ABSTRACT

Living in the era of knowledge economy in which the skilled manpower has applied the new techniques and ideas helpful in the development process, therefore it calls for heavy investment in higher education sector. It produces a variety of manpower needed in administration, industry, agriculture and other services. Since independence, the central and state government focusing on the expansion of tertiary education and country achieved the second largest in terms of enrolment. On the other side of the scale, the nation faced with paradoxes such as insufficient educational infrastructure in some pockets of India, among them North Eastern States, (eight states; Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura, Assam, Sikkim) faces the same circumstances. As a result, this paper investigates the scenario of Higher education among the North Eastern states. The question arises here; what is the interstate spatial distribution of higher educational institutes in area and population perspective? The paper uses the secondary data which includes reports of University Grants Commission, New Delhi. The result varies from highest number of colleges are found in Assam and a lowest in Arunachal Pradesh in area contexts and population served by colleges is highest in Manipur and Nagaland and lowest in Tripura. At the university level, quietly different picture is emerged out such as Sikkim recorded the highest place both in area and population and the lowest is registered in Arunachal Pradesh in area and Assam in population terms, respectively.

The paper is divided into the two sections: First section deals with the introduction and data and methodology second section analyze the spatial distribution of colleges and universities and composite index is also calculated to delineate the whole picture of higher education and the last is conclusions and recommendations.

Keywords: College, Higher Education, North Eastern States, University.
in 1951 to 634 in 2011. Against this, colleges increased by forty-eight times from 695 in 1951 to 33023 in 2011. At present, forty universities and 800 colleges are found in North Eastern States (hence forth NES). Higher education institutions were set up late among the region such as first college Cotton College in Guwahati was established in 1901 and the first university was set up in 1948 in Assam while universities in cities like Calcutta, Madras and Bombay were established in 1857, nearly a century earlier (Singh and Ahmad 2012). According to Census 2011, NER accounted total population of 45 billion with a total area of 2, 62,185 square kilometres. The population density of the states varies widely i.e., Assam and Tripura, registered most densely populated states with 398 and 350 persons per square kilometres, respectively while Arunachal Pradesh has only seventeen persons per square km, is the least densely populated state.

The north eastern region is a distinct geographical unit connected with the rest of the country through a narrow land corridor. Ninety-eight per cent of their border is touched international borders i.e. Bhutan and China in the north, Myanmar in the east and Bangladesh in the south and Nepal to the west of Sikkim (Refer Figure 1 here)

Among the north eastern states, percentage of tribal population is high and there are four states where proportion is more than fifty percent in Arunachal Pradesh, Nagaland, Mizoram and Meghalaya. This region has seen many inter-ethnic conflicts and disturbances since India’s independence. Due to these disturbances socio-economic life is adversely affected and means of transportation and communication are often cut off and directly or indirectly affect the higher educational institutions in the region. Throughout the British colonial period this region was treated separately and differently from the other regions of British India. A distinct entity derived from historical and politico-administrative factors, the region has immense physical, racial and social-cultural diversities and a literacy and education pattern which is highly varied both in spatial and social terms (Sharma, 2004). The foregoing paragraph gives an overview of area and population of NES of India.

In terms of area, Arunachal Pradesh the largest district covered 31.94 percent, followed by Assam with 29.82 percent. Manipur, Meghalaya, Mizoram and
Nagaland constitute nearly two-thirds of the total area of North-east. Sikkim (2.71 percent) and Tripura (4.00 percent) is at the bottom, respectively. However these ranking become totally different, once the population is taken into account. Arunachal Pradesh which occupies the first position in terms of area is assign to the second last position with a population of 3.02 percent. On the other side Assam has the highest position in terms of population with 68.18 percent and occupies a second position in area terms. Tripura (8.03 percent) holds the second rank in terms of population but in area terms it is ranked as second last. More than two-thirds population are lives in Assam and all the other states have only three-tenth population. 

(Refer Table 1 here)

The study covers the latest period of 2011 for the purpose of data analysis. The selection of the 2011 for detailed data analysis and mapping has been made as it is the latest period and UGC provides data from which the relevant information on higher education has been available and state is the unit of the study. In this context, efforts are made to examine the availability of higher education in this region. It is noticeably that the historical factor, geographic constraints, political situation, economic position of the area are affects the establishment of institution in a given area.

2. Research Methodology

2.1 Objectives
In the light of the above statements, the present study purports to examine the higher education among NES with the objective to identify spatial distribution of colleges and universities associated with area and population. The study also made an endeavour to examine the factors working behind the growth of higher education in the NES.

