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Identifying Decision-Making Challenges For Managers In The Construction Industry: A Case Study Of The Grove, Nachinola, Goa

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Abstract: Construction project managers often deal with complex decision-making challenges shaped by a mix of regulatory demands, environmental concerns, and socio-economic factors. This study takes a closer look at these challenges through a case study of The Grove project in Nachinola, Goa. A structured questionnaire was circulated among 93 industry professionals—including architects, engineers, consultants, and contractors—to assess risks across ten key categories, such as financial, technical, operational, political, environmental, and social. The results showed that water-related operational risk (average rating: 4.48), environmental risk (4.13), and management-related risk (3.96) ranked as the most critical areas of concern. To address these challenges, several mitigation strategies were employed. These included the use of water-efficient laterite stones, installation of groundwater recharge systems, adoption of solar energy solutions, and implementation of project management software to streamline operations. Social risks were managed through active community involvement, while transparent project processes helped reduce political risks. Overall, the study emphasizes the value of context-specific risk mitigation measures to support better decision-making and promote sustainability in construction—especially in environmentally sensitive areas like Goa.

Index Terms **- Construction Management, Risk Assessment, Sustainable Practices, Water Management. etc.**

I. INTRODUCTION

The construction industry is inherently complex, involving a wide range of stakeholders, evolving site conditions, and time-sensitive decisions that directly impact project outcomes. Effective decision-making is essential to ensure that projects are completed within the planned scope, budget, and timeline, while also meeting environmental standards and fulfilling social responsibilities. However, project managers often face significant hurdles, including regulatory delays, technical uncertainties, environmental challenges, and socio-economic pressures—especially in sensitive regions.

In ecologically rich areas like Goa, where environmental regulations are stringent, these challenges become even more pronounced. The Grove, a residential development in Nachinola, Goa, offers a meaningful case through which to examine these complexities. The project encountered a variety of issues, ranging from reliance on groundwater and environmental impact concerns to navigating approval processes and coordinating among diverse stakeholders.

To understand these challenges more deeply, a survey was conducted with 93 professionals from different roles within the construction field—including architects, engineers, contractors, site supervisors, interior designers, and administrative personnel. The questionnaire focused on ten key categories of risk that influence decision-making: financial, technical, market-related, operational (including water risks), political, social, and environmental.

The results pointed to three primary areas of concern: water-related operational risks, environmental constraints, and inefficiencies in project management. These factors not only posed risks to cost control and timelines but also had wider implications for the project's long-term sustainability and stakeholder confidence.

In response, the project implemented several thoughtful mitigation strategies. These included the use of water-conserving laterite stone, the creation of recharge pits and bioswales for better stormwater management, and the installation of solar energy systems to reduce environmental impact. Additionally, project coordination was improved through automated business software, and meaningful engagement with the local community helped build trust and social support.

This paper aims to explore the complex decision-making landscape in construction management through the lens of The Grove project, offering practical insights into how high-impact risks can be effectively managed in environmentally sensitive regions. By drawing connections between construction practices and groundwater stress, the study proposes a more responsible and water-conscious approach to project planning and execution—an approach that could serve as a model for sustainable construction management in similar parts of India.

II. Problem Statement

Construction projects in sensitive regions often suffer delays due to inadequate risk-based decision-making frameworks. Managers struggle to balance regulatory compliance and environmental sustainability during the construction process. Lack of integrated communication tools hampers coordination among diverse construction stakeholders.

III. Aim

To identify and analyze key decision-making challenges faced by construction managers, with a focus on risks influencing project execution at The Grove, Nachinola, Goa.

