

Planning Issue in Roorkee Town

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Abstract

Roorkee, a prominent urban center in India, has experienced rapid population growth and urbanization over the past few decades, leading to various planning challenges. This abstract presents a comprehensive analysis of the planning issues faced by Roorkee town. The first section of the abstract focuses on the burgeoning population and its impact on urban infrastructure. The exponential increase in residents has strained existing resources and necessitated the development of sustainable urban planning strategies. Issues such as inadequate housing, traffic congestion, and insufficient public amenities have become key concerns for town planners. Next, the abstract delves into the environmental ramifications of unchecked urban expansion in Roorkee. The town's natural ecosystems have faced encroachment and degradation due to poorly planned construction and insufficient waste management. Balancing urban development with environmental preservation is a critical challenge in these circumstances. The third section examines the state of transportation in Roorkee town. Rapid urbanization has led to a surge in vehicular traffic, overwhelming the existing road networks and public transportation systems. The lack of an integrated urban mobility plan has hindered efforts to alleviate traffic congestion and reduce carbon emissions. Furthermore, the abstract addresses the issue of land-use planning and urban sprawl. Unplanned expansion and haphazard development have resulted in the loss of agricultural land and green spaces, impacting residents' food security and quality of life. Effective land-use zoning and urban containment policies are essential to address these concerns. The final section discusses governance and policy challenges related to urban planning in Roorkee. Inadequate coordination among various government agencies, lack of community engagement, and corruption hinder efficient decision-making and implementation of planning initiatives. In conclusion, Roorkee town faces many planning issues from rapid population growth and urbanization. A holistic approach that considers environmental sustainability, transportation, land-use planning, and governance reforms is imperative to tackle these challenges. This abstract emphasizes the need for proactive and well-coordinated efforts by local authorities, urban planners, and the community to ensure Roorkee town's long-term prosperity and livability.

Keywords:

Planning Issues, Roorkee Town, Urban Planning, Urban Infrastructure, Quality of Life

Introduction

Roorkee, a vibrant town nestled in the northern state of Uttarakhand, India, has witnessed an unprecedented population and urban development surge in recent years. This rapid growth has ushered in numerous planning challenges that have become a focal point for policymakers, urban planners, and concerned citizens. As the town grapples with the consequences of urbanization, it is crucial to comprehensively analyze the planning issues it faces in critical areas, including infrastructure, amenities, transportation, public spaces, and environmental

concerns. Infrastructure forms the backbone of any urban center, and Roorkee is no exception. The ever-expanding population has placed immense pressure on the existing infrastructure, stretching it to its limits. The lack of proper planning and timely upgrades has strained utilities such as water supply, sewage, and electricity. Additionally, the demand for adequate and affordable housing has intensified, raising concerns about the quality and accessibility of housing for all residents.

