

June, 2020



India's Access to Improved Infrastructure

Measuring State Wise Access to Improved Essential
Infrastructure

The Strategy Boutique



The Strategy
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Honest Consulting

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Introduction
Section 1



1. Introduction

In a literal sense, essential infrastructure forms the foundation for any municipality, city or state. This typically includes public infrastructure like roads, hospitals, schools, telecommunication lines, and water & sanitation connections. These services anchor all economic activities and build the base for society and its development.

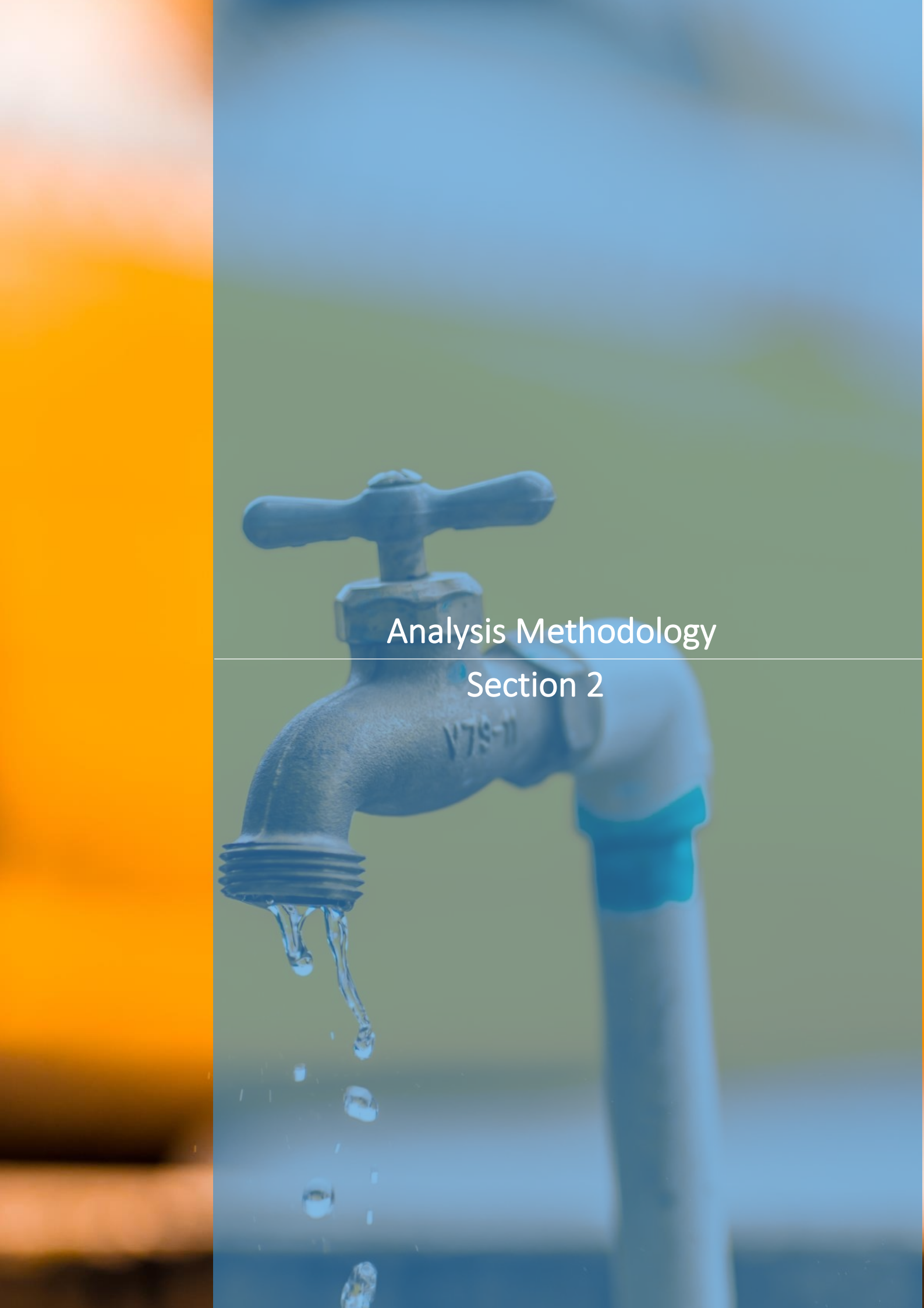
The relationship between infrastructure and economic development has been established time and again. A general universal consensus is present that, infrastructure is a pre-requisite for eradicating poverty and bridging the income gap. It is a fundamental driver of economic growth. And, a lack of essential infrastructure challenges the growth and progress of any country since without infrastructure, economic activities cannot be carried out. These have been recognized by the international community and the United Nation's 2030 Agenda has given the push required to initiate the move towards essential infrastructure for all. Annually, close to 42.7 trillion dollars is being invested in this space across the globe. This amount has not been sufficient to fulfill the current demand. Worldwide, 780 million people do not have access to clean and piped water, 2.5 billion lack access to improved sanitation facilities and half of the population goes without basic healthcare.

