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Higher Education in India: A Geographical Study

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Abstract
In the light on the ancient times, there were prominent universities of Nalanda, Takhashila, Vallabhi and Vikramshila which attract the scholars from all over the world in the field of higher education. The first three modern universities were established at Bombay (now Mumbai), Calcutta (now Kolkata) and Madras (now Chennai) in 1857 on the pattern of London University. Although the growth of higher education in British period was very slow. On the other side of scale, India has made significant growth since independence in terms of institutions, volume of enrolment and diversification of educational programmes. Higher education provides the capable manpower trained in arts, science, medicine, computer applications, agriculture and various technical and professional courses. At the national level, the number of universities is increased by twenty one times from 30 in 1951 to 642 in 2011. Against this, colleges increased by fifty times from 695 in 1951 to 34852 in 2011. This paper attempts to analyse the existing scenario of higher education in India. The main objective is to examine the spatial distribution of higher education among the major states[1] of India. This has been done to make a comparative study among the states in terms of number of colleges and universities served to area and population contexts and secondly to check the inter-state disparity in gross enrolment ratio of the states. A geographical approach has been adopted to deal with these aspects of higher education in making a comparison.
Keywords: Higher Education, Colleges, Universities, Gross Enrolment Ratio, Major States.

1. INTRODUCTION

Higher education is a key driver for the socio-economic growth of the country. India has made significant growth since independence in quantitative terms. As per All India Survey on Higher Education, 2011 reveals that there are 10.60 colleges served per 1000 sq. km, on one hand and 2.88 colleges served per lakh population, on the other. The range difference is 7.72. Against this, there are 19.53 universities served per ten thousand sq km on one side of scale, on the other hand 0.53 universities served per ten lakh people in India. The range difference is 19. It reflects that there are wider variations in terms of area and population served by colleges and universities in India. These variations are clearly visible at the regional level. It varies from a thousand sq km is served by 236.84 college in Chandigarh, the highest to lowest with 0.31 college in Arunachal Pradesh. The range difference is 236.53. On the other scale, in the context of population it varies from a high of 6.65 colleges per lakh population in Puducherry to a low of only 0.62 colleges in Bihar. The range difference is 6.03. In the context of universities, it is high in National Capital Territory of Delhi with 1685.77 per ten thousand sq. km to a low of 3.58 in Arunachal Pradesh. The range difference is 1682.19. On the other side in population context, recorded high with 0.98 in Sikkim to a low of 0.02 in Bihar. The range difference is 0.96. There is absence of universities in some of union territories[2].

In the light of the above paragraph it is evidently clear that inter-state and Union Territories variations are much sharper. Thus, it creates a difficulty for the comparative study of all the states and union territories. In this paper, the comparative study among the major states to figure out the states with higher availability and accessibility of higher education in India and union territories are excluded from the analysis for being smaller geographical units. There are basically two sections; In the first, the spatial distribution of higher education separately for colleges and universities with respect to the major states of India followed by index has been calculated to examine the inter-state variations and in the second section analyses the influence or availability of higher education institutes on the Gross enrolment ratio of the states or in other words, whether the higher availability of educational institutes leads to the higher enrolment ratio or there is no relation between the two.

1.1 DATA SOURCE AND METHODOLOGY

This paper uses secondary data and it is available from different reports of University Grants Commission, New Delhi, All India Survey on Higher Education and Five Year Plan documents available from the Planning Commission, New Delhi. A spatial picture of higher educational scenario has been arrived at with the help of the four indicators of colleges and universities reflecting the dimensions with respect to area and population context. This has been done with the help of the composite index method. The index value for each indicator has been

[1] Major states are Haryana, Kerala, Tamil Nadu, Uttarakhand, Punjab, West Bengal, Himachal Pradesh, Uttar Pradesh, Bihar, Karnataka, Gujarat, Andhra Pradesh, Jharkhand, Maharashtra, Rajasthan, Odisha, Assam, Chhattisgarh Madhya Pradesh and Jammu and Kashmir.
[2] There is no university in Andaman & Nicobar Islands, Dadra & Nagar Haveli, Daman & Diu and Lakshadweep.

