सत्यमेव जयते
NITI Aayog

Establishing New Universities in India

An Evidence-Based Suitability Analysis

Arunava Dey (Research Officer)
Dr. Shashank Shah (Senior Specialist)

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** The authors are working in NITI Aayog, Government of India.

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1. INTRODUCTION

India became the world's most populous country in 2023. It is home to more than one-sixth of the global population. In 2024, the median age of an Indian is 28.4 years, much lower than most of the other populous countries. This has made India one of the youngest countries in an ageing world leading to a window of opportunity in terms of 'demographic dividend'. On multiple occasions, Hon'ble Prime Minister Shri Narendra Modi has highlighted the fact that 'our demographic dividend is our biggest strength'.

The literacy rate in India has been growing consistently, reaching 74.04% in 2011 (82.14% for males and 65.46% for females). Although the Gross Enrolment Ratio (GER) for Elementary School Education in India was about 100%, the GER for Higher Education (18-23 years of age group) was 28.4% in 2021-22. This has created a unique demand-and-supply imbalance in India as less than one-third of the eligible population is pursuing higher education when compared to educational enrolment at primary school levels. Moreover, the Government of India has set an ambitious target of achieving GER of 50% in higher education by 2035. Official projections estimate that this would increase the number of students in the Indian higher education ecosystem to approximately 9 crores, effectively doubling the student enrolment of nearly 4.33 crore in 2021-22. To accommodate this significant increase in number of students pursuing higher education in India, about double the number of existing universities may be needed.

2. OBJECTIVES OF THE STUDY

The location of the existing universities is not evenly distributed over space; rather it is highly clustered in and around the major metro cities in India. Therefore, there is a need to study the current pattern and identify suitable locations to make higher education more accessible across regions, especially in the hinterland.

Against this backdrop, this paper aims to propose an evidence-based policy framework in India to identify the most suitable locations for setting up new universities in India using data analysis and spatial intelligence.

The objectives of the study are:

i. To analyse the geographical location and spatial concentration of universities, and

ii. To recommend suitable locations for setting up new universities in the country.

3. METHODOLOGY

This paper uses the following techniques to achieve the above mentioned objectives.

3.1. Data Analysis

Data analysis is a process of inspecting, cleansing, transforming, and modelling data with the goal of discovering useful information, deriving conclusions, and supporting decision-making. This approach has multiple facets and approaches, encompassing diverse techniques under a variety of names, and is used in different business, science, and social science domains. In this paper, data analysis methods have been used primarily to analyse the existing coverage of higher education in India. In addition, a weighted composite score has been derived for state-level recommendations using data analysis.

3.2. Spatial Analysis

Spatial analysis offers a set of techniques to analyse spatial data and comprehend relationships, patterns, and trends in a geographic context. In other words, spatial analysis is the process of extracting or creating new information about a set of geographic features to examine, assess, evaluate, analyse, or model data with spatial reference within a geographic area. According to De Smith et al. (2007), spatial analysis involves the examination of geographic data to uncover patterns, relationships, and trends. It provides insights into the spatial distribution of resources, population, economic activities, and infrastructure within a region. It entails the analysis of data with explicit geographic or spatial attributes for understanding the spatial distribution and characteristics of various phenomena. This can be carried out using various techniques with the aid of statistics and Geographical Information Systems (GIS). GIS is a technological field that incorporates geographical features with tabular data to map, analyse, and assess real-world problems.

3.2.1. Spatial Analysis in the field of Regional Development

Spatial analysis plays a crucial role in regional development by providing valuable information for decision-making, planning, and policy formulation. Site selection and land use planning are key applications of spatial analysis in regional development. In their book "Geographic Information Science & Systems," Chang (2019) discuss how spatial analytic techniques may be used to identify the best places for multiple diverse activities such as infrastructure development, industrial zones, commercial centres, and residential areas.

Spatial analysis has been extensively used in several regional and infrastructure development projects by the Government of India. For instance, the Ministry of Housing and Urban Affairs (MoHUA) has used geospatial analysis for the Smart Cities Mission analysis to evaluate the existing in-

frastructure, identify areas for improvement, and plan for future growth. MoHUA and the Ministry of Road Transport and Highways (MoRTH) have used spatial analysis in formulating the National Urban Transport Policy (NUTP) by analysing land use patterns, population density, and travel demand. The National Wetlands Conservation Programme (NWCP), a flagship scheme by the Ministry of Environment, Forests & Climate Change (MoEFCC) has used geospatial data to identify wetland areas, assess their ecological significance, and prioritize conservation efforts. Geospatial analysis also plays a crucial role in disaster management and risk assessment at the National Disaster Management Authority (NDMA) under the Ministry of Home Affairs (MHA).

3.2.2. Spatial Analysis for Higher Education Infrastructure Planning

There is a significant opportunity for the Ministry of Education (MoE) to use this technique in planning and creating higher education infrastructure. By integrating spatial planning principles into regional development processes, policymakers can promote the equitable distribution of universities and colleges across different regions, thereby facilitating equal access to education for all individuals. The incorporation of spatial planning facilitates strategic decision-making regarding the location and design of university campus buildings and facilities and can ensure their convenient accessibility for both students and faculty members.

The Institutional Development Plan (IDP) guidelines formulated by the Expert Committee under the University Grants Commission have also encouraged the use of Geographic Information System (GIS) and spatial data for physical infrastructure development in Indian Higher Education.

The NEP 2020 emphasizes the importance of 'equity and inclusion in Higher Education'. It has accorded top priority to providing quality higher education opportunities to all individuals. To achieve this goal, the integration of a Spatial Decision Support System (SDSS) for the overall planning of HEIs becomes essential. SDSS combines spatial data, analytical methods, and decision-making processes to support complex spatial decision-making tasks. It serves as a system that integrates geospatial data, models, and decision-support tools, to address intricate spatial problems. Moreover, the interactive nature of SDSS allows users to actively engage with spatial data, conduct analyses, create visualizations, and explore diverse decision scenarios (Fotheringham & Rogerson, 2009). Hence, conducting a thorough analysis of the current spatial distribution and the implementation of a SDSS are crucial steps in promoting equal opportunities for accessing high quality higher education across India.

In this paper, spatial analysis has been used to identify the clusters of districts having a higher number of universities (hot spot) and regions with no or lesser number of universities (cold spot).

4. DATA

The data used in the study are as follows:

4.1. All India Survey on Higher Education (AISHE)

The AISHE is an annual report, published by the Department of Higher Education, Ministry of Education, Government of India. It is prepared based on information on Higher Learning viz. Universities, Colleges, and Stand-Alone Institutions from all over the country. The AISHE Report 2021-22 was released in 2024. For this paper, the data available on the AISHE Dashboard as of August 2022 has been used where the total numbers of Universities and Colleges were 1,160 and 47,497, respectively.

4.2. Census of India

The 2011 Census of India (the 15th Indian Census) is used as the main secondary source for all demographic data. It covers 28 states and 8 union territories, spread across 640 districts.

4.3. Data Limitations

i. Number of Districts: It is important to mention that the geographical boundaries of the districts in India are highly dynamic in nature. Also, the number of districts keeps on changing over time due to administrative reasons. For the current paper, 733 districts in India have been considered (as of 2020). This has resulted in some data mismatches and data discrepancies while working in connection with other secondary data sources. It is important to keep this in mind while considering the findings of the paper and in further policy making and implementation.

ii. Number of HEIs: The number of universities and colleges is constantly evolving. According to the latest AISHE report (2021-22), there were 1,168 universities and 45,473 colleges. Given the dynamic nature of HEIs, the analysis and recommendations provided should be considered indicative.

iii. Demographic Data: The demographic data used in this analysis is based on the 2011 Census, which is out-of-date and creates a temporal mismatch when compared to the 2022 data on HEIs. Nonetheless, it is worth noting that the Ministry of Education also relied on 2011 Census data in its most recent AISHE report (2021-22). To maintain consistency with government reporting, this paper uses the same demographic data source.

5. KEY FINDINGS

The key findings of the availability and locations of universities in India are presented below:

5.1. Higher Education Institutions in India

As per the AISHE data as of August 2022, there are 1,160 Universities in India. Out of them, 52 are Central universities and 808 are State Public and Private Universities. There are a total of 152 Institutes of National Importance and 6 Institutes under the State Legislature Act.

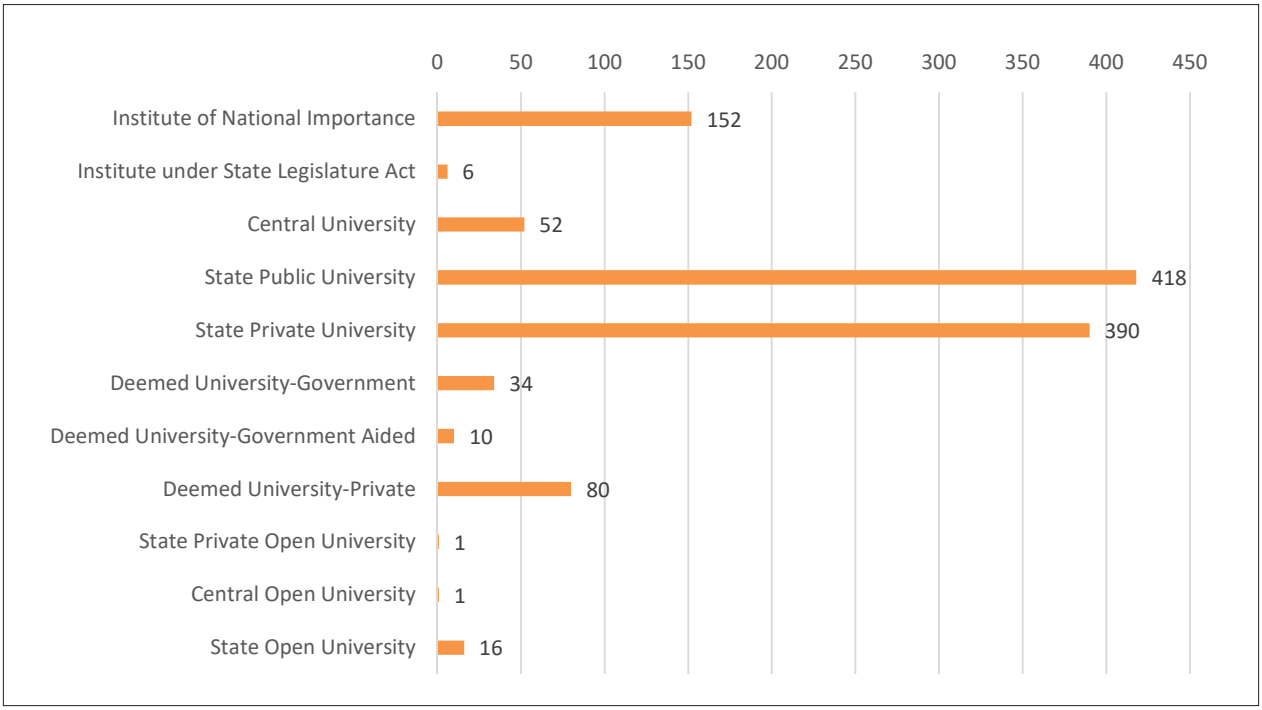

Figure 1: Types of Universities

Out of the 1,160 universities in India, 680 universities are located in urban areas, while 480 universities are in rural areas. This indicates that though 66% of the total population lives in rural areas, 41% of universities are located in their geographic proximity. Conversely, 59% of universities serve 34% of the population in urban areas. The situation is different for colleges. Out of the 47,947 colleges in India, about 60% are located in rural areas, while 40% are in urban areas. This distribution is due to historical reasons and the concentration of economic and social resources in urban areas. It is imperative to address this issue to ensure equitable access to higher education for students living in both rural and urban areas.

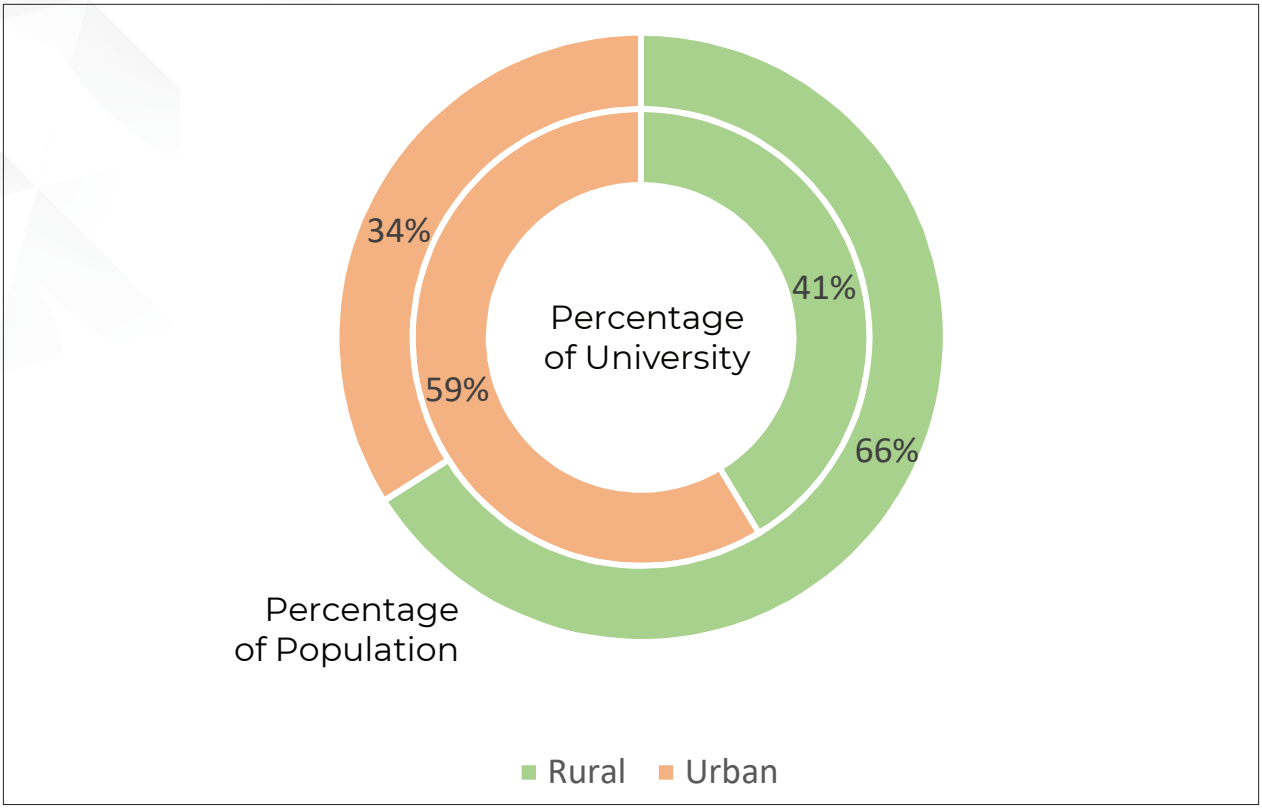

Figure 2: Location of Universities

5.1.1. State-level Distribution

There is also a significant disparity in the distribution of universities among states in India. Some states have a higher number of universities compared to others. For instance, Rajasthan has 93 universities, Gujarat has 91, and Uttar Pradesh has 87. However, in the Union Territories (UTs) of Andaman & Nicobar Islands, Lakshadweep, Dadra and Nagar Haveli and Daman and Diu, there are no universities. Other UTs and North Eastern States also have a relatively lower number of universities, except for the National Capital Region of Delhi. This disparity in the distribution of universities among states has resulted in uneven access to higher education in different regions of the country.

