



## Evaluating Public Services Delivery on Promoting Inclusive Growth for Inhabitants of Industrial Cities in Developing Countries

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### Abstract

It has been debated that effective essential public services delivery is crucial to inculcate inclusive growth in cities over the past decades. Cities continue to be central to the debate; however, the current study focuses on industrial towns. As industrial towns' development around cities attract investment and promote economic growth, the present research studies the impact of essential public services delivery on promoting inclusive growth for inhabitants of industrial towns in developing countries. Human Capabilities Dimension Approach and its parameters (Social and Physical Infrastructure) have been employed to explore the role of basic amenities in transferring growth levels across all population sections. The idea explored is studied through Mandideep Industrial Town's case study, where six parameters (Physical and socioeconomic status, water supply, sanitation, health care facilities, education facilities), and perceived inclusive growth have been considered for data collection and analysis. Indicators under each parameter are analyzed based on the 4A's-Availability, Accessibility, Awareness, and Affordability. Site selection revolved around a city reconnaissance survey and Household survey for 200 households. Aggregated analysis for the city and ward-wise comparative analysis and statistical correlation tools were used to establish a relationship between basic public services delivery and perceived inclusive growth. The research aims to study and establish a correlation between public service delivery and perceived inclusive growth by the industrial town's inhabitants. Discussions following data analysis led to recommendations for city and ward-level. The importance of efficient service delivery for increased perception of inclusive growth is established. Along with the six parameters considered for the study, physical and environmental planning emerge as crucial parameters that impact other public services for enhanced inclusive growth in industrial cities.

**Keywords:** Basic Public Services; Inclusive Growth; Human Capabilities Dimension Approach; Industrial Cities; Health and Education Facilities; Safe Water and Sanitation.

### 1. Introduction

Cities have always been critical to addressing poverty and inequality. "Inclusive growth covering the poorest of poor" has been considered the Indian government's top priority. However, as per the World Economic Forum (WEF), India continues to be a low-ranking country among emerging economies on an Inclusive Development Index (IDI) [1]. Inclusive growth concept worldwide continues to have critical unresolved issues rendering it operationally problematic [2]. Despite its shortcomings, it continues to be a concept that needs further exploration. Universal access to education, health services, and equal distribution of resources can support economic development and subsequent inclusive

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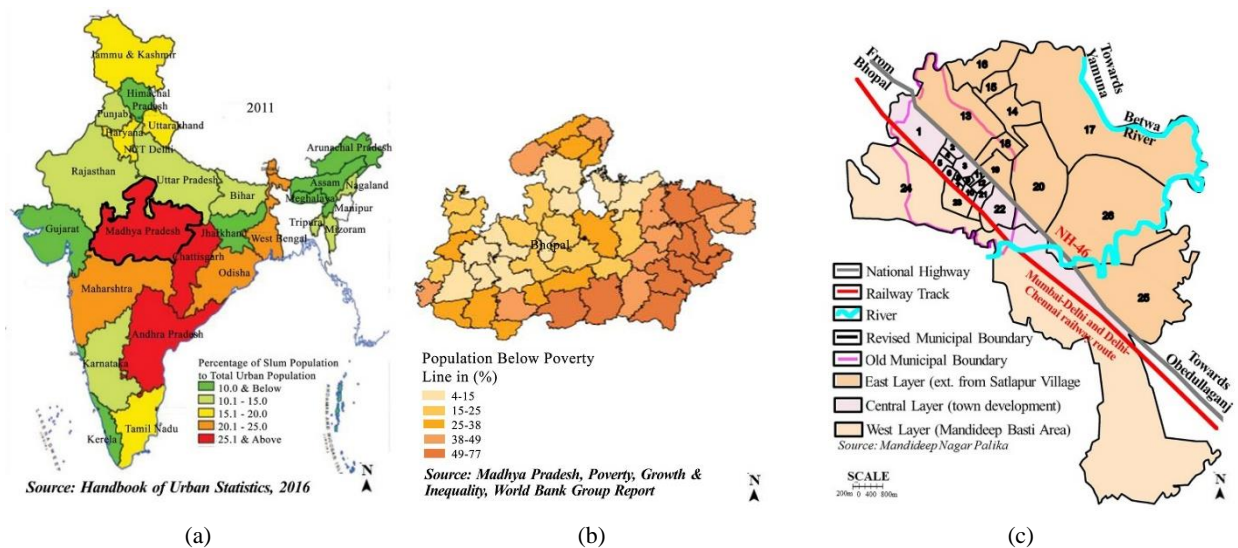


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growth [3]. However, studies reflect that the relationship between effective service delivery and inclusive growth is not clear. Indian cities continuously fail to provide equitable distribution of their resources, excluding essential, safe drinking water, sanitation, housing, healthcare, and education facilities.

Indian policymakers continue to push for industrial transformations without addressing the increasing problems of inclusion, job creation, urban poverty, and environmental sustainability [4]. With the world moving towards Industrial Revolution 4.0, it is essential to shift focus towards potential industrial towns to understand inclusive growth in these manufacturing hubs. The current research focuses on selected public services in promoting inclusive growth in India's Mandideep industrial town. Hence, the inhabitants' inclusive growth has been assessed through the lens of the basic public services (Healthcare, Water, Sanitation, and Educational facilities) in India's Mandideep industrial town. Figure 1(a) shows a map of India indicating Madhya Pradesh as having one of the highest concentrations of slum population. Figure 1(b) indicates districts around Bhopal, the capital city with more than 25% population living below the poverty line. Mandideep Town, as shown in Figure 1(c), is an Industrial Town that came up in the 1970s; it lies 25 km south of Bhopal, increasing from 560 acres to 1288 hectares to 6388 hectares. The present research questions the role of adequate provision of essential public services in inculcating perceived inclusive growth among industrial town inhabitants. It also aims to establish the importance of understanding inclusive growth from the inhabitants' perspective, focusing on public service delivery.

Mandideep townhouses 250 functional industrial units with 8 of its 18 wards declared as slums. Six hundred nineteen families live below the poverty line. Physically the town has evolved axially along the National Highway NH-46. The city can be described into three layers, with industrial development mainly taking place on the Highway's eastern side. The three layers are Satlapur Village on the east (Industrial zone), the central part (between NH-46 and the railway track), and the third layer being the western side (Mandideep Basti Area). Table 1 gives a comparative analysis of the percentage of various land-use categories stated by Urban and Regional Development Plans Formulation and Implementation (URDPFI) Guidelines for Industrial Cities and actual percentage areas existing in Mandideep Town.



**Figure 1. (a) Map showing the percentage of slum population in Indian states, 2011; (b) Madhya Pradesh District Level Poverty, 2012; (c) Mandideep Nagar Palika (Municipality) Jurisdictional Area, 2018**

**Table 1. Mandideep Nagar Palika (Municipality) Land-Use Classification against prescribed URDPFI Guidelines**

Land-Use Category	URDPFI Guidelines for Industrial Cities	Mandideep Town (% of developable area)
Residential	20-25%	24.19%
Commercial	3-4%	7.65%
Industrial	30-35%	<b>63.35%</b>
Public & Semi-Public	6-8%	<b>1.45%</b>
Recreational	12-15%	<b>2.05%</b>
Transportation	10-12%	<b>1.30%</b>
Water bodies/particular areas	balance	

The research is structured based on the following objectives as listed in Figure 2. The first objective was to study Inclusive Growth and Basic Public Services' concept identifying parameters and indicators for the two. The second objective was to draw linkages between Basic Public Services and Inclusive Growth based on the Literature. The third

objective was to understand the present status of Basic Public Services in the chosen study area. The fourth objective explored and established a relationship between essential public services and perceived inclusive growth based on the household survey conducted in Mandideep town. The fifth objective was to give recommendations to enhance Basic Public Services' impact on promoting Inclusive Growth in Mandideep town.

Section 2 of the article discusses the Literature study. Section 3 focuses on the Research Methodology with a description of the study area, site selection and Household survey, and data analysis methods. The results are presented, analyzed, and discussed, followed by Recommendations in Section 4 for both city and ward-level. Section 5 concludes the study with contributions and limitations.

