The Planning and Implementation of Urban City at Naya Raipur in the State of Chhattisgarh, India - A Descriptive Study

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ABSTRACT:

Global development is largely dependent on urbanisation, and sustainable and attractive cities are made possible by good urban planning. With the population's significant shift towards urbanisation comes a demand for the Smart City. The idea of a "Smart City" has recently gained popularity in both urban and rural areas of the world. An improved lifestyle built on the foundation of cutting-edge technology and communication systems is the aim of a smart city. This research article offers a descriptive analysis of the conception and construction of Naya Raipur, a contemporary metropolis situated in the Indian state of Chhattisgarh. To build a model city that promotes economic growth, social inclusion, and environmental sustainability, the article discusses the primary objectives, planning tactics, and implementation processes used. The smart city landscape, however, is forced to progress towards a chaotic condition due to improper planning. Everyone is aware that there isn't a single, broadly agreed definition of

what a "smart city" is. As a result, terms like Information City, Digital City, Intelligent City, etc. have been coined to describe Smart Cities. This widely used term can have varied meanings for many individuals, communities, and nations. In this paper, we examine the successful smart city models of Naya Raipur, the fourth planned capital city of India by considering the official papers that are provided by the federal, private, and municipal agencies responsible for the development of Smart City, a content analysis of the smart city (SC) and the management of the entire city is discussed and investigated carefully with the secondary data analysis. This study intends to offer insights into the successful emergence of Naya Raipur as a prospective urban centre through a review of several elements including infrastructure, housing, transportation, and government.

Key Words: Urban planning, Smart City, Architecture, Management, Land Management

INTRODUCTION:

Most modern towns and cities are the result of an evolutionary process in which some of the larger villages or a group of villages grew and diversified more quickly than others. While the size and variety of the population's occupational structure have typically been highlighted in census definitions of urban areas, settlements have also expanded geographically and frequently diversified in terms of their roles as markets, administrative capitals, industrial hubs, or tourist towns.

Only a few forts, temples, and palaces from ancient or medieval India remain due to a lengthy history of invasions and internal wars between kings, regional chieftains, and other warlords. There aren't many cities from even the 17th or 18th centuries that have managed to maintain their unique architectural or planning elements up to the current day, apart from Jaipur, Udaipur, and a few other places.

The end of the colonial era in modern times resulted in the creation of new states as well as the redistribution of national borders and provinces within existing nations. As a result, new towns and cities had to be built to serve as the provincial or national capitals of newly formed nation-states. There are undoubtedly examples of colonial governments creating new towns and cities as well, typically for administrative purposes, such as the establishment of summer capitals in hill stations or cantonment towns. There have also been more seriously planned cities of colonial times like New Delhi, Jamshedpur, Bhilai, Rourkela and Bokaro which have grown

and spilled over to their neighbourhoods to become some of the most cosmopolitan cities of India. Chandigarh was built as the result of the country's first significant post-independence endeavour to create a healthy planned metropolis. Chandigarh, which was meticulously planned by a group of architects and planners under the direction of eminent French architect Le Corbusier, served as a model for the construction of Gandhinagar and Bhubaneshwar, two other planned capital towns. Chandigarh's success may have served as motivation for the construction of numerous additional planned greenfield towns and cities around the nation. Even though this did not occur, many State Governments across the nation are now seriously concerned with the preparation of master plans for existing cities and towns as well as the planned development of new city centres or satellite townships.

New city planners and developers are faced with a variety of challenges and uncertain situations. These concerns range from how much of the history, legacy, and culture of the area should or should be incorporated into the design of a new city being constructed for future generations to possibly how to strike a balance between beauty and functionality. How much land may be left aside for open areas or recreational purposes without endangering the plans' capacity to make money? How can we make sure that the plans foster social cohesion and stop the growth of squatters or unlawful settlements? Or how about how to design a city-wide transport system that is secure, dependable, and economical with energy?

