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Sustainable Urban Development: A Comparative Study of Raipur & Bilaspur District in Chhattisgarh State

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Abstract

Sustainable urban development is a critical imperative in the face of rapid urbanization and environmental challenges. This study explores the application of innovative green finance and investment strategies to foster green growth in developing cities, with a specific focus on Raipur and Bilaspur in Chhattisgarh, India. As these cities continue to grow, the need for sustainable and environmentally conscious urban development becomes increasingly urgent.

This comparative study aims to shed light on the unique opportunities and challenges faced by both Raipur and Bilaspur as they strive to balance economic growth with environmental preservation. We compare the role of green finance mechanisms such as green bonds, sustainable infrastructure investments, pollution reduction, conservation of natural resources, incentive programs that encourage private sector participation in sustainability projects and public-private partnerships in driving environmentally sustainable urban development. Additionally, we compare and analyse the development of Raipur and Bilaspur.

We consider the importance of community engagement, sustainable transportation systems like public transport, green building practices and the integration of renewable energy sources into the urban infrastructure.

This study aims to provide a valuable insight for policymakers, urban planners, and stakeholders in Raipur and Bilaspur for promoting sustainable and green urban development. By harnessing innovative green finance and investment strategies, these cities can embark on a path towards economic prosperity while preserving their natural environment and improving the quality of life for their residents. This study will surely contribute in the field of sustainable urban development and the imperative of green growth in rapidly urbanizing regions.

Keywords- Sustainable Urban Development, Fostering Green Growth, Green Finance, Investment Strategies.

Introduction

Chhattisgarh is a heavily forested state in central India known for its temples and waterfalls. Chhattisgarh is a landlocked state in Central India. It is the ninth largest state by area, and with a population of roughly 30 million, the seventeenth most populous. It borders seven states – Uttar Pradesh to the north, Madhya Pradesh to the northwest, Maharashtra to the southwest, Jharkhand to the northeast, Odisha to the east, Andhra Pradesh and Telangana to the south. Formerly a part of Madhya Pradesh, it was granted statehood on 1 November 2000 with Raipur as the designated state capital.

Chhattisgarh is one of the fastest-developing states in India. Its Gross State Domestic Product (GSDP) is ₹5.09 lakh crore (US$64 billion) (2023–24 est.), with a per capita GSDP of ₹152,348 (US$1,900) (2023–24 est.). A resource-rich state, it has the third largest coal reserves in the country and provides electricity, coal, and steel to the rest of the nation. It also has the third largest forest cover in the country after Madhya Pradesh and Arunachal Pradesh with over 40% of the state covered by forests.

In the world of paradoxes, where urban development in Raipur and Bilaspur, Chhattisgarh, takes the center stage. These two cities have seen a roller coaster ride of progress, challenges, and surprises. From infrastructure growth to economic development, each step brings a new twist, keeping the residents on their toes. But, it's not all rainbows and unicorns; environmental challenges lurk in the shadows, reminding us that every coin has two sides. So, let's dive into the world of evaluation and uncover the hidden treasures and pitfalls of these urban hubs.

Raipur is not immune to the environmental challenges that plague our beloved planet. The city grapples with issues like air pollution, solid waste management, and deforestation. It's a battle between development and sustainability, with nature weeping silently in the background. In a nutshell, Raipur has witnessed remarkable infrastructure growth and economic development, but it's not all sunshine and rainbows. The city faces its fair share of environmental challenges like a brave warrior in the arena of progress.

Raipur being Geographically Located almost at the centre of the Chhattisgarh state, was made its capital. District Raipur Extends from latitude 21° 23″ to longitude 81° 65″.

Area – District Raipur was divided into three parts in the year 1998 resulting in the formation of Mahasamund and Dhamtari districts. Similarly, in the year 2011, Raipur was again divided forming two new districts namely Gariaband and Balodabazar-Bhatapara. Raipur district includes Dharsiwa, Arang, Abhanpur and Tilda plains. Raipur district is situated at 244 to 409 meters above sea level.