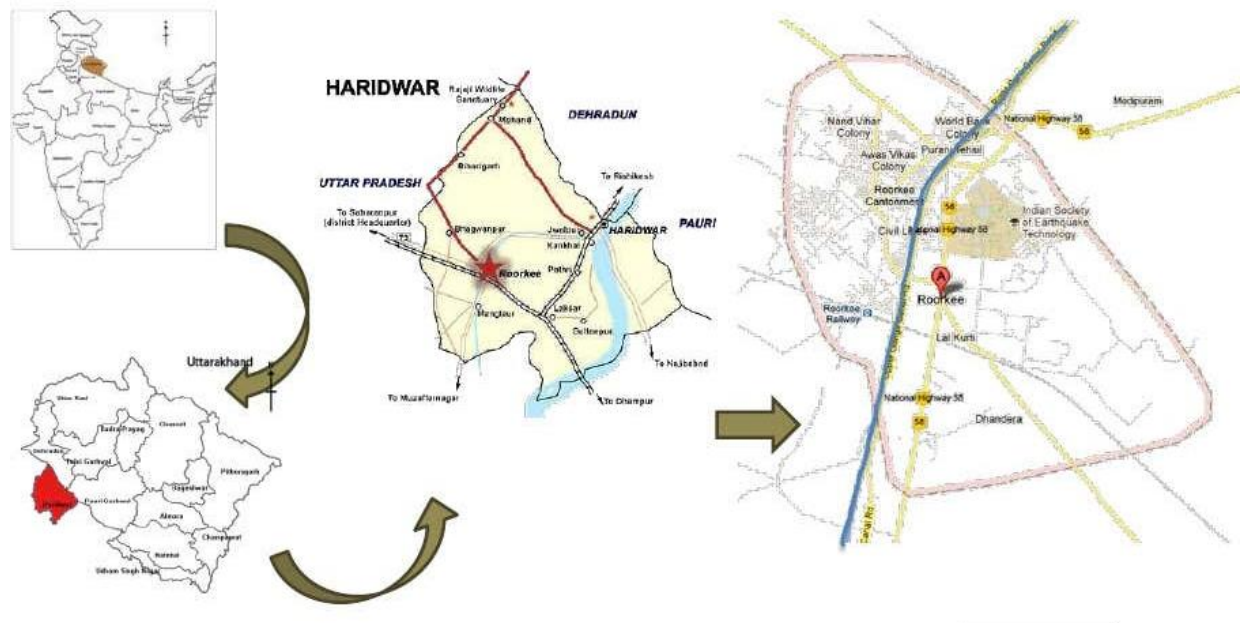
Amenities, too, are integral to a well-functioning town, enhancing its inhabitants' overall quality of life. As Roorkee's population grows, the demand for healthcare facilities, educational institutions, recreational centers, and public safety services has escalated. Ensuring equitable distribution and accessibility to these amenities remains a significant challenge for urban planners. Transportation is another critical aspect affected by Roorkee's rapid urbanization. With an upsurge in vehicular traffic, the town's roads and public transportation systems are experiencing mounting pressure. Traffic congestion disrupts daily life and poses environmental and safety concerns. The lack of a cohesive urban mobility plan has hindered efforts to address transportation issues effectively. Public spaces serve as communal gathering points essential for fostering community and well-being. However, in Roorkee, urban expansion has led to the encroachment of public spaces, threatening their availability and functionality. Proper planning and preservation of these spaces are crucial for promoting social interactions and enhancing the town's liveability. Furthermore, the rapid urban growth in Roorkee has posed significant environmental challenges. Unplanned construction and inadequate waste management have resulted in environmental degradation and a loss of green spaces. Balancing urban development with environmental sustainability has emerged as a pressing issue that requires immediate attention and innovative solutions.

In light of these multifaceted planning issues, it is imperative to conduct a comprehensive analysis of Roorkee's urban development to chart a sustainable and resilient path for the town's future. This study highlights the critical challenges in infrastructure development, amenities provisioning, transportation planning, public spaces, and environmental preservation. By understanding the nuances of these issues, stakeholders can collaboratively work towards devising well-informed policies and initiatives that ensure Roorkee's growth aligns with the principles of inclusivity, sustainability, and community well-being.

Findings and Discussion

This is a case study of the town of Roorkee to understand the existing condition of the study area in terms of physical and social infrastructure. This paper also attempts to study the existing land use and the character and nature of the commercial and informal sectors. Analyzing the existing transport infrastructure of the area and the character of roads has been done. The different uses of the building and the height of the building to assess the nature and character of the built form have been done.

The study will finally study the space's-built form and urban character. The study of social and physical infrastructure, land use, and build-form, with some emphasis on traffic- transportation, and the informal sector.



