ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 10| Issue: 6| June 2024|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2024: 8.402 || ISI Value: 1.188

# A TALE OF TWIN CITY: ANALOGY OF GROWTH AND DECAY IN PRESENT AND FUTURE

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**Article DOI: https://doi.org/10.36713/epra17540**
**DOI No: 10.36713/epra17540**

## ABSTRACT

*This paper presents a comparative spatial analysis of urban growth and decline trends in the Indian cities of Cuttack and Bhubaneswar. While geographically proximate, the two cities have experienced markedly different urbanization trajectories shaped by their contrasting origins, planning regimes, and governance. Historic Cuttack reflects an organic morphology with a dense, convoluted core and incremental peripheral growth. Planned Bhubaneswar exhibits an orderly layout with designated functional zones radiating from the center. However, both cities grapple with emerging challenges including deteriorating heritage cores, unmanaged peri-urban expansion, inadequate infrastructure in informal settlements, and spatial disparities.*

*Through mapping of past and projected future patterns, the study delineates locations of growth and decline and their spatial correlations. Findings highlight the significance of economic drivers, land use policies, transportation networks, and other determinants in divergent urbanization. The research recommends integrated planning approaches embracing inclusion, sustainability, and participatory governance principles to address these complex dynamics. By comparing Cuttack and Bhubaneswar, insights emerge to inform policies fostering economically vibrant yet livable cities, applicable across urbanizing India.*

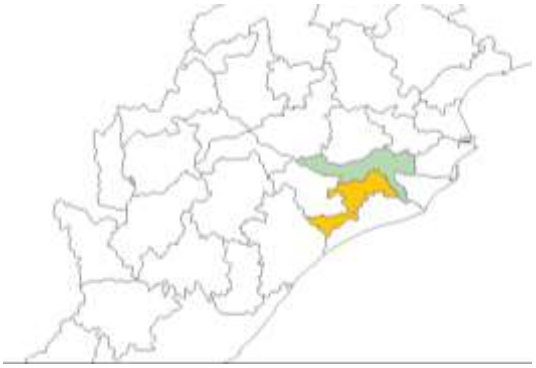


***Figure 1 Odisha Map showing Cuttack (green) and Khordha (Yellow)***
***Source: MyMaps***

## 2.BACKGROUND

### 2.1 Location

Cuttack and Bhubaneswar are the two largest urban centers in the state of Odisha, India. Located in the Mahanadi River delta region, the cities are only 30 kilometers apart. However, they have distinct historical identities and spatial patterns of growth.

With a population of over 600,000, Cuttack serves as the former capital and oldest inhabited city in Odisha, dating back to the 9th century. The city is situated at the head of the Mahanadi delta and was a major port and trading center in medieval times. However, the city lacks orderly planning and has congested old quarters interspersed with open spaces.

In contrast, Bhubaneswar is a planned city established in 1948 to serve as the new capital of Odisha. It has expanded considerably in recent decades with a current population of around 850,000. Located inland from the coast, Bhubaneswar enjoys orderly growth and development coordinated by the Bhubaneswar Development Authority.

While both cities are now heavily urbanized, Cuttack has a longer history and complex spatial structure. Bhubaneswar reflects post-independence urban planning ideals. Comparing their urban growth and morphology would provide insights into the evolution of urban form in India. The contrast also highlights the impacts of planning versus more organic development patterns.

### 2.2 History

***Cuttack City***

Over the past few decades, the inner city of Cuttack has experienced significant growth in various areas, including population, urbanization, and infrastructure development.

Population growth has played a crucial role in the city's expansion. According to the Census of India, Cuttack's population increased from 4,81,873 in 1991 to 5,34,654 in 2001, and to 6,06,007 in 2011. This rapid increase in population has resulted in a demand for more housing and other essential facilities such as schools, hospitals, and shops.

Urbanization is another factor that has contributed to the growth of Cuttack's inner city. Urbanization refers to the process of people migrating from rural areas to urban areas. As Cuttack became more developed, it attracted more people from neighbouring towns and villages. This influx of people has led to the establishment of new industries and businesses within the city, thereby contributing to its economic growth.

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Infrastructure development has also played a significant role in the city's growth. Over the years, the government has invested heavily in improving the city's transportation network, including the construction of new roads, bridges, and flyovers. This has made it easier for people to travel within the city and to neighbouring areas.

For instance, the construction of the Subhas Bose Bridge in 2018, which connects the twin cities of Cuttack and Bhubaneswar, has significantly improved connectivity and accessibility between the two cities.

The inner city of Cuttack has experienced significant growth over the past few decades, driven by various factors such as location, culture, transportation, government policies, and education. One critical factor contributing to the growth of Cuttack's inner city is its strategic location. Cuttack is situated on the banks of the Mahanadi River, providing a crucial source of water for the city's residents. Moreover, the city's proximity to the river has made it an essential center for trade and commerce. (Kumar, 2020)

Cuttack's rich cultural heritage has also played a vital role in the city's growth. Cuttack's cultural heritage, dating back to the Kalinga period, has also played a vital role in the city's growth. The city has several significant temples, including the Cuttack Chandi Temple, which attracts thousands of pilgrims every year. In addition to the temple, the city has several other tourist attractions such as the Barabati Fort, the Netaji Birth Place Museum, and the Maritime Museum. These sites draw in large numbers of tourists, contributing to the city's economy. The city is home to several temples, including the Cuttack Chandi Temple, a major pilgrimage center for devotees of the Goddess Chandi. The temple attracts thousands of visitors every year, contributing significantly to the city's economy. (Times of India, 2016)

