# Green Building Assessment Systems in South Africa: Key Indicators and Implementation Barriers

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# Presentation outline

- Introduction and Background
- Aim, Objectives, and Scope
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- Discussion
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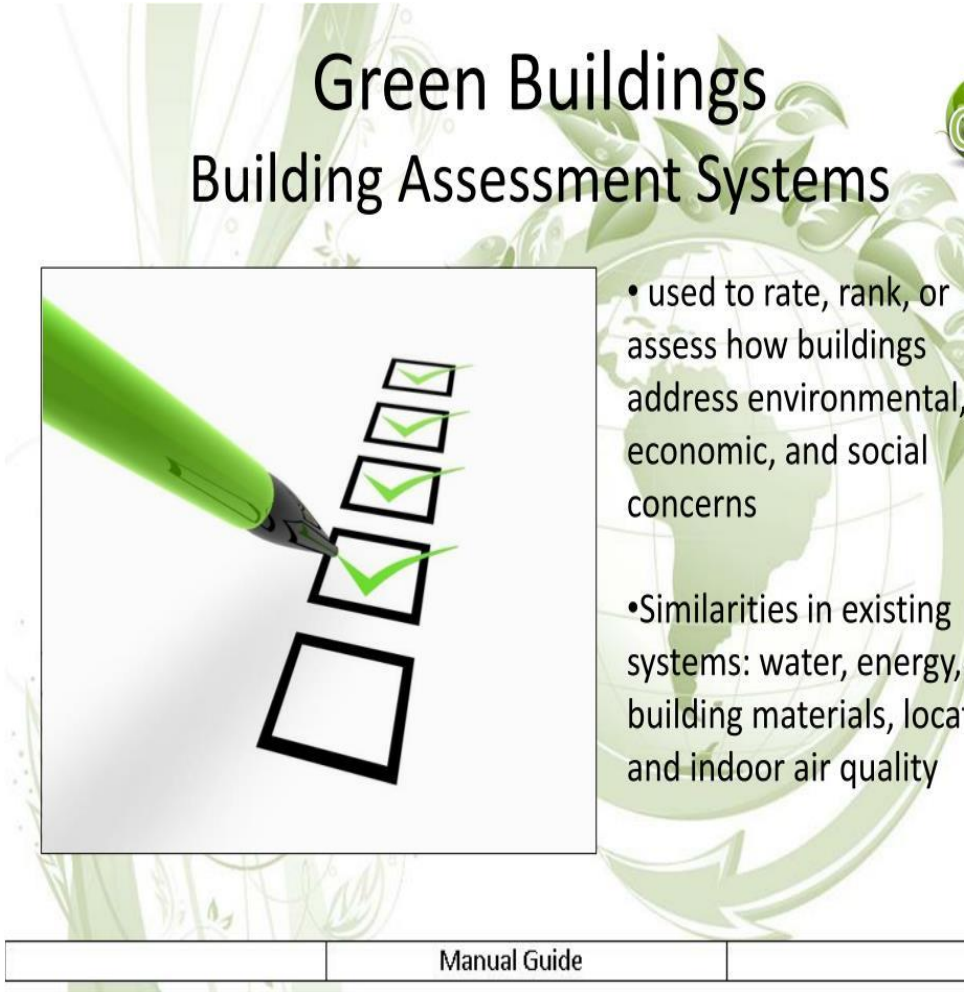
# Introduction & Background

- Green Building Assessment Systems (GBAS) serve as standardised tools for evaluating environmental performance and promoting sustainability in the construction industry (Kibert, 2016; Zuo & Zhao, 2014).
- In South Africa, the urgency for sustainable building practices is heightened by escalating energy demands, water scarcity, and climate change challenges (Masia et al., 2020; Mompati et al., 2024).
- Despite increasing awareness, the adoption of GBAS remains limited and inconsistent. This study investigates the key indicators employed in GBAS and examines the barriers to their effective implementation within the South African context.

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# Aim, Objectives, and Scope

- This study, aims to contribute to the growing body of knowledge on sustainable construction in South Africa by focusing on two primary objectives:

- To explore the key indicators for green building assessment systems in South Africa,

- To assess the barriers to the implementation of green building assessment systems in South Africa.

