia energética y la adaptabilidad a las necesidades cambiantes de los usuarios y el entorno. El enfoque UnaSalud concibe la arquitectura sostenible como un pilar fundamental en la ambición de lograr un enfoque integral y holístico minimizar el impacto ambiental de los edificios y mejorar la calidad de vida de sus ocupantes.
Objetivo: analizar la arquitectura sostenible desde el enfoque una UnaSalud.
Método: se identificaron 67 artículos, de los cuales se incluyeron 25, siendo más del 75 % de los últimos 3 años. Provenientes de buscadores académicos como PubMed, MedLine, Ovid, ResearchGate y Google Scholar.
Desarrollo: las estrategias de construcción ecológica, el uso de materiales no tóxicos y la integración de espacios verdes no solo reducen el impacto ambiental, sino que también promueven la salud física y mental de los habitantes, al tiempo que preservan los ecosistemas circundantes. Sin embargo, su implementación requiere colaboración multidisciplinaria, políticas públicas coherentes y mayor concienciación social para escalar soluciones efectivas.
Conclusiones: la revisión destaca cómo la arquitectura sostenible, alineada con UnaSalud, puede mitigar crisis globales como el cambio climático, la pérdida de biodiversidad y las enfermedades emergentes.

Palabras clave: Arquitectura; Biodiversidad Urbana; Diseño Bioclimático; Sostenibilidad; UnaSalud.

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INTRODUCTION

Sustainable architecture considers the impact that a building will have throughout its life cycle and considers climatic conditions, topography, and the materials to be used. It seeks to achieve maximum performance with the least impact.[1]

Sustainable architecture and urban planning are branches of scientific work that have gained significant prominence in recent years, directing their practice fundamentally towards the idealization of constructions that result in the building of healthy environments designed and conceived by ecological criteria and with efficient use of available resources.[2]

There is a growing need to rethink the importance of the architecture of cities from the perspective of sustainable development, where the economy, social welfare, and environmental conservation are articulated as perfect gear to minimize the ecological footprint and the negative impacts of human interventions in nature.[3]

In Latin America, the detrimental effects can be seen in the retreat of glaciers in the Andes, increased precipitation in many regions, increased risk of landslides and coastal flooding, coastal erosion, and increased frequency of extreme weather events. Developing countries are more sensitive to its effects, as their economies depend on climate-vulnerable sectors such as agriculture, forestry, and hydropower.[4]

According to the World Health Organisation (WHO), One Health is conceptually an integrated approach to sustainably balance and optimize the health of people, animals, and ecosystems. It is thus a transdisciplinary approach that addresses complex concerns related to human, animal, plant, and ecosystem health.[5]

One Health operational frameworks and tools are available to support countries and communities, particularly for the prevention and control of zoonotic diseases and antimicrobial resistance, as well as for food safety protection. However, One Health has not yet been implemented in a way that fully considers the complexities and interconnections of the various influences that impact at a broader systemic level. This lack of consideration can undermine the sustainability of any positive outcomes.[6]

Recognizing that the health of people, animals, plants, and the wider environment are closely linked and interdependent, One Health emphasizes intersectoral cooperation at all levels to protect ecosystems and address challenging health challenges, including the emergence of infectious diseases, antimicrobial resistance and food security.[7]

Given the need to continue working to ensure that architecture responds to housing needs and activates positive synergies between all components of the OneHealth approach, we set out to analyze sustainable architecture from a OneHealth perspective.

METHOD

A literature review was conducted from March 2024 to April 2025, consulting the following databases: Scielo, PubMed, and open-access journals. For their use, the publications found were subjected to the inclusion criteria of the review: relevance to the subject of the study, which makes a detailed description of sustainable architecture from the OneHealth approach, having been published predominantly in the last five years; being review articles, originals, case presentations, theses, etc., with the availability of full text.

Those published before 2021 that did not address the selected topic were excluded, as well as letters to the editor, editorials, and brief commentaries. Titles and abstracts were initially evaluated for the articles selected according to the research objective. Those for which the abstract did not provide sufficient information for selection were read in full text. Of the 67 items found, 25 (41,6 %) met these criteria, with which the present research was carried out.