Background of Naya Raipur:

The main city in the new state of Chhattisgarh, Raipur, was chosen as the capital when it was established on November 1st, 2000. For many years, central India's market city of Raipur has been thriving. Nevertheless, it was ill-prepared to assume its new role as the administrative capital of a quickly expanding state because of its already overburdened civic infrastructure. The need for a new city, its location, and the method of financing its development were all hot topics of discussion. The fact that Chhattisgarh's political leaders and its citizens were able to agree to create a sizable greenfield metropolis near Raipur is truly an amazing accomplishment. The new city, which has been given the name "Naya Raipur," would simultaneously function as the State's administrative centre and meet the infrastructure needs of local industry and trade. Before deciding on the city's exact location, numerous surveys and research were conducted. The physical plan of the city has been integrated with the fact that there are numerous human settlements, water bodies, and wooded regions in the proposed location. A total of 237.42 square kilometres are covered by the development plan, of which 95.22 square kilometres

would be the core area. Phases of development would be carried out, and 5.6 lac people will be living in the city in 2031.

Traditional and futuristic elements are combined in Naya Raipur's urban design to give the city's most prominent physical characteristics a touch of elegance and give its residents a tranquil environment. When deciding on the new city's transport system, the most important consideration would be to provide quick and convenient connectivity to Raipur and other significant Chhattisgarh cities. The core of a mass transit strategy for Naya Raipur would consist of building an access-controlled motorway from National Highway No. 6 and a short railway line from the Raipur-Titlagarh-Vizagapatam railway line, fusing the two with an intra-city Bus Rapid Transport System (BRT). The BRT would be complemented by dedicated bus lanes, bicycle paths, and secure pedestrian walkways, all of which would contribute to the growth of an environmentally and energetically sustainable city. The road segments and junctions would be built with children and people with physical limitations in mind.

PRECINCTS

The city is designed for a population of 5.6 lakh. The city has two prominent gateways that mark entry to the Naya Raipur City – one to the north and the other to the west. Naya Raipur has the following precincts:

i. Government Complex to include Secretariat, Assembly, Government offices, and Police Headquarters area.

ii. Cultural Heart to include Museum, Art Gallery, Library, Theatres, Convention centre and International Centre.

iii. City Centre to include city level shopping malls, commercial offices, restaurants, multiplexes, and other areas of recreation.

iv. University including research and institutional complexes.

v. Software Technology, Exhibition and Business centers

vi. Central City Park around an existing vast water body as one of the biggest city parks in the country. Park and Sports Centre in the North end to include urban forest, theme park and sports complex. City Park South to include Theme Park, Jungle Safari, Golf Course and Film City.

vii. Transport and integrated freight complex to service the city and its industrial area.

viii. Living areas with medium density development for the creation of a peaceful environment envisaged for the city.

Land use 2031- NRDA Planning Area

The NRDA Planning Area consists of three layers:

1. Planning Layer I (Naya Raipur City including green belt area) – 95.22 sq km (9522.00 ha)

2. Planning Layer II (Peripheral rural Zone) – 130.28 sq km (13028.00 ha)

3. Planning Layer III (Airport Zone) – 11.92 sq km (1192.56 ha)

The objective of Naya Raipur

The main characteristic of Naya Raipur is that it is a capital-holding satellite city of Raipur. It will be technologically advanced, defend honourable customs and fundamental principles, and preserve the region's rich natural and cultural resources as well as the pre-existing culture of man and nature coexisting harmoniously.

It is envisaged that the 21st-century metropolis of Naya Raipur will become the economic and cultural hub of Chhattisgarh, with a vital role and recognition both nationally and internationally as the state's socioeconomic and cultural centre.

It has been built in its natural surroundings, thus conserving its existing landscape by including a major city park, a botanical park, a jungle safari, theme park, and an integrated sports complex.

The design of the city is made in such a way that it reduces the traffic in every point due to its broad roadways and proper management of the population.

The primary research was conducted in the form of a secondary survey of data on Chandigarh, the first state capital of independent India, and Raipur, the older sister, and the most significant "organic" metropolis in the area, as part of the project to draught the Development Plan for Naya Raipur.

Primary research on the village's current population, site conditions, water source/water table, etc., was also conducted.