Transportation is another factor that has contributed to Cuttack's growth. The city is located at the crossroads of several major highways and rail networks, making it an essential transportation hub. transportation hub. The city's transportation network is another crucial factor contributing to its growth. Cuttack is well-connected to other parts of the country through several national highways, including NH 16, NH 53, and NH 55, as well as the East Coast Railway network. The city also has an excellent intra-city transportation system, with several bus routes, taxis, and auto-rickshaws. The government has initiated several projects, such as the Cuttack-Bhubaneswar Metro Rail Project, to further enhance the city's transportation infrastructure. (Government of Odisha, 2023). This has led to the establishment of several industries and businesses in the city, contributing to its economic development. (Planning Commission, 2014)

The government has also played a crucial role in Cuttack's growth by implementing various policies and initiatives. For instance, the Smart City Mission was launched to transform Cuttack into a smart and sustainable city. The mission aims to use technology to improve the city's infrastructure and services, enhance its livability, and promote economic growth. (Ministry of Housing and Urban Affairs, 2015).

The government's policies and initiatives have also contributed significantly to Cuttack's growth. The city has been included in the Smart Cities Mission, a flagship program launched by the government to promote sustainable urban development. The mission aims to leverage technology and innovation to improve the city's infrastructure, services, and overall liveability.

Finally, Cuttack's educational institutions have also contributed to the city's growth. Ravenshaw University, one of India's oldest and most prestigious universities, is located in Cuttack. The university has provided quality education to the city's residents and attracted students and scholars from all over the world. (Ravenshaw University, n.d.). There are Sri Sri University and the National Law University Odisha. These institutions attract students and scholars from all over the country and abroad, contributing to the city's intellectual and cultural vibrancy.

***Bhubaneswar City***

Bhubaneswar city, located in the state of Odisha, has seen substantial growth and development in recent years. The city's inner areas have undergone significant transformations, with several factors contributing to this growth. One of the key drivers of Bhubaneswar's growth has been its designation as the capital city of Odisha in 1948. Since then, the state government has invested heavily in the city's infrastructure and services, making it a hub for administration, education, and commerce. (Bhubaneswar Municipal Corporation, n.d.)

The population of Bhubaneswar has grown from around 300,000 in 1991 to over 1 million in 2021, making it one of the fastest-growing cities in the country. This growth in population has resulted in the expansion of the built-up area of the city. The built-up area of the city has increased from around 25 square kms in 1991 to over 135 square kms in 2021, reflecting a growth rate of over 400%. (Bhubaneswar Development Authority, 2011; Census of India, 2021)

The city's transportation network has also played a crucial role in its growth. Bhubaneswar is well-connected to other parts of the state and country through several national highways, including NH 16, NH 55, and NH 16A, as well as the East Coast Railway network. In addition, the city has a well-developed intra-city transportation system, with several bus routes, taxis, and auto-rickshaws. (Government of Odisha, 2021)

Bhubaneswar's education sector has also played a significant role in its growth. The city is home to several prestigious universities and colleges, including the Indian Institute of Technology Bhubaneswar, National Institute of Science Education and Research, Xavier University, and KIIT University. These institutions attract students and scholars from all over the country and abroad, contributing to the city's intellectual and cultural vibrancy. (Bhubaneswar Municipal Corporation, n.d.)

The city's cultural heritage, dating back to the Kalinga period, has also contributed to its growth. Bhubaneswar has several significant temples, including the Lingaraj Temple,

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Mukteswara Temple, and Ananta Vasudeva Temple, attracting thousands of pilgrims every year. In addition, the city has several other tourist attractions such as the Udayagiri and Khandagiri Caves, the Dhauli Peace Pagoda, and the Regional Science Centre. These sites draw in large numbers of tourists, contributing to the city's economy. (Odisha Tourism, n.d.)

The government's policies and initiatives have also contributed significantly to Bhubaneswar's growth. The city has been included in the Smart Cities Mission, a flagship program launched by the government to promote sustainable urban development. The mission aims to leverage technology and innovation to improve the city's infrastructure, services, and overall liveability. (Ministry of Housing and Urban Affairs, 2015)

### 2.3 Importance

As Odisha's former capital, Cuttack remains an important commercial, educational, and cultural hub. However, Bhubaneswar now eclipses Cuttack in economic and political significance as the modern capital. With major institutions and rapid growth, Bhubaneswar is a rising tech and education hub. While Cuttack retains its heritage, Bhubaneswar leads development as the prime urban center driving Odisha's future. Their shifting prominence mirrors the state's progression.

### 2.4 Objectives of the study

This study undertakes a comparative spatial analysis of urban growth and decay patterns in Cuttack and Bhubaneswar.
Cuttack has grown incrementally over centuries into a dense, convoluted urban fabric with congested old quarters and pockets of decline.

Bhubaneswar was planned post-independence as a modernist capital city, reflecting rational ordered layouts.
These contrasting urban forms provide an analytical lens to examine how growth and decline have manifested spatially.
The study will:

- Map current and projected spatial patterns of expansion and deterioration in each city using geospatial techniques
- Identify and compare locations of growth versus decay
- Assess correlations between influential factors like planning policies and outcomes using spatial statistical tools

By doing so, the research aims to:
•Elucidate complex interrelationships between planning paradigms and spatial dynamics of growth and decay
• Advanced understanding of sustainable urban morphologies
•Offer insights into strengths and weaknesses of planned development versus organic growth patterns found in Indian cities.
The comparative approach examines how divergent origins and planning regimes shape the spatial manifestation of urban change processes. Findings will enhance knowledge on managing growth and decline for liveable, efficient cities.