prepared by using ranking method, wherein the maximum obtainable score value for an indicator is assigned a value of first rank and the scores for the lower values are proportionately computed. This has been done in the light of area and population served by college/universities is converted into according their ranks and these ranks are added to give the composite ranking of the overall picture of higher education. Accordingly, the ranking for the states of India has been calculated for all the indicators separately for colleges and universities and then arrived at a composite index of higher educational institutes for each of the state. In the following, an attempt has been made to discern the spatial distribution of colleges and universities in the states of India, 2011. Based on the index scores, states have been grouped into three levels of high, moderate and low. The range technique is used for the cartographic representation of the spatial distribution of higher education in a single map. The range between the highest and the bottom value is calculated and divided it by the three to figure out the interval for the three categories. The data have been presented through different tables and maps.

1.1.1 RESULTS AND DISCUSSION

Spatial Distribution of Higher Education

At the national level distribution of colleges and universities revealed wider inter-state variation in the country. According to the area and population contexts, four indicators are framed for the analysis with the specific units. These are given below:-

- Number of colleges per thousand sq. km
- Number of colleges per lakh population
- Number of universities per ten thousand sq. km
- Number of universities per ten lakh population

For the detailed analysis the available data have been divided into high and low as per the national average. Those placed above the national average are designated above as high and those below as low.

1. Area served by colleges higher than the national average (10.60)

A). For comparative analysis major states of India are compared with national level. At the national level, on an average 1000 sq. km is served by 10.60 colleges. In other words in these states, on an average approximately 100 sq. km area is served by one college. Of the total twenty states, eight states have more than the national average. In this category, it ranges from a highest of 26.58 in Kerala to a lowest of 17.51 in Andhra Pradesh. The range difference is 9.07. In other words the states at the top have two times higher than at the bottom. Of eight states four states or fifty percent are located in the southern belt and these region lie in the state of Kerala, Tamil Nadu, Karnataka, and Andhra Pradesh (Table1). And the other states are one from the Western region namely Maharashtra and three from the Northern region i.e. Haryana, Uttar Pradesh and Punjab. (Fig 1)

B). Area served by colleges lower than the national average (10.60)

Table 1 shows that of the total twenty states, 12 or sixty percent have area served by colleges lower than the 10.60 colleges. It ranges highest of 10.15 in West Bengal to a lowest of 1.38 in Jammu & Kashmir. The range difference is 8.77. In other words the states at the top have seven times higher than at the bottom. There are two belts recognized through the map, it can be seen clearly three states such as Jammu & Kashmir, Himachal Pradesh and Uttarakhand from the northern region and the second belt extended from Western region i.e. Gujarat, Rajasthan to Central region; Madhya Pradesh and Chhattisgarh then to Eastern region such as Bihar, Jharkhand, Odisha, West Bengal and Assam (Fig 1)**.** It is observed that the coastal areas or Southern region of India where area served by colleges is above the national average as these areas are characterized with the beginning of educational centres by Britishers as first three modern universities were established in British India in 1857 in Calcutta, Bombay and Madras as well as Christian missionaries' education centres were spread education in southern states of Kerala and Tamil Nadu. Northern states like Haryana and Punjab are economically well states and topography of these areas are plain, which never constraints for the establishment of educational centres in these areas.

The lower distribution of colleges is found in Himachal Pradesh, Assam, Jammu and Kashmir, and Uttarakhand. Due to their hilly terrain, harsh climate, scattered population is the main constraints for the opening of the educational centres. India's poorest and most backward states Bihar and Odisha where government efforts are not sufficiently provide the higher educational centres. Rajasthan, Madhya Pradesh and Gujarat represent low distribution of colleges as Rajasthan is characterized by sharp differences in terms of terrain, most of the area is deserted which is not appropriate for educational centre. Two-tenth of the area share is covered by the two states of Rajasthan and Madhya Pradesh. It is concluded that the Southern states and Northern states like Haryana and Punjab doing better as these are economically well states and their location and topography is also responsible factors for establishing the educational centres there.