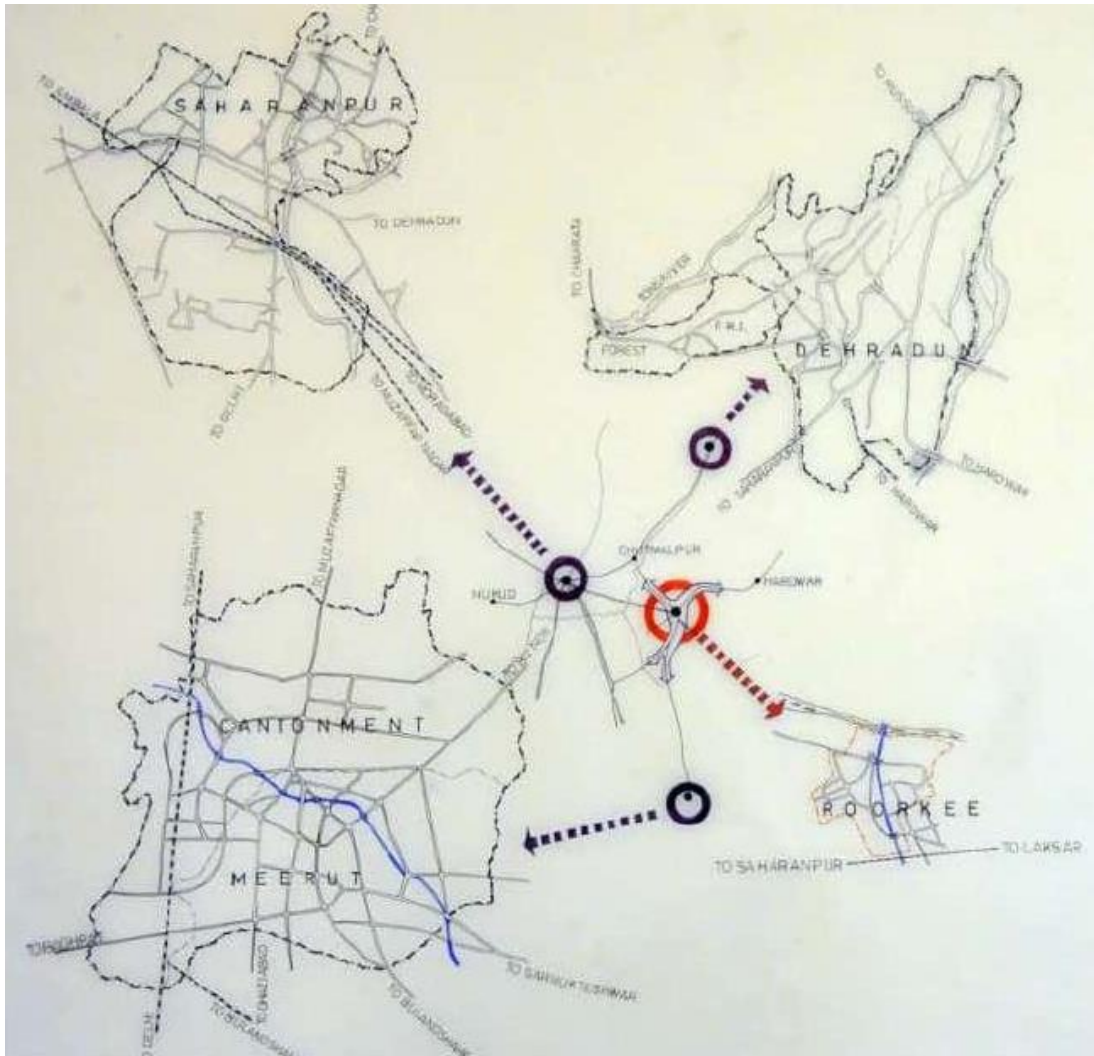
Map 1: Location of Roorkee Town

The growth pattern of Roorkee town defies the conventional classical theories of urban development in several aspects, although there are some limited similarities in certain zones or sectors. Unlike the typical concentric or sectoral growth patterns observed in many cities, Roorkee's expansion has been more sporadic and heterogeneous.

Most developments in Roorkee have occurred along the main transport routes, resulting in a ribbon development shape in many areas. This linear growth pattern has led to elongated stretches of urbanization along these routes, creating challenges in infrastructure planning and service delivery. Interestingly, due to the absence of a major industrial base, the town has avoided the creation of slum-like low-class residential zones or sectors. This absence reflects a unique aspect of Roorkee's urban fabric and may be attributed to the town's economic composition. Villages located on the fringes of the town often serve as commuter zones or residential suburbs. These areas experience a blend of urban and rural characteristics, making them an integral part of the town's periphery. The Civil Lines area, though relatively small in size, has assumed a distinct character with high-class residential development. This development trend can be attributed to the influence of institutions such as the Indian Institute of Technology (IIT) and the Cantonment, which have shaped the socio-economic landscape of the locality.