However, now the need is to focus on not just the bare minimum levels of infrastructure but rather, on providing efficient, modern and most importantly, reliable infrastructure. This quality infrastructure is termed as '*Improved Infrastructure*'. There is a call for spending

not just more, but also better. And, at the same time ensuring these services are accessible to all, with a focus on the most vulnerable groups.

In emerging economies like India, access to quality infrastructure is vital for the populace to realize their aspirations. It is necessary for the urban slum dweller in Delhi who wants his children to study but cannot afford private education; for the migrant worker from Bihar who needs access to affordable healthcare in the city he is residing in; for the local artisan in Mysore who needs all weather roads for his/her goods reach on time to markets in metropolitans; and, for the mother who hopes that she won't have to travel miles on miles to get water after working under the scorching suns of Rajasthan. It is time that quality infrastructure is accessible to all and is a given. The goal should be to ensure that no one is left behind and this has been gaining traction in the country with the emergence of a multitude of schemes to bridge this gap and ensure that infrastructure is an enabler and not a hinderance for the populace.

To understand the current levels of access to quality essential infrastructure in India, TSB has developed the *Access to Infrastructure Index (AII)*, factoring in developments and initiatives in multiple components of this space. It measures the different levels of access in this space across states in India. This report aims to analyse how different states have been performing on this Index and what is the way forward to achieve the universal access to improved infrastructure.



Analysis Methodology
Section 2



2. Analysis Methodology

2.1. Constituents

Given the objective of constructing a national level index that pegs states against each other in terms of the access to improved infrastructure, it is important to measure different aspects of essential infrastructure. Therefore, to develop a wholistic index, infrastructure has been broken down into the following components:

- 2.1 Access to Improved Drinking Water
- 2.2 Access to Improved Sanitation
- 2.3 Access to Healthcare
- 2.4 Access to Power & Electricity
- 2.5 Access to Education
- 2.6 Access to Transport
- 2.7 Access to Information & Communications Technology

2.1.1 Access to Improved Drinking Water

Improved drinking water source is a source that, by nature of its construction, adequately protects the water from outside contamination, from fecal matter. Common examples are piped household water connection, public standpipe, borehole, protected dug well, protected spring, rainwater collection.

Unimproved drinking water sources include unprotected dug well, unprotected spring, surface water (river, dam, lake, pond, stream, canal, irrigation channel), vendor-provided water (cart with small tank/drum, tanker truck).

Data Source: National Family Health Survey – 4

2.1.2 Access to Improved Sanitation

Improved sanitation includes sanitation facilities that hygienically separate human excreta from human contact. It includes flush toilet, connection to a piped sewer system, connection to a septic system, flush / pour-flush to a pit latrine, pit latrine with slab, ventilated improved pit latrine, composting toilet.

Unimproved sanitation facilities include public or shared latrine (meaning a toilet that is used by more than one household), flush/pour flush to elsewhere (not into a pit, septic tank, or sewer), pit latrine without slab, bucket latrines, hanging toilet / latrine.

Data Source: National Family Health Survey – 4

2.1.3 Access to Health Coverage

This consists of the number of households in which at least one usual member has health insurance or is covered under a health scheme.

Data Source: National Family Health Survey – 4

2.1.4 Access to Improved Power and Electricity

There are two essential components to power at a residential consumption level: electricity supply and cooking fuel. This segment factors in the access to electricity supply and the access to clean cooking fuel by each household.

Data Source: National Family Health Survey – 4



2.1.5 Access to Quality Education

The access to quality school education provides insights on the success rate of school education across the country. Quality school education is a result of a focus on learning outcomes, efficient governance structures, provision of essential infrastructure and enabling equitable academic opportunities.

Data Source: School Education Quality Index 2019 (SEQI), NITI Aayog

2.1.6 Access to Transport

Mobility acts as the backbone for any and every economy and, access to surfaced roads is absolutely essential to support mobility. These roads are covered in bitumen and tar. This segment calculates the access to surfaced roads across the country.

Data Source: MoSPI - Statistical Year Book India, 2019

2.1.7 Access to Information and Communications Technology

Information and Communications Technology (ICT) access is required for any nation to transition into a developed one. This indicator measures the access to wireless ICT – the tele density of wireless technology pan India.

Data Source: State/UT wise Wireless Tele-density, TRAI Industry Indicators

2.2 Calculation

The Access to Improved Infrastructure Index is an average of the scores of the aforementioned metrics.

The reason behind giving equal weights to all the seven aspects of improved infrastructure is the equal importance of components in their contribution to a higher standard of life. Keeping in mind that the objective of All is not to rank basic infrastructure and rather is to see if the people of a state have access to a certain level of standard of living. For instance, access to water is 95% plus for all states in India, thereby making it a moot aspect. Instead, the analysis looks at improved water sources.

Therefore, given the selected list of components, all have been assigned equal weights.