DEVELOPMENT

Sustainable architecture responds to global challenges like climate change and the increasing demand for natural resources. It could transform how we live and build our cities. One of the main objectives of sustainable architecture is to reduce greenhouse gas emissions and energy consumption in buildings. This is achieved through using low-impact building materials, such as wood and straw, and incorporating energy-efficient technologies and renewable energy sources.[8,9]

Sustainable architecture solves global challenges, such as climate change and increasing demand for natural resources. It has the potential to transform the way we live and build cities. One of the main objectives of sustainable architecture is to reduce greenhouse gas emissions and energy consumption in buildings. This is achieved through using low-impact building materials, such as wood and straw, and incorporating energy-efficient technologies and renewable energy sources.[10,11]

By embracing the guiding principles of sustainable architecture, it is possible to contribute to sustainable development and address the challenges of climate change and urbanization worldwide. Sustainable architecture also focuses on the adaptability and flexibility of buildings, allowing them to adjust to the changing needs of their occupants and the environment in which they live over time.[12,13]

Sustainable architecture is an approach to design and construction that seeks to reduce human environmental impact and promote a more sustainable future. It is based on using environmentally friendly materials, energy efficiency, and adaptability to the changing needs of the users and the environment.[15,16]

One of the main objectives of sustainable architecture is to reduce greenhouse gas emissions and energy consumption in buildings. This is achieved through using low-impact building materials, such as wood and straw, and incorporating energy-efficient technologies and renewable energy sources.[17,18]

By adopting the principles of sustainable architecture, it is possible to contribute to sustainable development and address the challenges of climate change and urbanization worldwide. In addition, sustainable architecture seeks to conserve and protect existing natural and urban environments, promoting urban densification and efficient use of space. An example is reversible architecture, which is based on planning demountable and adaptable buildings using materials that can be easily repaired or reused.[19,20]

Sustainable architecture also provides environmental, economic, and social benefits. By reducing energy and water consumption, using environmentally friendly building materials, and promoting the conservation of natural resources, sustainable architecture helps to protect the environment.[21] Sustainable architecture uses environmentally friendly means and materials.

Sustainable architecture uses environmentally friendly construction means, materials, and techniques, including green building systems, natural buildings, and renewable resources.[22] It also focuses on green design, environmentally friendly and natural architecture. While reversible architecture focuses on planning and ensuring demountable and adaptable buildings by using materials that can be easily repaired, replaced, or re-used.[23]

Rapid urbanization has had unfavorable, sometimes unforeseen, impacts on biodiversity and human health. While cities offer numerous advantages in meeting the basic needs of a growing population, they also present less obvious and long-term health costs. To address the multifaceted impacts of urbanization, an evidence-based design framework is essential for establishing mitigation and regeneration actions.[24,25]

The authors believe that the One Health approach provides ways and tools for revitalizing different urban ecosystems in cities, placing biodiversity and ecosystem services at the center of the design of healthy and sustainable urban spaces. Our proposed framework is based on a radial model to integrate dissimilar viewpoints from various public sectors. This would ensure that initiatives are more sustainable, primarily focused on human and animal health, socially inclusive, and based on highly reliable data, thus reinforcing the essential link between healthy environments and better-equipped communities.

CONCLUSIONS

Sustainable architecture from the OneHealth approach emerges as a holistic paradigm that seeks to harmonize human well-being, environmental health, and animal protection through innovative and responsible design. This review demonstrates that green building strategies, the use of non-toxic materials, and the integration of green spaces reduce environmental impact and promote the physical and mental health of inhabitants while preserving the surrounding ecosystems.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest.

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AUTHORSHIP CONTRIBUTION

Conceptualization: Carlos David Boris Miclin, Yonathan Estrada Rodríguez, Mayelin Marin Mendez.
Writing – original draft: Carlos David Boris Miclin, Yonathan Estrada Rodríguez, Mayelin Marin Mendez.
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