The presence of various institutions on the eastern side of Roorkee and the Solani river has acted as a physical barrier, influencing the town's spatial layout and restricting expansion in that direction. Roorkee exhibits a significant proportion of areas characterized by high-class residential developments, reflecting the educated and elitist nature of its population. This trend indicates the town's socio-economic status and aspirations. A recent trend observed in Roorkee is the isolated development along the Delhi road and, to a lesser extent, the Haridwar road. This phenomenon appears to be a response to the natural barrier posed by the Solani river, which limits expansion in those directions. Compared to other towns, pollution levels in Roorkee are relatively low. This favorable environmental condition contributes to the town's overall appeal and livability.

Growth on the periphery of Roorkee is generally uncontrolled, with informal settlements and sporadic developments expanding beyond the planned urban areas. This uncontrolled growth poses challenges in terms of infrastructure provision and urban management. The conversion of agricultural land along main roads into residential and commercial areas indicates the increasing urbanization pressure in Roorkee. This phenomenon raises concerns about preserving fertile land and highlights the need for sustainable land-use planning. Roorkee's development has taken place on almost all sides, particularly along the major axes of the town. This radial expansion reflects the dynamic nature of urban growth and the town's ability to adapt to changing needs and demands. Roorkee's urban development showcases a diverse and unique growth pattern that deviates from classical urban theories. The town's expansion along transport routes, absence of slum-like areas, influence of institutions, and controlled pollution levels are notable features. However, uncontrolled growth on the periphery, conversion of agricultural land, and isolated developments along natural barriers pose significant planning challenges that require careful attention from local authorities and urban planners