Access to Improved Infrastructure

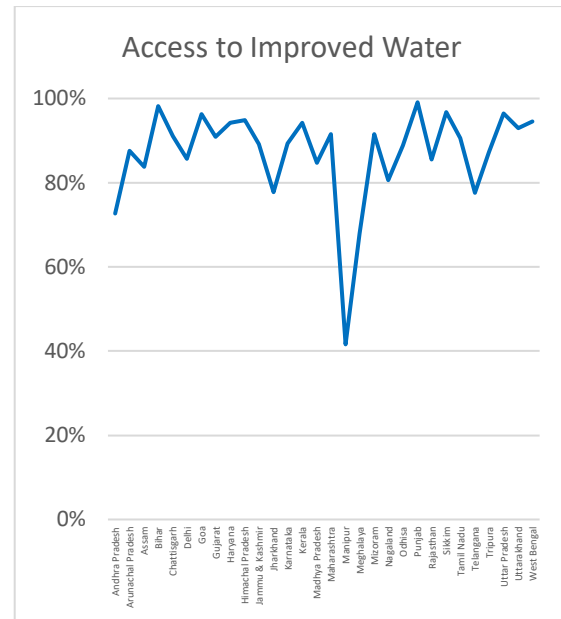
Section 3

3. Access to Improved Infrastructure

3.1 Access to Improved Drinking Water

Access to water and access to improved drinking water play a key role in a nation's development. Water borne diseases are a leading cause of diseases and fatality in the world and the provision of pipe water prevents such a scenario. India for long has struggled with supplying safe water to all, especially in the rural areas. Since 1972 the government has been moving towards supplying improved water to these 1.5 million villages. Since then multiple national and state level policies have been implemented to ensure universal access with financing backing from multilateral development banks and international institutions. The data from NFHS shows that Punjab and Manipur respectively have the highest and the lowest access to improved water.

To draw inferences, it is important to factor in the reasons that have impact on the water supply. The Manipuri hilly terrain, with lower surfaced roads and the drying up of rivers has caused the region to depend on bottled water from private vendors. On the other hand, Punjab is endowed with a favorable terrain and 5 rivers and has the requirements to support a well-established pipeline infrastructure along with an all year-round source of water not only for its needs but also for other neighboring regions. To bridge the gap between supply in urban and rural areas, the World Bank and the Government of Punjab along with support of the Union Government initiated the Punjab Rural Water Supply and Sanitation Project. The objective was to improve water supply systems in over 3,000 villages across the state. With over a million households receiving safe water supply, the state has the highest number of rural



households with piped water connections (as compared to other states).

Despite improved water supply considered as national priority, water demand is expected to grow by over 70% by 2025 and a large demand-supply gap is expected. This coupled with declining ground water has furthered the importance of not just provision of safe water but also cultivating a culture of conserving water. So, to ensure supply of safe water to all regions of the country and promote conservation of water a unified Ministry of Jal Shakti was launched in early 2019.

To ensure that schemes under this umbrella are impactful there is a need for constant monitoring and clearly defined outcomes and targets along with sufficient resource allocation, something which is currently not strongly present in the Jal Shakti Abhyan. There are also issues with installed systems not working properly, maintenance and lags with the implementation.

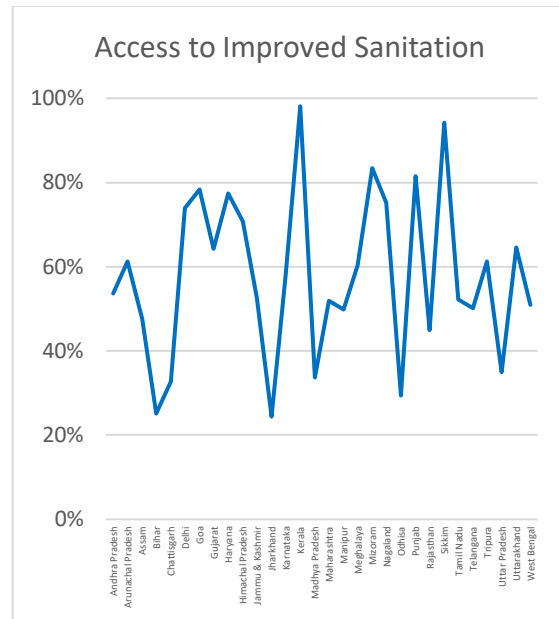
3.2 Access to Improved Sanitation

Along with water, improved sanitation is also essential for preventing health hazards in communities. While open defecation has been reduced by a great extent, the challenge that public sanitation facilities pose is still huge. Malfunctioning of disposal systems, leaking pipes, long queues and lack of regular cleaning has caused health hazards all throughout the nation.

Setting up a well-established sanitation framework, and a waste disposal program, in general, is a long process and in a populous country like India, needs a ground level implementation. This is clearly reflected by Kerala. As a state with 98% access to improved sanitation, the 2008 Suchitwa Mission has allowed the state to set an example for the country. The mission is responsible for providing technical and managerial support to the local governments of the state and conceptualizing, executing and monitoring activities in the waste management sector. It is also the nodal agency for implementing Swachh Bharat Mission (Rural & Urban) in Kerala.