The provided assets and constraints at the chosen site were thoroughly assessed. A four-focus, cruciform city structure developed from this. the capital complex in the east, the goods complex/light industries in the north, the software hub in the west and the institutional/tourist hub in the south.

Literature review:

Jajoo, S. (2014) Stated that Urban planning is the need of the hour in a rapidly developing county like India. In essence, urban planning enhances the quality of land at a reasonable cost. Naya (New) Raipur is the new planned capital of the Indian state of Chhattisgarh and is one of India's few planned cities. Over the next decade it will drastically change the landscape of the state of Chhattisgarh. This new planned development is quintessential in growing this backward region and providing for future infrastructure.

Dash, S., & Joshi, M. (2021) stated that energy consumption in India is rising faster in residential buildings, primarily due to the usage of air conditioning systems in summer to provide comfortable conditions to the occupants. Passive cooling techniques offer the best solutions without using mechanical or electrical components to lower electricity bills.

Shukla, H., Jha, R., Singh, V., & Baier, K. (2013) stated that in the present scenario of urbanization, the population of Raipur City is increasing rapidly, accordingly, the use of groundwater is also increasing and so as the susceptibility of groundwater contamination. This study reveals the findings of the intrinsic groundwater vulnerability assessment model, DRASTIC applied in the study area using the geographical information system (GIS) technique.

Shukla, P. N. (2017) stated that some of the unique features of this future-ready eco-friendly city are LED streetlights, a network-controlled lighting system, SCADA-compliant electrical and water components, and a dedicated optical fibre network.

Rohit, G. S., Chandra, M. B., Saha, S., & Das, D. (2018, April) stated that as urbanization is spreading rapidly, there is an increase in the production of waste. Waste management is a crucial issue to be considered in public places where waste is overflowed from the bins and may cause different diseases. The present work focuses to develop a model of smart dustbins which can be effectively used in public places in smart cities thus creating sustainability in the smart city.

Sharma, A. (2021) stated that in just 40 years, more than 70% of the world's population will live in urban areas. Therefore, cities around the world need smarter ways to operate and become more efficient and sustainable. This paper starts with an introduction to the need for a smart city, with a focus on its two major components-Smart Infrastructure and Smart Utilities. These are the building blocks of any city, and improving their efficiency brings immediate and visible improvement to the everyday life of people.

Tapas, N., & Vyas, O. P. (2017, March) stated that The Internet of Things is a fast-growing and pervasive reality, and millions of physical entities-from consumer products to transport vehicles, are recorded and tracked in time and space. Smart City projects are becoming suitable platforms for exploring the IoT deployments to enhance performance and well-being and to engage more effectively and actively with its citizens. Bicycling is an important part of the solution to many urban transportation issues since the growing increase in motor vehicle use is burdening cities with increasing problems.

Prakash, S. D., Apoorva, D. L., Omar, J. A., & Kumar, A. (2016) stated that their paper describes several strategies for the development of smart cities which can be elaborated in terms of Retrofitting, Redevelopment, Greenfield Development & PAN City Development. These four are the advanced techniques to be implemented for the fulfilment of projects under smart cities initiatives taken all over the world. The purpose of the Smart Cities Projects is to drive economic growth and improve the quality of life of people by enabling local area development and harnessing technology.

The objective of the research:

•To study the economic change and social transformation in the state.

• To study the efficient engine of growth and prosperity.

• To study the impact on the servicing hub not only in the manufacturing of goods but also in the Information Technology and Bio-Technology sectors.

• To study the financial centre, the hub of trade and hospitality sectors, the hub of cultural services, the hub of affordable and high-quality medical services, hub of quality educational facilities, in the region.

The hypothesis of the study:

1. This study shows that the impact of Naya Raipur project has positively impacted the economic, social, and environmental quality of life in the region.
2. This study shows that the smart city project has increased employment opportunities.
3. This study shows that the smart city project has improved public services.
4. This study shows that the smart city project has reduced the pollution and traffic population in the region.

