

# Challenges for Self-Sustainable Smart Cities in India

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**Abstract** - As the global urban population grows, so does the demand for resources. However, resources are limited to cater to the demand of the population growth. Cities must employ new approaches to address this demand gap in order to restore equilibrium to the system and ensure sustainable development. This study tries to emphasise the importance of regional approach towards Smart City Bilaspur development, where the importance of sustainability has been overshadowed by economic and infrastructure factors.

**Key Words:** Smart city, Sustainability, Transboundary, Region, Resources

## 1. INTRODUCTION

Around the world, 55 percent of the population live in cities, and it is expected to rise to 68 percent by 2050. Cities have long been regarded as magnets for better employment and new opportunities. Cities are densely packed and occupy a tiny area, yet they provide a significant portion of GDP. There are numerous advantages to living in a city, including improved employment opportunities, the excitement of city life, and other social and economic perks. Cities and towns are also catalysts for regional and national development. However, the very characteristics that make them attractive places to live and invest pose a number of obstacles to their long-term viability.

Cities must compete for resources in order to meet their demands as their populations grow. Infrastructure and connection, such as roads, tanks, and pipelines, are used to meet this resource need. These demands are generally addressed by utilizing resources in the outskirts of urban areas.

Cities are interconnected systems with other cities, regions, and villages. The extraction and exploitation of resources from these locations on the outskirts depletes the resources available to the periphery regions. This imbalance in the demand leads to over-exploitation of resources from the urban areas and creating scarcity for the rural peripheral areas.

Cities account for over 67 percent of worldwide energy requirement while they produce around 70% of damaging greenhouse gas emissions. Cities are the primary sources of environmental pollutants and the primary hotspots of vulnerability to climate risks and related upheavals along

with issues of social inequality, disparity, vulnerability, and insecurity.

In the context of Bilaspur Smart City, this article examines the current smart city system and the opportunities and challenges that exist in the process of making these cities smart. It looks at how the city is connected to other networks such as water, energy, food networks with villages and other cities, and how these systems grow or deteriorate as a result of rapid development and demand, the creation of urban sprawls as Rurban and rural populations are either pulled or pushed out of their areas, and how this impacts the city and its sustainability.

## 2. ABOUT BILASPUR

Bilaspur, the state's third largest city, is located 133 kilometres (83 miles) north of the state capital, Naya Raipur. The National Highway network connects the city to Mumbai and Kolkata. Bilaspur is a major tributary of the Mahanadi River and is located on the Deccan plateau in the Arpa River's watershed which is the lifeline of Bilaspur. Aagaar and Maniyaar are the other rivers that surround Bilaspur District. It has a population of over 5.5 lakh people and is expanding at a rate of roughly 33%. The area is mineral-rich and well-developed industrially.

Due to rapid urbanization, the city has grown at a haphazard manner. This has led to increased deforestation and the city has lost most of its green cover. The urban growth has impacted the demand for resources. Electricity is government regulated while the sewerage and drainage system is practically nonexistent. Various industries have been set up to extract resources such as Dolomite to the north and Coal mines of Hasdeo valley in the east.

The main source of water supply is through ground water sources which are supplied through underground pipelines in the city. The capacity of underground water source is 44.85 MLD (Source- Bilaspur Nagar Nigam SLIBP). There is over-dependence on ground water and this is being mitigated by identifying surface water sources far away from the city for the consumption of the city dwellers.

## DEFINING SMART CITY

*'A smart city is one in which citizens are co-managers of the city along with public officials, thus highlighting the*

*importance of citizen engagement'*. (NIUA – National Institute of Urban Affairs, 2015)

The Smart city mission in India launched on 25<sup>th</sup> June, 2015 aims to develop cities that provide core infrastructure, sustainable environment and give citizens a decent quality of life through the application of smart solutions. The mission aims at improving the quality of life on various fronts like social, economic, physical and institutional pillars as well as drive economic growth. In the Smart city mission, 100 cities were selected for development as Smart cities through a two-stage competition. The cities competing for Smart City Proposal are required to give the following details as part of the SCP format. They include, City Profile(A), Area Based Proposal (B), Pan-City Proposal (C), Implementation Plan (D) and Financial Plan(E).

Cities around the world are faced with various issues such as water scarcity and degradation of drinking water, urban slums, ageing infrastructure, etc. Smart Cities aim to optimize and improve the existing systems to be efficient and improve life quality for their citizens. For example, Smart phone apps now allow residents to check their water consumption in real time and reduce costs. Technology enabled systems have helped in real-time monitoring of any defects in the system and ensuring citizen engagement.