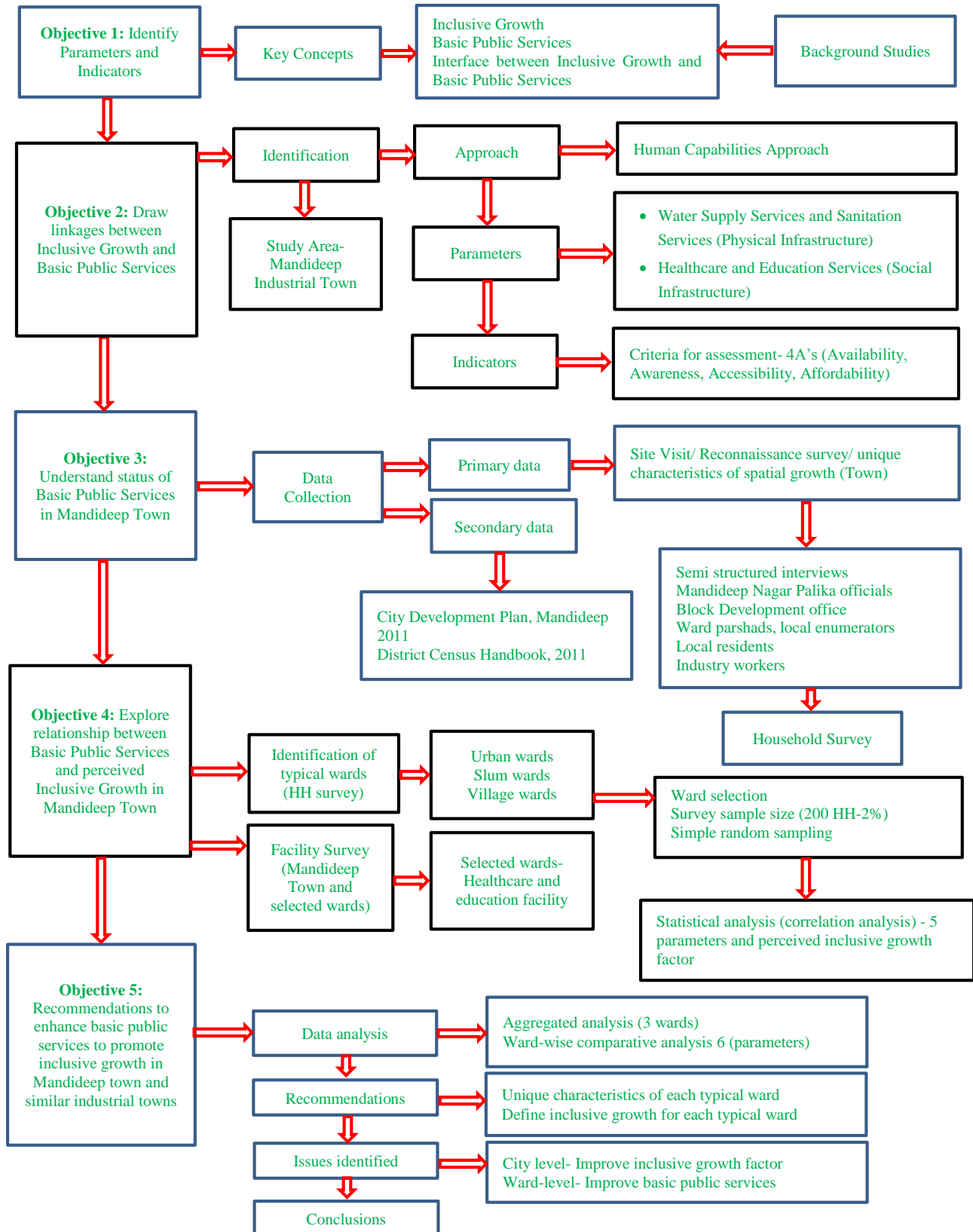


Figure 2. Overall methodology and structure of the research

## 2. Literature Review

### 2.1. Inclusive Growth

To gain a holistic understanding of Inclusive Growth, the concept was understood from different sources. Existing Literature on Inclusive Growth indicators shows that developing countries focus more on expansion and quality of services. In comparison, developed countries focus on delivering services showing differences in priorities in goals [5]. According to the Eleventh Five-Year Plan in India, access to essential services in health and education leads to faster and more inclusive growth. According to the Eleventh Five-Year Plan, access to critical services in Health and Education leads to quicker and more inclusive growth. Twelfth Five-Year Plan adds on improvement in the provision of basic amenities (water, sanitation, electricity, roads, and housing). Sustainable Development Goals indicate inclusive and equitable education, along with universal access to water and sanitation.

Inclusive growth has been described as growth with improvements in social indicators of Education and Health in developing countries [6]. Inclusive growth includes Education, Health, Nutrition, and Social integration (disadvantage-reducing impact of Inclusive Growth [7]. Inclusive growth tends to increase the average opportunities available to the population and impacts how these opportunities are shared among the community. As there are multiple definitions of Inclusive Growth, the concept was understood from several sources, as listed in Table 2.

**Table 2. Examples of definitions of Inclusive Growth from various sources**

Source/Organization	Inclusive Growth
Eleventh Five-Year Plan (2007-12) [8]	<ul style="list-style-type: none"> <li>• Consists of inter-related components</li> <li>• The rapid growth that reduces poverty creates employment opportunities</li> <li>• Access to essential services in (Health and Education) especially for Poor</li> <li>• Equality of Opportunity</li> <li>• Education and Skill Development lead to Empowerment.</li> <li>• National Rural Employment Guarantee focuses on employment opportunities.</li> <li>• Environmental Sustainability</li> <li>• Recognition of Women's agency &amp; good governance</li> </ul>
Twelfth Five-Year Plan (2012-17) [8]	<ul style="list-style-type: none"> <li>• Decrease in poverty</li> <li>• Improved health outcomes</li> <li>• Universal access for children to school increased access to higher education and improved education standards, including Skill Development</li> <li>• Focus on wage employment and livelihood</li> <li>• Improved provision of basic amenities- (Water, electricity, roads, sanitation, and housing)</li> </ul>
URDPFI Guidelines (2014) [9]	<ul style="list-style-type: none"> <li>• Requirements of 'Urban Poor,' need proper assessment by Development Plan. Examination of ground realities about the location of Vendors, informal activities, slums, need for in-situ redevelopment/ upgradation</li> </ul>
Sustainable Development Goals (SDGs) [10]	<ul style="list-style-type: none"> <li>• Social Inclusiveness (empowering the Poorest, through investing in Human Capital &amp; enhancing Opportunity for Participation)</li> <li>• End Poverty</li> <li>• End Hunger</li> <li>• Enhance well-being, healthy living</li> <li>• Inclusive and Equitable Education</li> <li>• End inequality between sexes</li> <li>• Improved Access to (Water and Sanitation) for All</li> <li>• Improved Access to Energy for All</li> <li>• Employment for All</li> </ul>
World Bank [11]	<ul style="list-style-type: none"> <li>• Improvement in the ability, opportunity, and dignity of the people, especially the disadvantaged, enhances society's role.</li> </ul>
Organization for Economic Co-operation and Development (OECD) [12]	<ul style="list-style-type: none"> <li>• Achieving Inclusive Growth requires a focus on multi-dimensional factors, integrated policies, and an emphasis on impacts on different social groups.</li> </ul>
Asian Development Bank [13]	<ul style="list-style-type: none"> <li>• Social inclusion, social protection, good governance, and institutions are required, along with economic growth and employment opportunities.</li> </ul>
United Nations of Development Program (UNDP) [14]	<ul style="list-style-type: none"> <li>• Reduced inequalities</li> <li>• Economic and political participation of the poor, benefit-sharing from the process.</li> </ul>

## 2.2. Basic Public Services

Citizens in low-income democracies depend on the state to provide essential services, viz. Education, health, and infrastructure. This dependency is either due to the absence of a market for these services or prevailing poverty. Hence, the government's role becomes crucial in the governance and delivery of public services [15]. Healthcare and Education Facilities under Social Infrastructure and Water and Sanitation under Physical Infrastructure have been taken up for the study. Inclusive health through the capacity- building and rigorous training at the grass-root level is crucial for inclusive growth [16]. This micro-level organization at the local station needs to be backed by macro-level policies. For inclusive education, the state government needs to act as a facilitator, provide school data analytics, build local authorities, and provide financial support. The literature study's key learnings helped decide the study parameters for both the Basic Public Services and Inclusive Growth interface. Basic Public Services parameters and indicators are listed in Appendix A.