2. Population served by Colleges higher than the national average (2.88)

A). Table 1 gives an overview at national level where one lakh population is served by approximate three colleges. In other words one college is serving for approximate thirty five thousand inhabitants. Of the total twenty states, 12 or more than 50 percent states have higher than the 2.88. It ranges from a highest of 5.69 in

Andhra Pradesh to lowest of 2.95 in Gujarat (Table 1). The range difference is 2.74. In other words the state at the top has twice time higher than that at the bottom. South-western belt, four states of the Northern region and one state from Central region are performing above the national average (Fig 2).

The southern states such as Kerala, Tamil Nadu, Karnataka and Andhra Pradesh have the highest availability of colleges due to the early advent of education. Among the Northern states except Uttar Pradesh and Jammu & Kashmir, states such as Himachal Pradesh, Haryana, Panjab and Uttarakhand have the high ratio between the colleges and population which is served the population above the national average. Secondly, due to the hill states of Himachal Pradesh and Uttarakhand, government policies are playing important role for the development of higher education as they provide the education to the doorsteps of the peoples of the state. Western region includes Gujarat, Rajasthan and Maharashtra and one state from Central region namely Madhya Pradesh as the ratio between the college and population is also high among these regions is also accountable for the above average category.

B). Population served by colleges lower than the national average (2.88)

Of the total twenty states, eight states are less than the 2.88. This range is highest of 2.60 in Odisha to a lowest of 0.62 in Bihar. The range difference is 2.00. In other words the state at the top has four times higher than that at the bottom (Table 1). One state from the Central region such as Chhattisgarh and two states from Northern region in Jammu & Kashmir and Uttar Pradesh observed with the population served by colleges is less than the national average due to the large population resides here. Eastern region; Bihar, Jharkhand, Odisha, West Bengal and Assam have lower population served by colleges than the state average and these are the most backward states of India (Fig 2). It can be observed that population served by colleges is performed better than area served by colleges. In area served by college covered less than half of the states are in the category of above national average. Area and population served by colleges depict different scenario of higher education like states perform better in area served are not performed better in population served and vice-versa. Area served by colleges in northern state of Uttar Pradesh is above the national average but the population served by colleges is lower than the national average due to the huge population size resides there. On the other side, Madhya Pradesh, Rajasthan, Uttarakhand and Himachal Pradesh which are lower than the national average in area served by colleges, are performed better in population served. Through this discussion, it can be pointed that the physical, economical, social and political factors plays important role for the distribution of educational institutes in any region. Like in hill states, topography is the main factor for the opening up of the educational centres. In addition to this, dispersed population, scattered settlement are some constraints for the opening of the institutions in any region.

3. Area served by universities higher than the national average (1.95)

A). Table 2 reveals that at the national average ten thousand sq. km is served by approximately 1.95 universities. In other words in these states, on an average five thousand sq. km area is served by one university. Of the total twenty states, half of the states or fifty percent have the area served by two universities. The highest number of universities served in Haryana with 4.98 to a lowest of 2.24 in Karnataka. The range difference is 2.74. In other words the state at the top has two times higher than at the bottom of the states. There are two belts observed which are above the national average one belt is recognized in Southern region such as Kerala, Tamil Nadu and Karnataka. And the second is extended from the five states from the Northern region namely Haryana, Punjab, Himachal Pradesh, Uttarakhand and Uttar Pradesh to two states from Eastern region such as Bihar and West Bengal (Fig 3).