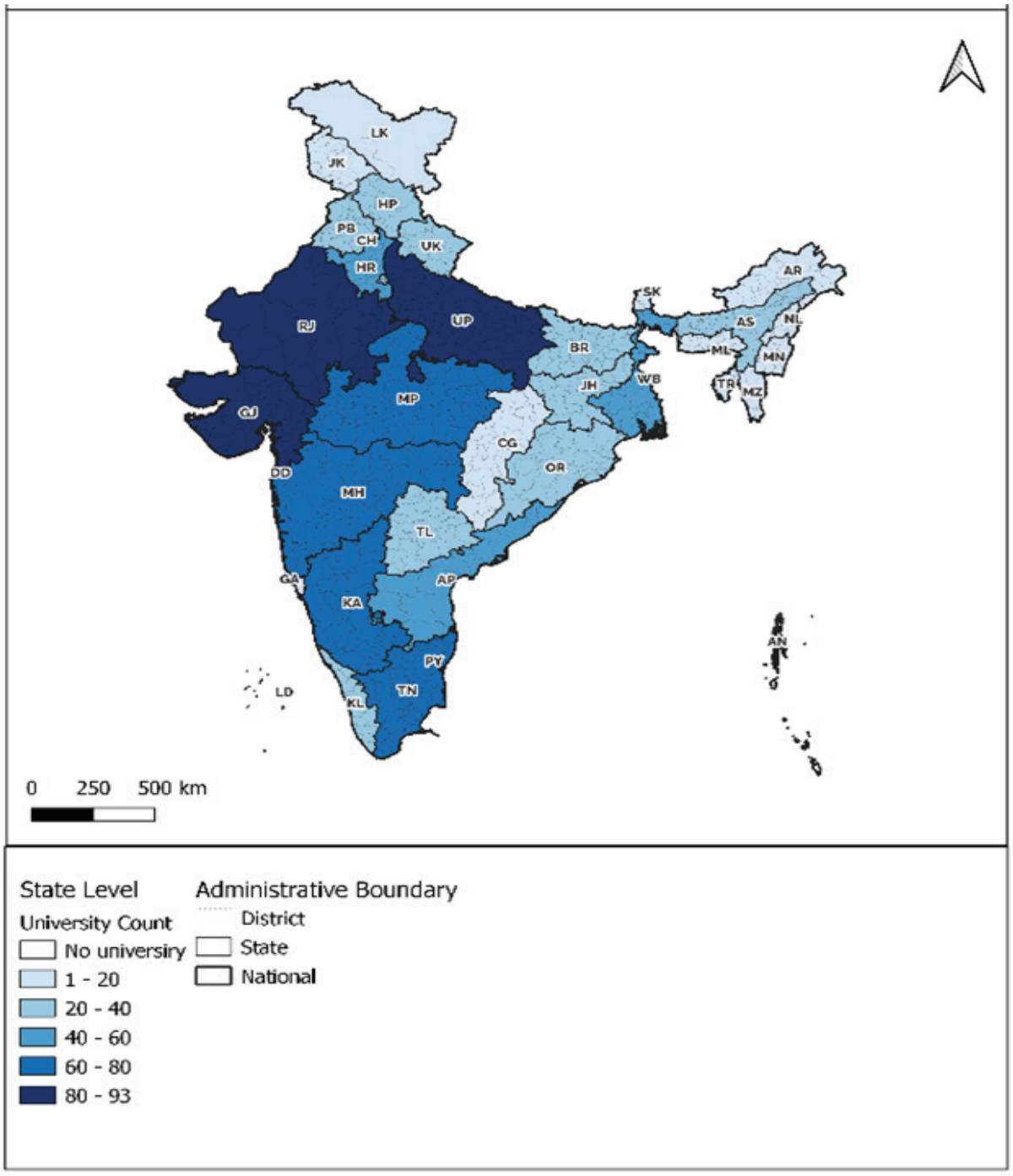

Figure 3: Number of Universities (State)

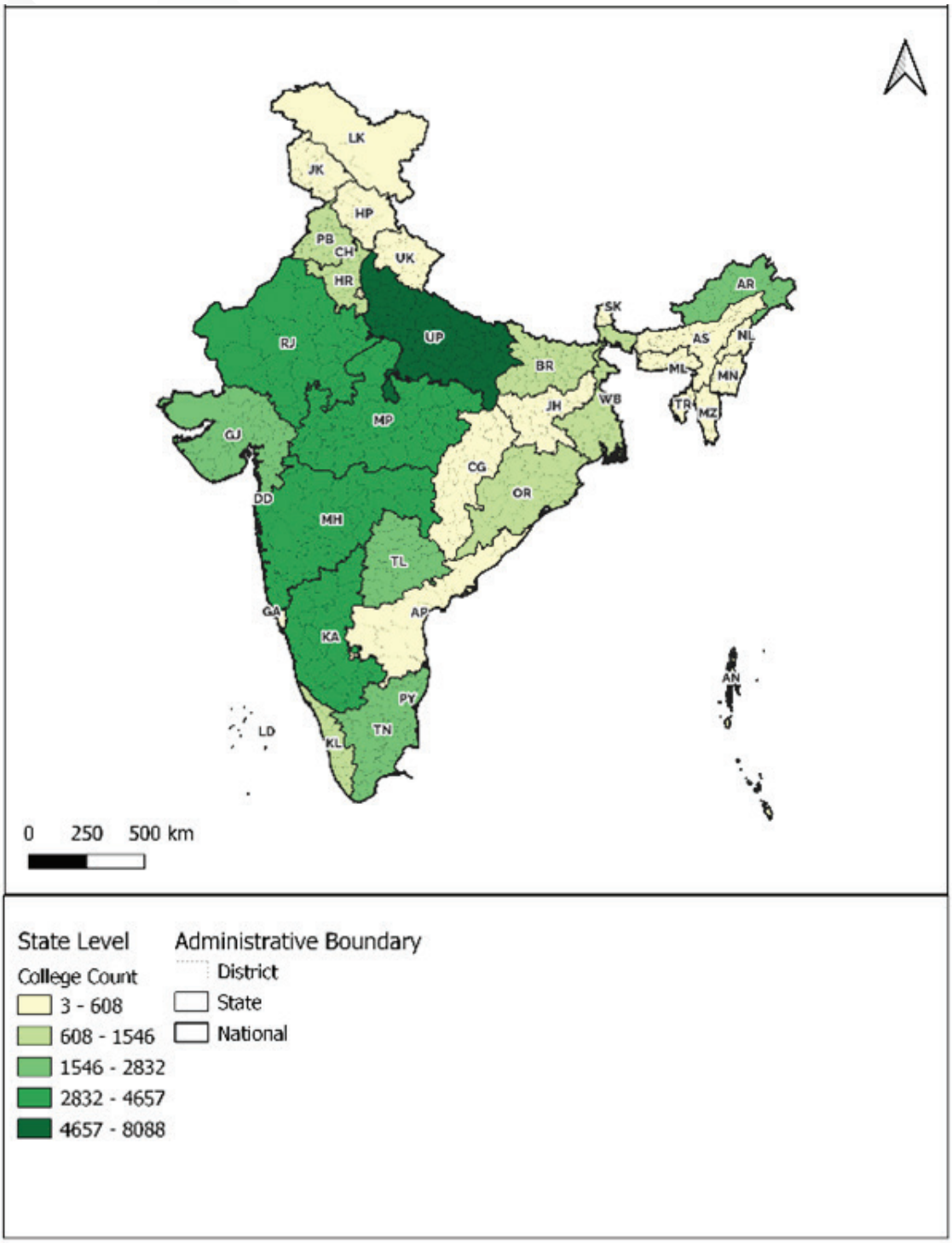

Figure 4: Number of Colleges (State)

There is a significant disparity in the ratio of universities and colleges per lakh population across different states in the country. Smaller and less densely populated North Eastern States tend to have a higher ratio of universities and colleges per lakh population. In contrast, larger and more populous states like Uttar Pradesh and Bihar have fewer universities per lakh population. States such as Andhra Pradesh and Chhattisgarh have the lowest ratio of colleges per lakh population, highlighting regional variations in higher education accessibility.

5.1.2. District-level Distribution

The inequality in access to higher education in India is further highlighted at the district level. While some districts have a high concentration of universities, others have very limited access to higher education. Jaipur in Rajasthan has the highest number of universities (35), followed by Bengaluru Urban in Karnataka (25), and Ahmedabad in Gujarat (21). There are 160 districts with only 1 university and 102 districts with less than 3 universities. As many as 380 districts mostly in Uttar Pradesh, Madhya Pradesh, and the North Eastern States do not have any university.

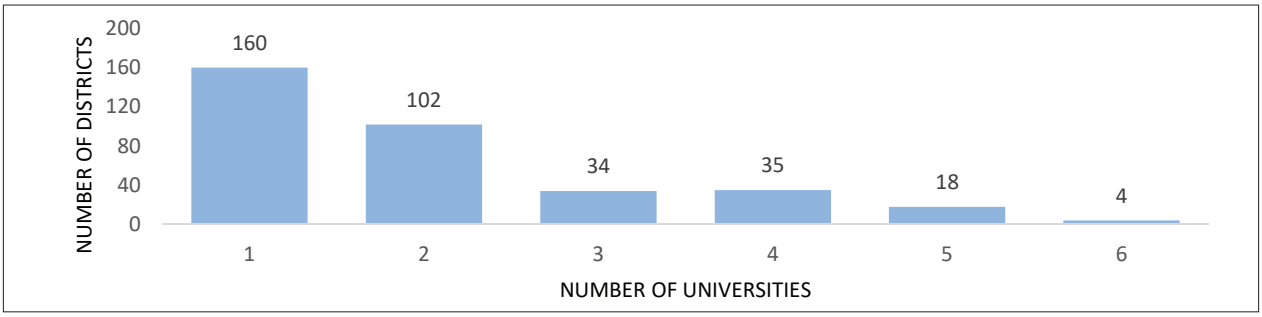

Figure 5: Distribution of Universities by Districts

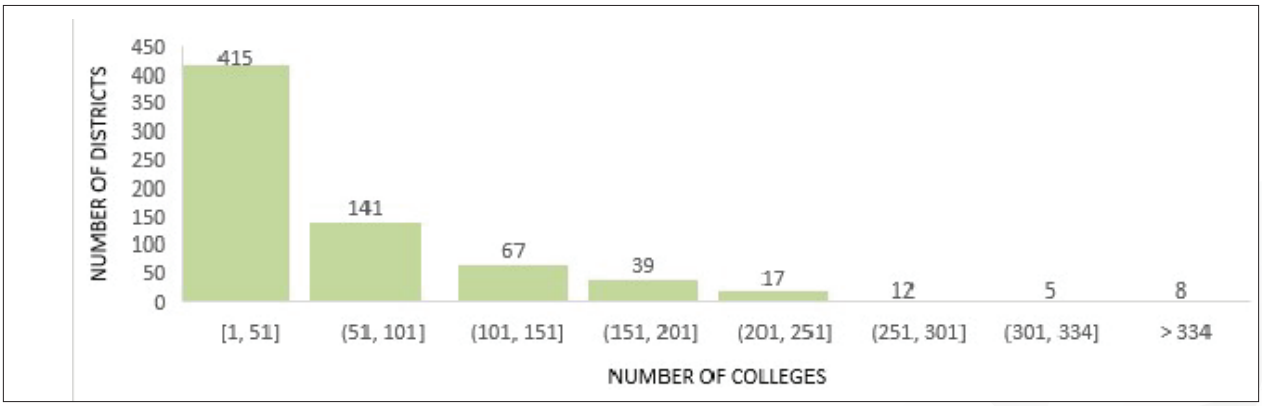

Figure 6: Distribution of Colleges by Districts

Bengaluru Urban in Karnataka has 1,118 colleges, followed by Jaipur in Rajasthan (740) and Pune in Maharashtra (628). 153 districts in India have 100 or more colleges. On the other hand, 29 districts do not have a single college and 85 districts have less than 5 colleges.

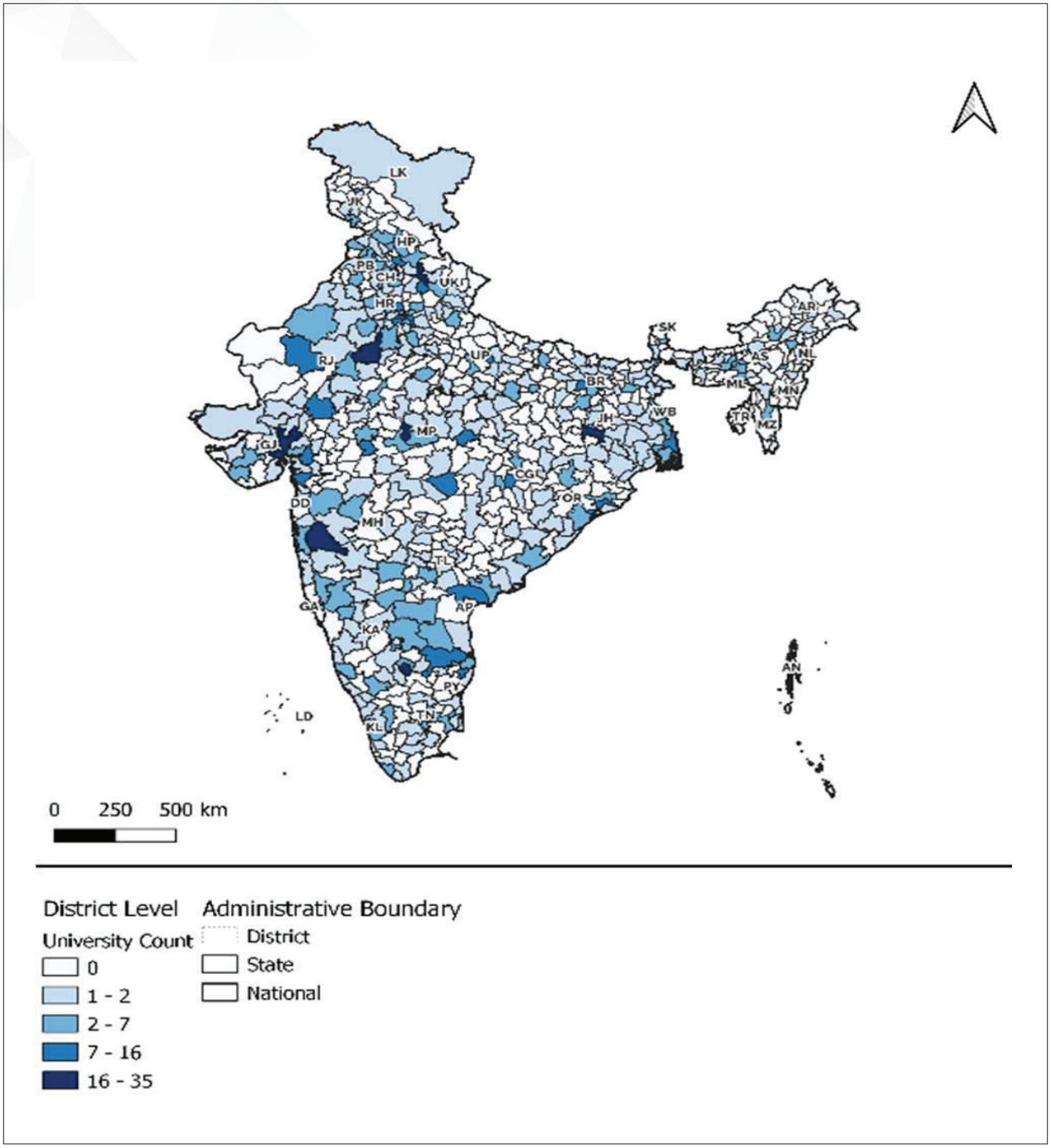

Figure 7: Number of Universities (Districts)