## 2.3. Human Capabilities Dimension Approach

Conceived by economist Amartya Sen, the capability approach is participative, deliberative, and democratic. It assumes a role for public services to support threshold domains and social justice [17]. The capability approach is a normative evaluative approach that argues that policy should expand an individuals' capabilities instead of resources and utilities. Inclusiveness, predominantly addressed in terms of income poverty, income inequality, and productive employment, which in Literature has been described as the demand side of achievement of equitable access to opportunities [18]. However, the current work focuses on the supply side of the capabilities dimension approach. Considering the population's access to public goods and services becomes central to such a focus. As the supply side emphasizes the strengthening of the population's capabilities by increasing their access to resources necessary to achieve outcomes they value [19].

The Human Capabilities Dimension acknowledges Education and Health parameters under social infrastructure and access to safe water and sanitation under physical infrastructure to study inclusive growth in a particular context. The parameters for Basic Public Services as per the Human Capabilities Dimension approach are listed in Appendix A. Thus, providing access to health and education and crucial infrastructure encompassing safe water and adequate sanitation has been given prominence. This ensures that the working population possesses the human capabilities necessary to be productively employed to take advantage of the available economic opportunities.

## 3. Research Methodology

To understand Inclusive Growth and Basic Public Services' parameters and the interface between the two, a literature study helped identify parameters and indicators. Literature helped in drawing linkages, where enhanced human capabilities lead to improved social indicators. An improved provision of Basic Public Services leads to an improved quality of life and Inclusive Growth [20]. The focus is on Industrial Cities, which are highly unsuitable for residential purposes owing to improper industrial discharges, noise, and air pollution, raising severe health concerns. Heavy traffic, unplanned infrastructure, and lack of housing made Mandideep Industrial Town a substantial case study. Literature showed that all the sources on Inclusive Growth referred to had access to health and education as the essential services with Universal Access to Water and Sanitation as the most basic of all amenities. However, Literature also helped derive an analysis framework based on the values of 4 A's, Availability, Awareness, Accessibility, and Affordability, that matter most to customers [21].

This framework has been applied to Basic Public Services (Healthcare, Education Facilities, Safe water, and sanitation facilities) to assess the literature study indicators. Availability implies resources in terms of utilities available to the public for use. Accessibility means physical access, i.e., within reasonable reach both in terms of distance, time convenience. Awareness for the present research has been defined as users' knowledge about the available utilities and government schemes public for their benefit. Affordability is defined as economic accessibility, where people's ability to pay for available services is being looked into for various parameters and indicators, as listed in Appendix A.

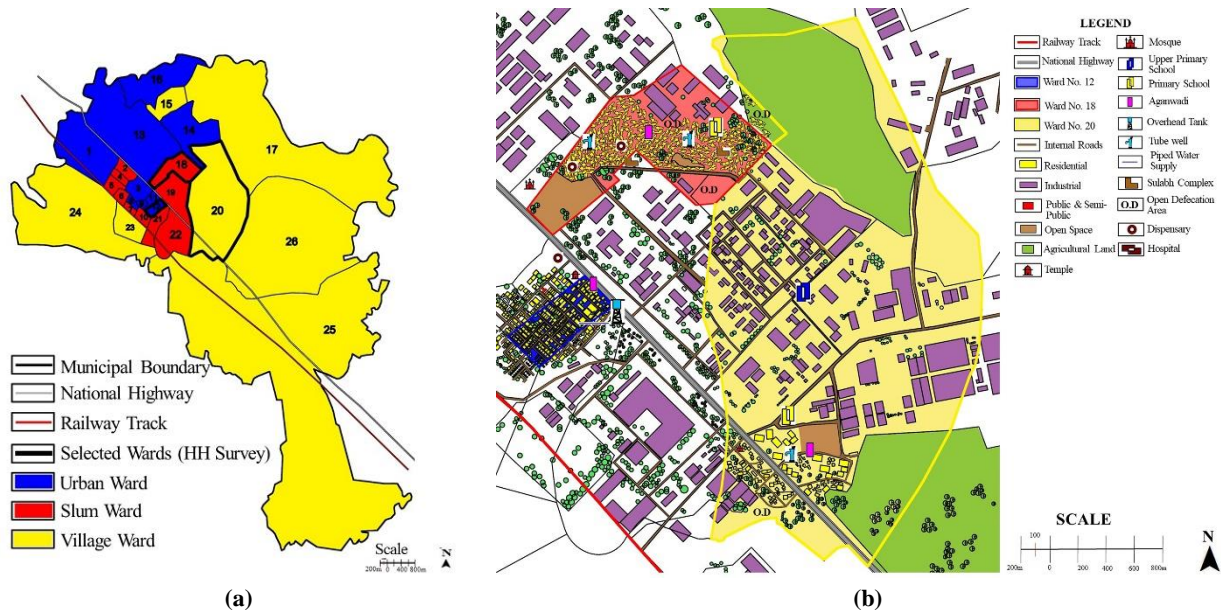
Scope of the Research Paper is limited to Mandideep Town, focusing on Healthcare and Education Facilities (Social Infrastructure) and Water Supply and Sanitation Services (Physical Infrastructure). Statistical analysis has been done on primary data sourced through the Ward-level Household survey. The relationship between Basic Public Services & Inclusive Growth based on the perceived Inclusive Growth Factor of the city inhabitants has been examined.

### 3.1. Study Area (Mandideep Town)

Background studies helped in identifying the case study of Mandideep Industrial Town for the present research. Before conducting the primary survey, secondary sources were studied to gauge the current status of determined Basic Public Services in Mandideep Town. Site Visits and reconnaissance surveys and semi-structured interviews with Mandideep Nagar Palika (Municipality) Officials, Ward Parshads (Councilor), and local enumerators helped derive



the town's unique characteristics. Interactions with residents and industrial workers helped in designing the survey questionnaire for the household survey. Identification of wards into three typical wards post reconnaissance survey, namely, Urban Wards, Village Wards, and Slum Wards, was represented in Figure 3 (a).



**Figure 3. (a) Classification of Wards for Household Survey, Mandideep Town; (b) Typical Wards selected for Household Survey with Identified Basic Public Services & Amenities**

### 3.2. Site Selection and Household Survey

The demographic study helped in getting a comprehensive picture of the entire town. Simple random sampling has been done for the Household Survey, where 200 households as a sample size were surveyed in March 2019. Healthcare and Education Facility Survey for selected wards has been done along with Facility Mapping for the entire town to gauge essential public services' present status. Ward 12 (Indra Nagar), Ward 18 (Slum Ward), and Ward 20 (Village Ward), as shown in Figure 3(b), were selected for survey based on the following criteria. Firstly, focus on low-income residents along with a fair representation of all socioeconomic classes of the town. Secondly, Wards representing the entire town comprehensively. Thirdly, a fair representation of industry and agriculture's two major economic activities as laid down in Table 3.

**Table 3. Criteria for chosen Sampling Size for Household Survey**

Ward Number	Name of the Ward	Classification Category	Prominent Economic Activity	Total Population <sup>21</sup>	Number of Household surveyed
12	Indra Nagar	Urban Ward	Labor	3703	75 (2.02%)
18	Rahul Nagar	Slum Ward	Labor	3426	60 (1.75%)
20	Nayapur Mewat	Village Ward	Agriculture	3020	65(2.15%)
<b>Total</b>				<b>10,149</b>	<b>200 Households</b>

<sup>22</sup> City Development Plan, Mandideep, District-Raisen, MP, 2011.

The Household questionnaire survey was designed to consider providing essential public services (Health, Water, Sanitation and, Education) and its relationship with perceived inclusive growth by the inhabitants.

### 3.3. Methods of Data Analysis

Both primary and secondary data helped in the analysis. Secondary data was taken into account before the reconnaissance survey to understand the nature of the town, its spatial growth, and the unique characteristics of the industrial city and its inhabitants. The primary survey followed the secondary data from reports, local authority, and site visit study. The household survey designed at the ward level to procure information on the level of provision of the essential public services in Mandideep and subsequent perceived inclusion or exclusion from the growth process was analyzed.