Resources such as water have become one of the scarce resources and are huge concern for the sustainability of the cities and their livelihood. Most of the cities have become water scarce and rely on the regional sources and the long pipelines to deliver their needs. Cities like Bangalore, Mumbai rely on pipelines travelling around 100km to supply their water requirements. However, this disturbs the natural ecosystem and the equitable distribution of resources. The villages around the reservoir get disturbed and their source of income, i.e., agriculture gets affected. This in turn creates a cycle of distressing problems, leading to push factors for the population to move towards the cities.

Smart cities, through their integration of technology enabled services can be key players in influencing and creating ripple effects towards a more sustainable future. Cities are interdependent on the rural and urban counterparts surrounding it for the food supply as well as for other resources.

### **3. DISCUSSION- A SUSTAINABLE SYSTEM**

Smart cities are a source of innovation and development which have a great degree of influence towards making more sustainable cities. Along with growth of economic and infrastructure sectors, there should be equal concern towards sustainability of the cities and their inter-relationship with surrounding villages and nature to ensure restoration and regeneration of environment.

The collaboration of smart cities and its regional periphery are required to meet the challenges faced by the growing population. Planning for a city and meeting its requirements should not create a negative effect on the other stakeholders who do not reside within the boundaries of the city.

In the case of Bilaspur, the city, as the ground water sources have been over exploited due to unavailability of surface water, resulting in lowering of ground water level. However, the solution to eliminate the dependence on ground water through a gravity-based system tapping a surface water source 26kms from the city has short term benefits. The water sources being tapped would have served for irrigation of agricultural lands and farming which serves for the city dwellers of Bilaspur. As the city grows, the threat of water scarcity from these regional water sources would further increase. This would imply, a lower yield of food grains, hence a shortage of food in the region and such factors would lead to farmers moving out to the city seeking for job opportunities. This creates a series of other issues such as increasing urban sprawl, shortage of food supply, increased unemployment in the region, effect on ecosystem close to the surface water source.

Smart cities should aim towards self-sufficiency. Resources need to be recycled and reused to reduce dependence on the regions. Cities contribute majorly to the pollution and degradation of environment, air, water etc. The presence of mineral rich mines and other resources have led to well established industries in and around Bilaspur. These industries consume large sources of energy and degrade the Air Quality index of the city as well as negatively affect the region. These issues should be mitigated to ensure the peripheral regions do not suffer loss of environment.

Smart cities affect entire regions- economically, environmentally, demographically etc. The need to understand the consequences of decisions for the city dwellers should have an inclusive approach towards the entire region to avoid issues arising out of the actions. Bilaspur Smart city should take innovative steps to improve its water supply system. With an increased growth of the population, it is imperative that new methods of water recharging be employed to meet the demand of the citizens. Sustainable sources of energy should be a priority to reduce dependence of the resources which have negative impact on the environment. Usage of Smart technologies to ensure reduction in water losses, energy dissipation as well as wastage of food should be enabled to improve and enhance sustainability of Smart cities.

Smart cities should aim towards alternative methods of energy generation to reduce impact on the environment and aim towards net zero emission and carbon negative footprint using technologies such as off-grid power. Covid-19 pandemic has highlighted the need for self-sufficiency of cities, and this should become a starting point towards a

planning of self-sustainable Smart cities that can sustain on resources within its geographical boundaries and have minimal negative impact on the peripheral areas surrounding the city.

Sustainability should be looked as a means of satisfying and creating better opportunities for all the stakeholders involved while keeping the needs of the future in mind.

#### 4. CONCLUSIONS

This study discussed the concept of Smart Cities, along with their overlapping focus areas. With the increasing demand of water, energy and the need for environmental sustainability, Smart cities need to set clear objectives to treat the concerns effectively. The study underlines the need for creating a secure future with the scarce resources in fast growing cities. Smart city developments should evaluate issues relating to environment, resource conservation and regeneration at a regional level for it to remain relevant. Technological innovation and ICT-based solutions can serve to improve the supply of resource in a more equitable manner and provide an opportunity to city governments to take informed decisions to create a resource secure future.

In the case of Bilaspur city, an increasing concentration of populations and economic activities create challenges that need to be addressed by improving the in-boundary (issues of water losses, alternative energy, reuse of resources etc) and transboundary linkages (e.g. water management and pipelines). The Smart City mission mainly focuses on the physical and social infrastructures like waste management, energy efficiency, mobility solutions, traffic management, etc. which lie within the boundary. But meeting resource demand like water, energy, food etc, requires trans-boundary interventions. These interventions need to be closely monitored and taken long-term vision of sustainability and city-region relationships to maintain a broader role in the fight of climate change, sustainable living and a better future.

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