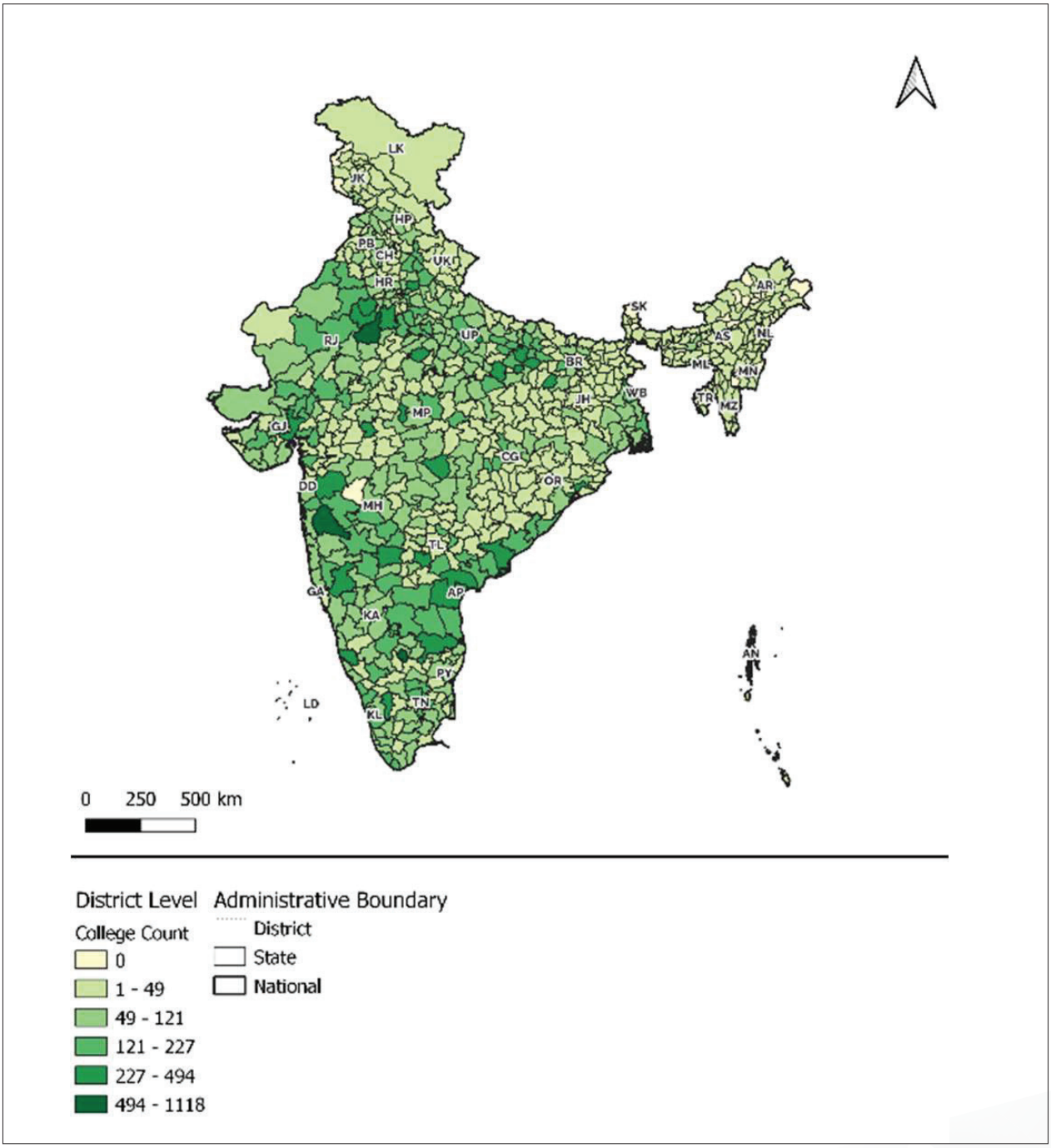

Figure 8: Number of Colleges (Districts)

5.1.3. Remote Regions

There are 169 districts in the remote regions of India comprising the Himalayan states, the North East Region, and the islands spread across 14 states & UTs that deserve special attention. There are a total of 167 universities and 2,293 colleges in this region. Dehradun in Uttarakhand has 19 universities and 132 colleges, the highest in this region. 116 districts do not have a university, while 23 districts do not have any college. The list of districts in the remote regions with the number of universities and colleges in each is given in Annexure– I.

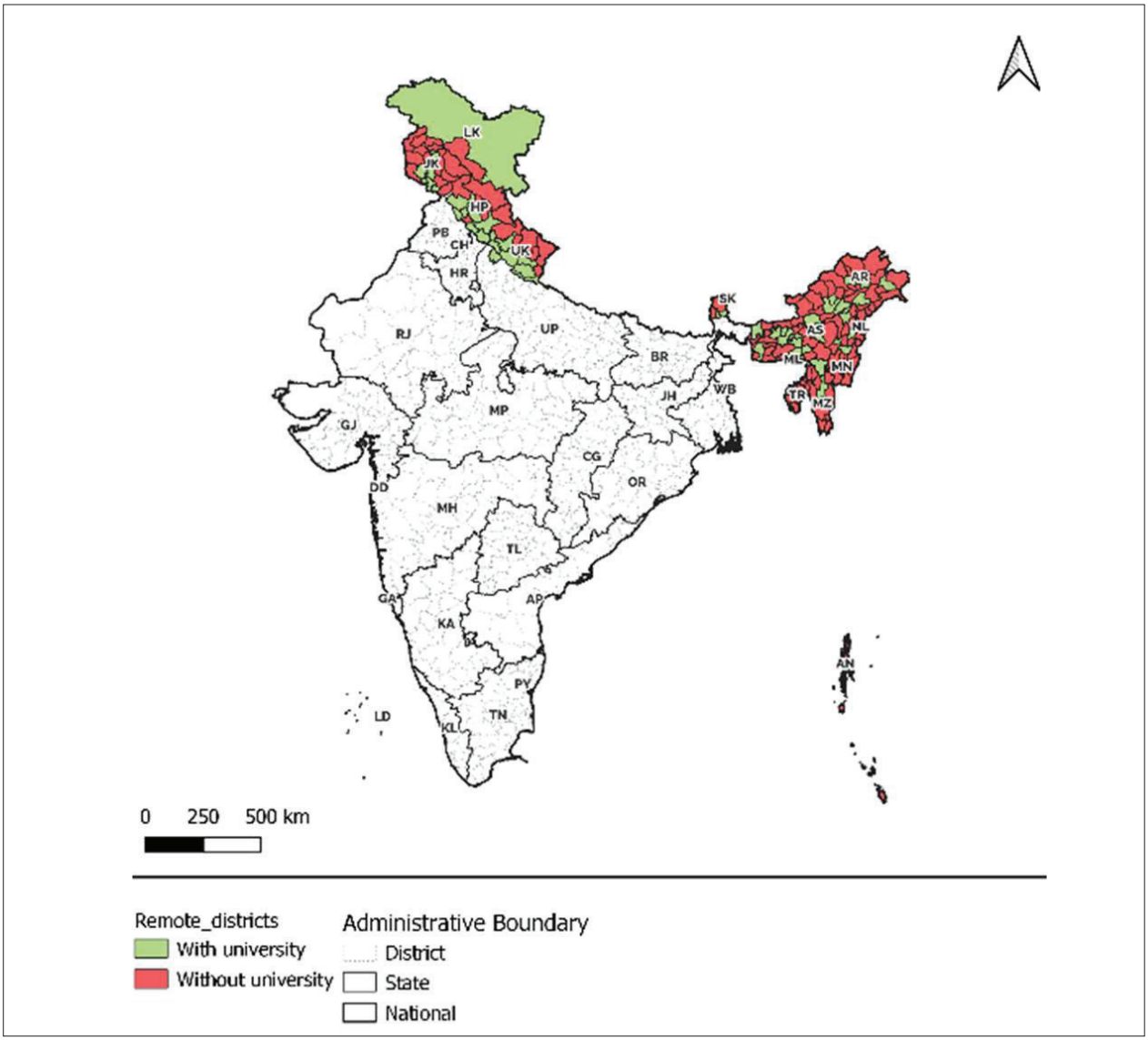

Figure 9: Number of Universities in Remote Regions

5.1.4. Aspirational Districts

Out of the 112 Aspirational Districts in India, 43 districts have at least one university, with Ranchi in Jharkhand having 18 universities, the highest among the Aspirational Districts. The remaining 74 districts do not have any university. The list of 112 Aspirational Districts with the number of universities and colleges in each is given in Annexure– II.

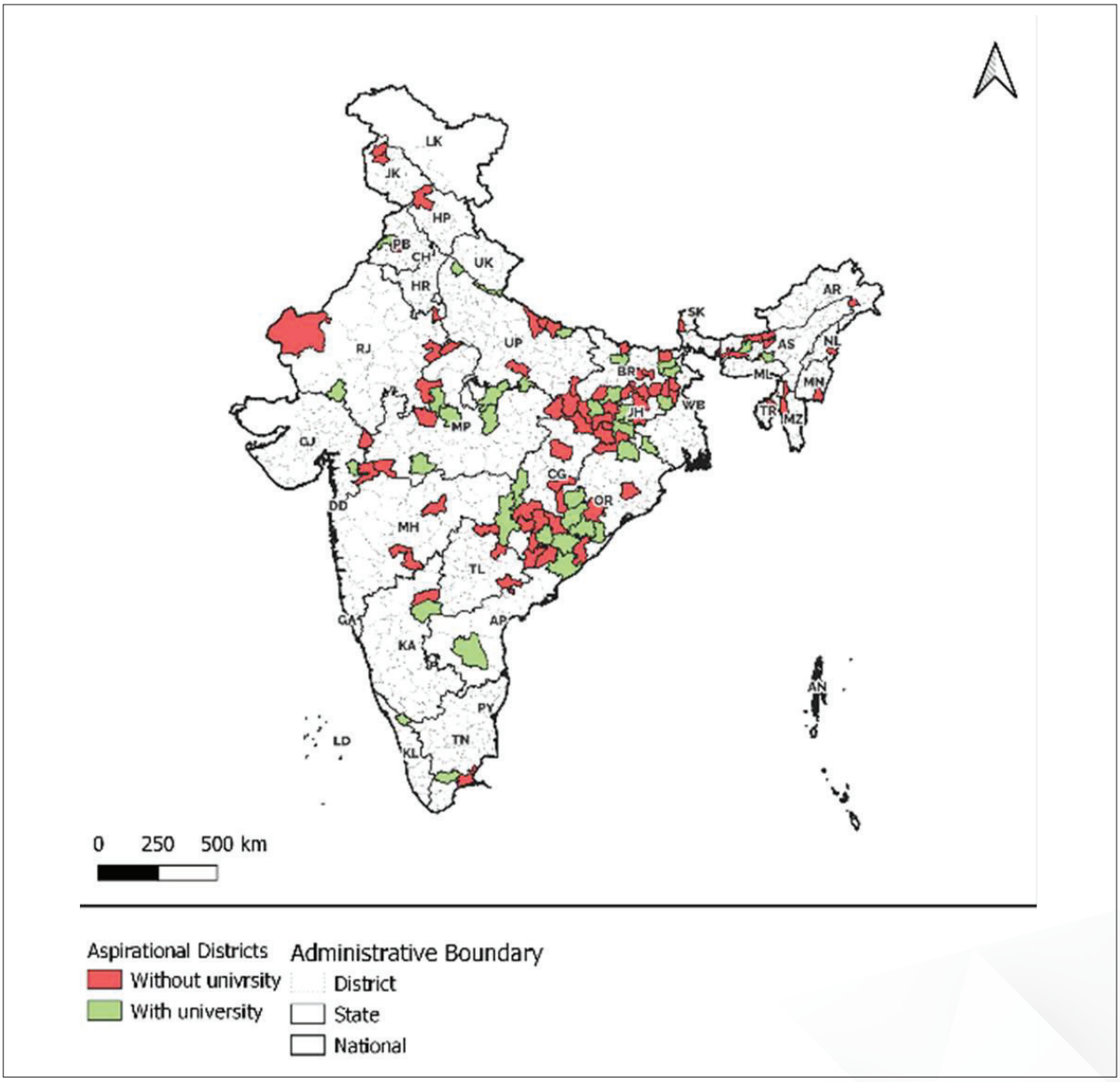

Figure 10: Number of Universities in Aspirational Districts

5.1.5. Temporal Changes

In recent years, the number of universities has been rapidly growing in India, from a total of 755 in 2015-16 to 1,160 in 2022. The number of Institutes of National Importance has increased by more than double since 2015-16, followed by a substantial growth in the number of State Private Universities. However, a more systematic approach is required to make higher education accessible to all in terms of spatial locations.

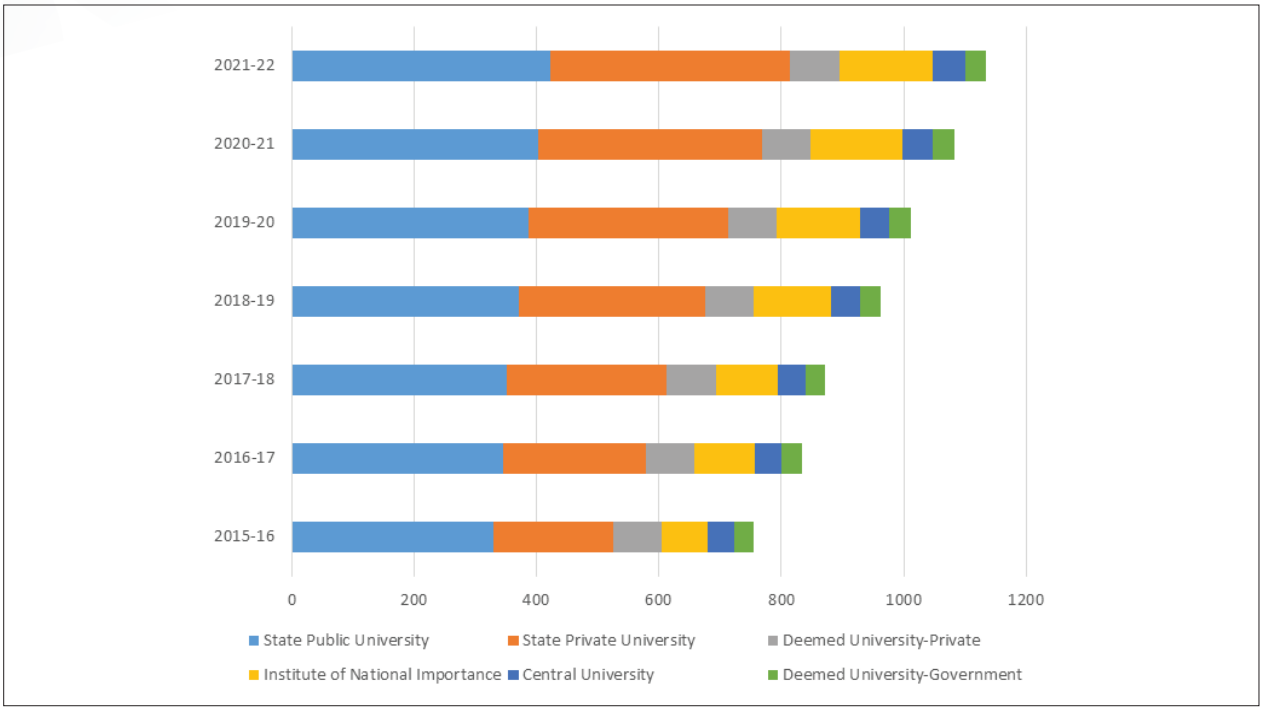

Figure 11: Number of Major Universities by Type (2015-22)