Planning and Management of the City

Under the Chhattisgarh Nagar Tatha Gram Nivesh Adhiniyam 1973, and C.G. Bhumi vikash rules 1984 the Naya Raipur Development Authority has been formed as a Special Area Development Authority to plan, implement and administer Naya Raipur. The NRDA is already working out the future tasks, which will be added on to its kitty especially considering the 74th Constitutional Amendment.

At present an area of 237.42 sq. km is delineated fully under the control of NRDA, detailed as under:

• Naya Raipur City with green belt (Planning Layer I) – 95.22 sq km- (Proposed as City Proper to be acquired in bulk with a 500 m green belt around)

• Peripheral Zone (Layer II) – 130.10 sq.km. - (Proposed as predominantly rural area with ancillary facilities and suitable uses, not to be acquired in bulk) Tasks- Plan making, basic infrastructure provision, development permission, administration

• Airport Zone (Layer III) – 11.92 sq km- (land to be acquired in bulk and handed over to Airport Authority of India for implementation according to their plan after concurrence by NRDA) The NRDA is expected to be corroborated by the following agencies among others, in executing its mammoth responsibilities.

Methodology Adopted in Plan-Making

As stated above while venturing to prepare the Development Plan for Naya Raipur, basic studies were made in the form of a secondary survey of data on Chandigarh (the first state capital of independent India) and Raipur, the elder sister, and the most important "organic" metropolis in the region. Primary studies related to existing village population, site conditions, those related to water source/ water table etc were also carried out.

On the selected site, a thorough analysis was made of the given assets and constraints. From this emerged a four-focus city structure, cruciform in shape. The foci are major work-centres, namely the capital complex in the east, the freight complex/light industries in the north, the software hub in the west and the institutional/tourist hub in the south.

Methodology for Site Selection

Raipur, the present-day State capital has an immense potential to develop into a metropolis on account of its location and its growing importance as a major node in the trade network of

Central India. Considering this latent value of the present-day capital Raipur, it was decided to locate Naya Raipur – the proposed new city in close proximity to Raipur. Accordingly, a region of 50 km radius around Raipur was demarcated for selecting a site for the Naya Raipur city.
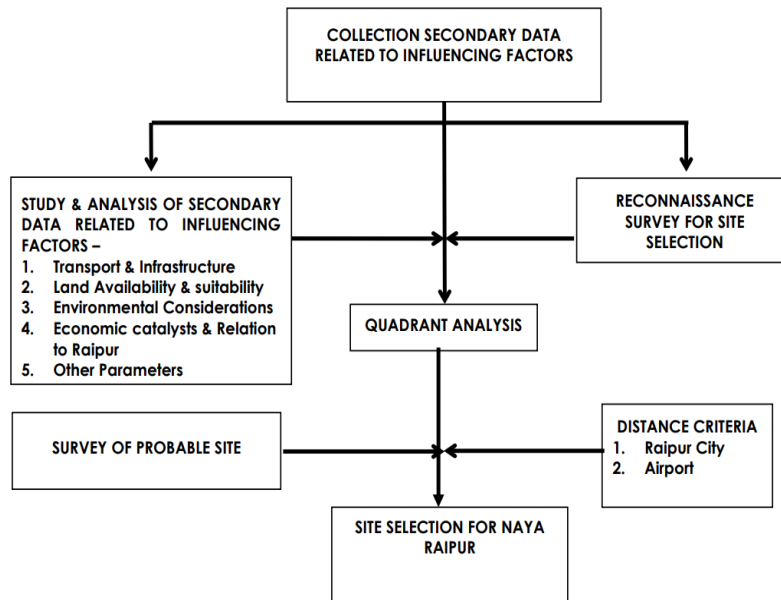

Figure 2.1: Methodology for Site Selection

Demographic Profile

As per 2001 Census, the total population of Chhattisgarh is 20.83 million. The state of Chhattisgarh has registered a population growth rate of 15.5% during 1991-2001, as compared to the average all-India growth rate of 21.54 % during the same period.