On the other end of the spectrum, Jharkhand struggles with 24% access to improved sanitation. This can be attributed to the widespread poverty, illiteracy, and the high population density. There is a strong correlation between literacy and awareness and improved sanitation.

At a national level the Swachh Bharat Abhyan has been a policy move that revolutionized the way India manages its waste and sanitization. The mission was initiated in 2014 to eliminate open defecation across the country. This is being done by promoting mass behavior change and construction of sanitation facilities for



both households and communities while monitoring their usage. Currently, the second phase of the scheme is underway to ensure open defecation free behaviours are sustained and no one is left behind.

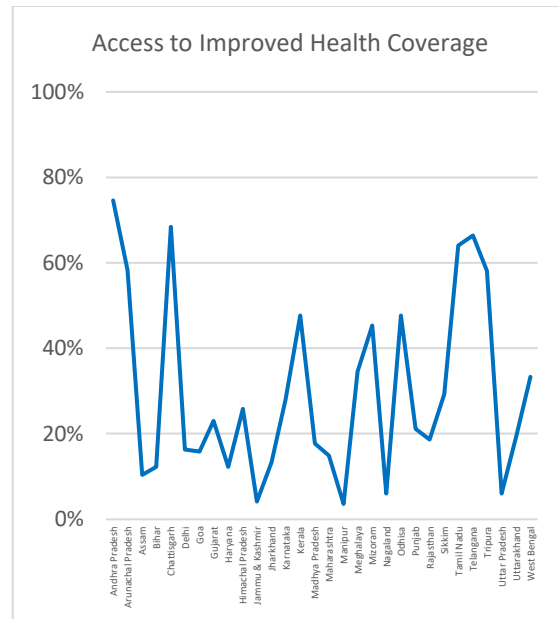
While being on the right track, corruption, and lack of effort on the ground level in underdeveloped parts prevented a full-fledged impact of the policy.

3.3 Access to Improved Health Coverage

Affordable and quality healthcare is essential for socio-economic development and coverage is an essential component here. Health coverage facilitates the entry into the formal health care system and ensures that there is access to the service. Uninsured people are less likely to seek medical care and more likely to have a weak health status. Hence, access to health coverage is extremely essential to improve the standard of living, especially for vulnerable groups in emerging economies.

Transitioning from access to facilities, importance of covering risks and preventing unprecedented financial burden on the households is the next key step. Such financial burden is dissipated using insurance policies and, in majority of cases, allows people to avail better healthcare facilities than they would have been able to without coverage.

Currently, this aspect of health coverage is weak in India with only 29.20% of households having at least one member covered either under health insurance or under a scheme. There is an existing national framework to provide health coverage to the bottom 40% of the Indian populace – Ayushman Bharat-PMJAY. However, the budget allocated to this scheme was slashed by nearly 50% in 2020, from Rs. 6400 crores to Rs. 3200 crores. This was driven by stats underutilization of funds and their slow release. Until November 2019, only nearly 16% of the allocated funds had been released as compared to the claims. Moreover, even the initial budget is a far cry from the investment required to achieve universal health coverage. There is a need for more investment and policy support at the state level.



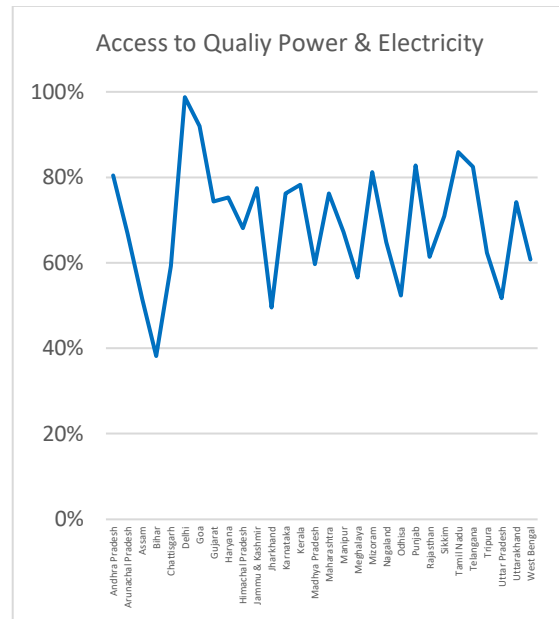
The effectiveness of pro-active state level policies is evident in the case of Andhra Pradesh. Andhra Pradesh is the only state in the country to provide universal health coverage to the poor by way of the Dr. YSR Aarogyasari Health Insurance Scheme. The state currently is the leader when it comes to access to improved healthcare with over 74.6% households having members covered under a health scheme/insurance. And, that too by a significant margin from the national average. This is largely attributed to the above states Aarogyasari Scheme.

3.4 Access to Quality Power & Electricity

Many developing countries, including India, have reformed their electricity sector in the last few decades. These efforts – mostly in the direction of market liberalization and corporatization – have only been partially successful in promoting efficient pricing and greater electricity access but, have proved to be a boost to economic activity. Electricity is a high-quality energy carrier – more productive and flexible than other energy sources, with zero pollution at the end use point.