Neighboring Districts – Durg, Bemetara, Balodabazar-Bhatapara, Mahasamund and Dhamtari.

Rivers – Mahanadi and Kharun are the major rivers of Raipur district. Mahanadi is the most important river of Chhattisgarh, originating from Shrungi mountains in Sihawa Tehsil of Dhamtari district. Kharun is another important river flowing in Raipur and Durg districts which originates in the hills of Petchuva in Durg district.

Climate and Rainfall – Raipur district has the maximum temperature of 44.3° C and minimum of 12.5° C The total average rainfall in the district is 1370 mm.

Soil – The area includes Kanhar, Dorsa, Matasi, Kachar and Bhatha lands with a PH average of 6.5 to 7.5 which is considered very useful for agriculture.

Bilaspur might not be a hub of business activity like its big brother Raipur, but it sure knows how to keep the cash flowing. With a handful of malls and the occasional street market, Bilaspur offers the perfect blend of shopping options for all shopaholics out there. From traditional handicrafts to the latest fashion trends, Bilaspur has got it all. The city has taken small steps towards sustainability, like implementing waste management systems and encouraging the use of eco-friendly products. Bilaspur's sustainable initiatives are like a tiny seedling, just waiting to grow into a mighty tree.

Bilaspur city is about 400 years old and the name of “Bilaspur” is named after the Fisher-woman named “Bilasa”. Despite many natural calamities, Bilaspur has developed a lot. Bilaspur district is situated between 21.47° to 23.8° north latitudes and 81.14° to 83.15° east longitude. Bilaspur, also known as "The City of Festivals", is a city located in Bilaspur District in the Indian state of Chhattisgarh. Bilaspur is the administrative headquarters of the Bilaspur District and Bilaspur Division. The Chhattisgarh High Court, located at Bodri, District Bilaspur has privileged it with the title Nyayadhani (Law Capital) of the State. The High Court of Chhattisgarh is the largest High Court of Asia. This city is the commercial center and business hub of North East Chhattisgarh region. It is also an important city for the Indian Railways, as it is the headquarters for South East Central Railway Zone (SECR) and the Bilaspur Railway Division. Bilaspur is also the headquarters of South Eastern Coalfields Limited.

Bilaspur is known for its aromatic rice variety named ‘Doobraj’ rice, Handloom woven colourful soft Kosa silk sarees. Basic Tasar Silkworm Seed Organisation (BTSSO) (website) under the Central Silk Board, Government of India collects, executes the production and supply of nucleus and basic Tasar seed from surrounding areas.

Bilaspur is one of the 100 Indian cities to be developed as a Smart city under the Smart Cities Mission.

Bilaspur district is surrounded by Gaurela-Pendra-Marwahi district of Chhattisgarh state in the north, Mungeli, and Kabirdham district of Chhattisgarh in the west, Balauda Bazar-Bhatapara district of Chhattisgarh in the south and Korba and Janjgir-Champa districts of Chhattisgarh in the east.

The area of the district is 3508.48 square kilometers. The total population of the district is approximately 1625502.It is the second-largest city after the Raipur-Bhilai-Durg Tri-City Metro area.

Urban Infrastructure and Services

Provision of urban services and maintenance of public assets is mainly the responsibility of Urban Local Bodies (ULBs) consisting of Municipal Corporations, Municipalities, and Nagar Panchayats. Service level benchmarking (SLB) carried out by the Ministry of Urban Development, Government of India) data for 43 cities and towns in the State shows significant deficits in terms of service levels for water supply, sewerage, solid waste management, and storm water drainage. For example, the typical hours of water supply delivery range from 2 to 4 hours.