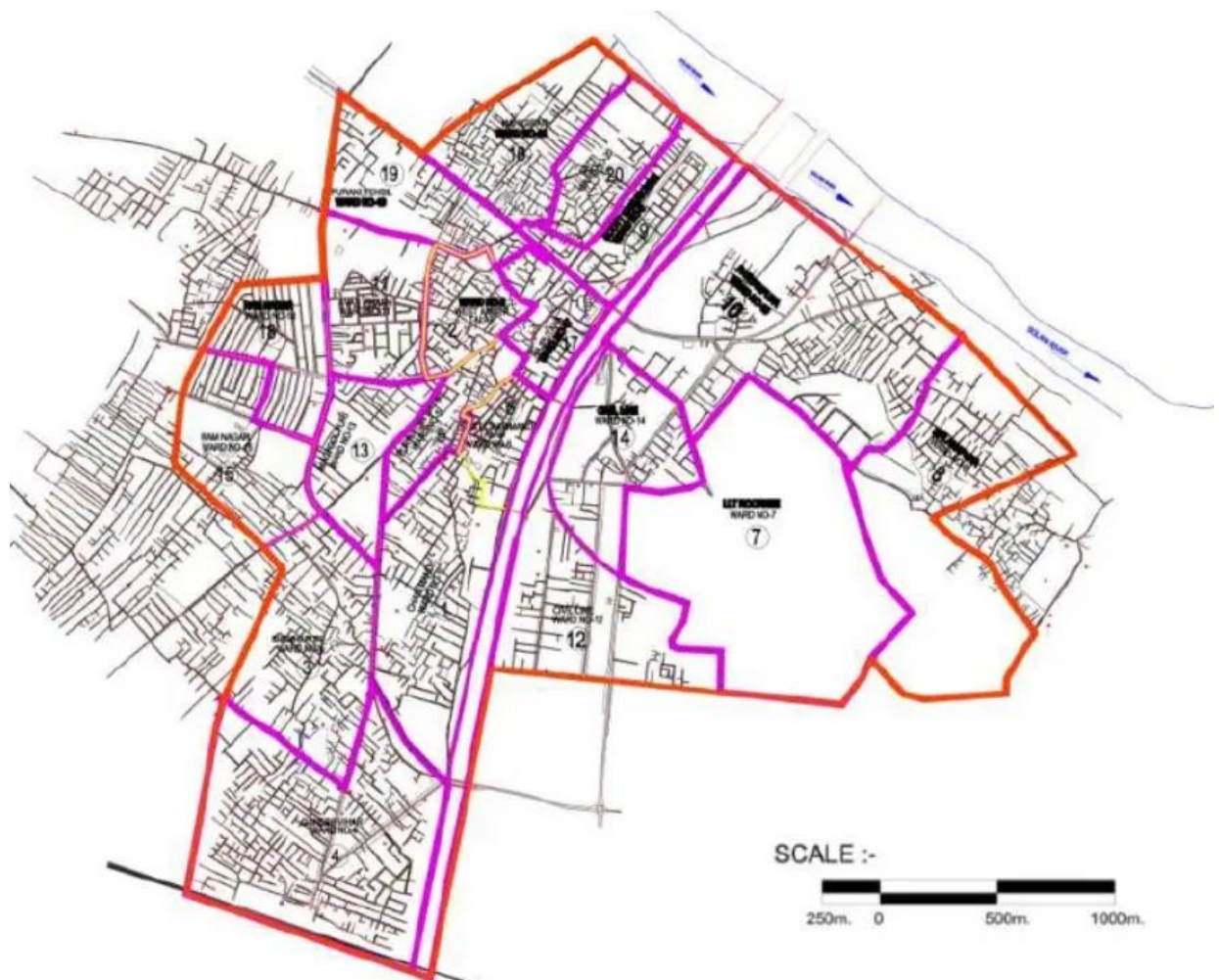


Map 2: Regional Setting of Roorkee

Roorkee finds its importance by hosting many prominent institutions and organizations. The city has contributed to national development by producing the finest quality engineers from the renowned University of Roorkee, now called the Indian Institute of Technology, Roorkee. It is also the home of various government research institutes as the Central Building Research

Institute (CBRI), Irrigation Research Institute (IRI), and the National Institute of Hydrology (NIH). It also has an army base of Bengal Engineering Group & Centre (BEG&C).

The town is also famous for the big Ganges canal, the brainchild of Sir Proby Thomas Cautley that flows on a bridge crossing a seasonal river, Solani which was built by the British in 1854 and augmented recently. The aqueduct to carry the canal is half a kilometer long and as a result, the canal flows at a height of 25 metres over the original river.



Map 3: Base Map of Roorkee Town

Roorkee, an emerging urban center in Uttarakhand, India, is well-connected to various key destinations through an extensive network of major roads, ensuring smooth transportation and accessibility. Among the prominent highways, NH 58 and NH 73 hold significant importance as they serve as vital links to essential neighboring regions.

NH 58 - Connecting Roorkee with Haridwar:

National Highway 58, commonly known as NH 58, serves as a lifeline connecting Roorkee with the nearby holy city of Haridwar. This highway plays a crucial role in facilitating the movement of goods and people between these two prominent towns. The route passes through scenic landscapes, offering travelers glimpses of the majestic Ganges and the surrounding hills. NH 58 serves as a gateway for pilgrims and tourists visiting Haridwar, which holds immense spiritual and cultural significance. Additionally, the highway also supports trade and commerce, aiding the economic development of both Roorkee and Haridwar.

NH 73 - Connecting Roorkee with Haryana:

National Highway 73, also known as NH 73, forms a crucial corridor connecting Roorkee with the neighboring state of Haryana. This highway plays a pivotal role in fostering regional connectivity and promoting trade and commerce between Uttarakhand and Haryana. It facilitates the movement of goods, services, and people, supporting the exchange of agricultural produce, industrial goods, and cultural influences. The strategic significance of NH 73 lies in its ability to enhance regional integration and stimulate economic growth in the connected areas.