Table 6.1: Population growth in India and Chhattisgarh

Year	India (in Million)	Growth Rate (%)	Chhattisgarh (in Million)	Growth Rate (%)
1901	238.3	-	4.18	-
1911	252.09	5.80	5.19	24.2
1921	251.32	-0.30	5.26	1.3
1931	278.97	11.00	6.02	14.4
1941	318.66	14.20	6.81	13.1
1951	361.08	13.30	7.45	9.4
1961	439.23	21.60	9.15	22.8
1971	548.15	24.80	11.63	27.1
1981	683.32	24.70	14.01	20.5
1991	846.30	23.90	17.61	25.7
2001	1028.61	21.54	20.83	15.5

Source: Census of India, 2001- Chhattisgarh; Provisional Population Totals Paper 1 of 2001

Population of Naya Raipur

Naya Raipur city is planned for a population of about 5.6 lakh in 2031. This new city would attract population from Raipur, the adjoining region and to some extent other parts of India. An exercise in this respect has been conducted with respect to the broad region, which is 50 km radius around Raipur.

Table 6.2 Future Population of the Region

Year	Population of the Region	Percentage of Region's Population to Total Population of the State
1991	2,285,044	12.97
2001	3,060,485	14.69
2011	4,099,076	16.90
2021	5,490,117	20.08
2031	7,353,216	23.75

Source: Census of India and Consultant's Projection

The percentage share of the region's population to the total population of the state is likely to increase from 12.97 % in 1991 to 23.75 % in 2031.

Fig 6.1: Composition of Population in the Region w.r.t. Chhattisgarh

COMPOSITION OF POPULATION IN THE REGION WRT CHHATTISGARH

Chhattisgarh: 176.15 (1991), 208.34 (2001), 242.58 (2011), 273.37 (2021), 309.62 (2031)

Region Population: 22.85 (1991), 30.69 (2001), 40.99 (2011), 54.90 (2021), 73.53 (2031)
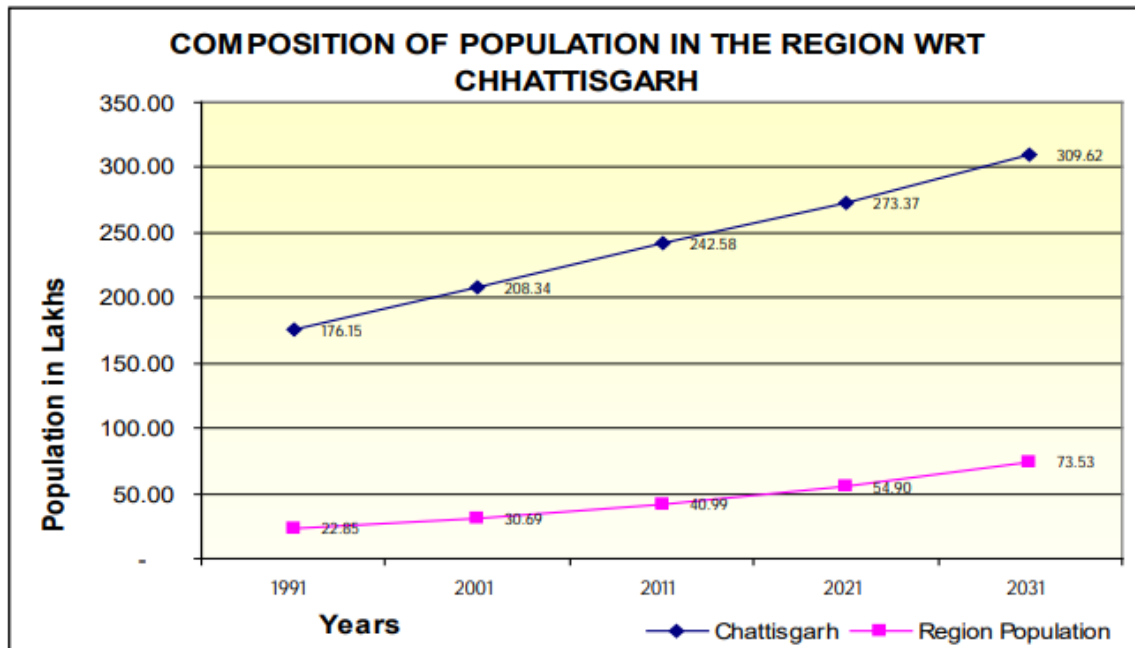
Economic Base, Employment and Work Areas

Economic Base

The main activity base of Naya Raipur would be the Government / State Capital functions. However, a diversification of economic activities is desirable which would be attained through the following activities:

i.   Software Technology Park.
ii.   Gems and Jewellery and other similar industries.
iii. Business Offices.
iv.   Health, Education and Research Services.
v.   Regional recreational activities.