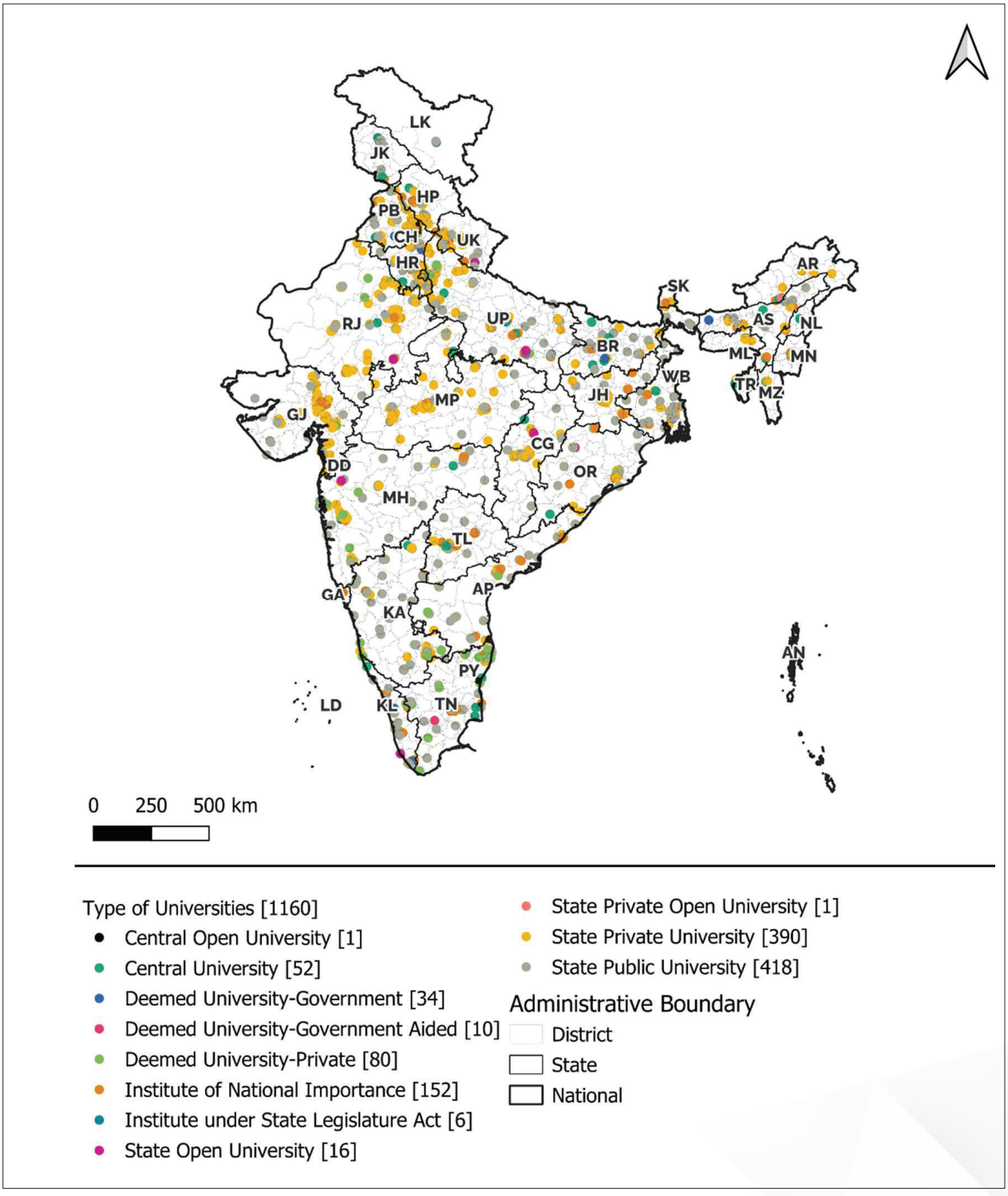

Figure 12: Location of Universities by Type

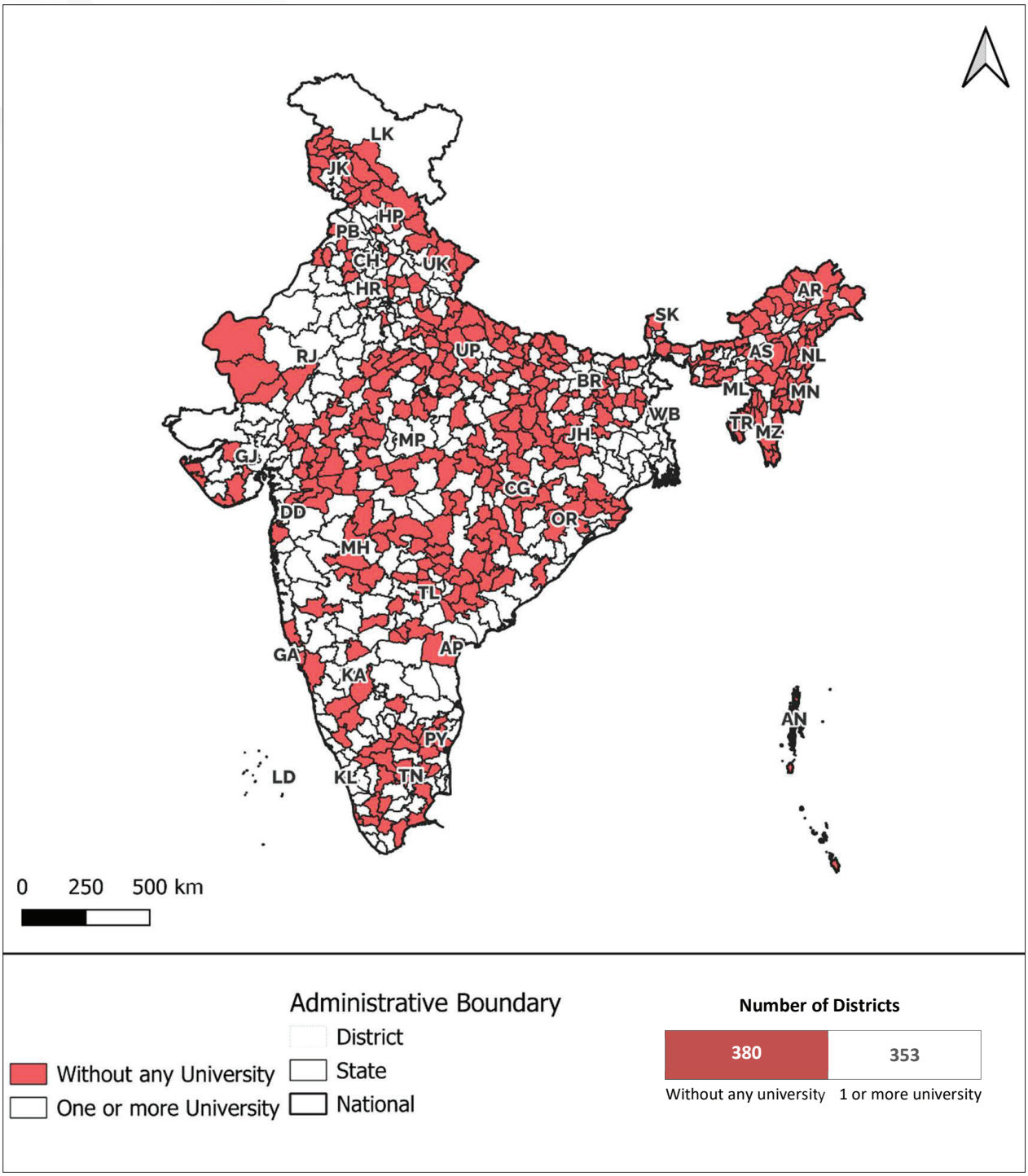

Figure 13: Districts without any University

5.2. Socio-demographic Characteristics

5.2.1. Number of Universities and Colleges per lakh population (18-23 Years)

The number of universities and colleges per lakh population in the age group of 18-23 years in India is 0.8 and 33, respectively. However, the ratio varies greatly among the states. The number of universities per lakh population in Chandigarh is the highest (17), whereas this ratio is less than 1 in 3 states namely Bihar, Uttar Pradesh, Chhattisgarh. The number of colleges per lakh population was 1 in Chhattisgarh and Andhra Pradesh, and as high as 1,692 in Arunachal Pradesh.

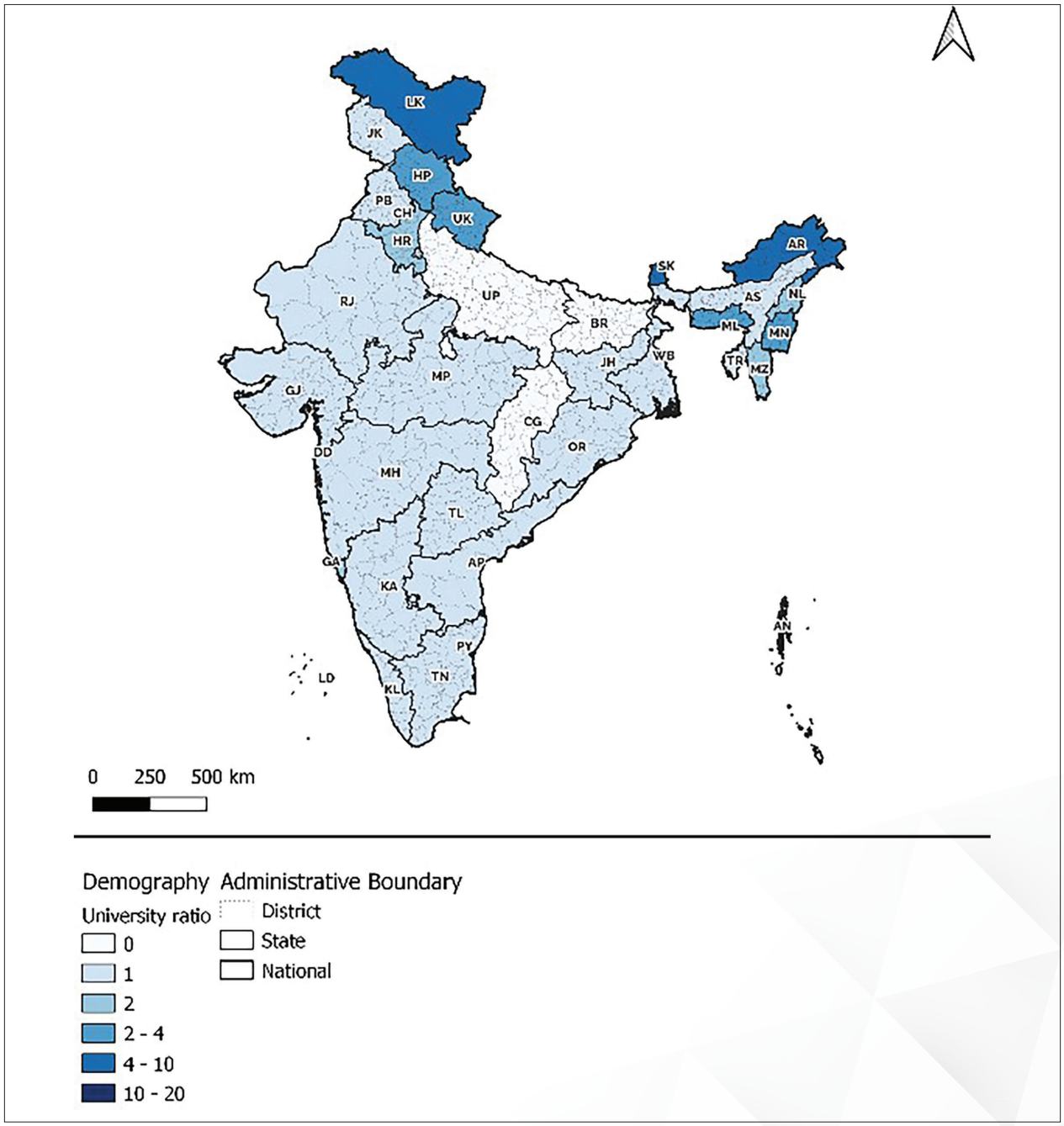

Figure 14: Number of Universities per lakh population (18-23 years)

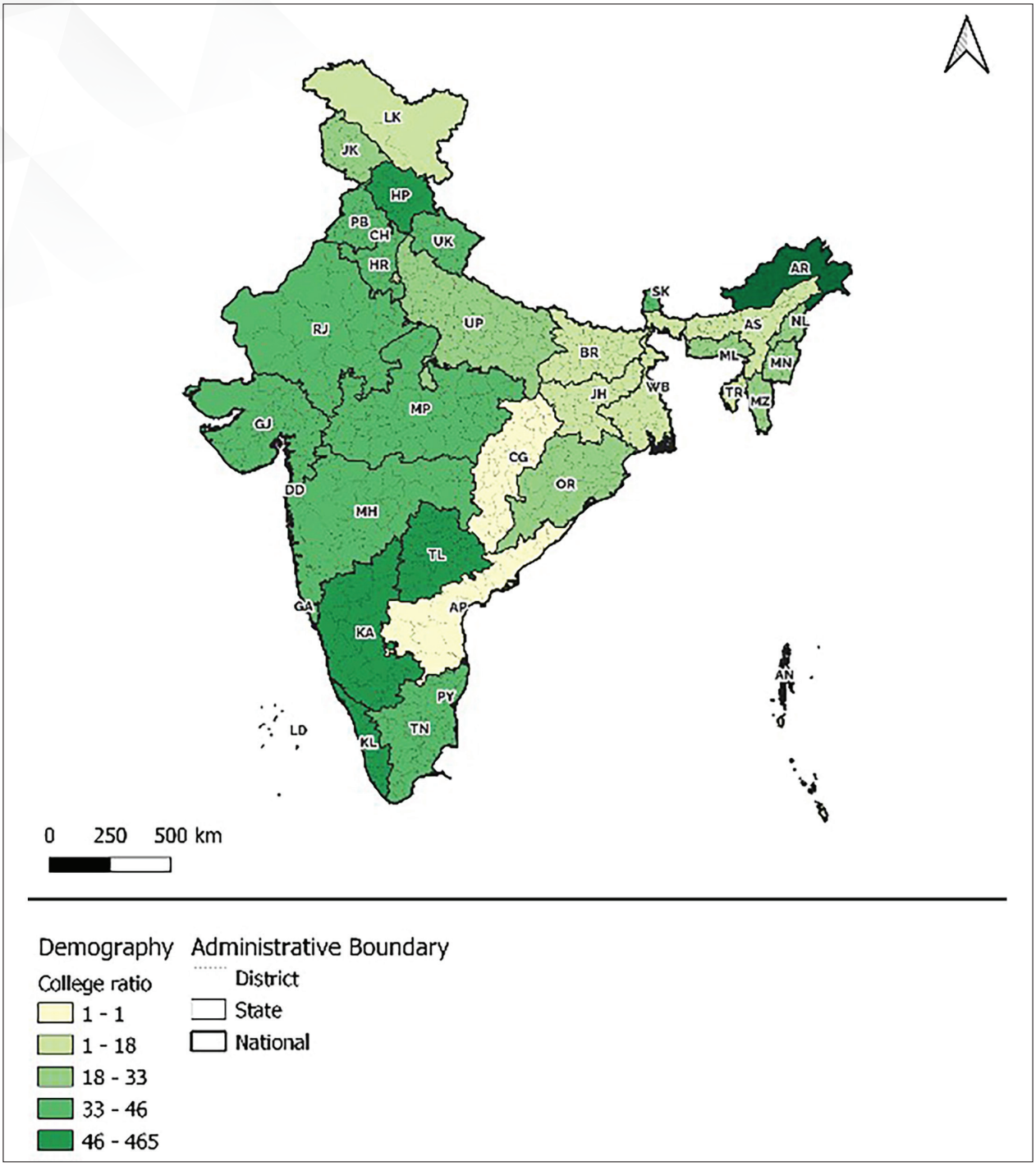

Figure 15: Number of Colleges per lakh population (18-23 years)

5.2.2. Gross Enrolment Ratio (GER) and Gender Parity Index (GPI)

As stated earlier, in 2021-22, GER in India was 28.4% in higher education (age group of 18 to 23 years). Female GER (28.5%) was marginally higher than that of males (28.3%). However, 17 states and UTs had less GER than the national average. Among the larger states, Tamil Nadu had recorded

a GER of 47%. The national average GPI was 1.01 in 2021-22. A total of 10 states had recorded a GPI of less than 1. Tripura, Sikkim, and Bihar recorded the lowest GPI in higher education. On the contrary, the smaller states and UTs had higher GPI, with Lakshadweep at the top, with a GPI of 6.33.