Apart from the major highways, Roorkee boasts a well-developed road network comprising various important roads, each contributing to the town's accessibility and connectivity:

Upper Ganga Canal Road:

The Upper Ganga Canal Road runs alongside the historic Upper Ganga Canal, which is an engineering marvel built during the British colonial era. This road serves as an essential intra-town artery, connecting various neighborhoods and localities in Roorkee. It provides a convenient transportation route for residents and facilitates the movement of goods and services within the town.

Right Bank Canal Road:

The Right Bank Canal Road follows the path of the Right Bank Canal, another significant irrigation canal in the region. This road plays a crucial role in enhancing connectivity to the areas located on the right bank of the canal, contributing to the overall development and accessibility of the region.

Dehradun Saharanpur Road:

The Dehradun Saharanpur Road connects Roorkee with the nearby towns of Dehradun and Saharanpur. This road serves as an important regional link, enabling the movement of people and goods between these cities and Roorkee. It also facilitates tourism and commercial activities, promoting economic growth and cultural exchange.

Pahadi Bazar Road:

The Pahadi Bazar Road is a significant local road that connects the bustling Pahadi Bazar area with the rest of Roorkee. It plays a crucial role in facilitating trade and commerce in the market area and ensures smooth accessibility for residents and visitors alike.

Railway Road:

The Railway Road in Roorkee runs parallel to the town's railway line and serves as an important transportation artery. It provides access to various residential, commercial, and industrial areas situated along the railway track. Additionally, it offers convenient connectivity to the railway station, enabling seamless travel for commuters and visitors arriving by train.

Roorkee's well-planned and extensive road network, including NH 58, NH 73, and various other major and local roads, ensures effective connectivity and accessibility within the town and to neighboring regions. These roadways play a crucial role in supporting economic activities, tourism, and regional integration, contributing significantly to the overall development and prosperity of Roorkee.



Figure 1: Mixed use development in the Roorkee Town

Urbanization is experiencing significant growth in India, and Roorkee town is following suit, transitioning from a small town into a burgeoning city. However, the essential services required to support this growth are not expanding proportionately, leading to inadequate and stretched resources. Of particular concern is the provision of safe water and sanitation, which is a critical component of urban development. To address these challenges, the city sanitation plan (CSP) has been introduced as a comprehensive strategy covering technical, administrative, social, financial, and legal aspects related to solid, liquid, biomedical, and toxic waste management within the city. Roorkee's total population, according to the 2011 census, resides in 20 wards and amounts to 116,809 people. The projected population for the year 2041 is estimated to reach 166,759. The demand for water supply, wastewater treatment, municipal solid waste management, and bio-medical waste generation has been assessed accordingly. To develop an effective CSP, field data regarding the water quality of the Solani river and sewage water quality from various locations within the city, including industrial areas, garages, sewer lines, and natural ponds, was collected. The CSP aims to achieve environmental sanitation for every individual in the city through immediate and long-term sustainable measures. It involves an integrated planning process that covers the entire sanitation cycle, from safe access to collection, treatment, and disposal. To support this complex planning, Geographical Information System (GIS) based tools are employed to manage and analyze the large amount of data and maps required for decision-making. The existing situation analysis for water supply, wastewater disposal, and solid waste management in Roorkee reveals deficiencies in current facilities and highlights the need for improvements to meet future demands.

Urban planning issues in Roorkee town:

Unplanned Urban Growth: Roorkee has experienced rapid urbanization without adequate planning, leading to haphazard development, encroachment on green spaces, and inefficient land use. This has resulted in traffic congestion, inadequate infrastructure, and strain on essential services.

- **Inadequate Infrastructure:** The town's infrastructure has not kept pace with its population growth, leading to challenges in providing essential amenities such as water supply, sewage disposal, and waste management. Inadequate roads and public transportation systems add to the overall infrastructure burden.
- **Environmental Degradation:** Unplanned urban expansion has led to the degradation of natural ecosystems and a rise in pollution levels. Lack of waste management facilities and inadequate preservation of green spaces contribute to environmental concerns.
- **Inefficient Public Transportation:** The town lacks a comprehensive and efficient public transportation system, leading to increased reliance on private vehicles and exacerbating traffic congestion and air pollution.