Data collected were analyzed at two levels; an aggregated analysis was done for all three wards. A ward-wise comparative study based on the six parameters, as shown in Appendix A, was done. Statistical analysis was carried out

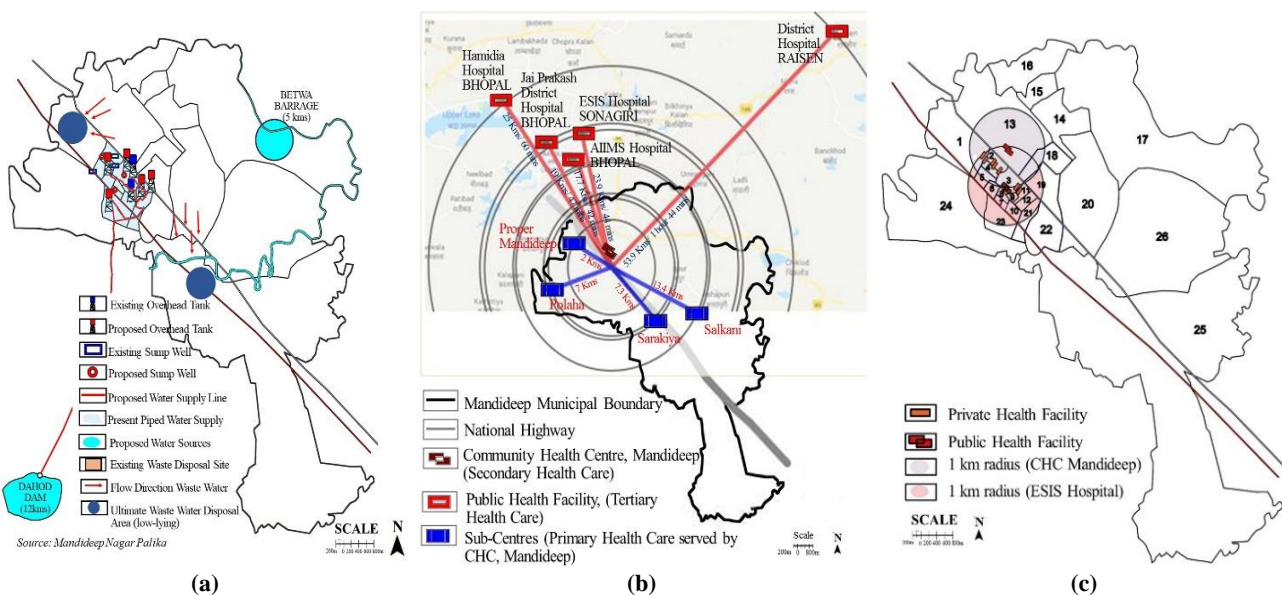
using Statistical Package for the Social Sciences (SPSS software) using the Pearson Coefficient Correlation and Regression Analysis [23]. Correlation analysis was done for all the five parameters (Physical and Socioeconomic Status, Water Supply Services, Sanitation Services, Healthcare Facilities, and Education Facilities) with Perceived Inclusive Growth Factor between the provision of Basic Public Services and perceived Inclusive Growth. As shown in Equation (1), the following formulae have been used to determine the Correlation Coefficient (Pearsons' Correlation Coefficient), where the correlation between two variables is to be found out.

$$r = Cov_{xy} / S_x S_y = \Sigma (x_i - \bar{x})(y_i - \bar{y}) / (N - 1) S_x S_y \quad (1)$$

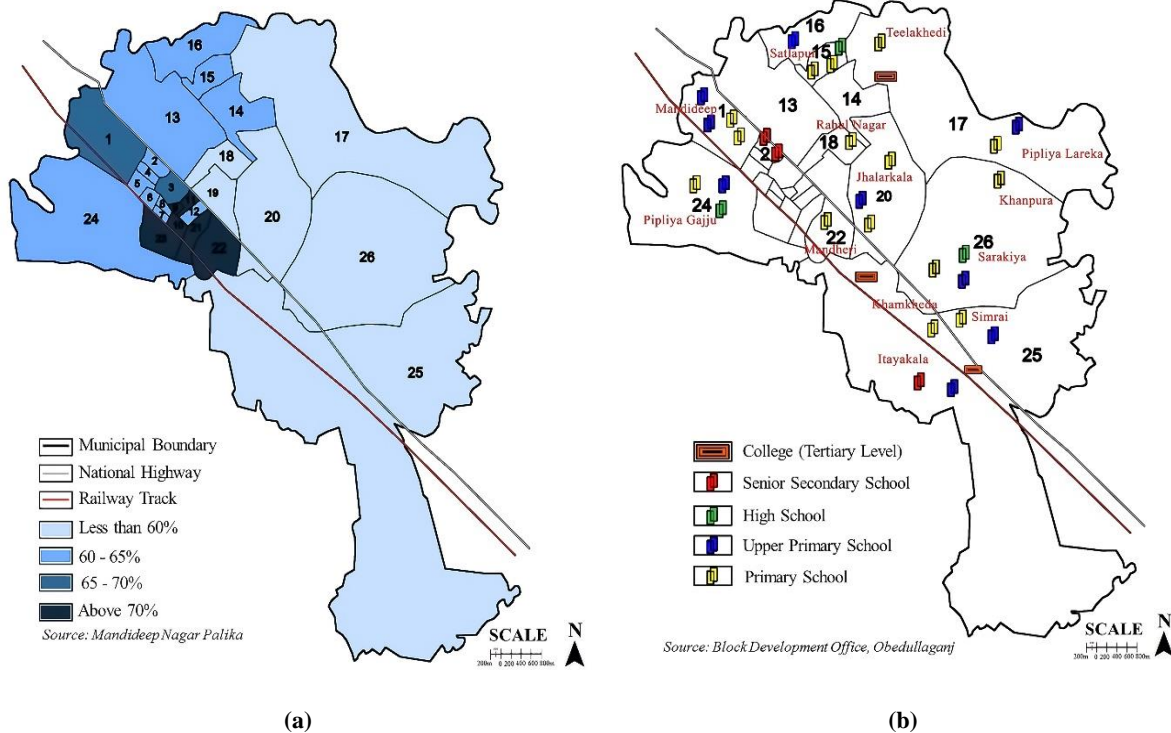
Where  $r$  is the Pearson Correlation Coefficient,  $S_x$  is the Standard Deviation of the 1<sup>st</sup> variable.  $S_y$  is the Standard Deviation of the 2<sup>nd</sup> variable.  $Cov_{xy}$  is the Covariance,  $\bar{x}$  is the mean of a sample of 1<sup>st</sup> variable is the data point (1<sup>st</sup> variable) in question.  $N$  is the number of observations,  $\bar{y}$  is the mean of a sample of the 2<sup>nd</sup> variable,  $y_i$  is the data point (2<sup>nd</sup> variable) in question.

Issues were identified through the household survey and site visits, and facility mapping, as shown in Figures 4 and 5. Unique characteristics for each typical ward and defining Inclusive Growth for each typical ward were done through data collected and studied. It was followed by recommendations at both the city-level and ward-level. Issues identified for Water Supply services for Mandideep Town include excessive dependence on groundwater with a highly inadequate and deteriorating state of the existing network. Absence of a proper sewerage network leading to reliance on individual septic tanks leading to contamination of natural drains—inefficient public toilets in the entire town with non-functional such complexes built under the Swachh Bharat Mission.

Lack of primary collection of solid waste, lack of open incineration with free disposal leads to health hazards and environmental deterioration. Lack of a drainage network leads to mixing sewage and solid waste, the encroachment of natural drains. The town lacks a common effluent treatment plant for the industrial area, as indicated in Figure 4 (a). Mandideep town has several secondary and tertiary private health facilities marked in Figure 4 (c). In the Mandideep Community Health Centre, health care facilities restricted in Figure 4 (b) indicates a lack of specialized services. With weak para-medical and supporting staff, the public health facility at Mandideep cannot provide essential services and investigative facilities. The community health center's present capacity is insufficient for the increasing Population of the Town and surrounding areas.