Cooking is a fundamental part of life and has cultural and social significance around the world. In developing countries, solid fuels like wood and coal are often used in traditional stoves for cooking. The use of such polluting fuels and technologies results in household air pollution, causing respiratory illnesses, heart problems and even death. In fact, indoor air pollution causes more than 4 million premature deaths every year—50 percent of which are children under the age of 5. Thereby, making access to electricity and clean cooking fuel important parameters of access to improved infrastructure.

Access to power and electricity supply is a segment where the country has made significant strides with a national average of 69.24%. While quantifying access to power and electricity, an equal weightage has been given to access to clean fuel for cooking along with electricity access to households. On one hand Delhi boasts of a 97.70% access to clean cooking fuel, while Jharkhand, Bihar and Odisha have an average access of 18.35%. On the other hand, in case of electricity supply access, Delhi and Goa top the list with 99.80% access rate and Bihar struggles with 58.60% access rate.



The similarity in patterns between access to electricity rates and urbanization rates brings out the strong correlation between development and energy access.

With electricity generation being controlled by the public sector and the distribution majorly by the private sector, this mix has enabled high access rates. However, in spite of a well laid distribution system, power outage and blackouts still remain common in India. According to the Central Electricity Authority, 79.80% of the electricity is produced from fossil fuels. The cooking fuel supply controlled by the public sector shows the lack of efficient use of renewable energy potential.

Thus, as a forward-looking move, India should focus on clean energy in order to not only reduce the carbon footprint but to make the supply more robust and regular. For clean cooking fuel, there is the eminent need to involve more private investment in order to completely phase out usage of inefficient and traditional fuels such as dung cakes and firewood.

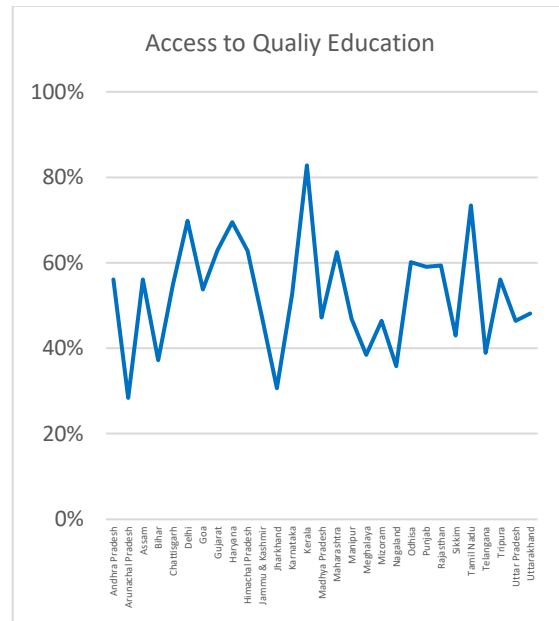
3.5 Access to Quality Education

Education has a cyclic effect on economic growth and development of countries. Providing quality education to a generation not only improves its standard of living, increases labour efficiency, decreases incidences of health issues and increases standard of living but also paves for innovation and technological development on which all future generations capitalize upon.

Measuring the development of education should not just be restricted to enrollment rates. India has already reached high levels of primary school enrollment rate; however, the quality of this education is questionable in some regions. Hence, it is important to judge the access to quality education.

The School Education Quality Index (SEQI), developed by the NITI Aayog, evaluates the performance of States and Union Territories (UTs) in the school education sector. The index aims to bring an outcome focus to education policy by providing States and UTs with a platform to identify their strengths and weaknesses and undertake requisite course corrections or policy interventions. The measure here focuses on indicators like learning outcomes, equity outcomes, and facilities outcomes which push the quality of education rather than on specific processes.

The national median for access to quality education is 53.35%. There are significant variations in the scores with Kerala at nearly 82.8% while Arunachal Pradesh is at 28%. There are a small group of states (Kerala, Tamil Nadu, Delhi and Haryana) outpacing other regions. Southern regions



have traditionally been the leaders when it comes to quality education. This can be largely attributed to the high spending on higher education in these states. On an average, this accounts for 15% of the household expenditure in rural areas and 18.4% in urban areas. There is also greater awareness regarding tertiary education in these states.