IV. STUDY AREA

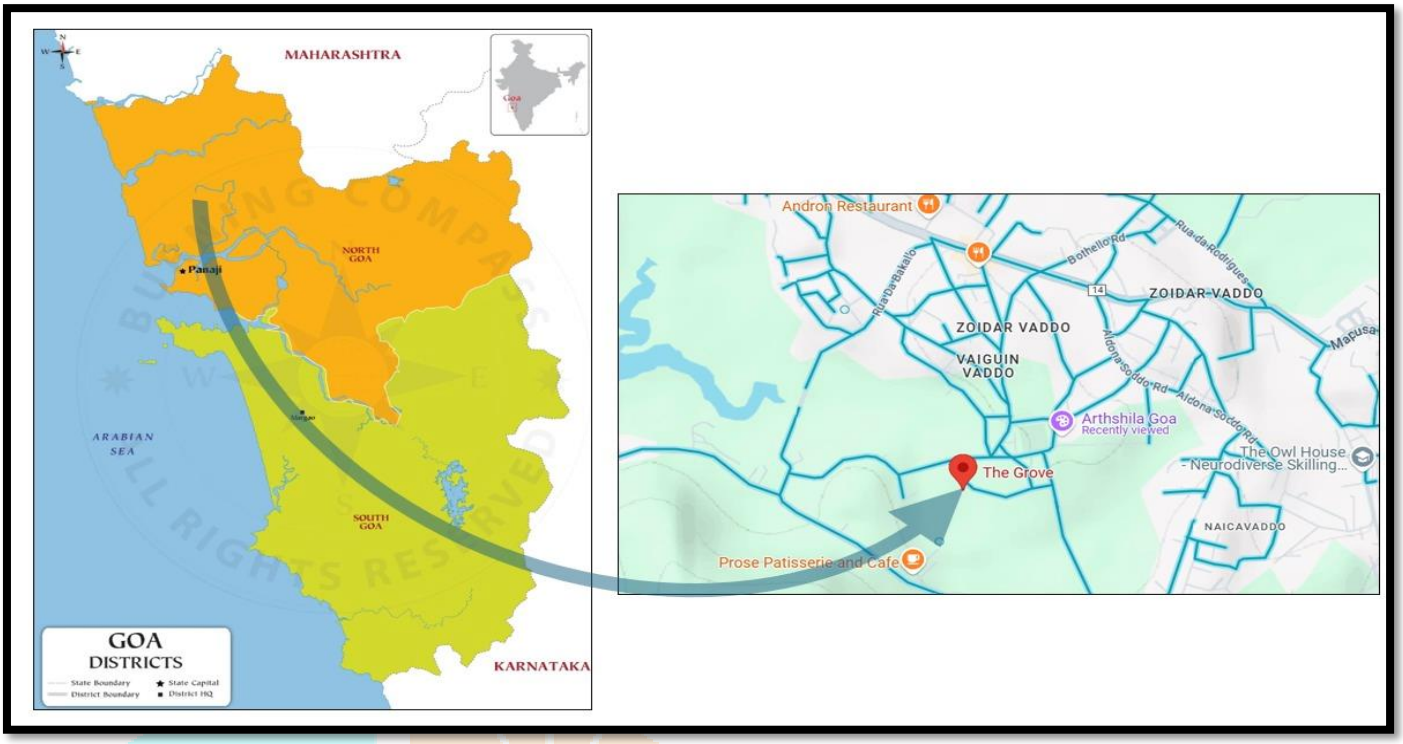

Fig.1 Showing Study Area The Grove, Nachinola, Goa.

The Grove is a residential construction project located in Nachinola, a semi-rural village in North Goa, India. The area is characterized by lateritic soil, moderate rainfall, and a sensitive ecological environment. It falls under strict regulatory zones governed by the Goa Coastal Zone Management Authority (GCZMA). The site presents unique challenges due to groundwater dependency, local construction norms, and community expectations.

V. METHODOLOGY

This study is based on a survey distributed among professionals involved in The Grove project. The questionnaire focused on construction challenges and risk factors, including financial, operational, safety, and environmental risks. A total of 93 responses were collected from professionals such as architects, owners, admin/accounts personnel, interior designers, junior site engineers, structural consultants, operational managers, commercial and accounts staff, and a contractor's engineer.

5.1 Risk Categories:

1. Financial Risk
2. Approval from Government Bodies
3. Management Risks
4. Market Risk
5. Technical Risk
6. Operational Risk
7. Operational Risk Related to Water
8. Political Risk
9. Environmental Risk
10. Social Risks

VI. SURVEY BASED RESULTS

The analysis revealed that the top three risk categories impacting the project were Operational Risk Related to Water (4.48), Environmental Risk (4.13), and Management Risk (3.96), indicating significant challenges in resource efficiency, sustainability, and project coordination. Conversely, the lowest scoring risks were Social Risk (1.77) and Political Risk (2.39), suggesting relatively lower concerns in community relations and governance-related issues. These findings highlight the importance of prioritizing mitigation strategies for

high-impact risks to enhance project performance, minimize delays, control costs, and reduce overall disruptions in the construction process.

Graph I :- Average ratings were calculated for each of the identified risk categories to determine their impact.

VII. MITIGATION STRATEGIES

To address water-related operational risks, The Grove adopted the use of locally sourced laterite stone—a material that doesn't require water-intensive curing. This choice not only helped reduce water consumption on-site but also offered natural insulation benefits, cutting down on energy use and contributing to a lower carbon footprint. By choosing this eco-friendly material, the project supported local craftsmanship and helped preserve the region's traditional building practices.

Site planning placed strong emphasis on groundwater recharge and sustainable water management. Features like open green areas and permeable paving were incorporated to encourage natural infiltration and manage stormwater efficiently. Importantly, recharge pits were constructed early in the project, even before major construction activities began, to promote aquifer replenishment from the outset. In addition, bioswales and rain gardens were installed to guide surface runoff into dedicated recharge zones, helping reduce water loss and enhancing the overall sustainability of the site.

Environmental risks were further minimized through the integration of green infrastructure. Permeable surfaces, recharge pits, and thoughtfully designed landscape elements all worked together to support groundwater recharge. The use of solar panels helped cut down on carbon emissions, while responsible waste management and the conservation of native vegetation ensured that the project remained environmentally sensitive and aligned with sustainable development goals.

To manage internal challenges such as miscommunication, poor coordination, and delays, the project team implemented AUTOMATE business software. This digital tool improved workflow, streamlined collaboration among teams, and boosted overall project efficiency.

Social risks were addressed through consistent community engagement and open communication with local residents. By offering employment opportunities to people in the surrounding area, the project fostered trust and built a strong foundation of local support.

VIII. Conclusion

The Grove project in Nachinola, Goa, stands out as a thoughtful example of how sustainable construction and effective risk management can go hand in hand. By addressing key risks—environmental, managerial, and social—the project adopted a well-rounded strategy that balanced development with responsibility. Eco-friendly design choices, the use of digital tools for better coordination, and consistent community engagement played a central role in achieving these outcomes. The integration of renewable energy and a commitment to transparency further improved project efficiency and built trust among stakeholders. As a whole, The Grove offers a valuable model for responsible development in environmentally sensitive areas.

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