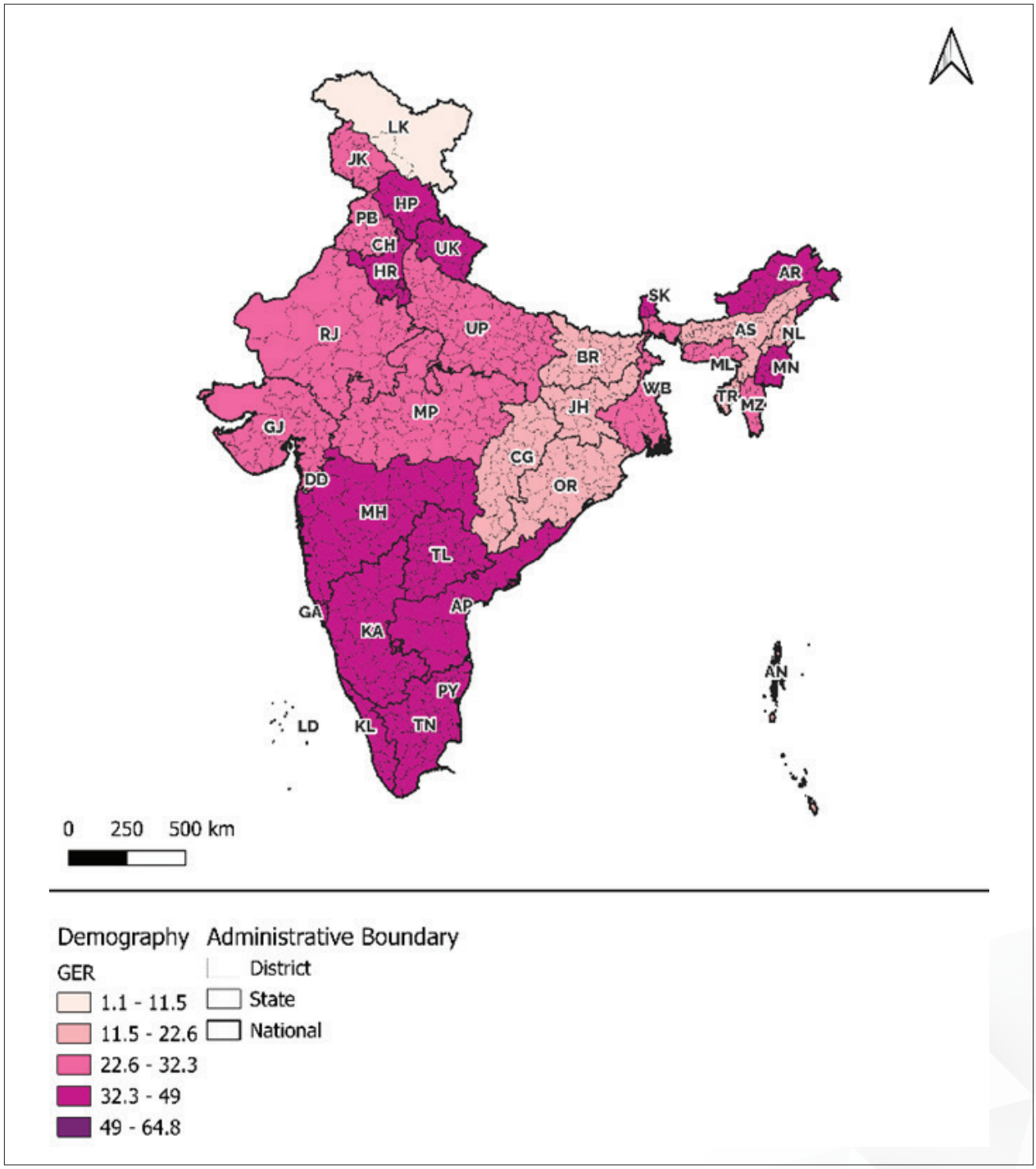

Figure 16: State-wise Gross Enrolment Ratio

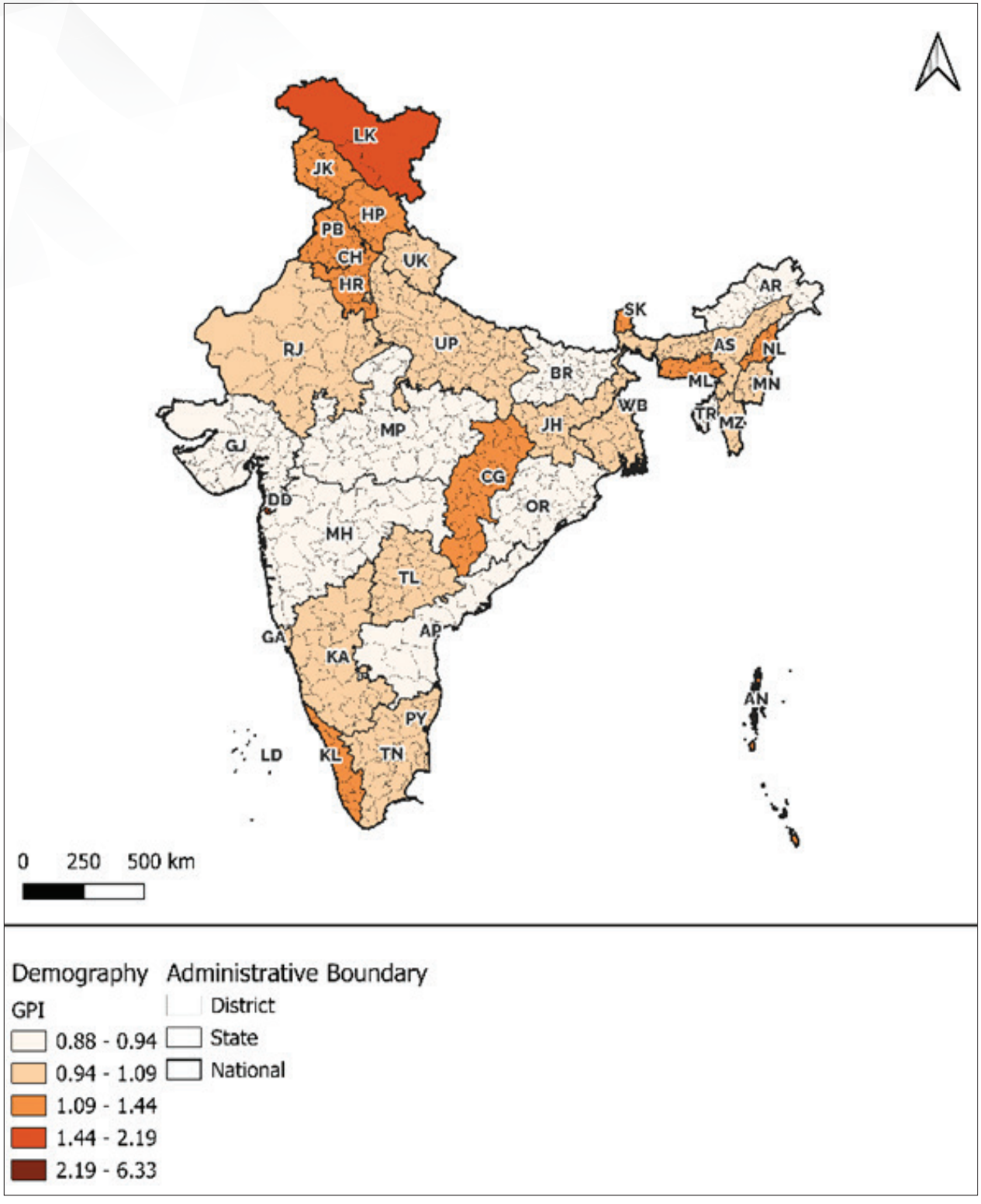

Figure 17: State-wise Gender Parity Index

6. RECOMMENDATIONS USING SPATIAL ANALYSIS

This paper aims to provide evidence-based recommendations for analysing the current spatial distribution of HEIs throughout the country and identifying optimal locations for establishing new universities at a macro scale. The study utilizes spatial analysis techniques in conjunction with relevant secondary datasets to gain insights into the spatial patterns and make recommendations regarding the location of new universities. These are made at 3 spatial scales, as elaborated below.

6.1. District-level Recommendations

6.1.1. Capital Cities of States/ UTs without a University

Overall, 3 UTs in India do not have any universities, namely the Andaman and Nicobar Islands, Dadra and Nagar Haveli and Daman and Diu, and Lakshadweep. It is, therefore recommended to set up a new university(s) or convert an affiliating college into an autonomous degree granting HEI at the capital city of the respective UT. The details of these UTs are given in Annexure - III.

6.1.2. Districts without universities but having more than 50 colleges

Out of the total 380 districts that do not have any university, 81 districts have 50 or more colleges. Most of these districts are neither part of the remote regions nor are they very sparsely populated. The considerably higher number of colleges establishes the fact that there is demand for higher education facilities there. Therefore, these districts (Figure 18) are recommended for setting up new cluster universities. The list of these districts is in Annexure- IV.

6.2. Region-level Recommendations

From the map (Figure 19) showing the current location of universities, it is quite evident that they are neither randomly nor evenly located over space, rather they are clustered in and around a few urban centres. In other words, districts with a higher number of universities are grouped together while there are multiple pockets of districts with no or lesser number of universities.

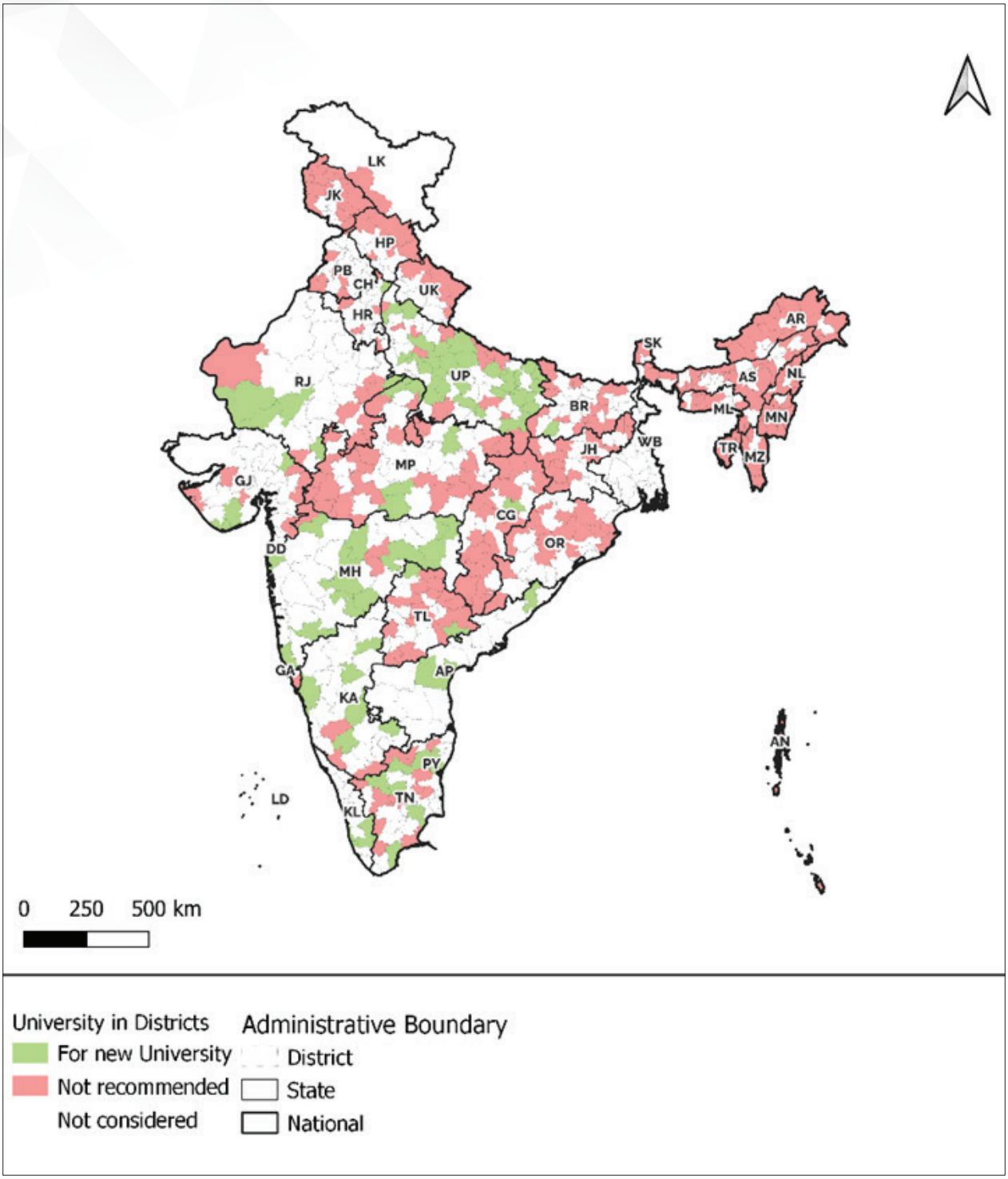

Figure 18: Districts without any Universities, having more than 50 Colleges

(Not Considered refers to districts that either already have at least one university, or have no universities but fewer than 50 colleges.)*

To analyse the spatial distribution of universities across the country and quantify the degree of concentration, a spatial statistical tool, namely spatial autocorrelation has been used. The term spatial autocorrelation refers to the presence of systematic spatial variation in a mapped variable. It is the correlation among values of a single variable strictly attributable to their relatively close locational positions on a two-dimensional surface. Positive spatial autocorrelation means that geographically nearby values of a variable tend to be similar on a map: high values tend to be located near high values, and low values near low values.

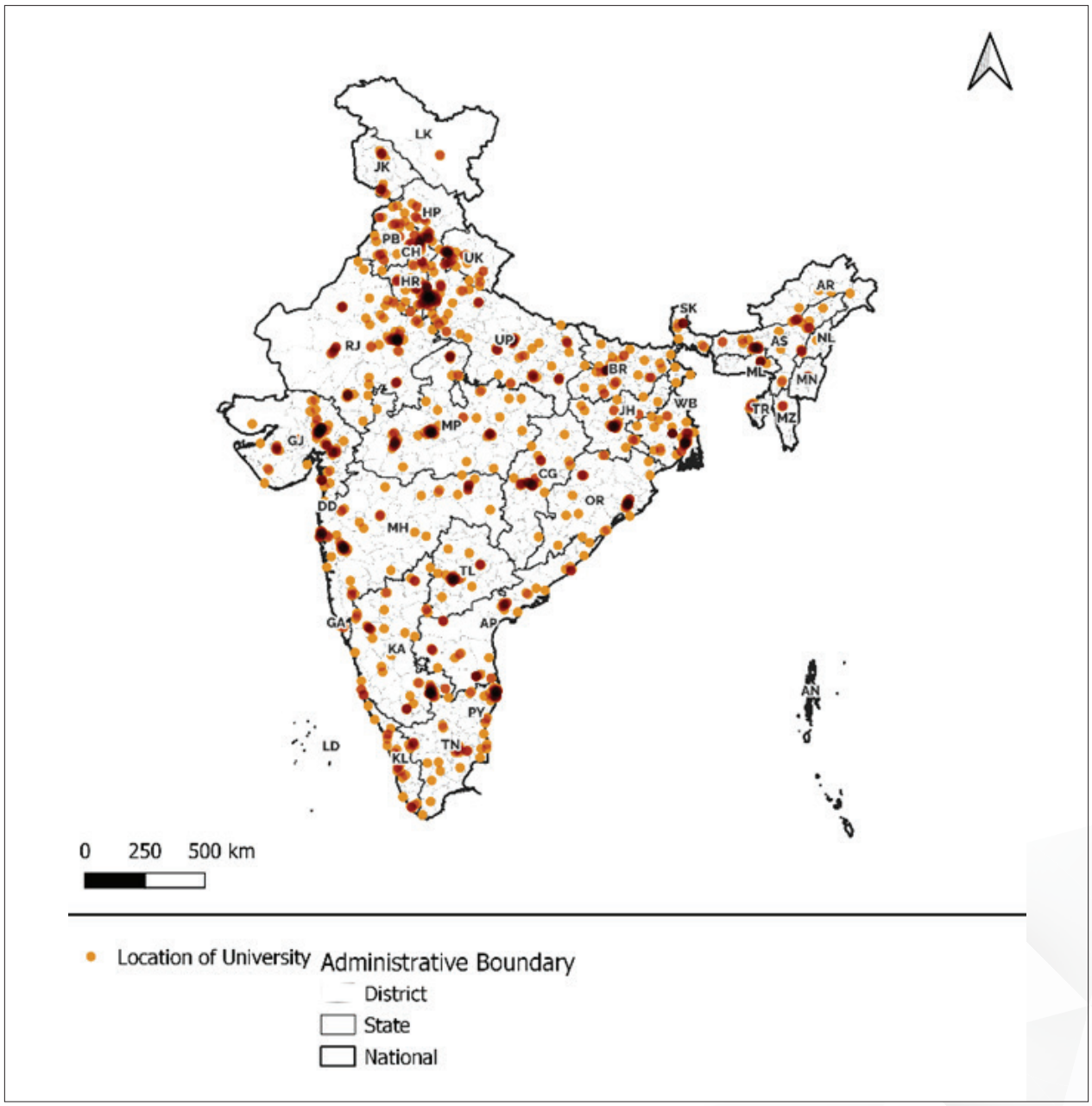

Figure 19: Location of current Universities

The most common way for testing spatial autocorrelation is the Moran's I statistic. It is designed to reject the null hypothesis of spatial randomness in favour of an alternative of clustering. However, clustering is a characteristic of the complete spatial pattern and does not indicate the location of the clusters. In order to identify the actual cluster locations in the dataset, Local Indicators of Spatial Association (LISA) were proposed by Luc Anselin in 1995. A LISA is seen as having two important characteristics. First, it provides a statistic for each location with an assessment of significance. Second, it establishes a proportional relationship between the sum of the local statistics and a corresponding global statistic. Local Moran's I statistic is the most widely used LISA statistic that describes spatial clustering of observations in high or low values. The formula for Moran's I statistic for an observation at location i is as follows:

$$I = \frac{\sum_i \sum_j w_{ij} z_i . z_j / S_0}{\sum_i z_i^2 / n}$$

Where:

z_i is $x_i - \bar{x}$, the mean of variable x

wij as the elements of the spatial weights matrix,

$S_0 = \sum_i \sum_j wij$ is the sum of all the weights

n is the number of observations

With the row-standardized weights, the sum of all weights, S_0 equals the number of observations, n. As a result, a corresponding Local Moran's I statistic would consist of the component in the double sum that corresponds to each observation i, or:

$$I_i = \frac{\sum_j w_{ij} z_i z_j}{\sum_i z_i^2}$$

i.e., the product of the value at location i with its spatial lag, the weighted sum of the values at neighbouring locations.