B). Area served by universities lower than the national average (1.95)

Of the total twenty states, 10 or fifty percent have area served by universities lower than the 1.95. It ranges highest of 1.94 in Gujarat to a lowest of 0.49 in Jammu & Kashmir (Table 2). The range difference is 1.45. In other words the state at the top has four times higher than at the bottom. It is observed that the Western region namely Gujarat, Rajasthan, Maharashtra to Central region includes Madhya Pradesh and Chhattisgarh to eastern region such as Jharkhand, Odisha and Assam. Two states, Jammu & Kashmir from Northern region and Andhra Pradesh from Southern region are also below the national average (Fig 3).

4. Population served by universities higher than the national average (0.53)

A). At national level, ten lakh population is served by 0.53 universities. Of the twenty states, 11 or more than half of the states have higher than the 0.53. It ranges from a highest of 2.62 in Himachal Pradesh to a lowest of 0.56 in Andhra Pradesh. The range difference between the two is 2.06. In other words the state at the top has five times higher than at the bottom (Table 2). There are two belts; one is observed in North-western region which includes five states from north and two states from Western region and the second in the Southern region Tamil Nadu, Karnataka and Andhra Pradesh which is extended to the Central region such as Chhattisgarh (Fig 4).

B). Population served by universities lower than the national average (0.53)

Of the twenty states, nine states are less than the 0.53. The range is highest of 0.51 in Kerala to a lowest of 0.19 in Bihar. The range difference is 0.32. State at the top has thrice times higher than at the bottom (Table 2**)**. One state from the Northern region i.e. Uttar Pradesh, Madhya Pradesh from central region; Maharashtra from Western region and all the states from the Eastern region such as Bihar, Jharkhand, West Bengal, Odisha and

Assam and one from southern state Kerala **(Fig 4).**

It is noticed that the Kerala, Uttar Pradesh, Bihar, West Bengal which are above the national average in terms of area covered are lower in population context. There is need for opening the universities in those states, where the universities is low than the national average. The government should focus on their educational policy and requirement of area and population. National knowledge Commission also recommends the expansion of the number of universities to 1500 in the country.

Composite index of the major states in India

Finally a composite index of higher education scenario is arrived by ranking method. The index value for each of the indicator has been proportionately computed. The composite index of major states which has been ranked four times according to the spatial distribution of each of the four indicators. The states having highest scores value has been assigned the first rank and the next highest the 2nd rank and so on and divided the summed ranks by four, corresponding to the number of indicators. Variations in the colleges and universities through composite ranking are brought out in the Fig 5. Therefore the composite rank given in the last column shows the overall higher education scenario of the major states of India.

Regional Pattern

Among the major states, Haryana is recorded as the highest distribution of higher education among the major states of India because its value of the composite score is the least. Tamil Nadu is the next state followed by Punjab, Karnataka and Uttarakhand. The least spatial distribution of higher education is found in Assam whose composite rank is twentieth.

Levels of higher education

There are wide variations in the levels of scenario of higher education in major states. The composite index varies from a high of first rank in Haryana to a low of twentieth in Assam. The range difference is 19. In other words, the state at the top has a composite index value six times higher than that of the state at the bottom. The states are categorized into three levels: high, moderate and low. (Fig 5)

1. **States with high level of higher education**

Seven out of twenty states falls in this category. Haryana attained the highest rank. It is followed by Tamil Nadu, Punjab, Karnataka, Uttarakhand, Kerala and Himachal Pradesh. One-third states are included under the category of high level of higher education. One pocket is identify in the Northern states such as Himachal Pradesh and Uttarakhand are socially developed hill states where government policies play important role for the establishment of higher education institutes and Punjab and Haryana, both the states are economically developed, secondly the plain terrain also an advantage to establish the infrastructure which is aggregately responsible for opening the educational centres (Fig 5). Another pocket is observed in the Southern region which includes the Kerala, Tamil Nadu and Karnataka states. Due to the early advent of education by the Britishers and Christian missionaries in these states are responsible for the high level of higher education among these states.