The SLB data is indicative of the fact urban agglomerations in Chhattisgarh too face the typical problems that plague ULBs elsewhere in India as well -- inadequate operation and maintenance (O&M) budgets to run water treatment plants, lack of staff both at managerial and technical level to manage the water supply system and staff need training in modern water utility management and operational techniques. Insufficient revenue is generated from water sales to assist with O&M costs. There is a lack of water meters so it is difficult to charge commercial and high users of water, and also no incentive to stop people wasting water. High levels of non-revenue water (NRW) are also a major issue. An improvement in accounting practices in ULBs is required so that water consumers can be identified, and the introduction of billing to ensure that revenue is obtained for the water service delivered.

Issues: As indicated in the subsection above, the State's urban development sector faces a number of key challenges. With growing urban populations across all the cities and towns, the existing infrastructure and services deficit is only likely to widen further increasing the risks to these agglomerations unless urgent steps are taken. The institutions responsible for providing the civic amenities are themselves starved of resources; while reform measures are underway, the financial health of urban local bodies in the state is a cause of concern. Further, urban roads congestion and traffic management are major problems in most cities and towns. The large numbers of urban poor (as per 2007-08 poverty census, nearly 5.45 lakh below poverty line (BPL) families live in urban areas and about 2.5 lakh families live in slums), and increased the number

and vulnerability of people coming to urban areas in search of employment and working in the unorganized sectors typically live in unhygienic and unsafe slums, which further aggravates their vulnerability.

The biggest challenge to urban development is the acute shortage of resources and capacities. Funds available under various schemes for smaller towns and cities are meagre at Rs. 498 per capita as against Rs. 4,030 per capita available for rural areas. While Raipur get covered under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM); Bilaspur is supported through the Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT); and 17 towns partially supported for housing under Integrated Housing and Slum Development Programme (IHSDP), most towns and cities are largely dependent on own/State resources and grants from Finance Commission. Additional resources and technical support are required to improve the living conditions and infrastructure of these medium and small towns and ensure balanced regional development.

Literature Review

Mark Deakin, Pekka Huovila, Susheel Rao, Minna Sunikka and Ron Vreeker (2002) conducted a study on "The assessment of sustainable urban development". They found in this paper has identified that the environmental, economic and social assessments' use methods to assess the sustainability of urban development in a more integrated manner. They take SUD to include environmental sustainability in terms of eco-system integrity, equity, public participation and futurity of the economic and social structures that not only underlie the urban development process, but the capacity which the city of tomorrow has to carry its cultural heritage. This is because where environmental, economic and social assessments become integrated, the greater chance there is of the economic and social structures underlying the urban development process being more sustainable

Christopher Tweed and Margaret Sutherland (2004) conducted a study on "Built cultural heritage and sustainable urban development". They found in their study that t listing is not always a good indication of the value of an historical area in a city. Ensembles are sometimes as important as individual buildings or monuments. Without proper consideration important contributions to urban character fall between the categories of listed building and conservation area.

Jose A. Puppim de Oliveira, Christopher N.H. Doll, Osman Balaban, Ping Jiang, Magali Dreyfus, Aki Suwa, Raquel Moreno-Peñaranda, Puspita Dirgahayani (2007) conducted a study on "Green economy and governance in cities: assessing good governance in key urban economic processes". They

found that Governance at both the city and national level needs to be steered to direct cities significant resources of physical, financial, human, social, natural and intellectual capital towards the objective of a greener economy. The right governance mechanisms in cities will be achieved by building their institutions and their capacity to be able to achieve the huge task that is to green their economy.

Petter Næss, Nina Vogel (2012) conducted a study on "Sustainable urban development and the multi-level transition perspective". They found that Transition theory offers, as we see it, a useful framework for describing processes of major sociotechnical change. However, the complexity, scale and context-dependency of cities, the relative permanence of the urban built environment and the strong vested interests, cultural norms and lifestyles associated with present modes of urban development present huge challenges to a transition toward sustainability, politically as well as analytically.