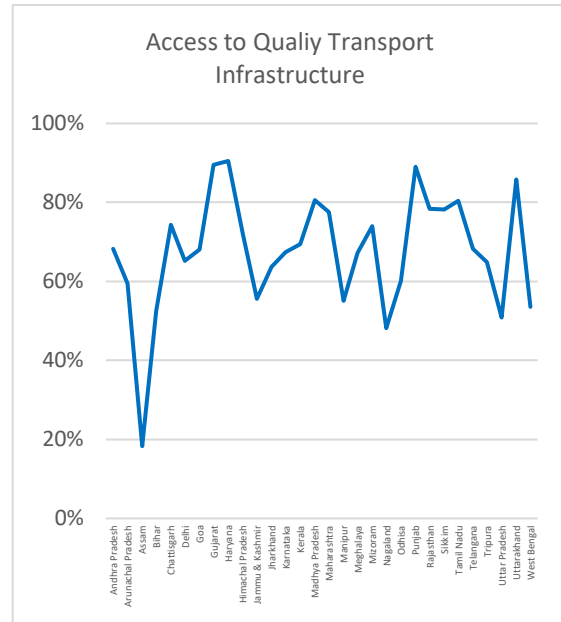
3.6 Access to Quality Transport Infrastructure

Because of its intensive use of infrastructures, the transport sector is an important component of the economy and a common tool used for development. This is even more so in a global economy where economic opportunities have been increasingly related to the mobility of people and freight.

A relation between the quantity and quality of transport infrastructure and the level of economic development is apparent. High-density transport infrastructure and highly connected networks are commonly associated with high levels of development. When transport systems are efficient, they provide economic and social opportunities and benefits that result in positive multiplier effects such as better accessibility to markets, employment, and additional investments. When transport systems are deficient in terms of capacity or reliability, they can have an economic cost such as reduced or missed opportunities and lower quality of life.

Quality transport while being dependent on public and private vehicular mediums is also reliant on quality roads. Thus, to measure the access to improved transport infrastructure, the All factors in the ratio of surfaced roads, covered with either bitumen or tar.

As opposed to unsurfaced roads, or otherwise, traditionally, called *kuchcha* roads which tend to be highly inefficient due to the slowing down of movement of freight and people, surfaced roads are a key indicator of concentration of transportation services as well.



The above map represents the ratio of length of surfaced roads to the total length of roads in all states. As a measure of quality transport infrastructure, surfaced roads represent development and vice versa.

National median of 72.43% shows that while Indian roads are mostly surfaced, places like Assam – with an access rate of 18.29% - pose the issue of the terrain coming in the way of constructing quality surfaced roads.

3.7 Access to Internet & Communications Technology

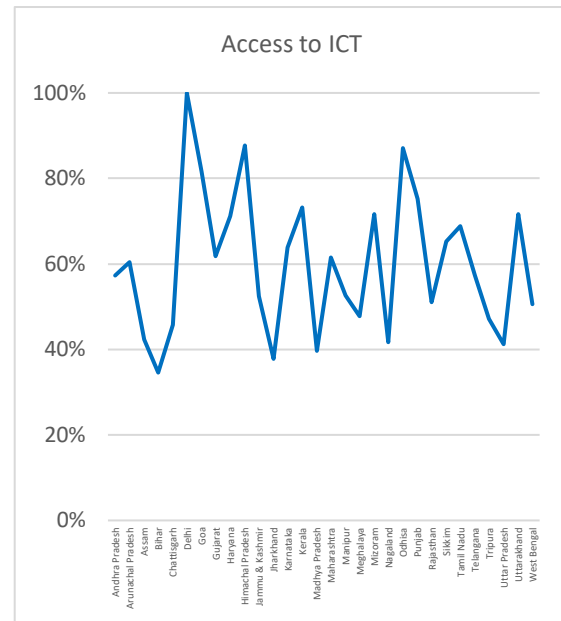
The economic development of a country is conceived from several perspectives, one of them is the technology and, within it, the Internet that is a tool that promotes the business innovation, the social inclusion through services related to education, health, etc.

It is argued that ICT impacts both consumers and industries. In a 'sources of growth' (i.e. growth accounting) context, productivity effects will occur via two channels. Firstly, via capital deepening (an increase in the capital to labour ratio), as firms invest in connectivity equipment for their machines. Secondly, in the form of total factor productivity (TFP) growth, which may be due to: increased efficiency and optimization in the production process; complementary innovation and the accumulation of complementary (in some cases, unmeasured in output) intangible capital including organizational capital and spillovers or network effects from the accumulation and deployment of communications capital.

As a metric to measure internet usage, the All factors in wireless teledensity across the Indian subcontinent.