2. **States with moderate level of higher education**

In five out of twenty states reported with the moderate level of higher education. The states falling in moderate category are Andhra Pradesh, Maharashtra, Rajasthan, Gujarat and Uttar Pradesh attained the eighth to twelfth rank. One-fourth districts are fall in this category. One pocket recorded from the Western region such as Rajasthan, Maharashtra and Gujarat. One states from the southern and northern region such as Andhra Pradesh and Uttar Pradesh, respectively..

3. **States with low level of higher education**

In eight out of 20 states the distribution of higher education as a low. The West Bengal has the rank of thirteen and the last is Assam with twentieth rank. The states falling in this category is included West Bengal, Jammu & Kashmir, Madhya Pradesh, Odisha, Chhattisgarh, Bihar, Jharkhand and Assam. One pocket emerged from the Central and Eastern region such as Madhya Pradesh, Chhattisgarh, Bihar, Jharkhand, Odisha, West Bengal and Assam. One state identifies from the Northern region namely Jammu & Kashmir.

Gross Enrolment Ratio of higher education

Gross enrolment ratio is a statistical measure used by the United Nations to measure education index of a nation. In the context of higher education, Gross enrolment ratio is calculated from the ratio of persons of all ages enrolled in higher education institutions divided by total population in the age group 18-23 and multiply by hundred. At the national average of 20.8 percent GER which lags behind to a great extent as compared to the developed as well as developing countries such as United States (95), Russia (77), United Kingdom (61), France (57), Malaysia (36) and China (24). (Institute for statistics database UNESCO, 2011

Table 3 indicates that the Gross enrolment ratio of India is 20.8. Against the national average, the proportion varies from a highest of 40 percent in Tamil Nadu to a lowest of only 9.9 percent in Jharkhand. The range difference of 30.1 percent reveals that the state at the top is ahead of the state at the bottom by four times. The highest GER state is nineteen point percentages far above the national average. Half of the major states are above the national average such as all the states from the northern region except Uttar Pradesh, from the western region only one state Maharashtra and the entire southern region fall in this category. Other states are behind

these states. For an in-depth analysis, the states have been classified into two groups. The grouping is based on the national average. The states falling above the national average are treated as regions of high GER and those below as low (Fig 6).

1. **States having high GER than the national average (20.8 percent)**

In 10 out of total 20 states, the percentage of GER is higher than the national average. Among these the proportion ranges from a highest of 40 per cent in Tamil Nadu to a lowest of 21.8 in Kerala. The range difference is 18.2 per cent. In other words the state at the top has twice times higher than that at the bottom state. Due the higher availability of higher educational institutes in the southern belt influence the enrolment ratio in Tamil Nadu, Andhra Pradesh, Kerala and Karnataka as well as the early advent of education also. Maharashtra the commercial capital of India where awareness among the people and secondly due to industrialization and better employment opportunities provoked the people to enrolled in higher education. The other pocket from the northern India where the socially and economically developed states are influenced the GER, moreover hilly states where various government policies are also helpful for the higher enrolment ratio in this belt. (Table 3)

2. **States having low GER than the national average (20.8 percent)**

Half of the states reported lower GER than the national average. It ranges from a highest of 18.5 in Madhya Pradesh to a lowest of 9.9 in Jharkhand. The range difference is 8.6 per cent. In other words the state at the top has twice time higher GER than that of the state at the bottom. In this category one northern state namely Uttar Pradesh, two states from Western region; Gujarat and Rajasthan and Central region namely, Madhya Pradesh and Chhattisgarh and entire Eastern region such as Bihar, Jharkhand, Odisha, West Bengal and Assam are fall in this category. The reasons behind the low GER due to the many factors such as in Uttar Pradesh where the population share is highest and the availability of higher educational institutes are lower than the population required.