**Figure 4. Public Facility Mapping for Mandideep Town: (a) Water Supply and Sanitation services in Mandideep Town; (b) Public Health Care Facilities at primary, secondary, and tertiary level in Mandideep Town; (c) Distribution of Public and Private Health facilities in Mandideep Town.**

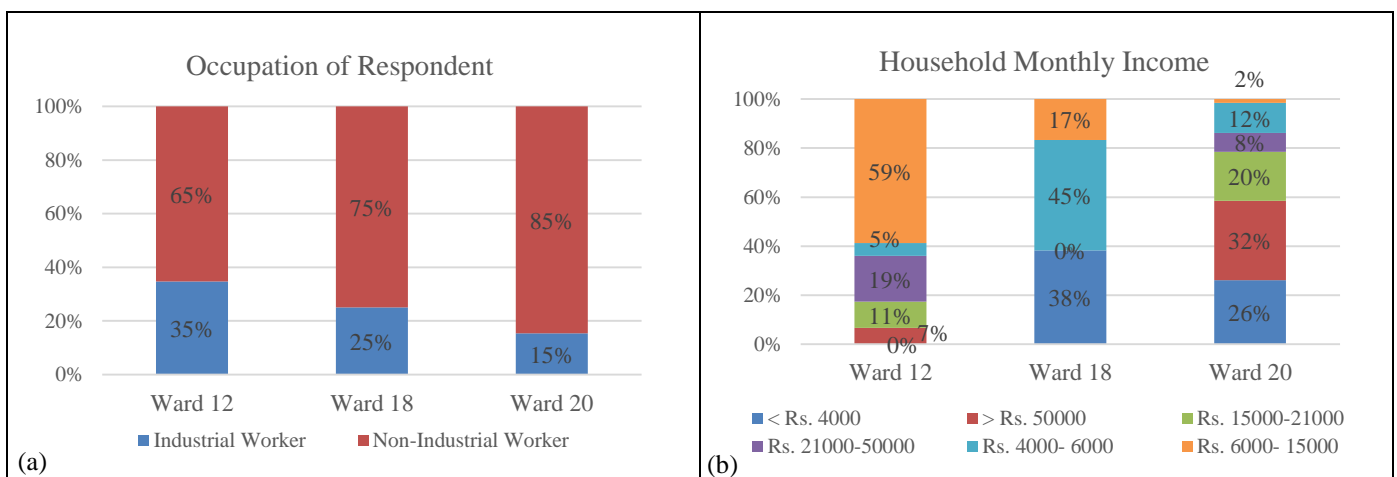


**Figure 5. Public Facility Mapping for Mandideep Town: (a) Ward-wise Literacy rate in Mandideep Town; (b) Public Education facility at different education levels in Mandideep Town**

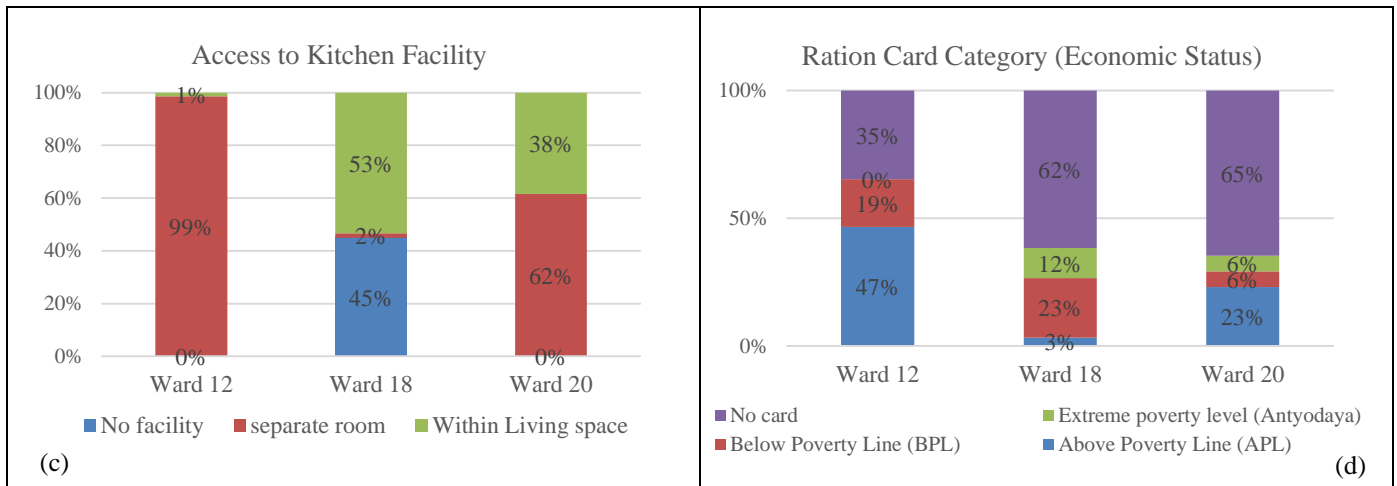
Unavailability of medicines, inadequate communication, and provision of Schemes like the Employees State Insurance Scheme need immediate attention. Figure 5 (a) shows slum wards have a relatively low literacy rate. Presently, there is an inadequate number of secondary schools and institutes of higher education, as demonstrated in Figure 5 (b). Issues with existing public education facilities include a low teacher-student ratio, quality of education provided, and inadequate funds. Though many private schools live in the town, however, lack of monitoring and regulations makes them unaffordable, especially for the poor.

#### 4. Results and Discussion

Urban, Slum, and Village Wards were studied based on six parameters and analyzed with an inter-ward and an intra-ward approach. The six parameters included Physical and Socioeconomic Status (SES), Water Supply Services, Sanitation Services (Sewerage, Drainage, and Solid-Waste Management), Health, and Healthcare Facilities, Education, and Education Facilities, and perceived inclusion. Based on the study, inferences drawn for Mandideep Town are that only 26.4 % (respondents) reported being Industrial Workers, as shown in Figure 6 (a). This highlighted the new policy that has been set up by Industries not to employ locals for various reasons. 47.5% of respondents fall below the poverty line that is below (\$3.20 per day per head) while 20% fall in the extreme poverty category, highlighting the stark poverty scenario in the town shown in Figure 6 (b).







**Figure 6. Intra-Ward analysis where Ward 12 represents Urban Ward, Ward 18 represents Slum Ward, and Ward 20 represents Village Ward: (a) Occupation of respondents across the three wards; (b) Household Monthly Income for the three communities; (c) Access to kitchen facility across the three wards; (d) Economic status of respondents across the three wards.**

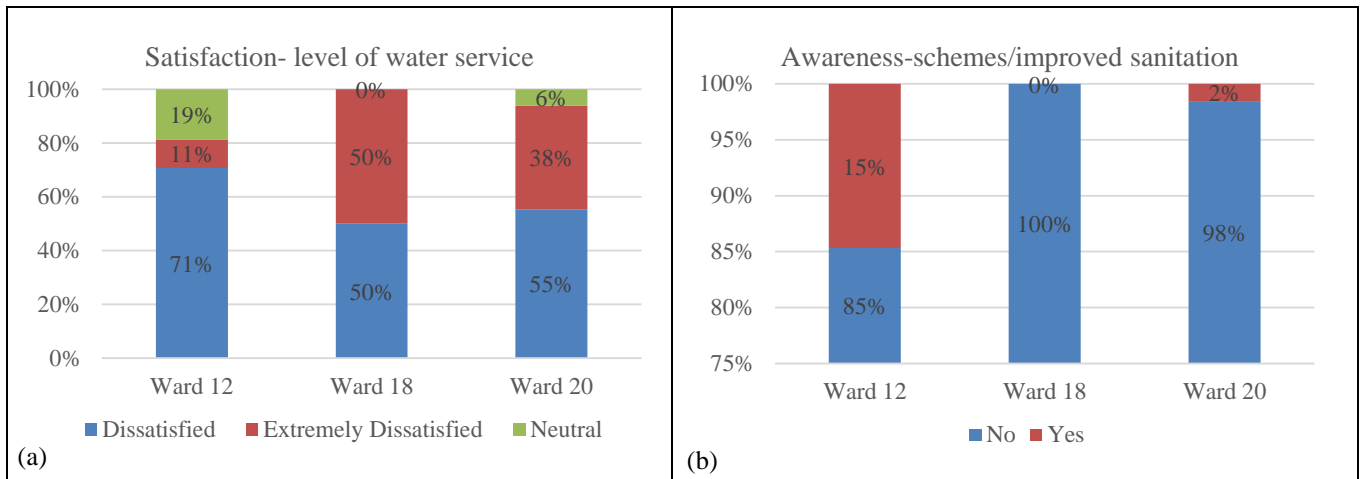
Almost 70 % of respondents have two or just one habitable room reflecting on the residents' low quality of life in the town. Close to 45% of the respondents have no access to a proper kitchen or a gas facility, as shown in Figure 6 (c). This raised concerns for environmental and personal health 52% of respondents reported no access to the Public Distribution System, raising concerns about judicial distribution benefits. An immediate effort to identify the beneficiaries who are genuinely in need of the Public Distribution System benefit is required. 45% of respondents report having ration cards below the poverty line, as indicated in Figure 6 (d). It highlights the issue that the ones most in need are excluded from having access to ration cards. Reasons being lack of awareness, means to approach & wide-scale corruption at all levels.

