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NAVIGATING CLIMATE CHANGE CHALLENGES: THE ROLE OF SMART CITIES IN BUILDING RESILIENCE - A CASE STUDY OF AHMEDABAD, INDIA

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ABSTRACT

Urban areas increasingly serve as the hubs for technological advancement, economic expansion,and human activity. But growing urbanization also brings forth an array of complex challenges, the most significant of which is the impact of climate change. These difficulties are especially noticeable in India, where rapid urbanization and growing vulnerability to the consequences of climate change coexist. This research study explores the complex interplay of climate change, urbanization, risk, resilience, and vulnerability within cities. This study investigates how the notion of smart cities presents novel approaches to address climate-related hazards and foster urban adaptability. It also outlines the significance of resilience in urban planning. It analyses a few case studies that present real-world resilience-building initiatives in urban settings. The concept of Smart Cities and the fundamental components that underpin their existence, such as technology, data, and connectivity, are also discussed while highlighting their innovative potential. It seeks to thoroughly examine the experiences of Ahmedabad, aiming to illuminate the potential for smart cities to address the challengesposed by climate change and urbanization in India's changing environment. It comprehensively analyses Ahmedabad's difficulties while acknowledging and celebrating its ambitions, inventive solutions, and capacity to adapt amid an unpredictable climate outlook.

1. INTRODUCTION

Climate change is expected to result in an escalation of both the frequency and intensity of extreme weather occurrences. The potential ramifications of climate change extend beyond environmental implications, encompassing strategic economic and political considerations. As climate change progresses, it can undermine India's economic performance and adversely affect the lives and livelihoods of a significant portion of its population.[1]

Urban areas are pivotal in driving economic development, with Indian cities accounting for approximately 58 percent of the country's gross domestic product (GDP). Projections indicate that this contribution is anticipate to increase to 70 percent by 2030. Without effective policies, the potential consequences of Climate Change can profoundly and devastatingly influence urban areas. Ahmedabad has been selected as a participant in the smart city initiative of the Government of India

[1] Prakash Kamtam, 'The Role of Smart Cities in Building the Resilience of Vulnerable Communities' (2022) 18 Springer 418-433.

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and is currently formulating its smart city plan.[2]

Given the susceptibility of Ahmedabad to various natural hazards, disaster management and resilience must become the primary focal points for all urban development endeavours within the city. Ahmedabad has been making significant efforts towards the development of a smart city. However, it is essential to note that further improvements are necessary to achieve a genuinely resilient and climate-integrated smart city.

Given the potential magnitude of losses that might undermine decades of progress, it becomes imperative for smart cities to adopt a comprehensive approach that encompasses engineering, design, and technical solutions to foster urban resilience. Following an analysis of the climate resilience status of the city, a series of recommendations have been proposed to assist Ahmedabad and other cities in incorporating climate resilience into their smart city strategy.

2. CLIMATE CHANGE AND URBAN VULNERABILITY IN AHMEDABAD

Cities worldwide need help to adapt and protect their infrastructure in the face of the increasing frequency of catastrophic weather events brought on by climate change. India, with its rapidly urbanizing environment and economic reliance on its cities, is particularly vulnerable to the far- reaching repercussions of climate change. The Indian city of Ahmedabad is at the forefront of this difficulty as it participates in the Indian government's smart city effort. While progress has been made toward creating smart and resilient cities of the future, getting there will require a more holistic and integrated strategy.

2.1 Smart city concept and Ahmedabad

Ahmedabad's participation in the smart city effort demonstrates the city's dedication to using technology and innovation to improve the quality of life for future generations. However, climate resilience should be built into the smart city strategy over time. While steps have been taken, much moremust be done if Ahmedabad is to avoid seeing its progress destroyed by climate change.

Integrating engineering, design, and technology solutions into Ahmedabad's comprehensive climate resilience strategy is essential. The first stage is to assess the city's present level of climate resilience. Examining the weaknesses, strengths, and gaps in the current infrastructure and policies might shed light on what areas must be addressed first. Recommendations for Ahmedabad and similar cities include strengthening essential infrastructure against climate-related hazards, applying sustainable urban design methods, and improving green infrastructure. Parks and urban woods are pleasing and essential in decreasing the negative impacts of urban heat islands and severe temperatures.

[2] Pourya Salehi, Resilient Smart Cities: Theoretical and Empirical Insights 121 (Springer International Publishing 2022).

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3. AHMEDABAD'S SMART CITY JOURNEY AND CLIMATE RESILIENCE

Sustainable city development aims to make urban areas more resistant to weather extremes. This includes zoning restrictions that account for potential floodplains, creating climate-responsive structures, and supporting public transit to cut carbon emissions. Cities can better weather the inevitable disruptions climate change brings if they are built with resilient design concepts. The design of essential infrastructure, including transportation systems, power grids, and water distribution systems, should factor in the effects of climate change. This includes establishing water management measures for shifting precipitation patterns and enhancing existing infrastructure to resist extreme weather events.[3] Involving locals in resilience-building efforts is also crucial. Public awareness campaigns, community-based disaster risk reduction initiatives, and participatory planning can empower individuals to contribute to and benefit from the city's resilience efforts. Sustainable living and resourcemanagement are the only topics that might benefit from local knowledge and traditional practices. While Ahmedabad's commitment to sustainable urban growth through the smart city plan is admirable,the city must prioritize climate resilience. Ahmedabad can not only face the problems of climate change but also become a role model for other cities trying to develop a smart, resilient, and sustainablefuture by using a holistic strategy that considers engineering, design, and technology solutions. Immediate action is necessary to protect urban people's economic success and well-being in anincreasingly unpredictable climate.

4. CONCLUSION AND SUGGESTIONS

The risks associated with climate change go far beyond environmental ones and have significant economic and political implications. It is impossible to emphasize the vulnerability of India'smetropolitan districts, which contribute considerably to the country's GDP. The projected rise in urbanization's share of GDP by 2030 raises the stakes for considering the effects of climate changeon city economies and citizens' quality of life. Since Ahmedabad, like many Indian cities, is vulnerableto a wide range of natural hazards, the city's development strategy must prioritize disaster managementand resilience.
Suggestions:

1. Climate resilience must be prioritized in Ahmedabad's smart city initiative. A comprehensive strategy must address vulnerabilities, emphasizing catastrophe management and climate-responsive design.
2. Climate resilience should be studied in smart city development. Ahmedabad and other cities should invest in infrastructure, sustainable urban design, and green spaces to reduce global warming.
3. Sustainable city development requires a comprehensive engineering, design, and technology strategy. Ahmedabad's smart city vision must be followed by fast action to protect the city's economy and residents against climate change.

[3] Asha Kaushik, 'Integrating Climate Resilience in Smart Cities; Case Study of Ahmadabad City' (2016) 4 Research Gate 42, 64.

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