The Univariate Local Moran's I was calculated for the district map with the number of universities in each district as the variable with 'queen contiguity' for the spatial weight matrix. The LISA cluster map along with the Moran Scatter Plot was generated using Geoda, a free and open-source software tool for spatial data science. The Moran Scatter Plot displays the relationship between the variable value at observation i and the average variable value in the neighbourhood, organized into four quadrants: High-High, High-Low, Low-Low, and Low-High. Local Moran's I outcome is then colour-coded, based on scatterplot quadrant, onto a choropleth map illustrating spatial clusters.

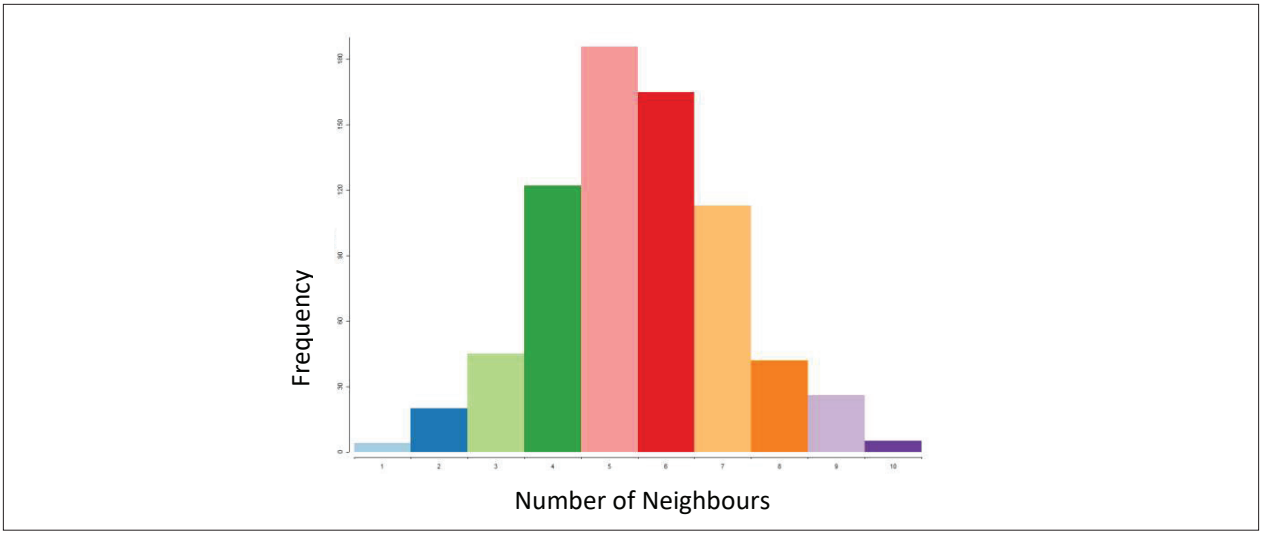

Figure 20: District Connectivity Histogram

The connectivity histogram is generated using the queen criterion that determines neighbouring units as those that have any point in common, including both common boundaries and common corners.

The Moran Scatter Plot shows the classification of spatial association into four categories, corresponding to the location of the points in the four quadrants of the plot.

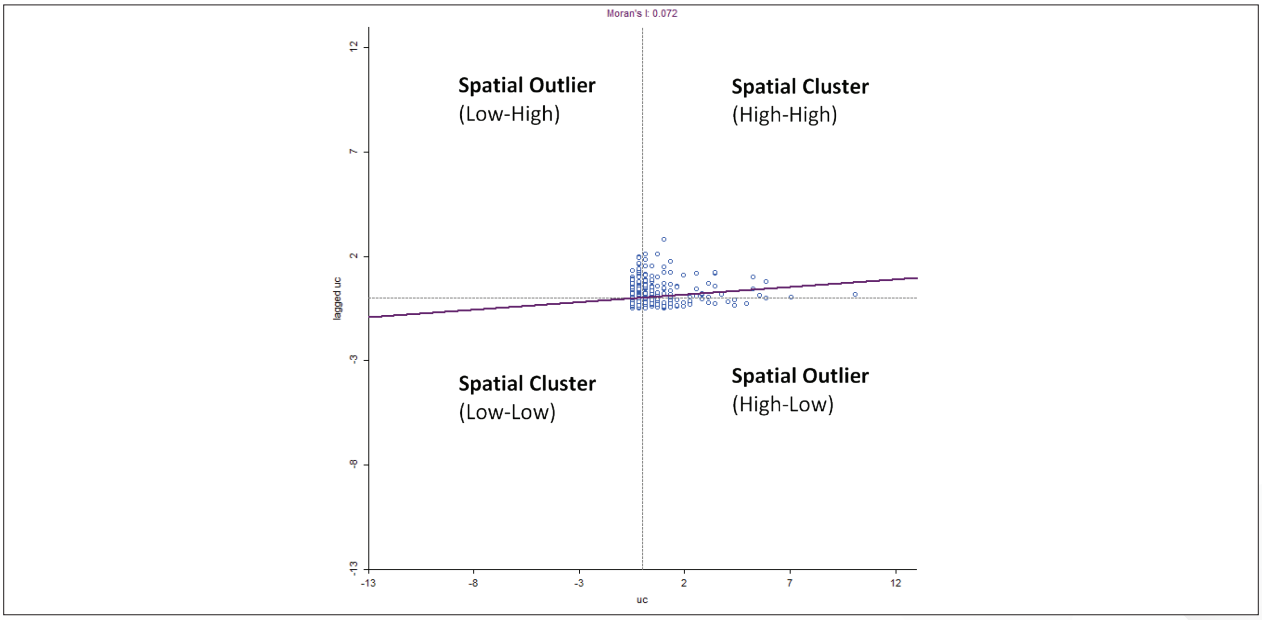

Figure 21: Moran Scatter Plot

This cluster map augments the significant locations with an indication of the type of spatial association, based on the location of the value and its spatial lag in the Moran Scatter Plot. Here, all four categories are represented, with the high-high clusters (52), the low-low clusters (76), the low-high spatial outliers (68), and the high-low spatial outliers (29). A total of 503 districts are found not significant here.

At the regional level, the analysis is used to identify the group of districts with a low number of universities surrounded by similar districts, where the setting up of new universities is recommended. These regions include the North East States particularly Arunachal Pradesh, Assam, and Manipur, the eastern part of Maharashtra, and southwestern part of Odisha, the eastern part of Madhya Pradesh with neighbouring southeastern part of Uttar Pradesh and Bihar, and the eastern districts of Gujarat along with neighbouring districts of western Madhya Pradesh. The state-wise details of the districts in these regions are given in Annexure – V.

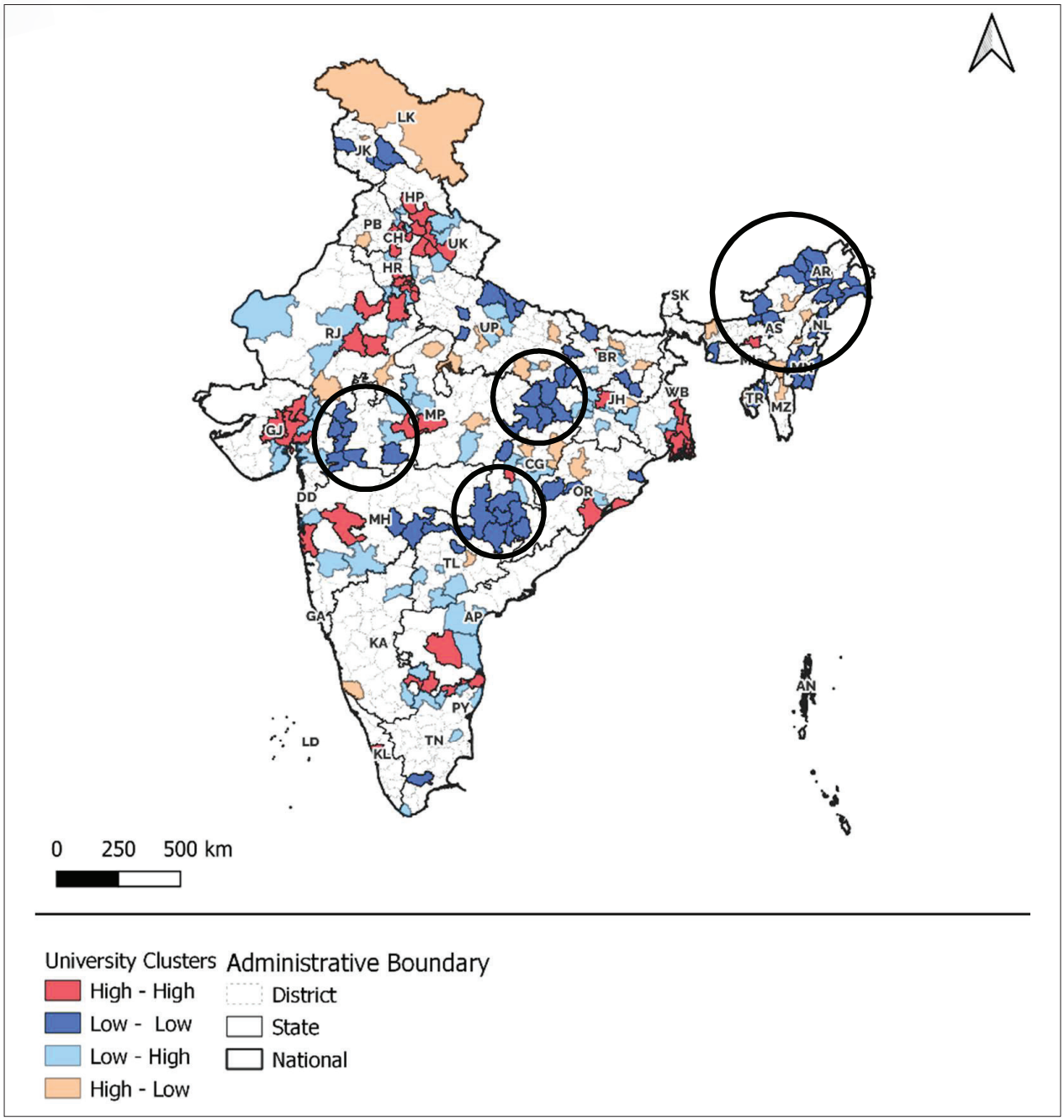

Figure 22: Local Spatial Autocorrelation (Moran's I)

6.3. State-level Recommendations

The GER and the number of Higher Education facilities per lakh population in the 18-23 years age group are considered to identify the states that require more universities on a priority basis.

According to United Nations Educational, Scientific and Cultural Organization (UNESCO), GER is defined as the total enrolment in a specific level of education, regardless of age, expressed as a percentage of the eligible age-group population corresponding to the same level of education in a given school year. The formula for GER is as follows:

$$GER = \frac{\text{Enrolment in a specific level of education}}{\text{Population of official age-group for the specific level of education}} \times 100$$

The University Ratio (UR) and College Ratio (CR) per lakh population (18-23 years age group) are derived by dividing the number of universities and colleges respectively by the total population of the corresponding state. In the beginning, all 3 factors, viz. GER, UR and CR are normalized using the following formulae:

$$\mathbf{z_i = (x_i - min(x)) / (max(x) - min(x))}$$

where:

z_i: The ith normalized value in the dataset

x_i: The ith value in the dataset

min(x): The minimum value in the dataset

max(x): The maximum value in the dataset

The percentage of the respective state population aged between 18 – 23 years to the total national population (TNP) in the same age group and to the total state population (TSP) was then calculated.

Finally, the composite score of states is calculated using the following formulae:

$$\mathbf{S_i = (1 - (GERn * 0.4) + (URn * 0.15) + (CRn * 0.15)) + (TNPp * 0.15) + (TSPp * 0.15))}$$

where:

S_i: The ith composite score in the dataset

GERn: Normalised GER of the ith item in the dataset

URn: Normalised university count per lakh population of the ith item in the dataset

CRn: Normalised college count per lakh population of the ith item in the dataset

TNPp: Percentage of the population to the national population of the ith item in the dataset

TSPp: Percentage of the population to the state population of the ith item in the dataset

TSPp: Percentage of the population to the state population of the ith item in the dataset

By sorting, the states/ UTs in ascending order of the composite score produce the list where the GER and the ratio of Colleges and Universities are low, but the population is high in the age group of 18-23 years. Therefore, states with higher composite scores will require more new universities to meet the demand.

This analysis shows that Uttar Pradesh, the most populous state in India, needs the highest number of new universities to meet its demand. Next to it, other larger states with higher populations like Maharashtra, West Bengal, Bihar, Rajasthan, and Madhya Pradesh are at a higher priority.

The complete calculation is given in Annexure – VI.

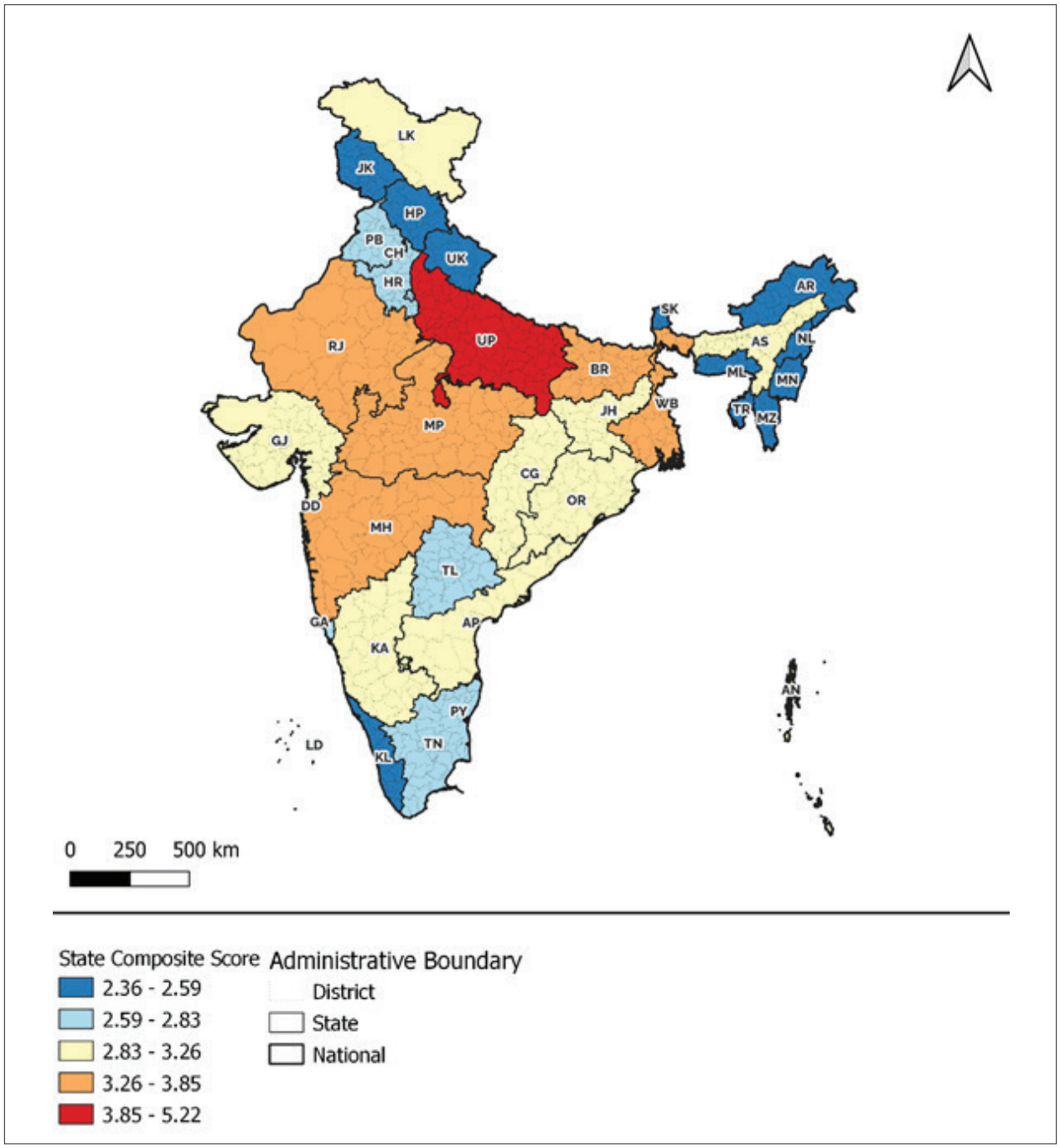

Figure 23: States requiring more Universities (as per the Composite Score)

7. WAY FORWARD

This paper provides a macro-scale analysis of the current distribution of universities across India and offers strategic recommendations for establishing new universities at district, regional, and state levels. The underlying data has been integrated into a dynamic spatial database, designed to be updated as more recent data becomes available. This database can be leveraged to develop a rule-based Spatial Decision Support System (SDSS) to enable policymakers and administrators in making informed, data-driven decisions. Additionally, if needed, an interactive online dashboard could be developed to enable real-time data and spatial analysis, enhancing the accessibility and applicability of these insights for ongoing planning and development.