**Table 5. Correlation Values for Physical and Socioeconomic Indicators with Perceived Inclusive Growth Factor (R-values)**

S. No.	Indicators	Ward 12 (Urban Ward)	Ward 18 (Slum Ward)	Ward 20 (Village Ward)
1	Home Ownership	.238*	Not applicable	.281*
2	The structural condition of the house	.390**	.247*	.459**
3	Access to the Public Distribution System	.281**	.382**	.160
4	Socio-economic status	.534**	.280*	.530**

Note: \*\* correlation is significant at the 0.01 level (1-tailed).

Statistical analysis shows that homeownership, the house's structural condition, and the respondent's socioeconomic status (SES) reflected strong positive correlation values with perceived inclusive growth factor for both the Urban and Village wards as indicated in Table 4. With an increase in both the variables, an increase in the perception of inclusiveness in the growth process is expected. Simultaneously, access to Public Distribution System shows a healthy and positive relationship for the Slum Ward. Table 4 reflects that respondents feel more included in the growth process with an increase in access to Public Distribution System benefits. Table 5 reflects that physical and socioeconomic variables show a strong and positive correlation with the inclusive growth variable.



**Figure 7. Intra-Ward analysis where Ward 12 represents Urban Ward, Ward 18 represents Slum Ward. Ward 20 represents Village Ward: (a) Satisfaction Level for Water Supply Services across three wards; (b) Level of Awareness of schemes related to sanitation across the three wards.**

About 71% of respondents reported being dissatisfied with overall water services in the Urban Ward. While 50% reported being extremely dissatisfied, 50% reported dissatisfaction with the current water services in the Slum Ward. 55% of the Village Ward respondents reported dissatisfaction with the water services, as shown in Figure 7 (a). Despite piece-meal interventions by schemes like Swachh Bharat Mission, open defecation across the town prevails. Two non-functional Sulabh Shauchalaya (public toilet) constructed in two slum wards indicate a lack of political will. Also, just creating such a complex that lies unused is not the solution. Location, size, accessibility, especially safety for women are important factors that determine these facilities' success. Lack of Awareness and transparency regarding government schemes related to sanitation services are reflected in Figure 7 (b). Awareness can significantly improve not only sanitation aspects but also contribute to the inclusiveness factor.

**Table 6. Correlation Values for Water Supply Indicators with Perceived Inclusive Growth Factor (R-values)**

S. No.	Indicators	Ward 12 (Urban Ward)	Ward 18 (Slum Ward)	Ward 20 (Village Ward)
1	Frequency of Water Supply	.348**	.137	.330**
2	The distance of the user from the water supply source	-.117	-.343**	-.546**
3	Convenience in fetching water from the source	.402**	.081	.551**
4	Affordability of water supply services	.544**	.211*	.115
5	Awareness of Water Supply schemes	.349**		.104

Note: \*\* correlation is significant at the 0.01 level (1-tailed).

Table 6 shows that water supply frequency, convenience in fetching water from the source, affordability of water supply, and awareness of water-related schemes show strong and positive relationships with the perceived inclusive growth factor for the Urban Ward. It is clear that with an increase in the variables mentioned above, there is a proportionate increase in the inclusive growth variable. The water source distance shows a strong and negative correlation with all three wards' perceived inclusive growth factors. It indicates that with a decrease in water source distance, the feeling of being included in the growth process increases.

Accessibility in public health facilities is about distance, and the approach and convenience in accessing public health facilities. Public transport is an important aspect that must be addressed for improving access to all public health and education facilities. As more than 50% of respondents are dissatisfied with existing medical and education facilities in Mandideep, it is essential to note that there is a scope and need for improvement in the crucial quality of services being provided at Community Health Centre and public education facilities. Education plays a significant role in promoting inclusivity irrespective of socioeconomic status (SES).

Table 7 statistically shows that the highest educational qualification in the family of respondents has a healthy and positive relationship with perceived inclusive growth factor for all the three wards. With an increase in educational qualification, there is a subsequent increase in the sensed inclusive growth variable. Interactions with the three wards reflect each specific pressing need before feeling included in the growth process. Thus, inclusive growth is a subjective concept. Variables showing a strong correlation with perceived inclusive growth factors were studied. This

was followed by drawing the unique characteristics of the three typical wards. The analysis for Individual Wards has been discussed below.

**Table 7. Correlation Values for Education Indicators with Perceived Inclusive Growth Factor (R-values)**

S. No.	Indicator	Ward 12 (Urban Ward)	Ward 18 (Slum Ward)	Ward 20 (Village Ward)
1	Highest Educational Qualification	.280**	.484*	.527**

Note: \*\* correlation is significant at the 0.01 level (1-tailed).

#### 4.1. Urban Ward

The majority of the Urban-ward population is non-industrial workers with a mix of low-income and middle-income residents. Schemes such as Pradhan Mantri Awas Yojana (Scheme) are existent in this ward. The ward has basic amenities like drinking water and access to an individual Household toilet facility. Issues identified are sanitation, especially with streets, drains, solid waste collection, and road infrastructure. Unavailability of Education and Health facilities add to the inefficient service delivery of government programs

#### 4.2. Slum Ward

Slum Ward is marked by no pattas (land tenure), a conflict of various agencies (Hindustan Electro-Graphites, Madhya Pradesh Forest Department, and Madhya Pradesh Audyogik Kendra Vikas Nigam) on the land on which slum dwellers reside. The majority population here also turned out to be non-industrial workers despite belonging to the labor class. The poorest of the poor in this ward are deprived of any access to the Public Distribution System. Overall, this ward is marked by extreme poverty, gender exclusion, with women bearing the double responsibility of arranging water for the family. Many school-age children are unable to acquire education due to household responsibilities like fetching water, among others. Major issues identified in this ward are no access to safe drinking water, no access to individual Household toilet facilities for a significant population. The absence of infrastructure like roads and drains in this ward adds to government programs' ineffective service delivery.

#### 4.3. Village Ward

Village Ward is marked by stark inequality having both the very rich & the poorest of low living opposite each other. Despite being a Village ward, the majority population in this ward is served basic amenities such as drinking water and toilet facility, majorly due to rich cultivators occupying this ward. This also brings out another feature: it is always the better-off residents who are served better facilities. A well-developed infrastructure in this village ward brings to notice the excellent governance under the village panchayat. Firstly, proximity to major polluting industries & secondly due to basic amenities fulfilled, health emerges as a significant concern for most populations. Issues identified in the Village ward are highly polluted environment- both air and water, lack of adequate health facilities, and inadequate service delivery of programs.

#### 4.4. Ward-level Recommendations

Defining each ward's issues and unique characteristics helped give recommendations for each ward, as discussed below.

##### 4.4.1. Recommendations for Urban Ward

The Urban ward inhabitants defined inclusivity in the growth process as better infrastructure- street drains, better education facilities, and efficient government programs. There is a need to revise the Industrial Policy, which must ensure at least 70% of local youth jobs. Schemes should be promoted holistically with greater accountability, such as Pradhan Mantri Awas Yojana (Scheme), with stricter regulations to combat corruption so that benefits reach beneficiaries. Public Transport System needs to be planned and implemented to solve the education facilities issue, especially accessibility to secondary schools. The efficiency of Mandideep Nagar Palika (Municipality) is essential for improving the overall state of sanitation.

##### 4.4.2. Recommendations for Slum Ward

The Slum ward inhabitants defined inclusivity in the growth process as security of land tenure, assurance of basic amenities such as drinking water, access to the Public Distribution System & an efficient and transparent service delivery of government programs. The integration of slums into the mainstream requires the revision of policies. Resolving conflict regarding overlapping functions (Multiplicity of Agencies) and render agencies wholly responsible

for different heads. Ensuring land tenure for slum wards, even if the process is carried out in stages, is very important. The process should resolve land conflict ownership between concerned authorities and gradually move to full tenure from limited tenure. Need-assessment of slum dwellers should be done while formulating Physical and Financial Plans for the city. Immediate supply of potable water to Slum Wards must be ensured. Women Empowerment needs to be channelized by resolving drinking water woes and promoting vocational training to empower women further.

#### **4.4.3. Recommendations for Village Ward**

The Village ward defined inclusivity in the growth process to be a healthy town with greater access to better healthcare facilities. However, the efficient service delivery of government programs remains a common factor in all three wards. It is essential to cater to slum dwellers and take care of the poor people in other words such as Ward 20. It is necessary to revise the Public Distribution System beneficiary list and identify the poorest to ensure that benefits reach those most need. Stricter environmental laws and regulations are a must for industries that are near residential areas. Institutional Improvement for the urban local body is recommended to bring a change at the grass-root level. Improvements in healthcare facilities at Community Health Centre (CHC) need to be done so that residents from Mandideep need not travel long distances, even for seasonal illnesses.