### 2.5 Overview of theories and factors influencing urban growth and decline

There are some theories advocating spatial growth in the twin city such as:

1. Central place theory helps explain the dominance of Cuttack and Bhubaneswar as urban hubs providing goods and services to surrounding rural hinterlands. Their strategic locations allowed them to emerge as central places for regional administration, commerce, and cultural activities.
2. Migration theory provides insights into the urban expansion of Cuttack and Bhubaneswar driven by rural-urban migration within Odisha. Migrants are attracted by greater employment opportunities, education, healthcare, and amenities in these major cities.
3. Suburbanization theories elucidate the more recent centrifugal growth and sprawl of built-up areas into the peripheries of Cuttack and Bhubaneswar. Population and economic decentralization to the urban fringes are shaped by factors like inner-city congestion, transportation networks, lower land costs, and aspirational housing demand.
4. Human ecology theories assist in understanding how neighbourhoods in Cuttack and Bhubaneswar have evolved distinct social and physical characteristics based on the interplay between their inhabitants and environments. Different community identities, incomes, ethnicities, and migrant origins interact with the built environment.

These foundational urban theories provide frameworks to analyze the locational advantages, migratory flows, sprawling morphologies, and socio-spatial segregation patterns that have shaped the divergent growth trajectories of Cuttack and Bhubaneswar.

Key factors influencing growth and decline include:

- Economic drivers - industrialization, influx of investments creating jobs and opportunities
- Infrastructure development - transport networks, utilities facilitating growth
- Governance - proactive planning and policies to attract people and investments
- Geography - locations near resources, transport corridors, or hindered by hazards
- Demographic shifts - influx of working age populations due to migration and natural growth
- Sociocultural trends - evolving cultural preferences shaping settlement patterns
- Environmental issues - pollution, hazards, climate risks degrading urban areas

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*Figure 2 Cuttack City Map with ward boundaries*



*Figure 3 Bhubaneswar Municipal Corporation in shaded pink area*

## 3. DISCUSSION OF MODELS AND FRAMEWORKS FOR ANALYZING SPATIAL PATTERNS

a. The concentric zone model outlines the tendency for cities to develop in concentric rings, with Cuttack exhibiting older commercial cores surrounded by transitional neighborhoods and industrial peripheral zones. Bhubaneswar reflects sectoral development radiating from the city center.
b. The multiple nuclei model recognizes the clustered growth around scattered nodes seen in Cuttack's organic fabric. Bhubaneswar reflects the unitary planned nature of its layout.
c. Spatial interaction models analyze the flows of people, goods and information between places. These flows differ greatly between the congested lanes of Cuttack and highway networks of Bhubaneswar.
d. Cellular automata models simulate urban morphologies emerging from localized interactions between adjacent city blocks. These can show how small-scale incremental development in Cuttack creates more complex forms than Bhubaneswar's planned structure.
e. Agent-based models represent human behaviors shaping urban growth. Custom models could examine how migrants' housing location choices differ in the two cities.

### 3.1 Data-Based Analysis

| Year | Cuttack city | Cuttack district | Bhubaneswar city | Khordha district |
|---|---|---|---|---|
| 1971 | 232975 | 1624470 | 137811 | 1517133 |
| 1981 | 273871 | 1840214 | 223200 | 1695464 |
| 1991 | 406918 | 2021738 | 411542 | 1951646 |
| 2001 | 534654 | 2371541 | 648032 | 2633203 |
| 2011 | 606007 | 2624470 | 837737 | 2251171 |

***Table 1 Population Analysis over last five deacdes***

*Source: CMC, BDA*

The table data reflects divergent demographic trajectories for Cuttack and Bhubaneswar from 1971-2011.

- Bhubaneswar's population grew remarkably from 138k to 838k, far outpacing Cuttack's growth from 233k to 606k.
- Bhubaneswar exhibited massive expansion as Odisha's new capital city, aligned with the state's economic and urban development.
- Cuttack's growth slowed as it ceded administrative importance, though it maintains cultural and commercial significance.

Similar trends are seen at the district level:

1. Khordha district grew rapidly by 35% in 2001, reflecting Bhubaneswar's metropolitan expansion.
2. But its 14% decline in 2011 indicates the separation of Bhubaneswar into its own urban agglomeration.
3. Cuttack district showed steady moderate growth between 10-17% each decade, in line with Odisha's overall population growth rate.
4. The divergent patterns underscore the breakneck urbanization of Bhubaneswar-Khordha versus the more gradual growth in Cuttack's historical hinterland.

Bhubaneswar's ascendance as the capital city is the prime demographic driver differentiating the two interconnected districts

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**Regression Equation for Population Growth**:
POPULATION=0·1.0261$^{YEAR}$
Correlation: r= 0.9861
R-squared: $r^2$= 0.9724
Equation of straight line is $y=mx+b$, where Slope is m and Intercept is b
$m=n\sum xy-\sum x\sum yn\sum(x2)-(\sum x)2$
$b=\sum y-m\sum xn$

The values are calculated using the following table

| ***X*** | ***y*** | ***x*=(*X*-199110)** | ***x*2** | ***x*·*y*** |
|---|---|---|---|---|
| 1971 | 232975 | -2 | 4 | -465950 |
| 1981 | 273871 | -1 | 1 | -273871 |
| 1991 | 406918 | 0 | 0 | 0 |
| 2001 | 534654 | 1 | 1 | 534654 |
| 2011 | 606007 | 2 | 4 | 1212014 |
| --- | --- | --- | --- | --- |
| $\sum X$=9955 | $\sum y$=2054425 | $\sum x$=0 | $\sum x2$= 10 | $\sum x\cdot y$=1006 847 |