Low proportion in Rajasthan is attributed to the physiographic constraints caused by the desert. Eastern region is characterized with the backward region in India, state of Odisha, Bihar, and Jharkhand where poverty is also one of the main constraints which affected the enrolment level at the higher education. Among the major states of India, the highest rank is attained by the Tamil Nadu, and it is followed by the Uttarakhand, Andhra Pradesh, Haryana and Maharashtra. The bottom five states are Assam, West Bengal, Bihar, Chhattisgarh and Jharkhand. The significance of GER and availability of educational institutions in the major states is very well captured as the two have depicted a rationally high degree of rank correlation ($r = 0.84$) which reveals higher the availability of higher education increased the enrolment level of the area.

CONCLUSION

The following main conclusions emerge out of the above analysis:-

- Wide regional variations are more predominance in area contexts than the population both in colleges and universities, respectively. Distribution of colleges and universities is affected by the historical, locational and physiographical reasons among the major states of India such as the southern region are performed better than the other regions of India due to the historical and locational advantages. On the other hand physiography plays the important role which is the major constraints that are responsible for the lower level of distribution of higher education. It is difficult to establish the infrastructure in the mountainous region (Himachal Pradesh, Uttarakhand, Assam) than plain areas (Punjab and Haryana) in the context of the locational aspect.
- Among the major states of India, Haryana attained the highest place with respect to the spatial distribution of higher education in area and population terms and it is followed by Tamil Nadu, Punjab, Karnataka, Uttarakhand and Kerala. On the other side backward states like Odisha, Bihar, Jharkhand, Chhattisgarh and Assam shows the lower distribution than the national average. On the whole it is found that the southern states (Andhra Pradesh, Kerala, Tamil Nadu and Karnataka) are far ahead in comparison to the northern states (Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Uttar Pradesh, Punjab and Haryana) of India. The lower availability of higher education and GER is recorded in the Eastern region (Bihar, Jharkhand, West Bengal, Odisha and Assam) of India as these the most backward region and it is followed by the Central (Madhya Pradesh and Chhattisgarh) and Western region (Gujarat, Rajasthan and Maharashtra) of India.
- Analysis of data also reveals that the some states performed better in output (in terms of GER) such as northern region (except Uttar Pradesh), Southern region and one state from Western region i.e. Maharashtra.

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TABLES & FIGURES

Table 1: Major States: Area and Population Served by Colleges in India, 2011

S. No	Major States	No. of colleges per thousand sq. km	No. of colleges per lakh population
1	Kerala	26.58	**3.09**
2	Haryana	24.00	**4.19**
3	Tamil Nadu	17.70	**3.19**
4	Punjab	19.02	**3.45**
5	Karnataka	16.00	**5.02**
6	Uttar Pradesh	20.04	2.42
7	Maharashtra	14.84	**4.06**
8	Andhra Pradesh	17.51	**5.69**
	India	**10.60**	**2.88**
9	West Bengal	10.15	0.99
10	Gujarat	9.08	**2.95**
11	Madhya Pradesh	7.05	**2.99**
12	Odisha	7.00	2.60
13	Rajasthan	7.80	**3.90**
14	Bihar	6.90	0.62
15	Uttarakhand	7.39	**3.90**
16	Assam	6.18	1.55
17	Himachal Pradesh	5.19	**4.21**
18	Chhattisgarh	4.33	2.31
19	Jharkhand	2.94	0.71
20	Jammu & Kashmir	1.38	2.44

Source: All India Survey on Higher Education (2011-12) GOI, MHRD Department of Higher Education, New Delhi 2014