#### **4.5. City-level Recommendations**

City-level recommendations on the six identified parameters for research are discussed below. The study emerged that Ward-level improvements are not possible without systems being in place at the city-level. For this purpose, issues were identified for the six parameters (Physical Planning, Water supply services, Sanitation services, Healthcare facilities, Education Facilities, and Environmental Planning). Physical and Environmental Planning emerged as potential and indispensable parameters during the study.

##### **4.5.1. Recommendations for Physical Planning**

Physical planning plays a significant role in the provision of Basic Public Services. Issues such as the Existing Land Use Map reflect a negligible area for public service and amenities. Inadequate & lack of hygienic housing for Industrial labor and migrant labor. The town lacks alternate parallel corridors to NH46, due to which most facilities are rendered inaccessible. Massive regional traffic on the central spine due to no bypass or regional corridors to cater to the local traffic. There is no Truck terminal due to which trucks and other heavy vehicles occupy sides of the National Highway 46. Land availability plays a vital role in providing essential public services. Public service and amenities should be re-planned and strategically proposed with on-ground implementation. Land Use Maps for Industrial Cities need to provide adequate green spaces. Facility mapping for each basic public service on Development Plan needs to be earmarked. It should be made mandatory for industries to purchase and provide land for present and future lowest-income labor force, permanent, contractual, or seasonal labor. Land should be reserved for Housing of Urban poor. Along with the ongoing NH-46 Expansion, Water & Sewerage supply scheme should be planned for this expansion avoiding piece-meal intervention. The bypass should be proposed, making it mandatory for industries to provide adequate infrastructure and parking for loading, unloading activities, and heavy vehicular traffic.

##### **4.5.2. Recommendations for Water Supply Services**

Depleting groundwater levels are a significant concern in Mandideep due to over-dependence on groundwater for fulfilling water needs. Inadequate piped water supply and absence of urban water supply scheme for the town. Deteriorating existing water supply infrastructure. Lack of ownership and coordination between Mandideep Nagar Palika (Mandideep Municipality) and Audyogik Kendra Vikas Nigam (AKVN). The inability of Mandideep Nagar Palika to charge users for services of water supply. To conserve groundwater recharge, watershed management program, as shown in Figure 7 (a), recycle water & rooftop Rain Harvesting. Change Irrigation Policy for agricultural farmers, to avoid irrigation through flooding, but due to challenging rock terrain & scarce water, sprinkler and drip irrigation should be adopted [24].

Groundwater resources development or use should be based on scientific investigations & not just need-based, as is Mandideep Town's scenario. Privatization of Water Service delivery should be promoted as it is much needed to improve skills for improved quality of service, which is not being provided by Mandideep Nagar Palika (Municipality). Outsourcing of tube wells can be promoted through residents for a small remuneration, distributing the responsibility & provide employment, as done in Ludhiana [25]. Public Participation through Community, Non-Governmental Organizations should be promoted, such as (Self-Employed Women's Association SEWA, Gujarat), where women take the lead in the provisioning of drinking water. It is essential to promote systematic discourse and create mass awareness to conserve water. Check untreated industrial effluents & municipal sewage going into natural drains to check the quality of water in Mandideep Town with a heavy concentration of polluting industries, as shown in Figure 7 (b).



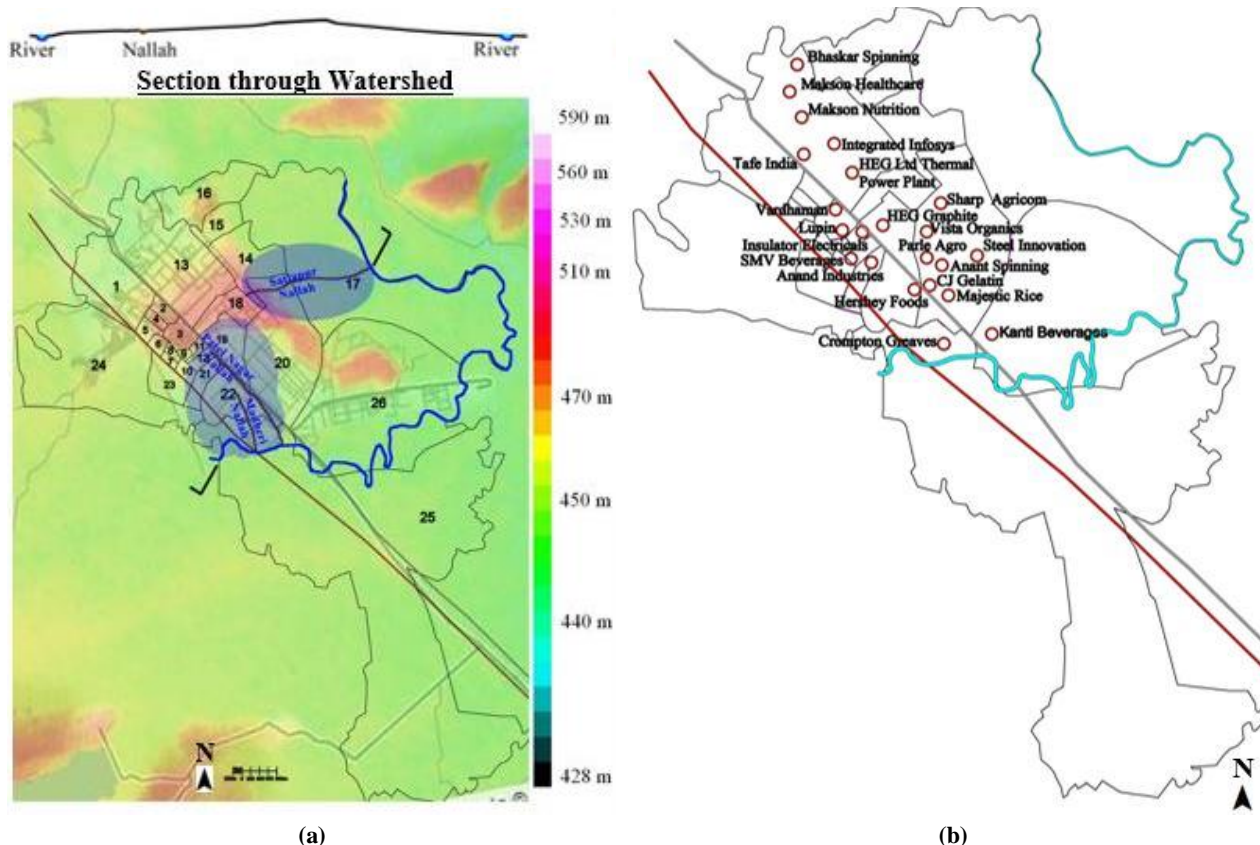


Figure 8. (a) Proposed Watershed Management Program for Mandideep Town; (b) Map showing the concentration of polluting industries in Mandideep Town

#### 4.5.3. Recommendations for Sanitation Services

A proper Sewage Treatment and Disposal Plan should be proposed for the industrial town with an accurate estimation of sewerage generation. Installation of Common Effluent Treatment Plant and channelization of industrial effluents so that all industries follow discharge norms. The strategic location of functional Community toilets post needs assessment where critical wards are prioritized. Public toilets for the city should be planned to keep a public restroom for roads & open areas every kilometer. Daily collection of solid waste everywhere in the city should be made mandatory by Mandideep Nagar Palika (Municipality). Public participation to keep the town clean is a must. Active awareness campaigns can bring about a difference in the public.

#### 4.5.4. Recommendations for Healthcare Facilities

Immediate up-gradation of 30-bedded CHC to 100-bedded hospital, which has been a pending proposal. Immediate appointment of 2 specialists in Medicine and Surgery. Ambulance service is an urgent requirement & should be made available to patients, especially the Poor. Enforcing Ayurveda, Yoga, and Naturopathy, Unani, Siddha, and Homeopathy (AYUSH) to provide for medical personnel can help fill the lack in numbers. Mandatory internships of medical students from nearby leading institutes as All India Institute of Medical Sciences (AIIMS), Bhopal, and Gandhi Medical College, Bhopal under Preventive and Social Medicine (PSM), should be used for overcoming lack of capacity. Training Programs for medical personnel, including the pharmacist at CHC and awareness programs to educate the public, should be made a regular phenomenon. A strict regulatory check with more transparency for Occupational Health Safety (OHS) compliance needs to be augmented. Economies of scale can be used by grouping 10-20 industries into zones to form OHS Camps & pool infrastructure. This would incentivize smaller initiatives to pay attention to the Occupational Health Safety (OHS) and improve industrial workers' health.