***Table 2 Regression Equation Table for Population growth***

To find the value of Slope $m$

$m=n\sum xy-\sum x\sum yn\sum(x2)-(\sum x)2$

$\therefore m$=5·1006847-0·20544255·10-(0)2

$\therefore m$=100684.7

To find the value of Intercept $b$

$b=\sum y-m\sum xn$
$\therefore b$=2054425-100684.7·05

$\therefore b$=20544255

$\therefore b$=20544255

$\therefore b$=410885

So the required equation is $y= mx+b$

$y$=100684.7$x$+410885

$\therefore y$=100684.7($X$-199110)+410885

$\therefore y$=10068.47$X$-19635438.77

The (x,y) points and line $y$=-19635438.77+10068.47$X$ on a graph

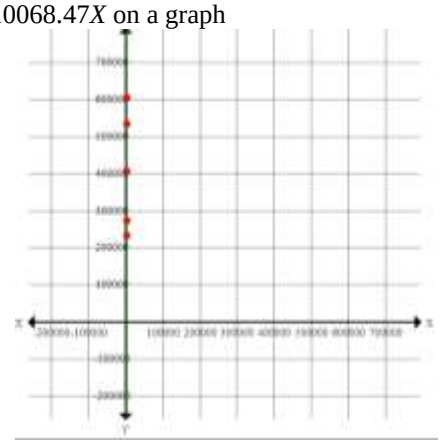


***Figure 4 Plotted Graph for population regression analysis***
Source: Author

## 4. PRESENT-DAY SPATIAL PATTERNS OF GROWTH AND DECLINE: POPULATION DISTRIBUTION

***Cuttack:***

- The old city areas near the Mahanadi riverbank like Buxibazar, Manglabag have experienced depopulation and decline due to congestion, dilapidated housing, and lack of infrastructure. Residents have shifted to newer planned areas in the western, southern and southeastern periphery.
- Peri-urban expansion is occurring rapidly in villages and settlements in the south and southeast sectors like Tangi, Choudwar and Banki which are less constrained by the river and offer vacant land for development. Unplanned

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growth has led to the emergence of slums and squatter settlements in these areas.

- Satellite towns are emerging along major transportation corridors leading out from Cuttack such as Khurda Road, Jajpur Road, Paradip. This indicates decentralized population growth in the regional hinterland.

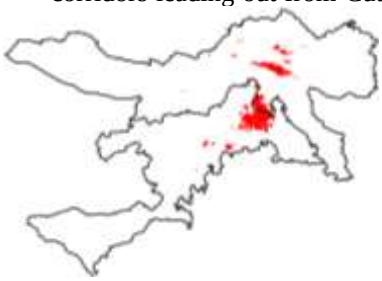


*Figure 5 Built up Area 2005-06*



*Figure 6 Built up Area 2011-12*



*Figure 7 Built up Area 2015-16*

Source: Author

***Bhubaneswar***

- As a planned city, most population growth has been concentrated in the designated residential neighborhoods of the city's master plan such as Chandrasekharpur, Sahid Nagar, and Patia. These areas have seen rapid in-migration from within Odisha.
- Uncontrolled peri-urban areas like Jatni, Khurda, Balianta have also seen haphazard development and in-migration, leading to the growth of informal settlements and pockets of decline due to lack of infrastructure.
- The city's east-west physical expansion is constrained by geographical features on both sides. So most growth has followed a north-south corridor along NH-5 and the rail line.
- In the southern periphery, affluent gated communities and luxury apartments have sprung up, catering to high-income professionals. These areas exhibit stark contrasts with informal settlements nearby.

## 5. PRESENT-DAY SPATIAL PATTERNS OF GROWTH AND DECLINE: ECONOMIC GROWTH

***Cuttack***

- The old city center areas like Chandi Chawk, Buxi Bazar have declining economic activity and investments due to congestion and encroached public spaces.
- New commercial nodes are developing along major transportation routes, like Bidanasi on the Cuttack-Puri road. Retail, offices, and logistics facilities are concentrating in these areas.
- Industrial growth is occurring in the western outskirts in villages like Kanpur, Rasulgarh where land is available for factories and ancillary services.

***Bhubaneswar***

- As the state capital, major public sector and IT companies concentrate in the designated zones like Chandaka Industrial Park, Infocity, and Patia IT Hub.
- New malls, commercial complexes, and business districts are emerging in the western planned neighborhoods like Rasulgarh, Jaydev Vihar.
- Unplanned peri-urban areas struggle to attract formal economic activity and rely on informal retail, services, and small-scale manufacturing.
- Promoted as a tourism hub, activity is expanding near Bhubaneswar's temples and historic sites. But congestion hampers growth in areas like old Bhubaneswar.



*Figure 8 Contrasting Economy of Cuttack and Bhubaneshwar Source: Google*

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## 6. PRESENT-DAY SPATIAL PATTERNS OF GROWTH AND DECLINE: PHYSICAL GROWTH AND INFRASTRUCTURE

***Cuttack:***

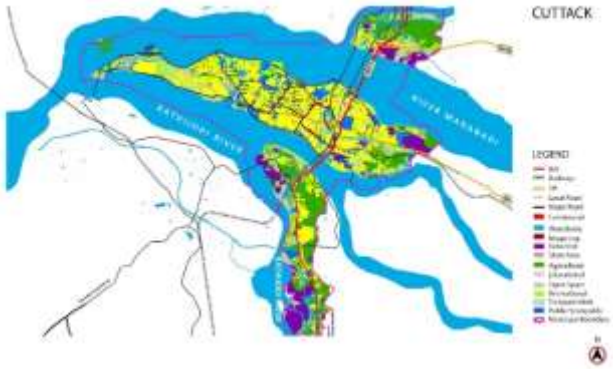



***Figure 9 Landuse Map 2018 Cuttack City Source: CDA***

- Old city areas like Chauliaganj suffer from congested housing, narrow streets, and lack of water supply, sewerage, and drainage. This infrastructure deficit repels residents and businesses to newer areas.
- Peripheral areas like Tangi, Choudwar have seen unplanned housing and commercial growth. But lack of commensurate infrastructure like roads, power, sanitation has led to emergence of informal settlements and slums.
- New townships like Bidanasi and CDA and Trishulia along highways boast better-designed houses, water supply, power, accessibility. These attract migrants from the hinterland.

