



ADOPTION OF GREEN BUILDING CONCEPT TO RESIDENTIAL BUILDING IN MONARAGALA MUNICIPAL AREA

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Green Building is a sustainable development initiative that can be considered a solution. It enhances efficiency in electricity, water, soil, and materials, while minimizing environmental impacts and promoting human health throughout a building's life cycle. Many residential buildings in urban areas of Sri Lanka have adopted this concept, but non-urban areas are behind. This research evaluates the awareness, readiness, and practical use of green building technologies and strategies among homeowners, construction professionals, and experienced experts in green building projects. A mixed-methods approach was used, combining quantitative data from structured questionnaires with qualitative insights from stakeholder interviews and field observations. Key factors influencing the adoption of these practices include limited awareness among developers and homeowners, financial barriers, and inadequate facilities. Green building offers numerous benefits in terms of economics, environment, health and well-being, and quality of living. The research findings can be applied to develop a green residential building in the Monaragala area, featuring natural ventilation, daylighting, and optimal building orientation. This could incorporate locally sourced, sustainable materials, landscape design, rainwater collection, solar energy systems, and thermal insulation. Although some activities related to green practices are already in place, the adoption of green building practices in Monaragala is limited. However, the perceived benefits suggest a strong potential for future growth. By addressing the identified barriers with targeted strategies and policies, it's possible to significantly increase the adoption of green building concepts. This would not only contribute to sustainable development in the Monaragala municipal area but also set an example for broader regional and national efforts toward environmental stewardship.

Keywords: Green Building, residential building, sustainability, adoption

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1.0. INTRODUCTION

Environmental challenges like climate change, pollution, and ecosystem destruction threaten global development and life. In response, the World Green Building Council was founded in 1993 to promote sustainable building, now spanning 70+ countries with 49,000 members. (moramudali, w.k., 2018) A green building is designed to be environmentally responsible and resource-efficient throughout its life cycle, playing a key role in sustainable development through innovative practices. (Green Building Council of Sri Lanka, 2013) Extreme weather in dry climates challenges urban housing, yet green building research in semi-urban and rural areas remains limited. This study promotes green practices in Monaragala by evaluating current methods, perceptions, barriers, and offering improvement recommendations.

2.0 LITERATURE REVIEW

Green or sustainable buildings use essential resources such as energy, water, materials, and land more efficiently than conventional buildings that are only built to meet standard codes. (Kats, 2003) Green building rating systems are used to evaluate whether a structure meets green building standards. With the growth of the green economy, various assessment tools such as LEED, BREEAM, CASBEE, GRIHA, and IGBC have been developed to support environmental sustainability (M. Shravan kumar, 2022). The green building concept is newly introduced in Sri Lanka and is rapidly gaining traction across various industries. (Waidyasekara K.G.A.S) The GREENSL® Rating System aims to encourage eco-friendly building design, construction, and operations. (Dilrukshi et al., 2014) Eight factors were selected for the Sri Lankan GREENSL® Rating System based on existing rating systems and local environmental needs. (Moramudali, w.k., 2018) Adopting green building concepts in residential construction faces several challenges, including financial limitations, lack of knowledge, inadequate regulations and policies, technical difficulties, social and cultural resistance, insufficient facilities, and limited support. These barriers collectively hinder the widespread implementation of sustainable practices in the housing sector. (Darko, 2018) Green construction in homes offers social, economic, and environmental benefits, enhancing quality of life and promoting sustainability. As awareness grows, more stakeholders are expected to adopt these practices, driving a shift toward a more sustainable future. (Nduka & Ogunsanmi, 2015) This review explores current research on green building adoption, highlighting benefits, barriers, and stakeholder attitudes. Despite growing awareness of its advantages, challenges remain due to cultural views and knowledge gaps, prompting a need for further innovative research.



3.0 METHODOLOGY

The study's data collection was carried out in two phases. Phase I involved interviews with 50 randomly selected residents in the Monaragala municipal area, using semi-structured questions based on the Green SL Rating System and literature review to explore current green building practices, barriers, enablers, and residents' perceptions. Phase II involved distributing questionnaires to 30 construction professionals, including architects, engineers, and contractors, to identify barriers to adopting green building practices. The questionnaires used a Likert scale and included both closed and open-ended questions. To recommend strategies for adopting green building concepts in residential buildings in the Monaragala municipal area, interviews were conducted with five experts, using questions based on literature and study findings. The study employed various analysis methods: descriptive statistics and graphical tools (bar and pie charts) were used to evaluate the current status of green building practices; thematic analysis examined perceptions of green building benefits; and the Relative Importance Index (RII) method was used to rank barriers based on their significance. Manual content analysis was applied to interpret qualitative data and support final recommendations.

4.0 RESULTS AND DISCUSSION

The study aimed to assess the current status of green building practices in residential buildings in the Monaragala Municipal Area. It revealed that while most residents have only a vague understanding of the term "green building," associating it loosely with the environment, many unknowingly engage in green practices. These actions are driven more by social norms, convenience, and cost than by awareness of the green building concept. Despite the lack of formal knowledge, some sustainable elements were still present in their homes

Table 4.1 The current status of green building practices in the residence

Factors	Response	Factors	Response
Energy & Atmosphere (EA)		Material and resource (MR)	
have energy-efficient appliances	86%	3R concept	4%
insulated with eco-friendly materials	0%	Have eco-friendly disposal practices	54%
have Energy-Efficient Windows	0%	Sustainable Site (SS)	
have renewable energy source	6%	Does cleaning pavement	78%
regularly maintained HVAC	2%	Does cleaning equipment	76%
Water Efficiency (WE)		use outdoor chemical	2%
Use water-efficient appliances	100%	Use chemicals fertilizers	8%
installed water-saving fixtures	8%	reuse storm water	10%
Use rainwater harvesting	2%	Have vegetated Roof	6%
Use Irrigation Systems	2%	Use Low lux light	6%