#### 4.5.5. Recommendations for Education Facilities

Enforcement of the universal access of primary education along with Secondary & Higher Education is required. In the absence of government funding, Industries' promotion of Corporate Social responsibility should be encouraged to finance infrastructure improvements in schools. Organized data handling should be done by the Education Department at Block Development Office, Obedullaganj. Ensure expansion of public education facility accompanied by quality. Ensure Public Transport Systems to improve the accessibility of education facilities. Land Use should provide adequate space for recreational activities. Public Libraries, Reading Rooms to promote discussions and

debates to educate and improve awareness in the real sense. Promote vocational training centers with a focus to channelize youth in the town, provide alternative employment options.

#### 4.5.6. Recommendations for Environmental Planning

Strict action against identified industries for violating laws under Water & Air Acts should be taken with a rigorous monitoring system to monitor Ambient Air Quality. An aggressive program to initiate a 100% shift to LPG or electricity should be conducted to check the use of coal or wood for cooking & lighting purposes. Extensive plantation drive should be taken up through mass awareness campaigns & public participation.

### 5. Conclusion

Industrial Cities are known to be economic growth engines, but a balanced social environment backed by the right policies is crucial to making cities inclusive. Cities where the equitable distribution of opportunities and resources is encouraged. From the research, it can be asserted that Inclusive Growth is a multi-dimensional and subjective concept. Also, strengthening Basic Public Services and efficient service delivery indeed play a positive role and promote Inclusive Growth. The research demonstrates that the perceived inclusive growth factor increases with an increase in public services delivery. Basic Public Services such as water supply and sanitation indicate a strong relationship with perceived Inclusive Growth (All Basic Public Services are interconnected, i.e., improvement in one will lead to an improvement in the other and vice-versa. In Mandideep Town, most essential amenities (drinking water & sanitation services) require immediate attention. However, to improve the Basic Public Services' situation, institutional reorganization of urban local bodies is indispensable.

The research also highlights that Inclusive Growth continues to be an ambiguous concept, and further study to develop a comprehensive framework to correlate public services delivery and inclusive growth needs to be developed. The results reflect that elaborate work to define perceived inclusive growth for inhabitants, specifically for different subjects at the grass-root level, is required. The current study is limited to Mandideep Town and is mostly survey-based research. However, similar studies can be conducted for industrial towns of a similar scale. The results can be collaborated at the regional level to evaluate the impact of efficient public services delivery on perceived inclusive growth factors. The results obtained can then be evolved into actionable steps for urban policy. The current study concludes that an inclusive approach backed by efficient service delivery of basic amenities is indispensable to develop healthy industrial cities.

### 6. Declarations

#### 6.1. Author Contributions

Conceptualization, Methodology, Investigation and Writing and Original Draft, M. N. A.; Data Collection, Writing - Review & Editing, Visualization and Validation, S. S.; Writing - Review & Editing and Supervision, J. N.; Writing – Review, & Editing, M. S. A. All authors have read and agreed to the published version of the manuscript.

#### 6.2. Data Availability Statement

The data presented in this study are available in article or supplementary material here.

#### 6.3. Funding

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#### 6.4. Conflicts of Interest

The authors declare no conflict of interest.

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## Appendix A

### Parameters and Indicators for Facility Survey and Household Survey.

Parameters	Indicators	Source of Data	
		Primary Data	Secondary Data
Physical and Socio-Economic Status	<ul style="list-style-type: none"> <li>Home ownership</li> <li>Period of stay</li> <li>Occupation</li> <li>HH monthly income</li> </ul>	Ward-wise HH survey	Census 2011 City Development Plan, Mandideep
	<ul style="list-style-type: none"> <li>Housing typology</li> <li>Number of floors</li> <li>Structural condition of house</li> <li>Dwelling area</li> <li>Number of habitable rooms</li> </ul>		
	<ul style="list-style-type: none"> <li>Access to kitchen facility</li> <li>Gas supply</li> <li>Access to public distribution- system</li> <li>Ration card category</li> <li>Assets owned</li> </ul>		
<b>Basic Public Services (Based on 4 A's- Availability, Awareness, Accessibility, Affordability)</b>			
<b>Water Services</b>			
Availability	<ul style="list-style-type: none"> <li>Water connection</li> <li>Sources- drinking water</li> <li>Sources- non drinking water</li> <li>Who is responsible to provide water</li> <li>Frequency-water supply (hours &amp; days)</li> <li>Average time- collect water</li> <li>Distance from source</li> <li>Who fetches water from source</li> <li>Satisfaction- overall water services</li> <li>Expenditure on water</li> <li>Affordability of water services</li> </ul>	Ward-wise HH survey,	Census 2011 City Development Plan, Mandideep
	<ul style="list-style-type: none"> <li>Quality of water</li> <li>Treatment of water</li> <li>Complaint regarding water</li> <li>Schemes- improve water</li> </ul>		
Awareness	<ul style="list-style-type: none"> <li>Quality of water</li> <li>Treatment of water</li> <li>Complaint regarding water</li> <li>Schemes- improve water</li> </ul>	Filed study	Mandideep Nagar Palika
Accessibility	<ul style="list-style-type: none"> <li>Average time to collect water</li> <li>Distance from source</li> <li>Who fetches water from source</li> </ul>		
Affordability	<ul style="list-style-type: none"> <li>Expenditure on water</li> <li>Affordability of water services (average cost/ financial capability) to meet water needs- tankers/ buying from vendors/ maintenance</li> </ul>		
<b>Sanitation (Sewerage)</b>			
Availability	<ul style="list-style-type: none"> <li>Nature of toilet facility available for use</li> <li>Toilet facility- shared among households/ access to individual household toilet facility</li> </ul>		
Awareness	<ul style="list-style-type: none"> <li>Clean hands after defecation</li> <li>Where to dispose of- child's waste</li> </ul>	Ward-wise HH survey,	Census 2011 City Development Plan, Mandideep
Accessibility	<ul style="list-style-type: none"> <li>Convenience-shared toilet facility use</li> </ul>		
Affordability	<ul style="list-style-type: none"> <li>Do you pay for- common toilet</li> <li>Expenditure on water</li> <li>Affordability of sewer services (average cost/ financial capability)-maintenance, septic tank, pit latrine</li> </ul>	Filed study	Mandideep Nagar Palika

Sanitation (Storm water drainage)			
Availability	• Availability-storm water drain in locality		
	• Nature of drain (kutch/pucca /semi-pucca)		
	• Status of drain (open/ covered/ flowing/clogged)		
	• Does neighborhood suffer-water logging/ clogging		
	• How often drains are cleaned, frequency and by whom		
Healthcare Facilities			
General	(Habitable space-affecting physical health, psychological health, social health)/ frequency-diseases, respiratory issues, infections in the family)		
Availability	• Public Health Facility		
	• If yes, do you visit public health facility		
	• Reasons for not visiting public health facility		
	• Private hospitals visited		
	• Availability- doctor, guidance, medicines, nurses, investigative facilities		
Awareness	• Awareness- Health schemes at public health facility		Census 2011
	• Overall satisfaction with schemes	Ward-wise HH survey,	City Development Plan, Mandideep
Accessibility	• Distance- Public health facility from home		
	• Means of transport- reach public health facility	Facility Survey	Block Development Office, Obedullaganj
	• Public transport provision- reach public health facility		
	• Approach/road- leading to public health facility safe/maintained		
	• Waiting hours to get service		
Affordability	• Affordability of public health facility with respect to private health facility		
Education Facilities			
General	Highest education qualification in family/ education of respondents		
Availability	• Do school age children attend school		
	• If yes, public or private		Census 2011
Awareness	Education schemes	Ward-wise HH survey,	City Development Plan, Mandideep
Accessibility	Public education facility- (time, distance, safety, convenience)	Facility Survey	Block Development Office, Obedullaganj
Affordability	Public education facility as compared to private facilities		
Perceived Inclusive Growth Factor			
	• Groups- particular risk of exclusion		
	• Feel- included/ excluded in growth process	Ward-wise HH survey	Mandideep Nagar Palika
	• Reasons- exclusion		
	• Feel- provision of basic public services will improve inclusive growth		