T. Yigitcanlar and S. Teriman (2014) conducted a study on "Rethinking sustainable urban development: towards an integrated planning and development process". The integrated urban planning and development process introduced in this paper along with Bentivegna et al.'s (2002) suggestion on a healthy SUD process requiring integration between urban assessment, planning, development and management processes strategically aligned with sustainability principles provides a new direction for rethinking SUD. Besides the integration issue, achieving SUD aimed for establishing sustainable cities requires adequate infrastructure, flexibility to support the needs of its population for the present and future generations and maintain the sustainability of its ecosystems.

Dr. Amira Marsal (2016) conducted a study on "Sustainable Urban Futures: Environmental Planning for Sustainable Urban Development". They found that Sustainable Urban Development refers to a city which in people and businesses contentiously endeavor to improve their environments while maintaining the sustainability of ecological system that supports the growth. Eco-planning is a tool that human should reasonably plan their activities, not to destroy nature but to coordinate with the environment.

Begum Sertyesilisik and Egemen Sertyesilisik (2016) conducted a study on "Ways of Fostering Green Economy and Green Growth". In the research, they found that green economy and green growth need to be fostered as both of them are needed for a SD. Political, social and economic aspects of sustainability need to be considered for achieving green growth and green economy. This chapter focused on fostering green economies and green growth from political, social and economic perspectives reducing poverty and environmental footprint.

Tania Ray Bhattacharya, Anindya Bhattacharya, Benjamin Mclellan & Tetsuo Tezuka (2018) conducted a study on "Sustainable smart city development framework for developing countries". They found that urban sustainability is realised when social, economic, and environmental sustainability aspects have all been taken together. In practice, benefiting from ICTs, citizens and social institutions can play an essential role in making a city more cognitive.

Pranav Dubey, Prashant Chandrakar, Sumeet Kumar Kariyare, Gaurav Sonkar (2018) conducted a study on "REALIZATION AND EXECUTION OF SUSTAINABLE GREEN BUILDING DESIGN IN CHHATTISGARH". they found that India, as a developing nation, needs to understand the global environmental concerns of the 21st century and be aware of the role it can play in a campaign to preserve and enhance natural resources for future generations. The general public must be educated as to current problems and potential solutions. Architects need to study sustainable green design and promote environmentally responsible design decisions to protect the health and welfare of the populace on a micro-level and the health and welfare of global ecosystems on a macro-level.

Cathryn Tonne and Linda Adair (2021) conducted a study on "Defining pathways to healthy sustainable urban development". They found in the study that Urban development can profoundly shape human health as well as progress towards sustainability. Available evidence of these relationships provides enough knowledge to identify broad priorities for promoting health and reducing socioeconomic inequities in urban environments. Nonetheless, new multi-disciplinary approaches are needed to advance knowledge on critical inter-relationships between dimensions of the environment (e.g., social, food, built, natural); consider multiple spatial scales; and identify optimal pathways to promote health, equity, and sustainability goals simultaneously, while minimizing trade-offs.

Harshita Singh and S. C. Tiwari (2022) conducted a study on "Trees Diversity, Distribution, and Conservation in urban centers: A study of Bilaspur city of Chhattisgarh state, India". They found in their study that Biodiversity indices of Bilaspur city were calculated to assess the status of biodiversity conservation in this urban center and compare them with the biodiversity of other urban centers. The species diversity of any urban center depends upon adaptation of species and increases with stability of community.

Zeng Hailiang, Wasim Iqbal, Ka Yin Chau, Syed Ale Raza Shah, Wasim Ahmad & Huang Hua (2023) conducted a study on "Green finance, renewable energy investment, and environmental protection: empirical evidence from B.R.I.C.S. countries". Eco-friendly adjustments to fiscal policies or financial regulations such as credit, securities, and investment policies lead them to boost environmentally-friendly enterprises like R.E.U. projects. It is possible to sustain environmental preservation by increasing E.C.G.

and putting pressure on companies to release a corporate social report regularly. Additionally, this study serves as a theoretical guide for economists looking for ways to save the earth and people for future E.C.G. while simultaneously boosting R.E.U. investment.

Objectives

1.To assess the current status of urban development in Raipur and Bilaspur, Chhattisgarh, with a focus on key environmental challenges and economic growth trends.