Table 2: Major States: Area and Population Served by Universities in India, 2011

S. No	Major States	No. of universities per ten thousand sq. km	No. of universities per ten lakh population
1	Haryana	4.98	**0.87**
2	Kerala	4.37	0.51
3	Tamil Nadu	4.50	**0.82**
4	Uttarakhand	3.74	**1.98**
5	Punjab	3.77	**0.68**
6	Himachal Pradesh	3.23	**2.62**
7	West Bengal	2.93	0.28
8	Uttar Pradesh	2.37	0.29
9	Bihar	2.12	0.19
10	Karnataka	2.24	**0.70**
	India	**1.95**	**0.53**
11	Gujarat	1.94	**0.63**
12	Andhra Pradesh	1.71	**0.56**
13	Jharkhand	1.51	0.36
14	Maharashtra	1.43	0.39
15	Rajasthan	1.31	**0.66**
16	Assam	1.15	0.29
17	Odisha	1.22	0.45
18	Chhattisgarh	1.25	**0.67**
19	Madhya Pradesh	1.07	0.45
20	Jammu & Kashmir	0.49	**0.88**

Source: As of Table 1

Table 3: Major States: Gross Enrolment Ratio of Higher Education in India, 2011

S. No	Major States	All Categories		
		M	F	T
1	Jammu & Kashmir	21.8	24.0	**22.8**
2	Haryana	28.3	27.7	**28.0**
3	Himachal Pradesh	24.6	25.1	**24.8**
4	Punjab	22.4	23.6	**23.0**
5	Uttar Pradesh	17.5	17.2	17.4
6	Uttarakhand	30.1	32.3	**31.1**
7	Gujarat	18.1	14.7	16.5
8	Rajasthan	20.6	15.5	18.2
9	Maharashtra	28.1	24.3	**26.3**
10	Madhya Pradesh	22.0	14.6	18.5
11	Chhattisgarh	11.0	10.1	10.5
12	Bihar	14.0	10.8	12.5
13	Jharkhand	10.2	9.5	9.9
14	Odisha	18.3	15.0	16.6
15	West Bengal	15.4	11.8	13.6
16	Assam	14.6	14.8	14.7
17	Andhra Pradesh	33.3	26.4	**29.9**
18	Kerala	17.8	25.6	**21.8**
19	Karnataka	24.9	22.7	**23.8**
20	Tamil Nadu	43.2	36.8	**40.0**
	India	**22.1**	**19.4**	**20.8**