- **Insufficient Affordable Housing:** The rapid population growth has led to a shortage of affordable housing options, forcing many residents to live in informal settlements or on the town's periphery.
- **Inadequate Healthcare and Educational Facilities:** The town's healthcare and educational infrastructure struggle to meet the growing demands of the population, leading to substandard services and overcrowded facilities.

Solutions for Urban Planning Issues:

- **Comprehensive Master Plan:** Develop a comprehensive and up-to-date master plan for Roorkee that outlines sustainable urban growth, land-use zoning, and infrastructure development. The plan should prioritize the preservation of green spaces and promote efficient land use.
- **Infrastructure Upgrades:** Invest in improving and expanding the town's infrastructure, including roads, water supply, sewage disposal, waste management, and public transportation systems, to accommodate the growing population's needs.
- **Environmental Conservation:** Implement measures to protect and preserve natural ecosystems, promote waste segregation and recycling, and encourage eco-friendly practices among residents and businesses.
- **Integrated Public Transportation:** Develop an integrated and well-connected public transportation system that includes buses, mini-buses, and cycle tracks to reduce reliance on private vehicles and ease traffic congestion.
- **Affordable Housing Initiatives:** Encourage private and public-sector partnerships to develop affordable housing projects that cater to the needs of various income groups, ensuring access to adequate housing for all residents.
- **Improve Healthcare and Education Facilities:** Invest in upgrading existing healthcare and education facilities and establish new ones to meet the increasing demands of the population and improve the quality of services.
- **Community Engagement:** Involve local communities in the urban planning process to ensure their needs and concerns are considered, fostering a sense of ownership and promoting sustainable development.
- **Enforcement of Building Regulations:** Strictly enforce building regulations and zoning laws to prevent unauthorized constructions, protect green spaces, and maintain the town's aesthetic appeal.
- **Promote Green and Smart Initiatives:** Encourage the adoption of green building practices and smart technologies to improve energy efficiency, reduce environmental impact, and enhance the overall urban experience.
- **Capacity Building:** Invest in capacity building for local government officials, planners, and other stakeholders to enhance their skills and knowledge in sustainable urban planning and management.

By addressing these urban planning issues and implementing appropriate solutions, Roorkee town can achieve sustainable and inclusive growth, offering its residents a better quality of life and preserving its unique cultural and natural heritage.

Conclusions

Urbanization and Infrastructure: Roorkee has been experiencing rapid urbanization, which can strain the existing infrastructure. Issues such as inadequate road networks, water supply, sanitation, and waste management may need attention to support the growing population.

Traffic Congestion: With urban development and an increase in vehicles, traffic congestion could be a significant concern in Roorkee. Implementing better traffic management strategies and improving public transportation options might be necessary to address this problem.

Environmental Sustainability: As urban areas expand, preserving green spaces, promoting sustainable building practices, and addressing pollution become crucial to maintaining the town's environmental balance and quality of life for residents.

Heritage Conservation: Roorkee town has a rich historical and cultural heritage. Preserving and promoting the town's heritage sites and traditional architecture while accommodating modern development can be a challenging balancing act.

Housing and Affordable Housing: Ensuring an adequate supply of housing, including affordable housing options, is vital to meet the needs of the growing population and reduce housing affordability challenges.

Disaster Preparedness: Roorkee lies in a region prone to natural disasters such as floods and earthquakes. Planning and implementing disaster preparedness measures are essential to mitigate potential risks and protect the residents and infrastructure.

Economic Growth and Employment: Balancing economic growth and employment opportunities with sustainable development is critical for ensuring the prosperity of Roorkee and its residents.

Social Infrastructure: Adequate facilities such as schools, healthcare centers, community centers, and recreational spaces are essential for the well-being and social cohesion of the town's population.

To develop effective solutions for these planning issues, it is essential for local authorities, urban planners, and community stakeholders to collaborate, assess the current situation, anticipate future needs, and implement sustainable and inclusive development strategies.

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