# Research Design and Methodology

## RESEARCH DESIGN

- Quantitative research design was used.
- Existing literature were reviewed.
- Survey design (questionnaire) was drafted using factors identified in literature.

## TARGET POPULATION

The population for this study includes:

- Quantity surveyors
- Architects
- Projects managers
- Engineers

Working within Gauteng province, South Africa

## SAMPLING TECHNIQUE

- Purposive sampling technique was employed for this research study.

## METHOD OF DATA COLLECTION

- Questionnaire was administered using Google form.
- 60 questionnaires were retrieved.

## METHOD OF DATA ANALYSIS

- Frequency and Percentage
- Mean Item Score
- Std. Deviation
- One Sample T-test
- Reliability was confirmed through Cronbach's alpha (0.924)

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# Table 1: Background Information of Respondents

| Variables | Frequency | Percent |
|---|---|---|
| **What is your highest educational qualification?** | | |
| **Post-Matric certificate or Diploma** | 10 | 16.67 |
| **BSc Degree** | 28 | 46.67 |
| **Honours' Degree** | 14 | 23.33 |
| **MSc Degree** | 2 | 3.33 |
| **PhD** | 6 | 10.0 |
| **Total** | 60 | 100.0 |
| **What is your profession?** | | |
| **Quantity Surveyor** | 20 | 33.33 |
| **Engineer** | 3 | 5.0 |
| **Property Manager** | 7 | 11.67 |
| **Construction Project Manager** | 6 | 10.0 |
| **Construction Manager** | 21 | 35.0 |
| **Architect** | 3 | 5.0 |
| **Total** | 60 | 100.0 |
| **What is your year of experience?** | | |
| **0-5years** | 31 | 51.67 |
| **5-10years** | 17 | 28.33 |
| **10-15years** | 10 | 16.67 |
| **More than 15years** | 2 | 3.33 |
| **Total** | 60 | 100.0 |

These findings suggest that the respondents collectively possess substantial professional expertise and strong academic qualifications, positioning them to provide informed and relevant insights that contribute meaningfully to the objectives of this study.

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# Table 2. Key Indicators for GBAS in South Africa

Test Value = 3.5
p-values less than 0.05 @ 95% confidence level

| Indicators to green building assessment | Mean | Std. Deviation | p-value (Sig. 2-tailed) | Rank |
|---|---|---|---|---|
| Energy efficiency | 4.27 | .918 | .000 | 1 |
| Carbon emission reduction | 4.27 | 1.023 | .000 | 2 |
| Water efficiency | 4.20 | 1.086 | .000 | 3 |
| Indoor Environmental Quality | 4.18 | .983 | .000 | 4 |
| Resource utilisation | 4.18 | 1.049 | .000 | 5 |
| Waste and pollution | 4.17 | .960 | .000 | 6 |
| Sustainable site development | 4.15 | .954 | .000 | 7 |
| Management | 4.13 | 1.049 | .000 | 8 |
| Safety | 4.12 | .976 | .000 | 9 |
| Innovative designs | 4.10 | 1.037 | .000 | 10 |
| Durability | 4.08 | .996 | .000 | 11 |

As shown in Table 2, the results of the one-sample t-test revealed that all the identified indicators have p-values (Sig.2-tailed) less than 0.05 at a 95% confidence level, thereby indicating that each indicator is statistically significant and perceived by respondents as key indicators to green building assessment in South African construction industry.

Using 3.5 as the test value is to enhances the analysis by ensuring that only factors rated above neutrality and leaning towards agreement are considered significant.