Indoor Environmental Quality (EQ)		MN	
Have Natural ventilation features	100%	Use building guide	0%
Have Indoor plants	6%	ID	
Use low-VOC Flooring	96%	Use innovation practices	0%
Use low-VOC products	10%		
Have Energy-Efficient Lighting	100%		
Have daylight	74%		

The research explored residents' perceptions of the benefits of applying the Green Building Concept in homes. Initially unfamiliar with the concept, residents showed interest after receiving explanations. The perceived benefits included: Such as Economic Benefits, Environmental Benefits, Health and Well-being Benefits, and Aesthetic and Quality of Living. According was observed that they had an interest in using these practices in their homes.

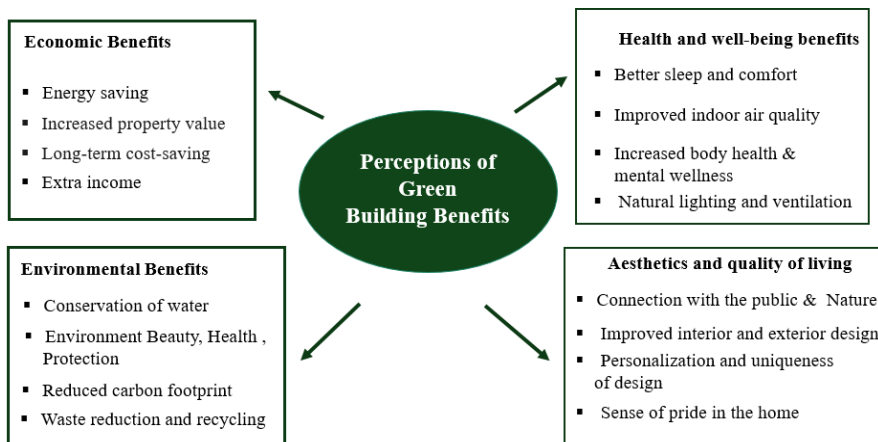


Figure 4.1 Perceptions of Green Building benefits

The slow adoption of green building in Monaragala is mainly due to low awareness, financial constraints, and limited facilities. Moderate barriers include maintenance issues, resistance to change, and social factors. Regulatory and other minor challenges were found to be the least significant.

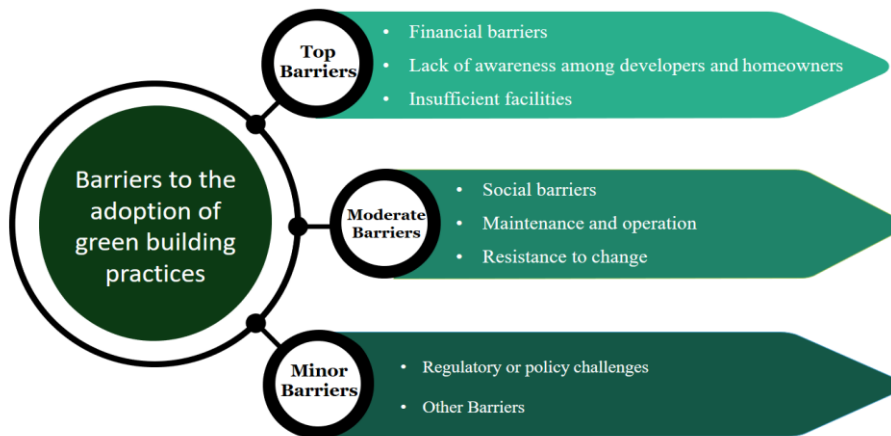


Figure 4.2. Barriers to adopting green building practices

To encourage green building practices in Monaragala, residents are urged to adopt passive design strategies such as natural ventilation, daylighting, and optimal building orientation to reduce energy consumption. Incorporating locally sourced and sustainable materials like compressed stabilized earth blocks and clay tiles helps minimize environmental impact. Integrating thoughtful landscape design can enhance microclimates and promote local biodiversity. Sustainability can be further strengthened through the use of rainwater harvesting systems, solar energy, improved HVAC systems, thermal insulation, and recycled materials in reinforced concrete. Together, these practices support environmentally friendly development that aligns with Monaragala's unique climate and available resources.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

Green building focuses on designing and operating structures to enhance occupant well-being while reducing environmental impact. This study explores the adoption of green building practices in residential buildings within the non-urbanized Monaragala area. Currently, the implementation of such practices in Monaragala remains limited. However, there is a positive perception of the benefits associated with green buildings, indicating strong potential for future adoption. By addressing the existing barriers through targeted strategies and effective policy measures, the uptake of green building concepts can be significantly improved. Such progress would promote sustainable development within the Monaragala municipal region and serve as a model for broader regional and national environmental efforts.

5.2 RECOMMENDATIONS

Recommendations can be made for adopting green building concepts based on the experts' discussion.



- Promote public awareness initiatives that highlight the practical benefits of green housing for homeowners.
- Encourage local banks to offer green financing initiatives, such as low-interest loans specifically for green building projects.
- Essential for periodically training construction professionals, ensuring that green building practices can be applied efficiently and reliably in residential projects.
- When the stakeholder applies COC, then priority for faster certification procedures can be given to those who apply with a green building feature in residential buildings.
- The implementation of supportive policies, such as subsidies and tax breaks, is essential to improve the affordability and accessibility of sustainable materials.
- Revising building codes and enhancing public-private partnerships.
- Revise the awarding scale or certification, and a rating system special for the residential buildings at the Green Building Council of Sri Lanka.

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