The following are the Major work areas in Naya Raipur:

Government Functions:

Naya Raipur being an administrative city with all the important Capital functions of the state would have a significant population employed in the Government sector. The Capitol complex, Government Offices and the Civic corridor are the important employment generating activities.

Wholesale Trade:

Naya Raipur on account of its strategic location, strong connectivity through the rail & road and proximity to the airport is destined to be an important wholesale trade centre/hub. The wholesale market shall be integrated with the Integrated Freight Complex for better facilitation and effective operation of the wholesale trade.

Integrated Freight Complex:

A land parcel of 130.67 ha has been set aside for an integrated freight complex. The basic function of an integrated freight complex is to provide –

i)   Facilities for inter-city freight movement and interchange mode.

ii)   Warehousing & storage facilities to cater to sub-city level markets.

iii)   Servicing, lodging & boarding, idle parking, and other required facilities.

Proposed Hierarchy of trade and commerce areas

The following four-tier system of commercial activities (Refer table 7.7) has been adopted to accommodate the retail shopping facilities integrated with other services such as entertainment, business, etc.

Table 7.7: Four-tier System adopted for Trade and Commercial Areas

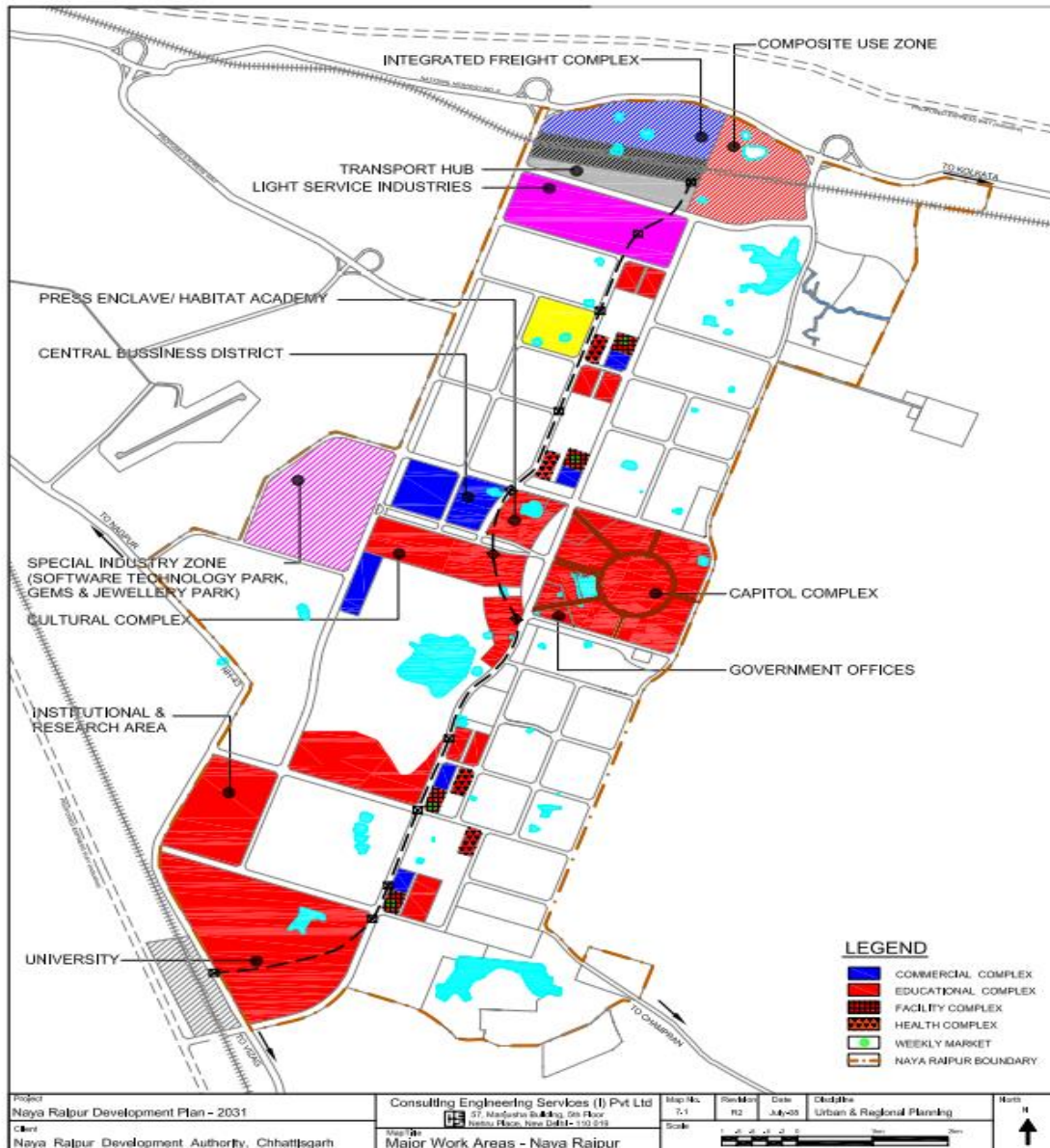| Facility	Population Served	Area* (Ha)	Activities
City Centre/CBD	5 lakh	96.12 ha	Shopping (Retail Service, Repair & limited Wholesale) Informal Shopping, Commercial Offices, Cinema, Hotel, Guest House, and Nursing Home.
			Auditorium, Museum, Library, Science Centre, Art/Craft/Music/ Dance School, Craft/Mela/Book Bazar, Weekly Markets (on close days), Local Government Offices.