***Bhubaneswar***

- Planned neighborhoods like Saheed Nagar, Jaydev Vihar offer orderly growth, amenities, open spaces, attracting investment and high-income residents.
- In contrast, unplanned peri-urban areas have seen haphazard construction and lack public transit, sanitation, green spaces. This spurs irregular migration and slum proliferation.
- East-west expansion faces constraints like hills, forests. But recent new highways have opened up north-south corridors like Sukhua-Kalinga Nagar to growth.
- Water supply, sewerage, drainage remains inadequate in old Bhubaneswar. Development is hampered despite the area's tourism potential.

## 7. MAJOR FACTORS OF GROWTH AND DECLINE IN TERMS OF SPATIAL VANTAGE

**Economic Drivers**

1. Areas with investment, employment hubs and presence of formal sector attract migrants and spur growth (e.g. IT hubs in Bhubaneswar)
2. Decline in traditional commercial areas with congestion, encroachments due to lack of new investment (e.g. old Cuttack city center)

**Infrastructure Development**

1. Areas with better connectivity, housing, amenities and infrastructure facilities see progress (e.g. planned neighborhoods in Bhubaneswar)
2. Inadequate basic infrastructure like water supply, sewerage leads to decline (e.g. old city areas of Cuttack)

**Governance and policies**

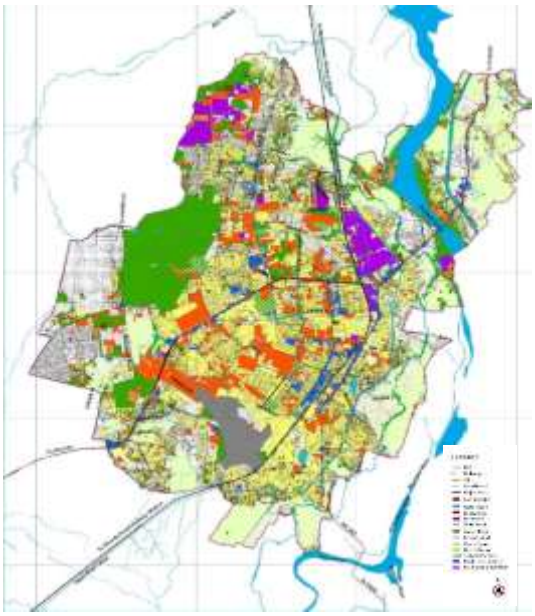
1. Proactive planning, zoning and policies enable growth in intended areas (e.g. designated zones in Bhubaneswar master plan)
2. Unplanned areas see haphazard, insufficient developments (e.g. peri-urban fringes with informal housing)

**Geography and location**

1. Outlying areas with vacant land, transport links attract new developments (e.g. Cuttack peripheries along highways)
2. Constraints like hills, forests, rivers limit growth in certain directions (e.g. east-west expansion of Bhubaneswar)

**Demographic shifts**

1. In-migration and population concentration in areas with jobs, amenities (e.g. Chandrasekharpur, Bhubaneswar)
2. Depopulation where liveability declines (e.g. old Cuttack city)



***Source: Author***

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### 7.1 Future spatial patterns based on projected population and economic trends:

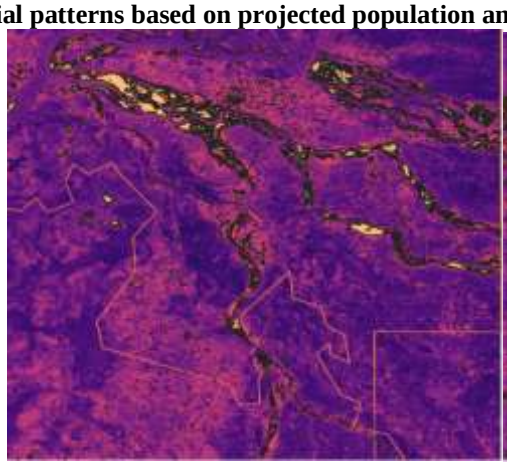


*Figure 10 Growth of Cities 2000s (Yellow Shaded)*

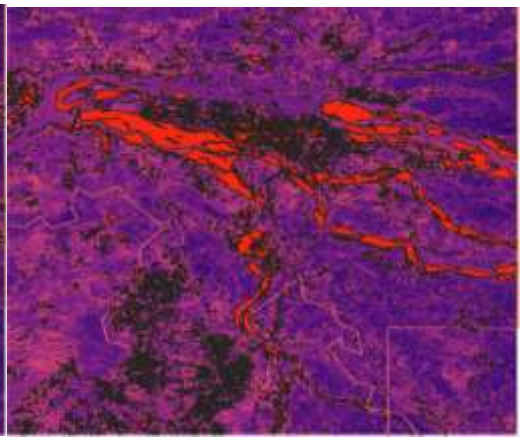


*Figure 11 Growth of Cities 2010s (Red Shaded)*

***Cuttack***

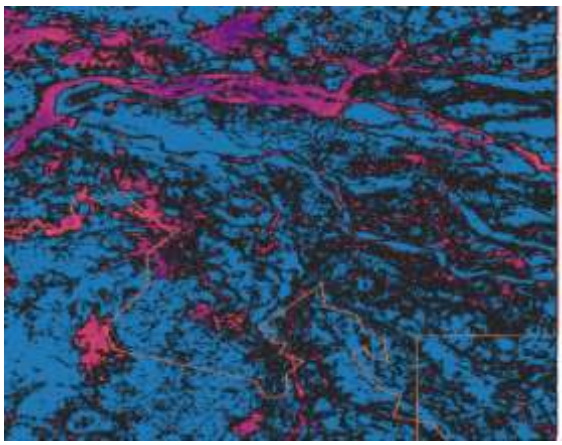


*Figure 12 Growth of Cities 2020s (Magenta Shaded)*

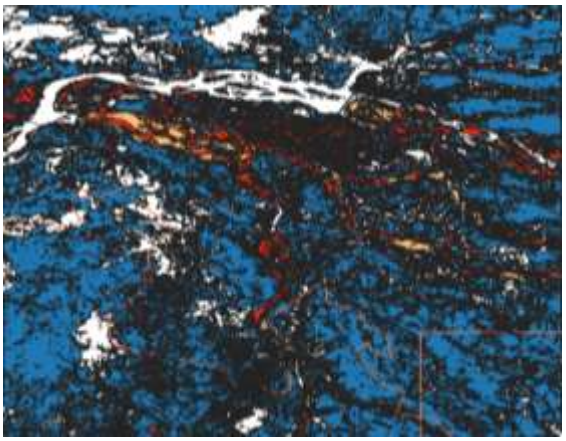


*Figure 13 Current situation of Cities 2022 (Red composite)*

Source: Author

- Population is projected to grow at a moderate pace driven by births and intra-state migration. This could concentrate in emerging peripheral townships along major transportation routes.
- Economic expansion predicted in tertiary sector services, retail, small-scale manufacturing. Could accelerate growth around newly planned commercial nodes on arterial roads.
- Industrial growth projected near proposed SEZs in western periphery. Would expand built-up area outwards via rail/road connectivity.

***Bhubaneswar***

1. Population projected to grow rapidly with continued in-migration of working age groups seeking jobs. Likely to intensify housing demand in western planned areas.
2. Robust economic growth predicted, especially in IT/ITES, education, healthcare, tourism and hospitality sectors. Would bolster expansion in designated zones of the master plan.
3. Peri-urban areas could see haphazard mixed developments without commensurate infrastructure. Risk of deteriorating livability and congestion.
4. Environmental protection needed as growth pressures encroach on forests, wetlands surrounding the city's fringes.

## 8. SOME KEY PLANNED DEVELOPMENT PROJECTS IN CUTTACK AND BHUBANESWAR AND THEIR IMPLICATIONS:

***Cuttack***

I. Proposed Metro rail project could ease congestion and boost connectivity between the old city, new areas and periphery. Needs integrated land use planning to maximize accessibility.

II. Development of new Cuttack Choudwar Urban Complex across 30 sq km on the city's southeast with residential, commercial and industrial areas. Could drive peri-urban growth if infrastructure kept pace.

III. Expansion of Bidanasi-CDA township and Trishulia township with improved housing, amenities, and road networks. Would attract more population but increase pressures on groundwater, environment.

***Bhubaneswar***

I. Khurda-Jatni Urban Complex planned across 95 sq km to channel metropolitan expansion in eastern corridor. Success depends on transit connectivity and structured growth.

II. Proposed for Puri-Konark urban agglomeration to boost tourism-based economy. Need coordinated efforts to balance growth across the urban system.

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 10| Issue: 6| June 2024|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2024: 8.402 || ISI Value: 1.188

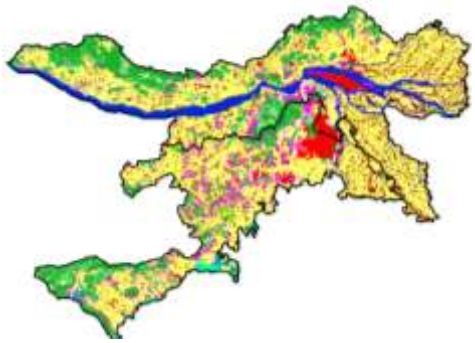
III. Master plan envisions new zones for residential, institutional and recreational areas. But space constraints could complicate implementation.

IV. Transit-oriented development is needed along proposed Bus Rapid Transit and Metro routes to fully leverage infrastructure.

## 9. SPATIAL GROWTH AND DECAY SHOWING SIMILARITIES AND DIFFERENCES IN GROWTH AND DECLINE SPATIAL PATTERNS:

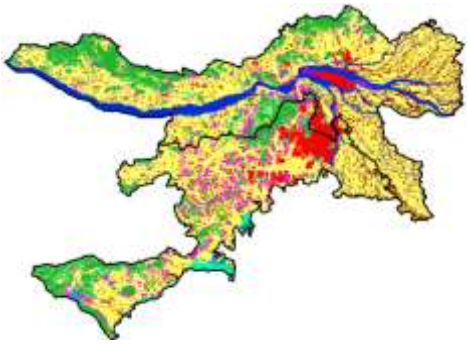
Similarities

- Both cities exhibit declining old city cores with congestion, lack of investment and infrastructure deficit repelling populations.
- Peri-urban areas in both cities undergoing rapid unplanned growth leading to emergence of informal settlements, slums due to lack of commensurate infrastructure.
- Spatial concentration of economic assets and high-income neighborhoods in planned zones with good amenities versus deprivation in unplanned areas.
- Outward spread into peripheral villages facilitated by major transportation networks and availability of vacant land.