The recommendations in this paper primarily focus on a macro scale, prioritizing states and districts across the country that require new universities. However, when planning for the development or expansion of universities, both greenfield and brownfield projects, it is crucial to consider several associated factors for their successful establishment. In addition to the macro-level analysis, further in-depth micro-scale studies are necessary while considering the following factors:

i. Location: Consider factors such as accessibility, transportation connectivity, and proximity to student populations.

ii. Demographics and Regional Demand: Analyse the demographics of the region and assess the demand for higher education.

iii. Infrastructure and Facilities: Evaluate the availability of infrastructure and facilities necessary for a university, including classrooms, laboratories, libraries, administrative buildings, student accommodations, and recreational spaces.

iv. Environmental Considerations: Prepare development plans by taking into account the environmental characteristics of the site, including topography, climate, and ecological factors.

v. Social and Cultural Context: Ensure that the university's mission and programmes reflect and respect the local context, promoting inclusivity and diversity within the campus community.

vi. Future Growth Potential: Evaluate the potential for future growth and expansion of the university.

Further, some specific pilot studies can be taken up for the following:

7.1 Special attention for improving Gender Parity Index

Gender Parity Index (GPI) in education is the ratio of the number of female students enrolled at a specific level of education to the number of male students at the same level. The formula for GPI is as follows:

$$GPI = \frac{\text{Number of female students in a specific level of education}}{\text{Number of male students in the specific level of education}}$$

While comparing the GPI for the age group 18 to 23 years with the sex ratio (per male) in states, it was found that many large and populous states have lower GPI in higher education than their respective sex ratio. Such states include Maharashtra, Bihar, West Bengal, Tamil Nadu, among others. Therefore, it is recommended to take up appropriate actions to encourage the equitable participation of girls in the Higher Education system in such states/UTs. The Government of India and the respective state governments may consider introducing targeted schemes to improve the GPI in higher education bridging the social and gender gaps in line with Samagra Shiksha - an Integrated Scheme for School Education (ISSE).

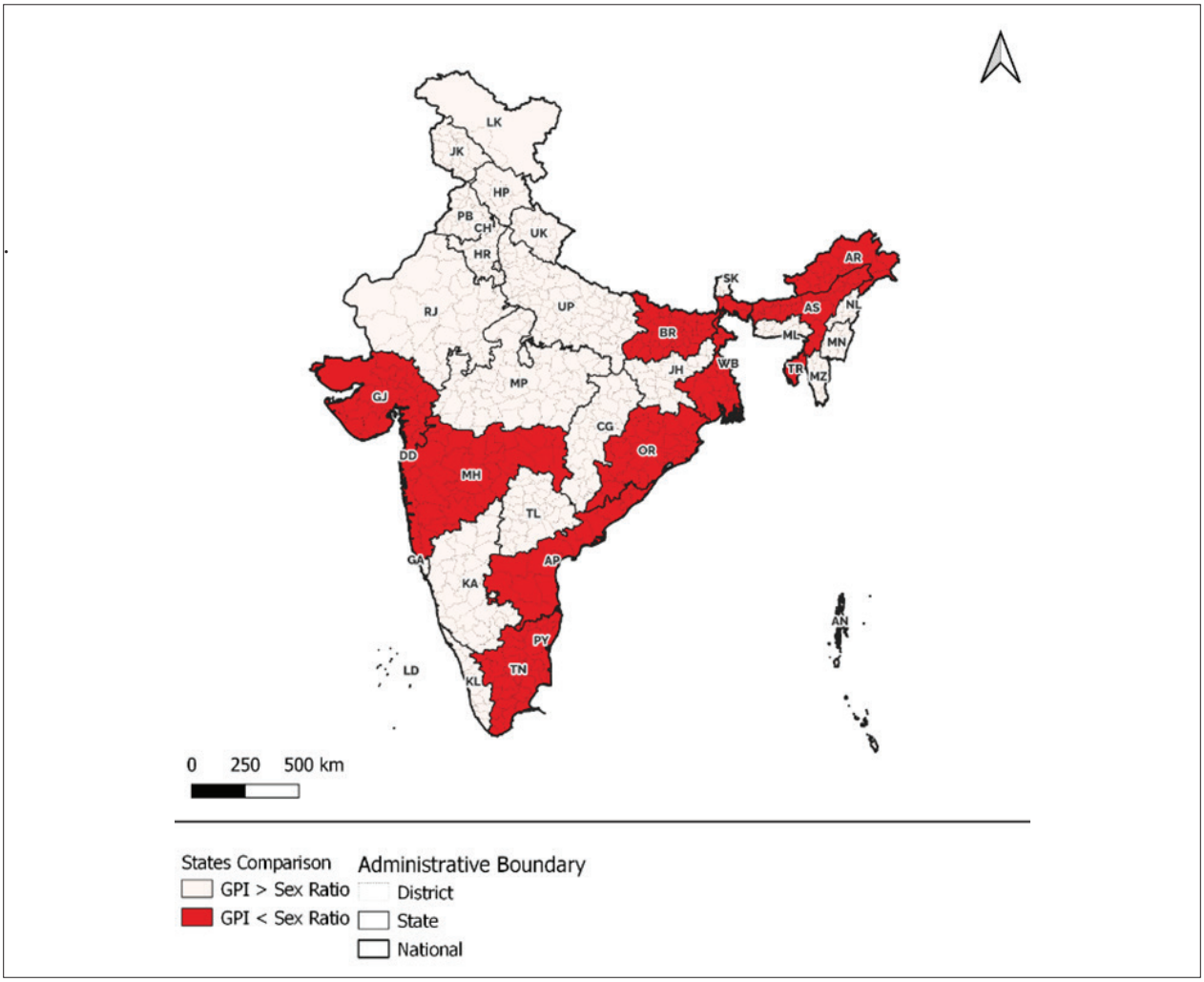

Figure 24: Comparison of GPI in Higher Education and Sex Ratio

7.2. Tribal/ Forest/ Hilly Districts for Specialized Universities

In most districts in the hilly regions and the tribal areas, the number of universities is relatively low. In order to encourage the local people for Higher Education, it is

recommended to set up specialized universities and departments in such areas, considering the local environment and demography. These may include Himalayan studies, Tribal studies, Culture, Handicrafts, Tourism, Local Language and Religion, etc. However, further research is recommended to identify and correlate the locations, specializations, and demand.

7.3. Technical University/ Vocational Training Institutes in Industrial Regions

A total of 34 universities and 113 Institutes of National Importance exists in India with specialization in technical studies. It is further recommended to take up a more detailed study to map the major industrial regions in India with their specializations and identify the gap in the supply of local skilled human resources. Based on such studies, new universities with selective specialization may be set up to fulfil the local talent demand.

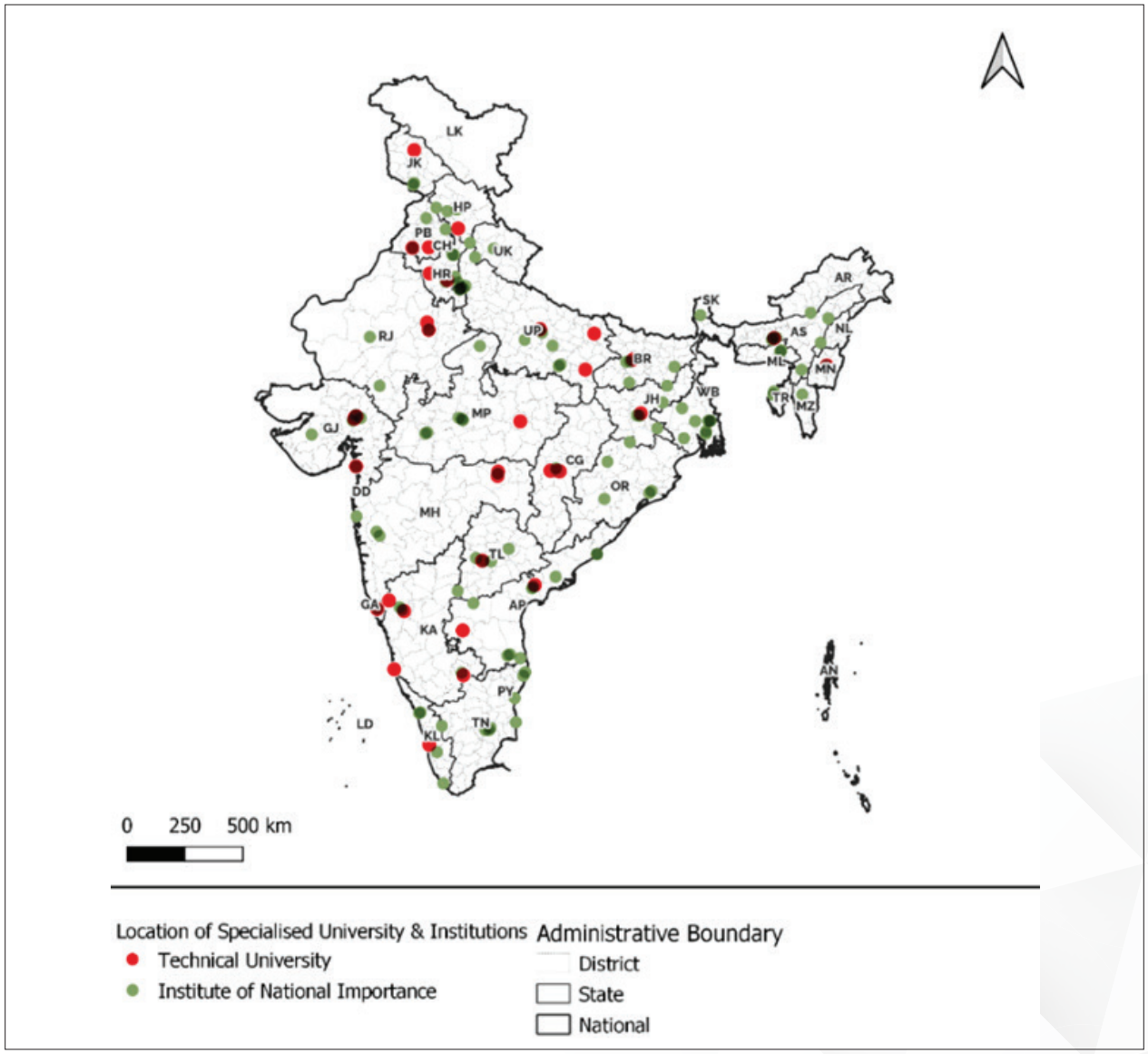

Figure 25: Location of Technical Universities and Institutes of National Importance

8. CONCLUSION

NEP 2020 envisages an increase in the GER in Indian Higher Education for the age group of 18-23 years to 50% by 2035. To take on board this quantum of students (about 4.5 crore additional students), many HEIs will have to plan both greenfield and brownfield campuses.

Several new universities including cluster universities will also need to be established. Identifying the optimal location for establishing new universities would entail careful consideration of a range of factors like regional demand, accessibility and proximity of nearby universities, collaboration opportunities with existing academic institutions, research organizations, and industries in the region, and the socio-economic characteristics of the locality.

The analysis of the spatial distribution of existing universities and colleges must play a crucial role in planning for the future growth plan. To ensure an effective and inclusive expansion of infrastructure, it is essential to adopt a data-driven approach.

This paper proposes the use of spatial and statistical analysis as a lens for infrastructure planning in higher education in India. By utilizing scientific and evidence-based methods, this approach will facilitate informed decision-making and promote equitable access to higher education across the country. As new institutions emerge, both greenfield and brownfield, this methodology will support the efficient allocation of resources and promote balanced educational opportunities for all, across regions.

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Annexure I: List of Districts in remote regions# with the number of universities and colleges

S. No.	District	State	Number of	
			College	University
1	Nicobars	ANDAMAN & NICOBAR	4	0
2	North and Middle Andaman		1	0
3	South Andamans		4	0
4	Anjaw	ARUNACHAL PRADESH	0	0
5	Changlang		2	0
6	Dibang Valley		1	0
7	East Kameng		1	0
8	East Siang		4	1
9	Kamle		0	0
10	Kra Daadi		0	0
11	Kurung Kumey		1	0
12	Leparada		0	0
13	Lohit		4	1
14	Longding		0	0
15	Lower Dibang Valley		2	0
16	Lower Siang		0	0
17	Lower Subansiri		3	1
18	Namsai		0	0
19	Pakke Kessang		0	0
20	Papum Pare		14	6
21	Shi Yomi		0	0
22	Siang		1	0
23	Tawang		1	0
24	Tirap		1	0
25	Upper Siang		1	0
26	Upper Subansiri		1	0
27	West Kameng		1	0
28	West Siang		4	1
29	Baksa	ASSAM	13	0
30	Barpeta		32	2
31	Biswanath		0	0
32	Bongaigaon		12	0
33	Cachar		31	2
34	Charaideo		7	0
35	Chirang		8	0

S. No.	District	State	Number of	
			College	University
36	Darrang	ASSAM	12	0
37	Dhemaji		25	0
38	Dhubri		19	0
39	Dibrugarh		22	1
40	Dima Hasao		1	0
41	Goalpara		16	0
42	Golaghat		19	0
43	Hailakandi		9	0
44	Hojai		3	1
45	Jorhat		27	4
46	Kamrup		101	6
47	Kamrup Metro		35	6
48	Karbi Anglong		15	0
49	Karimganj		17	0
50	Kokrajhar		23	2
51	Lakhimpur		27	1
52	Majuli		6	1
53	Morigaon		11	0
54	Nagaon		39	1
55	Nalbari		13	1
56	Sivasagar		14	0
57	Sonitpur		22	1
58	South Salmara Mancachar		0	0
59	Tinsukia		17	0
60	Udalguri		11	0
61	West Karbi Anglong		1	0
62	Bilaspur	HIMACHAL PRADESH	0	0
63	Chamba		16	0
64	Hamirpur		69	3
65	Kangra		83	4
66	Kinnaur		2	0
67	Kullu		13	0
68	Lahaul And Spiti		1	0
69	Mandi		54	4
70	Shimla		51	3
71	Sirmaur		30	2
72	Solan		43	11
73	Una		22	2