			Bus Terminal, Fire Post, Police Post, Telephone Exchange, Electric Sub Station, Post and Telegraph Office, Petrol Pump, Conveniences and Residential
Community Shopping & Business Complex	1.0 to 1.5 lakh	5.4 ha	Shopping (Retail Service, Repair, Informal Shopping, Commercial Offices, Cinema, Hotel, Guest House, Nursing Home)
			Post office, Dispensary, Petrol Pump (filling Station only) Weekly Markets (on off days) Electric Sub-Station Conveniences
Sector / Neighbourhood Shopping Centre	15,000 to 20,000	0.46 ha	Shopping Retail Service, Repair, Informal Shops, and Commercial Offices.
			Community Hall and Library
			Electric Sub-Station Conveniences
Housing Area Centre	About 5 thousand	0.11 ha	Shopping Retail Service, Repair, Informal Shopping
			Electric Sub Station Conveniences.

Notes: Besides the above, retail shopping of desired level may also be provided in all work centres and transportation nodes

Provision of Housing Area Centres/ Neighbourhood Shopping Centres and Community Centres

Housing Area Centres and Neighbourhood Shopping centres shall be indicated in the layout plans of the sectors. Community shopping and business complexes are located in the central facility- green corridor; four such units have been located.

City Centre / Central Business District

The land parcel of 96.12 ha has been reserved for the CBD. The following table gives a break-up of the land allocated for various activities in the CBD.

INTEGRATED FREIGHT COMPLEX
COMPOSITE USE ZONE
TRANSPORT HUB
LIGHT SERVICE INDUSTRIES
PRESS ENCLAVE/ HABITAT ACADEMY
CENTRAL BUSSINESS DISTRICT
SPECIAL INDUSTRY ZONE
(SOFTWARE TECHNOLOGY PARK,
GEMS & JEWELLERY PARK)
CULTURAL COMPLEX
INSTITUTIONAL &
RESEARCH AREA
UNIVERSITY
CAPITOL COMPLEX
GOVERNMENT OFFICES