# Table 3. The Barriers to GBAS in South Africa

| Test Value = 3.5<br>p-values less than 0.05 @ 95% confidence level | | | | |
|---|---|---|---|---|
| Barriers To Green Building Assessment Systems | Mean | Std. Deviation | p-value (Sig. (2-tailed) | Rank |
| Higher investment costs | 4.17 | 1.060 | .000 | 1 |
| Risks and uncertainties | 4.07 | 1.023 | .000 | 2 |
| Failure to commit to environmental protection | 4.05 | 1.080 | .000 | 3 |
| Lack of implementation of green building policies and regulations acts | 4.05 | 1.126 | .000 | 4 |
| Lack of government support | 4.03 | 1.248 | .002 | 5 |
| Lack of awareness | 3.97 | 1.164 | .003 | 6 |
| Higher costs | 3.95 | 1.199 | .005 | 7 |
| Lack of incentives | 3.93 | 1.056 | .002 | 8 |
| Inefficiency in adopting sustainable construction | 3.93 | 1.103 | .003 | 9 |
| Lack of building codes and regulations | 3.93 | 1.133 | .004 | 10 |
| Lack of technological advancements | 3.92 | 1.211 | .010 | 11 |
| Inadequate understanding | 3.83 | 1.076 | .020 | 12 |
| Lack of demand | 3.82 | 1.157 | .038 | 13 |
| Fear of liability and litigation | 3.78 | 1.106 | .052 | 14 |
| Lack of knowledge | 3.77 | 1.212 | .094 | 15 |

The results, presented in Table 3, demonstrate that all the identified barriers except two, are statistically significant, as evidenced by p-values (Sig.2-tailed) less than 0.05 at a 95% confidence level.

The results show that the most significant green building assessment barriers are “high investment cost”, “risks and uncertainties”, “failure to commit to environmental protection”, “lack of implementation of green building policies and regulations acts”, and “lack of government support”.

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# Discussion of Findings

- The one-sample t-test results confirm that all assessed indicators were statistically significant, reinforcing their relevance within the South African green construction context.

- Energy efficiency and carbon emission reduction were ranked highest, underscoring the sector's increasing awareness of environmental sustainability. These findings are consistent with Ghaffarianhoseini et al. (2017) and Darko and Chan (2018), who identified energy performance and carbon footprint reduction as central pillars in most global GBAS frameworks such as LEED and BREEAM.

- The ranking of innovative designs, safety, and durability towards the bottom, despite their significance, suggests that while innovation and resilience are recognized, they may still be underemphasized in assessment practice. This aligns with findings by Olanrewaju and Abdul-Aziz (2015), who argue that innovation in green construction is often limited by cost and compliance concerns in developing economies.

# Discussion of Findings Cont…

- Furthermore, the study revealed the barriers to the implementation of GBAS. The most significant barriers was higher investment costs, aligning with literature that frequently identifies initial capital expenditure as a primary constraint to sustainable building adoption (Aigbavboa et al., 2017; Häkkinen & Belloni, 2011).

- Closely related barriers included risks and uncertainties, lack of implementation of green building policies, and inadequate government support, which reflect systemic issues affecting policy enforcement and institutional readiness. These results echo those of Darko and Chan (2018), who emphasized the lack of enabling environments in many African countries as a critical impediment to green construction.

- Overall, the results show a convergence with global green building principles, while highlighting context-specific barriers rooted in economic and institutional limitations. Therefore, to enhance the uptake of GBAS in South Africa, policy makers and industry stakeholders must address systemic financial constraints and institutional inertia, while reinforcing existing awareness and performance-based incentives.

# Conclusions & Recommendations

- This study examined the key indicators and barriers associated with the implementation of green building assessment systems in South Africa. The findings reveal that energy efficiency, carbon emission reduction, and water efficiency are the most significant indicators recognised by stakeholders.

- The study also identified the following barriers to the adoption of GBAS in SA: High investment costs, risks and uncertainties, lack of policy enforcement, and inadequate government support.

- The study therefore recommend that the South African government should strengthen policy frameworks and enforcement mechanisms to ensure the consistent adoption of Green Building Assessment Systems across the construction sector. Financial incentives such as tax rebates, grants, and low-interest loans should be introduced to mitigate high initial investment costs, which are a major barrier to implementation.

- However, future studies could address the limitations of this study by expanding the sample to include multiple provinces, adopting mixed methods approaches, and incorporating longitudinal designs to track changes over time.

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Thank you

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