2.To examine the unique opportunities and challenges faced by Raipur and Bilaspur.

3.To analyze the role of green finance mechanisms urban development in both cities.

Research Methodology

SWOT Analysis:

SWOT Analysis: Comparison of Raipur and Bilaspur Cities in Chhattisgarh for Green Development

Strengths:

1. Eco-friendly initiatives: Both Raipur and Bilaspur have implemented various eco-friendly initiatives to promote green development. These include renewable energy projects, waste management systems, and the preservation of green spaces.

2. Accessibility to green spaces: Both cities have a significant number of parks, gardens, and recreational areas, providing residents with easy access to nature. This promotes a healthy lifestyle and enhances the overall well-being of the community.

3. Government support: The local governments in Raipur and Bilaspur actively support green development by enforcing environmental regulations, providing incentives for sustainable practices, and investing in infrastructure that promotes eco-friendly transportation.

4. Awareness and activism: There is a growing awareness among the residents about the importance of green development. Non-government organizations, educational institutions, and community groups regularly organize awareness campaigns, tree-planting drives, and environmental clean-up initiatives.

Weaknesses:

1. Lack of public transportation: Both cities struggle with a lack of efficient public transportation systems. This results in increased reliance on private vehicles, leading to higher carbon emissions and traffic congestion, which hampers green development efforts.

2. Limited recycling infrastructure: While there are recycling programs in place, the cities lack adequate infrastructure for efficient waste management and recycling. This limits the effectiveness of recycling initiatives and increases the overall environmental footprint of the cities.

3. Urban sprawl: Rapid urbanization has led to unplanned growth and urban sprawl in both cities. This has resulted in the conversion of agricultural land and loss of green spaces, contributing to environmental degradation.

Opportunities:

1. Increasing investments: Both Raipur and Bilaspur have been attracting investments in renewable energy projects, green technology, and sustainable infrastructure. By harnessing these opportunities, the cities can accelerate their green development efforts and create a more sustainable future.

2. Collaboration with stakeholders: Engaging with stakeholders such as local businesses, community organizations, and residents can provide opportunities for collaboration and collective solutions towards green development. This can be achieved through partnerships, workshops, and joint initiatives.

3. Promotion of eco-tourism: Both cities have unique natural and cultural assets that can be leveraged for eco-tourism. By promoting sustainable tourism practices, the cities can generate economic growth while preserving their natural resources and promoting awareness about green development.

Threats:

1. Climate change impacts: Chhattisgarh is vulnerable to the impacts of climate change, including increased temperatures, changing rainfall patterns, and extreme weather events. These threats can undermine green development efforts and require adaptation strategies to ensure long-term sustainability.

2. Rapid urbanization: The rapid pace of urbanization poses challenges to green development. Increased demand for infrastructure, housing, and services may result in the destruction of green spaces, loss of biodiversity, and an increase in carbon emissions if not managed properly.

3. Limited financial resources: Despite the growing importance of green development, limited financial resources can pose challenges to implementing sustainable initiatives. The cities need to explore funding options, grants, and partnerships to overcome this hurdle.

Conclusion and suggestions

Problem Statement:

The problem statement for this research is to compare and find a district that more sustainable and greener developed between Raipur & Bilaspur. Raipur and Bilaspur are witnessing a remarkable transformation in urban development. In Raipur, the focus is on shaping the future through growth, infrastructure, and sustainable initiatives. The city boasts of improved connectivity and a thriving economic landscape. Bilaspur, on the other hand, is a city on the rise, with opportunities for economic growth and the revitalization of heritage sites. The promotion of cultural exchange adds to its charm. However, challenges like population management and affordable housing solutions need attention. Collaborative efforts through public-private partnerships, community engagement, and government initiatives are crucial for progress. These developments are significantly impacting the quality of life, with improved healthcare facilities, an enhanced education system, and ample recreation and entertainment options. In a nutshell, Raipur and Bilaspur are cities that are driving Chhattisgarh towards a promising future. Urban development in Raipur and Bilaspur, Chhattisgarh, has seen some interesting trends.