Source: As of Table 1

Fig 1

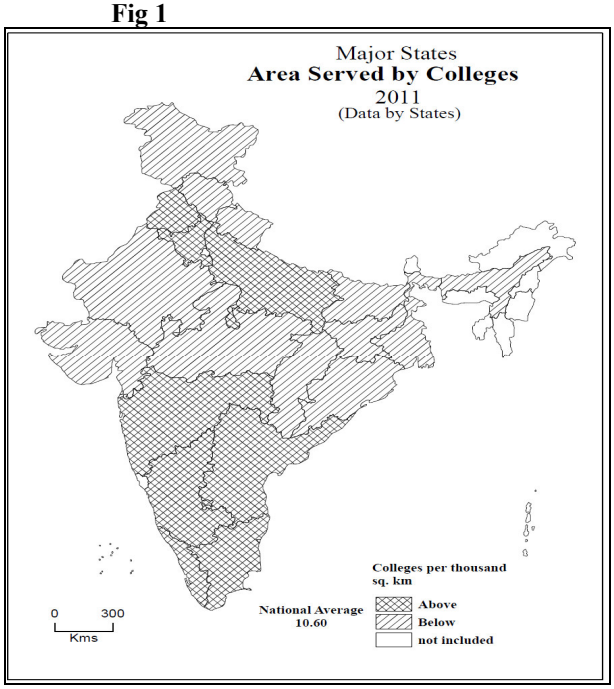
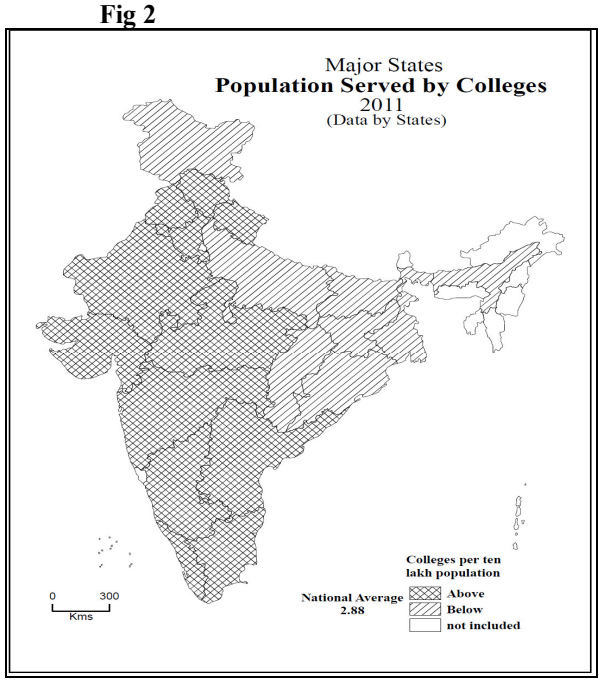
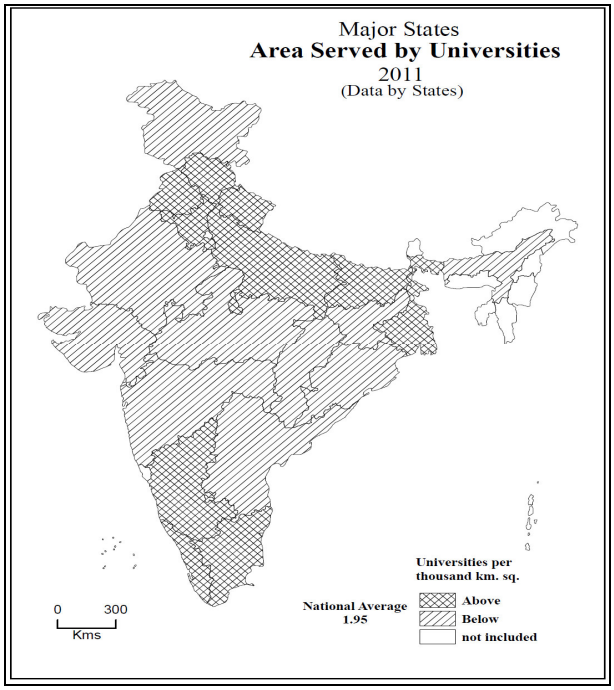


Fig 2





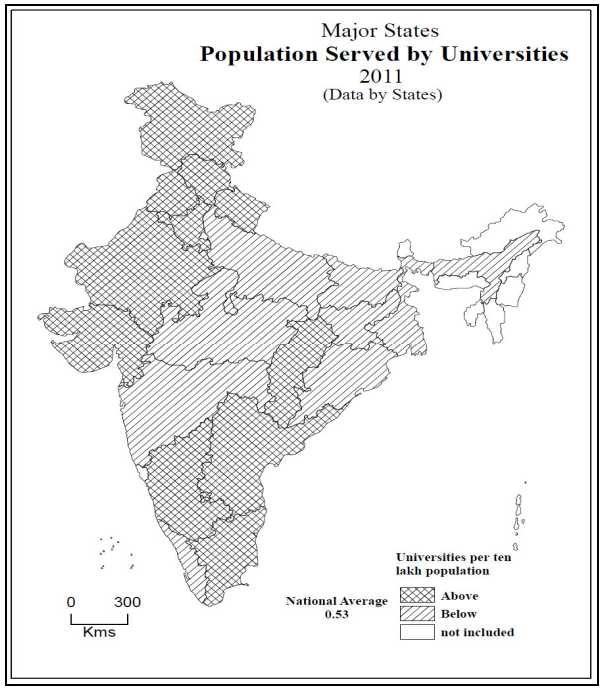


Fig 3 **Fig 4**

Source: Census of India, Administrative Atlas of India, 2011