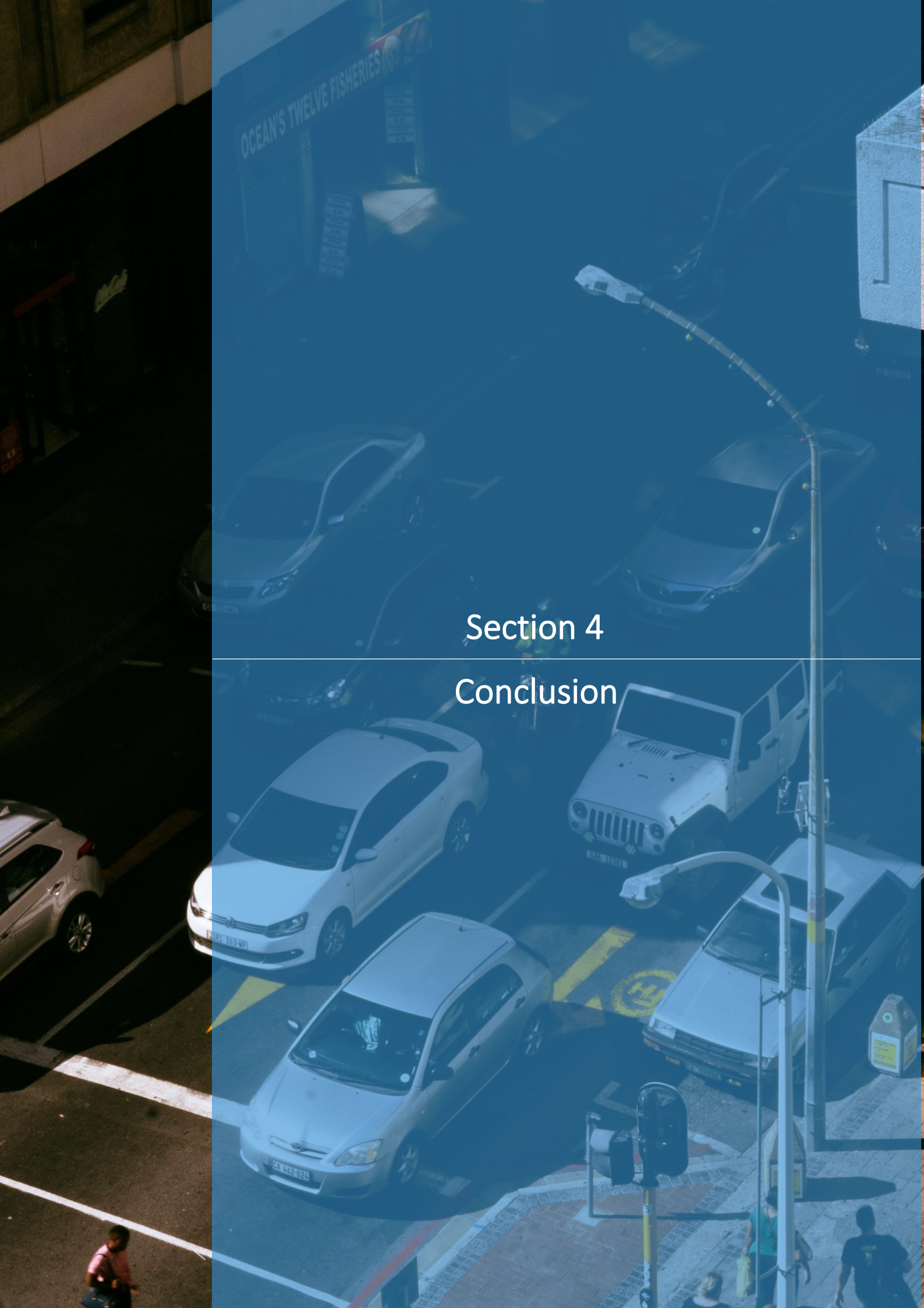
Tele-density is the number of telephone connections (wireless and mobile phone subscribers) per 100 inhabitants within a geographical area.

The selected data from TRAI Performance indicators, while being the most reliable source of data, leave out the cases where a person having multiple connections leads to skewing of data. For example, a tele-density of 168 in Delhi does not mean that everyone has a wireless telecommunications device. Hence, for the



calculation of All, measurements have been scaled down in a relative manner rather than an absolute manner. While this might lead to a certain level of disparity amongst states within the All, the factual representation remains the same.

With a median teledensity of 54.91%, India is moving in the right direction with a large number of telephones, computers and other media devices that connect the people to the internet. Additionally, cheap data and voice rates along with cost effective devices has led to India becoming one of the largest markets for telecommunications.