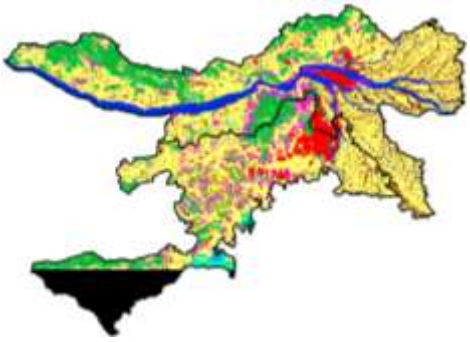
Source: Author

***Figure 14 Spatial Growth of built up areas and decay of the green patches of the region 2005-06***



Source: Author

***Figure 15 Spatial Growth of built up areas and decay of the green patches of the region 2011-12***



Source: Author

***Figure 16 Spatial Growth of built up areas and decay of the green patches of the region 2015-16***

Differences

- Cuttack reflects more clustered growth patterns in old city and around traditional nodes. Bhubaneswar shows sectoral expansion from city center.
- Cuttack growth along major transit corridors has fostered emerging satellite townships. Bhubaneswar growth remains concentrated within official planning boundaries.
- Cuttack has less spatial constraints, so growth proceeds rapidly in all directions. Bhubaneswar has major east-west barriers shaping linear north-south growth.
- Cuttack's decline more localized in old neighborhoods. Bhubaneswar has scattered pockets of deprivation based on planning gaps.

While divergent in morphology, spatial inequalities persist in both cities warranting urgent policy attention.

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## 10. OVERVIEW OF THE RELATIVE SIGNIFICANCE OF FACTORS INFLUENCING THE DIVERGENT URBAN FORMS AND STRUCTURES OF CUTTACK AND BHUBANESWA

- Cuttack's organic and incremental growth over centuries has produced a more clustered and convoluted urban form. Key factors include:
- Tradition and culture shaping the location of old temples, marketplaces and settlements along the Mahanadi riverbank. This defined the historic city core.
- Economic trends leading to the shift of commercial nodes along new transportation corridors that emerged with industrialization and globalization.
- Limited governance in planning and infrastructure provision, especially in newly developed peripheral areas.

In contrast, Bhubaneswar's planned development as a modern capital has yielded a more orderly structure:

- Urban design principles and architecture influenced the city's concentric layout with designated functional zones.
- Local geography constrained the east-west expansion, funneling growth along a north-south corridor.
- Institutionally coordinated planning and infrastructure provision, attracting investments to intended growth poles.
- However, both cities grapple with emergent slums, congestion and decline in older areas warranting deeper policy interventions.

In summary, Cuttack's form has evolved more organically over time while Bhubaneswar reflects strong planning conceptions.

However, dynamic economic and demographic forces continue to reshape these cities warranting adaptable, equitable and sustainable planning approaches.

## 11. IMPLICATIONS ON EXISTING URBAN PLANNING AND POLICIES IN THE TWIN CITY REGION

- Integrated planning is needed to coordinate land use, transportation networks and infrastructure development. This can address gaps leading to unplanned growth and decline across both cities.
- Inclusive zoning policies and equitable provision of basic amenities to lower income areas can mitigate emerging disparities between formal and informal settlements mostly the old areas.
- Transit-oriented development should be prioritized along major transportation corridors and metro rail networks to steer growth toward intended nodes.
- Stricter development controls are required for environmentally sensitive peripheral areas to conserve wetlands, forests and prevent haphazard sprawl.
- Capital investments and incentives can help revive traditional commercial districts through façade improvements, decongestion and local economic development plans.
- GIS-based land information systems can improve monitoring and transparency in land use planning if adopted across municipal agencies.
- Improved urban data collection and monitoring mechanisms to track demographic shifts, infrastructure gaps, land use changes. This can inform dynamic planning.
- Heritage conservation plans needed to preserve historic assets and revitalize old city areas, especially in Cuttack.
- Housing policies to expand affordable and well-designed options for the influx of migrants and lower-income groups.
- Slum rehabilitation programs to upgrade informal settlements with in situ development providing basic amenities.
- Green space requirements for all new developments to strengthen environmental quality and community health.
- Form-based codes to promote mixed land use, walkability and context-sensitive designs, especially in new zones.
- Coordinated capacity building across planning agencies on topics like GIS, urban economics, sustainable transport etc. to strengthen technical expertise.

## 12. RECOMMENDATIONS

To address the divergent spatial patterns of growth and decline in Cuttack and Bhubaneswar, an integrated regional planning approach is crucial. This should involve a coordinating body overseeing harmonized strategies across municipal boundaries. Inclusive zoning policies and equitable infrastructure provision, especially in underprivileged areas like Cuttack's old quarters (Chauliaganj, Buxi Bazar) and Bhubaneswar's unplanned peripheries (Jatni, Khurda), can mitigate socio-economic disparities.

Transit-oriented development along proposed metro/BRT corridors (e.g., Cuttack-Bhubaneswar route, Puri-Konark urban agglomeration) should promote compact, mixed-use neighborhoods. Environmental conservation measures, like stricter regulations and green initiatives, are needed in sensitive areas surrounding both cities, such as the Mahanadi riverbank in Cuttack and forested fringes in Bhubaneswar.