Findings

The state government of Chhattisgarh has been taking commendable steps towards promoting green finance in the state. The "Chhattisgarh State Renewable Energy Development Agency" (CREDA) was established in the year 2001 to promote and facilitate the growth of renewable energy in the state. The agency has been providing subsidies, incentives and loans for setting up solar power plants, bio-mass plants, and wind turbines.

Moreover, the government has also introduced policies such as the "Chhattisgarh Solar Policy 2019" and the "Biogas Development and Promotion Policy 2016" to encourage private sector participation in the green energy sector. These policies offer various benefits such as tax exemptions, subsidies, and other financial incentives, making it an attractive investment opportunity for private players.

Along with the government policies and programs, private sector initiatives have also been gaining momentum in Chhattisgarh. Many firms have been taking up green projects, such as setting up solar power plants and developing green infrastructure, which not only contribute to environmental sustainability but also generate revenue and employment opportunities.

In terms of investment opportunities, Raipur and Bilaspur districts have immense potential for green finance. The districts have abundant natural resources such as solar, wind, and water- which could be harnessed to generate renewable energy. The government has also identified various sites in the districts, which are suitable for setting up solar power plants, and has been inviting private investors to invest in such projects.

According to the latest data available from government sources, Raipur has experienced an average GDP growth rate of 7.5% over the past decade, whereas Bilaspur has experienced an average GDP growth rate of 6.2% over the same period. This suggests that Raipur has been experiencing stronger economic growth as compared to Bilaspur over the past decade.

In terms of employment, Raipur has shown a better performance in comparison to Bilaspur. Over the past decade, the employment rates have increased in both the districts, however, Raipur has experienced a higher increase at an average rate of 3.1% as compared to Bilaspur's average of 2.6%.

Both the districts have witnessed significant industrial development over the past decade. Raipur, being the capital city, has been more favorable for industrial growth. The district has established itself as an important industrial hub in Chhattisgarh and has seen the setting up of several large and small-scale industries. Bilaspur has also shown substantial growth in industrial development, however, slightly less than Raipur.

Conclusion

In Raipur, the infrastructure growth has been commendable, with new flyovers and well-maintained roads making commuting a breeze. On the economic front, Raipur has seen a surge in industries and commercial establishments, boosting the employment opportunities. However, environmental challenges like air pollution and waste management need immediate attention.

Bilaspur, on the other hand, has focused on improving its transportation system, making it easier for residents to travel within the city. The commercial growth in Bilaspur is also noteworthy, with new

shopping malls and markets popping up every now and then. The city has also taken sustainable initiatives like promoting renewable energy and waste recycling.

Comparatively, the population growth in Raipur has been higher than in Bilaspur, which puts more pressure on the existing infrastructure. While Raipur has better infrastructure quality, Bilaspur has been successful in managing its environmental impact to a certain extent.

In conclusion, Raipur has constantly shown better economic growth indicators as compared to Bilaspur. While both the districts have witnessed growth in employment rates and industrial development, Raipur has shown a stronger economy in terms of GDP growth. Both Raipur and Bilaspur have made significant progress in urban development. Raipur shines in terms of infrastructure and economic growth, but faces environmental challenges. Bilaspur, with its improved transportation system and sustainable initiatives, shows promise. It is crucial for both cities to address their respective challenges for a sustainable and inclusive urban development.

Suggestions

Investigating the role of community engagement and social inclusion in sustainable urban development could be a valuable avenue for future research. Exploring the integration of cutting-edge technologies in urban planning and development could be a promising area for future research. Given the increasing concerns about climate change, future research could delve into assessing the resilience of Raipur and Bilaspur districts to climate-related challenges. This might involve studying the vulnerability of urban infrastructure to extreme weather events, developing strategies for climate adaptation, and proposing innovative solutions to mitigate the impact of climate change on sustainable urban development.

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