Section 4
Conclusion

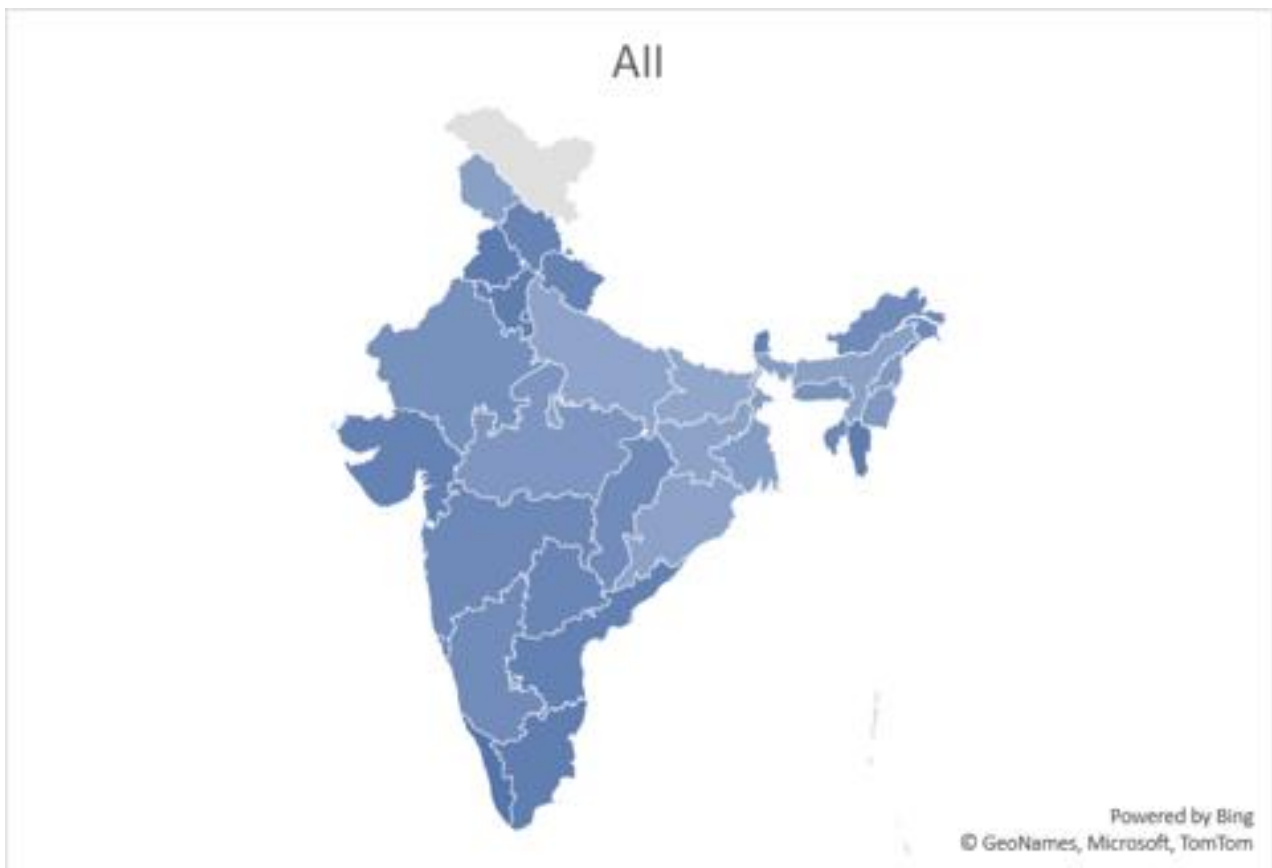


4. Conclusion and National Trends

TSB's Access to Infrastructure Index (All) aims to analyze the quality of essential infrastructure in the country and benchmark states with their counterparts. The Index recognizes that majorly the constituents of the Index are driven by Central government initiatives and implemented by state and local governments. All is based on a set of indicators that measure the overall effectiveness, quality, and efficiency of the essential infrastructure of India. As a result of choosing a variety of metrics, the TSB All Index is an efficient and effective way of stacking cities, states and geographical areas of varying sizes against each other due to the use of per capita measures to a great extent. Depending on the use case, the metrics can be added or removed to bring out more nuanced details.

All Index is more suitable to distinguish between underdeveloped and developed geographies as a way to see the potential prospect of a particular idea. The national trends of the All are:

The Index pegs Kerala and Tamil Nadu at the top of the charts with a rate of 77.67% and 73.63% respectively. This is in line with the trend of southern states performing better than the rest of the country when it comes to human development indicators. States in the Central Indian belt have lower access rates with Jharkhand at 42.43%, Bihar at 42.61% Uttar Pradesh at 46.84% and Odhisa at 58.6%. North Eastern states also have a trend of lower ranges of access. This can be largely attributed to rough terrain in these states, volatility in the political situation and issues regarding the reach there.





6. Appendix: State Wise All

Indicators from the seven sectors mentioned in the report are factored to calculate the overall Access to Improved Infrastructure Rate. Data sources and research methodology is specified in Section 2.

State	All
<i>Kerala</i>	77.676%
<i>Sikkim</i>	68.245%
<i>Mizoram</i>	70.542%
<i>Punjab</i>	72.552%
<i>Goa</i>	69.416%
<i>Haryana</i>	70.054%
<i>Nagaland</i>	50.351%
<i>Delhi</i>	72.841%
<i>Himachal Pradesh</i>	68.845%
<i>Uttarakhand</i>	65.243%
<i>Gujarat</i>	66.706%
<i>Arunachal Pradesh</i>	60.310%
<i>Tripura</i>	62.448%
<i>Meghalaya</i>	53.255%
<i>Karnataka</i>	62.223%
<i>Andhra Pradesh</i>	66.144%
<i>Jammu & Kashmir</i>	54.073%
<i>Tamil Nadu</i>	73.635%
<i>Maharashtra</i>	62.289%
<i>West Bengal</i>	49.120%
<i>Telangana</i>	63.044%
<i>Manipur</i>	45.269%
<i>Assam</i>	44.323%
<i>Rajasthan</i>	57.071%
<i>Uttar Pradesh</i>	46.847%
<i>Madhya Pradesh</i>	51.911%
<i>Chattisgarh</i>	60.927%
<i>Odisha</i>	58.605%
<i>Bihar</i>	42.619%
<i>Jharkhand</i>	42.439%



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