Comprehensive heritage conservation plans should revitalize Cuttack's historic precincts (Chandi Chawk, Buxi Bazar) through adaptive reuse, public-private partnerships, and local economic development strategies. Affordable housing policies and slum rehabilitation programs (in-situ development) are essential, particularly in informal settlements like Tangi and Choudwar (Cuttack), and Balianta (Bhubaneswar).

Data-driven planning, leveraging GIS and land information systems, can improve monitoring and decision-making across agencies. Capacity building, especially in sustainable transportation and climate-resilient planning, should strengthen municipal institutions. Participatory approaches involving stakeholders are vital for community-driven, inclusive development.

Regular master plan updates and adaptive management strategies are needed to keep pace with rapid urbanization. By implementing these location-specific recommendations, Cuttack and Bhubaneswar can foster sustainable, equitable growth while preserving their unique identities.

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## 13. CONCLUSION

This comparative study analyzed the divergent spatial patterns of growth and decline in the adjacent cities of Cuttack and Bhubaneswar. While located proximately, their distinct histories and planning regimes have produced markedly different urban forms. Cuttack evolved organically over centuries into a convoluted fabric with congested old quarters and peripheral sprawl. In contrast, Bhubaneswar was planned post-independence on modernist conceptions of order and functionality. However, both cities now exhibit challenges like deteriorating cores, unmanaged peri-urban growth, and socio-economic disparities.

The analysis identified the relative significance of factors like policies, geography, and investments in shaping urban morphology. It illuminated how these forces interact to produce varying patterns of progress and decline across space. The research underscores the need for coordinated governance, integrated planning, and inclusive policies that address emerging inequities. As Cuttack and Bhubaneswar rapidly urbanize, leveraging their divergent strengths while mitigating common shortfalls is essential for twin goals of economic dynamism and livability. The study provides vital insights to inform policies and planning practices for sustainable urban development in these and similar Indian cities.

## REFERENCES

1. *Census of India. (2021). Cuttack Population Census 2011. Retrieved from https://www.census2011.co.in/data/town/801437-cuttack-orissa.html*
2. *Planning Commission. (2014). Report of the Sub-group on Urbanization and Governance. Government of India.*
3. *The Times of India. (2018, September 14). Cuttack-Bhubaneswar connect to get a boost with Kathajodi Bridge. Retrieved from https://timesofindia.indiatimes.com/city/bhubaneswar/cuttack-bhubaneswar-connect-to-get-a-boost-with-kathajodi-bridge/articleshow/65796343.cms*
4. *Kumar, S. (2020). Water resources development and management of Mahanadi River basin. International Journal of Environmental Studies, 77(4), 515-528.*
5. *Ministry of Housing and Urban Affairs. (2015). Smart City Mission. Retrieved from https://smartcities.gov.in/content/aboutsmartcity/mission.php*
6. *Planning Commission. (2014). Report of the Sub-group on Urbanization and Governance. Government of India.*
7. *Ravenshaw University. (n.d.). About Ravenshaw University. Retrieved from https://www.ravenshawuniversity.ac.in/about-ravenshaw*
8. *Times of India. (2016, October 8). Cuttack Chandi temple gets more visitors than Jagannath temple. Retrieved from https://timesofindia.indiatimes.com/city/bhubaneswar/Cuttack-Chandi-temple-gets-more-visitors-than-Jagannath-temple/articleshow/54721445.cms*
9. *Ministry of Housing and Urban Affairs. (2015). Smart City Mission. Retrieved from https://smartcities.gov.in/content/aboutsmartcity/mission.php*
10. *Mohapatra, P.K.J., & Chandrasekhar, S. (2015). Urbanisation in Odisha: Some less focused aspects. Urbanisation in Odisha, 50(3), 252-277.*
11. *Padhi, S.S., & Panigrahi, B.K. (2011). The changing travel characteristics of Bhubaneswar city. Research in Transportation Economics, 32(1), 28-34.*
12. *Das, T.K. & Parida, B.P. (2015). Planning for a better Bhubaneswar (Vol.2). New Delhi: Ankur Publishing House.*
13. *Nayak, N.C. (Ed.). (2019). Emerging dynamics of Cuttack from a historical backwater to a modern hub. New Delhi: Routledge.*
14. *Bhubaneswar Development Authority. (2017). Master plan for Bhubaneswar development area: 2017-2037. Bhubaneswar: Govt. of Odisha.*
15. *Cuttack Development Authority. (2013). Annual report 2012-13. Cuttack: Cuttack Development Authority.*
16. *Mohanty, P.K. (2021). Urban environmental challenges in Cuttack and Bhubaneswar. International Journal of Regional Development, 4(2), 10-19.*
17. *Samal, P.K. & Meher, D. (2013). Urbanization in Odisha: Spatio-temporal Analysis. Odisha Review, 70(3), 28-39.*
18. *Sahoo, B.K. & Rath, M. (2014). Changing planning scenario in the peripheral areas of Cuttack and Bhubaneswar. Urbana World, 3(1), 21-34.*
19. *Pattanaik, F. (Ed.). (2021). Spatial Structure and Growth of Cities: A Case Study of Cuttack. New Delhi: Crest Publications.*
20. *Nayak, N.C. (2014). Emerging Urbanization Trends in Bhubaneswar Region: A Geo-spatial Analysis. New Delhi: Adarsh Books.*
21. *Pujari, A.K. (2015). Urban Planning in Odisha: A Comparative Study of Cuttack and Bhubaneshwar. Chennai: Frontier Publications.*
22. *Housing and Urban Development Department. (2019). Comprehensive Mobility Plan for Cuttack. Govt of Odisha.*
23. *Odisha Tourism Development Corporation. (2021). Tourism potential assessment of religious sites in Cuttack. Govt of Odisha.*