S. No.	District	State	Number of	
			College	University
74	Anantnag	JAMMU AND KASHMIR (UT)	17	0
75	Budgam		20	0
76	Bandipora		13	0
77	Baramulla		42	0
78	Doda		8	0
79	Ganderbal		9	0
80	Jammu		69	5
81	Kathua		29	0
82	Kishtwar		6	0
83	Kulgam		7	0
84	Kupwara		10	0
85	Mirpur		0	0
86	Muzaffarabad		0	0
87	Pulwama		20	1
88	Poonch		7	0
89	Rajouri		16	1
90	Ramban		5	0
91	Reasi		8	1
92	Samba		10	2
93	Shopian		4	0
94	Srinagar		46	6
95	Udhampur		15	0
96	Lakshadweep District	LAKSHADWEEP	3	0
97	Kargil	LADAKH	3	0
98	Leh ladakh		2	2
99	East Garo Hills	MEGHALAYA	3	0
100	East Jaintia Hills		3	0
101	East Khasi Hills		42	6
102	North Garo Hills		0	0
103	Ri Bhoi		8	3
104	South Garo Hills		1	0
105	South West Garo Hills		0	0
106	South West Khasi Hills		1	0
107	West Garo Hills		13	1
108	West Jaintia Hills		5	1
109	West Khasi Hills		6	0
110	Bishnupur	MANIPUR	10	0
111	Chandel		3	0

S. No.	District	State	Number of	
			College	University
112	Churachandpur	MANIPUR	6	0
113	Imphal East		20	1
114	Imphal West		36	6
115	Jiribam		1	0
116	Kakching		0	0
117	Kamjong		0	0
118	Kangpokpi		2	0
119	Noney		0	0
120	Pherzawl		0	0
121	Senapati		13	1
122	Tamenglong		2	0
123	Tengnoupal		1	0
124	Thoubal		10	1
125	Ukhrul		3	0
126	Aizawl	MIZORAM	25	3
127	Champhai		2	0
128	Kolasib		2	0
129	Lawngtlai		2	0
130	Lunglei		4	0
131	Mamit		2	0
132	Siaha		1	0
133	Serchhip		2	0
134	Dimapur	NAGALAND	27	5
135	Kiphire		1	0
136	Kohima		23	0
137	Longleng		1	0
138	Mokokchung		6	0
139	Mon		2	0
140	Peren		3	0
141	Phek		2	0
142	Tuensang		3	0
143	Wokha		2	0
144	Zunheboto		1	1
145	Gangtok	SIKKIM	22	6
146	Mangan		0	0
147	Namchi		4	2
148	Gyalshing		4	0

S. No.	District	State	Number of	
			College	University
149	Dhalai	TRIPURA	4	0
150	Gomati		1	0
151	Khowai		0	0
152	North Tripura		6	0
153	Sepahijala		0	0
154	South Tripura		5	0
155	Unakoti		1	0
156	West Tripura		38	5
157	Almora	UTTARAKHAND	18	2
158	Bageshwar		6	0
159	Chamoli		14	0
160	Champawat		11	0
161	Dehradun		132	19
162	Pauri Garhwal		25	5
163	Haridwar		128	8
164	Nainital		37	2
165	Pithoragarh		12	0
166	Rudra Prayag		7	0
167	Tehri Garhwal		22	1
168	Udam Singh Nagar		74	2
169	Uttar Kashi		10	0

The remote regions of India that deserve special attention, comprising the Himalayan states, the northeast region, and the islands spread across 14 states and UTs

* In alphabetical order of state/UT names; District names are as per Integrated Government Online Directory

Annexure II: List of Aspirational Districts with the number of universities and colleges

S. No.	District	State	Number of	
			College	University
1	Y.S.R.	ANDHRA PRADESH	191	3
2	Visakhapatnam		216	6
3	Vizianagaram		142	0
4	Namsai	ARUNACHAL PRADESH	0	0
5	Baksa	ASSAM	13	0
6	Barpeta		32	2
7	Darrang		12	0
8	Goalpara		16	0
9	Hailakandi		9	0
10	Dhubri		19	0
11	Udalguri		11	0
12	Araria	BIHAR	11	0
13	Aurangabad		291	0
14	Banka		18	0
15	Begusarai		22	0
16	Gaya		60	3
17	Jamui		11	0
18	Katihar		19	1
19	Khagaria		12	0
20	Muzaffarpur		59	1
21	Purnia		24	1
22	Sheikhpura		8	0
23	Sitamarhi		18	0
24	Nawada		23	0
25	Korba	CHHATTISGARH	28	0
26	Mahasamund		22	0
27	Rajnandgaon		51	1
28	Balrampur		29	0
29	Bastar		24	1
30	Sukma		5	0
31	Narayanpur		4	0
32	Dakshin Bastar Dantewada		11	0
33	Kondagaon		7	0
34	Uttar Bastar Kanker		8	0

S. No.	District	State	Number of	
			College	University
35	Dahod	GUJARAT	35	0
36	Narmada		17	1
37	Chamba	HIMACHAL PRADESH	16	0
38	Nuh	HARYANA	17	0
39	Bokaro	JHARKHAND	26	0
40	Chatra		5	0
41	Dumka		12	1
42	Garhwa		18	0
43	Godda		7	0
44	Gumla		8	0
45	Hazaribagh		26	2
46	Latehar		3	0
47	Lohardaga		3	0
48	Pakur		3	0
49	Palamu		23	2
50	Pashchimi Singhbhum		15	1
51	Purbi Singhbhum		33	1
52	Ramgarh		11	1
53	Ranchi		61	18
54	Sahibganj		5	0
55	Simdega		3	0
56	Khunti		2	0
57	Giridih		18	0
58	Baramulla	JAMMU AND KASHMIR (UT)	42	0
59	Kupwara		10	0
60	Raichur	KARNATAKA	162	3
61	Yadgir		101	0
62	Wayanad	KERALA	36	1
63	Gadchiroli	MAHARASHTRA	77	1
64	Nandurbar		46	0
65	Washim		40	0
66	Osmanabad		67	0
67	Ri Bhoi	MEGHALAYA	8	3
68	Chandel	MANIPUR	3	0

S. No.	District	State	Number of	
			College	University
69	Barwani	MADHYA PRADESH	37	0
70	Chhatarpur		113	2
71	Damoh		43	1
72	Guna		34	1
73	Rajgarh		40	0
74	Singrauli		32	0
75	Vidisha		70	1
76	Khandwa		24	1
77	Mamit	MIZORAM	2	0
78	Kiphire	NAGALAND	1	0
79	Dhenkanal	ODISHA	33	0
80	Balangir		32	1
81	Gajapati		14	1
82	Kalahandi		38	1
83	Kandhamal		21	0
84	Koraput		21	1
85	Malkangiri		8	0
86	Nabarangpur		11	0
87	Nuapada		11	0
88	Rayagada		23	1
89	Moga	PUNJAB	49	0
90	Firozpur		39	1
91	Baran	RAJASTHAN	31	0
92	Dholpur		57	0
93	Jaisalmer		15	0
94	Karauli		43	0
95	Sirohi		29	1
96	Gyalshing	SIKKIM	4	0
97	Khammam	TELANGANA	123	0
98	Kumuram Bheem Asifabad		4	0
99	Jayashankar Bhupalapally		3	0
100	Virudhunagar	TAMIL NADU	63	1
101	Ramanathapuram		40	0
102	Dhalai	TRIPURA	4	0

S. No.	District	State	Number of	
			College	University
103	Haridwar	UTTARAKHAND	128	8
104	Udam Singh Nagar		74	2
105	Bahraich	UTTAR PRADESH	45	0
106	Balrampur		10	0
107	Chandauli		57	0
108	Chitrakoot		27	1
109	Fatehpur		85	0
110	Shrawasti		11	0
111	Siddharthnagar		43	1
112	Sonbhadra		47	0

* In alphabetical order of state/UT names; District names are as per Integrated Government Online Directory

Annexure III: List of UTs without any university

S. No.	Union Territory	Number of Colleges
1	Andaman and Nicobar Islands	9
2	Lakshadweep	3
3	Dadra and Nagar Haveli and Daman and Diu	21

*In alphabetical order of UT names

Annexure IV: Districts without any universities but having more than 50 colleges

S. No.	District	State	No of Colleges
1	Prakasam	ANDHRA PRADESH	251
2	Vizianagaram		142
3	Aurangabad	BIHAR	291
4	Janjgir-Champa	CHHATTISGARH	70
5	Arvalli	GUJARAT	69
6	Gir Somnath		57
7	Amreli		53
8	Yamunanagar	HARYANA	56
9	Yadgir	KARNATAKA	101
10	Hassan		88
11	Chitradurga		84
12	Uttara Kannada		75
13	Koppal		67
14	Chikkaballapura		62
15	Alappuzha	KERALA	80
16	Pathanamthitta		79
17	Idukki		61
18	Bhind	MADHYA PRADESH	108
19	Morena		105
20	Betul		77
21	Hoshangabad		62
22	Panna		53
23	Beed	MAHARASHTRA	136
24	Latur		123
25	Chandrapur		120
26	Sangli		117
27	Jalna		104
28	Buldhana		96
29	Yavatmal		93
30	Bhandara		80
31	Dhule		69

S. No.	District	State	No of Colleges
32	Gondia		69
33	Osmanabad/ Narmadapuram		67
34	Palghar		66
35	Sindhudurg		64
36	Pratapgarh	RAJASTHAN	185
37	Barmer		80
38	Jalore		71
39	Pali		66
40	Dholpur		57
41	Namakkal	TAMIL NADU	135
42	Erode		94
43	Viluppuram		83
44	Dharmapuri		78
45	Tiruvannamalai		75
46	Pudukkottai		66
47	Thoothukkudi		65
48	Khammam	TELANGANA	123
49	Adilabad		94
50	Ghazipur	UTTAR PRADESH	325
51	Azamgarh		276
52	Mau		176
53	Sultanpur		164
54	Ambedkar Nagar		145
55	Deoria		137
56	Hardoi		133
57	Bijnor		124
58	Etah		116
59	Mainpuri		104
60	Sitapur		102
61	Gonda		95
62	Unnao		94
63	Jalaun		93
64	Baghpat		92

S. No.	District	State	No of Colleges
65	Kannauj		92
66	Kanpur Dehat		89
67	Mirzapur		86
68	Fatehpur		85
69	Muzaffarnagar		84
70	Kushinagar		82
71	Farrukhabad		81
72	Kaushambi		80
73	Hathras		79
74	Mahrajganj		72
75	Auraiya		70
76	Basti		70
77	Sant Kabir Nagar		70
78	Kheri		66
79	Shahjahanpur		60
80	Chandauli		57

* In alphabetical order of state/UT names; District names are as per Integrated Government Online Directory

Annexure V: Districts as identified in the Region-level Recommendations

S. No.	District	State	Number of	
			College	University
1	Changlang	ARUNACHAL PRADESH	2	0
2	East Siang		4	1
3	Lohit		4	1
4	Lower Siang		0	0
5	Shi Yomi		0	0
6	Siang		1	0
7	Upper Siang		1	0
8	Upper Subansiri		1	0
9	West Kameng		1	0
10	West Siang		4	1
11	Dibrugarh	ASSAM	22	1
12	Nagaon		39	1
13	Sonitpur		22	1
14	Tinsukia		17	0
15	Udalguri		11	0
16	Jamui	BIHAR	11	0
17	Kaimur (Bhabua)		17	0
18	Purbi Champaran		23	1
19	Rohtas		42	1
20	Balrampur	CHHATTISGARH	29	0
21	Bastar		24	1
22	Bijapur		6	0
23	Dakshin Bastar Dantewada		11	0
24	Kabeerdham		19	0
25	Kondagaon		7	0
26	Korea		21	0
27	Narayanpur		4	0
28	Surajpur		10	0
29	Uttar Bastar Kanker		8	0

S. No.	District	State	Number of	
			College	University
30	Dahod	GUJARAT	35	0
31	Doda	JAMMU AND KASHMIR (UT)	8	0
32	Kishtwar		6	0
33	Kulgam		7	0
34	Poonch		7	0
35	Ramban		5	0
36	Deoghar	JHARKHAND	17	1
37	Alirajpur	MADHYA PRADESH	9	0
38	Anuppur		34	1
39	Barwani		37	0
40	Jhabua		16	0
41	Khandwa		24	1
42	Singrauli		32	0
43	Gadchiroli	MAHARASHTRA	77	1
44	Nanded		121	1
45	Nandurbar		46	0
46	Parbhani		81	1
47	Chandel	MANIPUR	3	0
48	Churachandpur		6	0
49	Kamjong		0	0
50	Noney		0	0
51	Senapati		13	1
52	Tamenglong		2	0
53	Tengnoupal		1	0
54	West Garo Hills	MEGHALAYA	13	1
55	Longleng	NAGALAND	1	0
56	Mon		2	0
57	Tuensang		3	0
58	Zunheboto		1	1
59	Balangir	ODISHA	32	1
60	Boudh		7	0
61	Bhadrak		41	0
62	Banswara	RAJASTHAN	70	1

S. No.	District	State	Number of	
			College	University
63	Virudhunagar	TAMIL NADU	63	1
64	Karimnagar	TELANGANA	173	1
65	Mancherial		2	0
66	Nirmal		1	1
67	Dhalai	TRIPURA	4	0
68	Gomati		1	0
69	North Tripura		6	0
70	Auraiya	UTTAR PRADESH	70	0
71	Bahraich		45	0
72	Ballia		147	1
73	Farrukhabad		81	0
74	Kheri		66	0
75	Shrawasti		11	0
76	Sonbhadra		47	0

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Annexure VI: Composite score for States for State-level Recommendations

Rank	State Name	GER	Population ('000s)		Per lakh population		Composite Index
			Total	18-23 years	Unive-rsity	College	
1	Uttar Pradesh	25.3	2,29,672	25,289	0	32	5.22
2	Maharashtra	32.3	1,23,961	13,193	1	35	3.85
3	West Bengal	19.9	97,871	10,833	1	14	3.74
4	Bihar	14.5	1,22,341	12,023	0	11	3.70
5	Rajasthan	24.1	78,861	9,156	1	46	3.62
6	Madhya Pradesh	24.2	84,040	9,021	1	41	3.48
7	Chhattisgarh	52.1	1,250	205	17	465	3.41
8	Gujarat	21.3	69,403	7,246	1	39	3.26
9	Karnataka	32	66,627	6,843	1	66	3.13
10	Andaman and Nicobar Islands	20	348	51	0	18	3.12
11	Andhra Pradesh	35.2	52,669	5,388	1	1	2.95
12	Chandigarh	18.5	28,492	3,170	0	1	2.94
13	Odisha	21.7	45,552	4,590	1	28	2.92
14	Assam	17.3	36,174	3,760	1	16	2.91
15	Ladakh	7.9	297	37	5	14	2.89
16	Jharkhand	20.9	38,274	3,909	1	9	2.88
17	Haryana	29.3	29,881	3,182	2	35	2.83
18	Tamil Nadu	51.4	76,255	6,853	1	41	2.83
19	Telangana	35.6	37,574	3,902	1	54	2.82
20	Dadra and Nagar Haveli and Daman and Diu	9.4	1,104	132	0	16	2.80
21	Delhi	48	20,414	2,359	1	8	2.75
22	Punjab	28.2	30,512	3,079	1	35	2.73
23	Goa	28.4	1,555	186	2	39	2.71

Rank	State Name	GER	Population ('000s)		Per lakh population		Composite Index
			Total	18-23 years	Univer-sity	College	
24	Lakshadweep	7.5	68	7	0	40	2.65
25	Nagaland	26.1	2,182	241	2	29	2.59
26	Mizoram	26.1	1,162	127	2	31	2.57
27	Tripura	20.2	4,051	427	1	13	2.56
28	Puducherry	46.3	1,488	173	2	53	2.56
29	Arunachal Pradesh	35.4	1,596	158	6	1692	2.54
30	Uttarakhand	41.5	11,346	1,189	3	42	2.53
31	Meghalaya	26.1	3,272	335	3	24	2.49
32	Manipur	38.3	3,149	325	3	33	2.43
33	Kerala	38.8	34,127	2,934	1	53	2.43
34	Sikkim	75.8	673	77	10	39	2.41
35	Jammu and Kashmir	32.4	13,365	1,220	1	30	2.36
36	Himachal Pradesh	40.8	7,374	709	4	54	2.36

* In descending order of composite score for state/UTs

Designed by:

NITI Aayog