LEGEND
COMMERCIAL COMPLEX
EDUCATIONAL COMPLEX
FACILITY COMPLEX
HEALTH COMPLEX
WEEKLY MARKET
NAYA RAIPUR BOUNDARY

Project		Map No.	Revision	Date	Discipline	North
Naya Raipur Development Plan – 2031	Consulting Engineering Services (I) Pvt Ltd 57, Manjusha Building, 6th Floor Nehru Place, New Delhi – 110 019	7.1	R2	July-08	Urban & Regional Planning	N
Client Naya Raipur Development Authority, Chhattisgarh	Map Title Major Work Areas - Naya Raipur	Scale				

30 A

Table7.8 : Area break-up for the City Centre/CBD

Sr. No.	Activity	Percentage	Area (Ha)
1	Shopping areas	28	26.91
2	Banks and Offices	28	26.91
3	Hotels, Restaurants & Cultural areas	7	6.72
4	Public and semi-public Facility	10	9.61
5	Residential	16	15.6
6	Parks and open spaces	10	9.61
7	Informal sector	1	0.96
	Total	100	96.12

Light & Service Industries

A city also needs an industrial base. The Software technology park and light industries constitute the industrial sector of Naya Raipur. Raipur broad region would provide the skilled labour force required for the software technology park and the skilled, unskilled, and semi-skilled labour required for the industries. Light flatted group industries shall be permitted in the mixed-use zone as well as the area demarcated for industries.

Special Industry Zone (Software Technology Park)

The software technology park area designated as a Special Industry zone will employ skilled and semiskilled workforce. The area shall also include a Gems and Jewellery Park. Refer table 7.10 for breakup of the broad land use distribution.

Table 7.10: Broad Land use Distribution for Special Industry Zone

Sr. No	Activity	Percentage	Area (Ha)
1	Offices and Business areas	75	197.29
2	Residential (net area)	25	65.76
	Total	100%	263.05

Rainwater Harvesting

Special emphasis is to be given to rainwater harvesting, in urban areas. Appropriate methods for recharging the groundwater should be considered and adopted. Rooftop rainwater

harvesting at the individual as well as community level shall also be considered. Rainwater storage, into dug-up or natural lakes/ depressions, from the stormwater drainage system shall be proposed, which will also help in environmental improvement as well as recreational uses.

Solid Waste Management:

The quantity of the solid wastes generated is an indicator of the development and the character of city. More the city is developed, more the generation of the waste. Again, the predominance of the industrial and commercial land use in the city increases its generation.

Data Collection and Analysis:

The information collected from various secondary sources like government reports, and academic studies, proves that the planning to build a new smart city has evolved in a positive way apart from the other negative aspects such as relocating the villagers and paying compensatory amounts to them.

An open-ended survey done among the 12 villages nearby, it proves that most of the people were dissatisfied with NRDA due to rehabilitation. But they were also optimistic about the future as it aims at providing better career opportunities and improving prospects of future generations and benefit society.

Based on the information collected from the online sources, it is revealed that there are not many employment opportunities present as per the plans made earlier due to a lack of skilled labour, wages provided and resources available nearby.

The data also reveals the future planning related to different areas and parts of the city which focuses on sustainable development. The first step taken is the design on which the city is planned and constructed which reduces the traffic and saves time for travelling.

Although efforts were made, there are certain fields which required more focus such as water drying up during summers, the low population at the nearby places, and the transport system needs to be more active, shopping malls, schools and colleges should have more crowd, quick services need to be made available which we see at the old cities. All these factors once improvised properly will make the true success of this beautiful smart city which is already flourishing at fast growth.

Conclusion:

While developing a new city from scratch not only required a wholesome amount of money but also takes the emotions of people along with it. Most of the people seem dissatisfied due to dislocation, the amount of money received, and the lack of opportunities provided. But they were also optimistic for the future generations to come, who will not require to thrive in the unfavourable conditions of a city. My recommendations will be such that it is the requirement to educate the indigenous people regarding different schemes related to investment and provide them with skilled-based training. The city is crowded as people have started to shift from the old city, and the coming time will tell us more about the design, sustainability and implementation of the Naya Raipur Smart City.

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