2.2 Research Questions
In the light of the above stated objectives, the following research question has been framed for their answers such as what is the inter-state availability of colleges and universities in area and population perspective? And secondly, which states are place highest in the context of higher education?

2.3 Data Sources
This study is based on secondary sources such as reports from the UGC, New Delhi, and Five Year Plan documents. State is the spatial unit of study and state wise data on
indicators were collected from UGC. The present research work calls for a selection of appropriate indicators. The indicators (i) and (ii) represent the spatial distribution of colleges-area and college-population, indicators (iii) & (iv) reveals the university-area and university-population dimension. For analyzing the data various statistical techniques i.e. simple arithmetic mean in terms of percentages have been used in order to calculate the distribution of colleges and universities in area and population terms through maps and tables.

(Refer Table 2 here)

Keeping this in view, the data is tabulated, analyzed and mapped and cartographic techniques have been used. Choropleth technique has been used for mapping the spatial patterns of selected indicators on the NES map of India. ‘Arc view GIS’ software has been used for making the map and geographical analysis. Through these techniques, the investigator tries to analyse the spatial distribution phenomena which is the core of any geographical study. The study segregates the dimension of colleges and universities with area and population, respectively to constructs a composite picture of higher educational institutes in North-East of India are arrived at with the help of the composite index method. The index value for each indicator has been prepared by using ranking method, wherein the maximum obtainable score value for an indicator is assigned a first rank and the scores for the lower values are proportionately computed.

Area and population served by college/universities are converted into their ranks and these ranks are added to give the composite ranking of the overall picture higher education. Accordingly, the ranking of the NER have been calculated for all the indicators separately for colleges and universities and arrived at a composite index of higher educational institutes for each state. In the following an attempt has been made to discern the spatial pattern of colleges and universities in NES of India, 2011. Based on the index scores, states have been grouped into three levels, high, moderate and low. The range technique is used for the cartographic representation of the higher education in a single map. The range between the highest and the bottom values is calculated and divided it by the three to figure out the interval for the three categories.

3. Results and Discussions
The section deals with area and population served by colleges and universities, respectively. In geographical investigation, distribution of educational institutions is analyzed in terms of area and population coverage to carve out the true picture of the availability of higher educational institutes in the NES. The following paragraphs explain the distribution of colleges in respect to area and population context. The number of colleges and universities are calculated on the basis of given units:

- Number of colleges per thousand kilometres
- Number of Colleges per lakh population
- Number of Universities per ten thousand Kilometres
- Number of universities per ten lakh population

3.1. Area served by colleges

At the national level thousand square km is served by ten colleges it means hundred square km is served by one college. The regional average of NER is below the national average depicts that the thousand sq. km is served by 3.05 colleges and three hundred twenty seven square km is served by one college. The highest colleges are recorded in Assam (6.50) to lowest in Arunachal Pradesh (0.20).

(Refer Table 3 here)

Two-fourth states are performing better than the regional average. For the purpose of mapping the values calculated for area served by colleges are divided into above and below the regional average (Fig.2) and it is given below:-

3.1.1 Above regional average:

Assam (6.50) Tripura (3.70), Manipur (3.40) and Nagaland (3.30) are recorded above the regional average. The reason behind the higher availability in Assam due to the early advent of education is accounted for the higher availability such as the state has the highest number of colleges. Before independence, there were only fifteen colleges in the NES and majority of them was in Assam. The first college, Cotton College and first university (Guwahati University, 1948) was established in Guwahati and it is the capital of the state as well as one of the main hubs of higher education, where number of colleges (507) is also high. Due to their smaller size of area, these states namely, Tripura, Manipur and Nagaland performed well.
3.1.2 Below regional average: Meghalaya (2.90), Sikkim (2.10), Mizoram (1.30) and Arunachal Pradesh (0.20) are below the regional average. These states did not have colleges due to its mountainous topography and on the other side, late formation of statehood in the country.

3.2. Population served by colleges
At the regional average, one lakh population is served by approximately 1.75 colleges lower than the national average (2.70). It means one college is serving for approximately fifty seven thousand and thirty seven thousand population at regional and national level respectively. More than two-fourth states are above the regional average. (Fig. 2) The highest value is found in Manipur and Nagaland (2.80) to lowest is in Tripura (1.10).

3.2.1 Above regional average: Manipur (2.80), Nagaland (2.80), Sikkim (2.50), Mizoram (2.60) and Meghalaya (2.20) are found above the regional average. These states are the Christian dominated where the spread of the literacy was very earlier. Although population served by colleges in Sikkim is high as small size of population resides there, this accounts only 1.33 percent share to the total NES.

3.2.2 Below regional average: Tripura (1.10), Arunachal Pradesh (1.50) and Assam (1.60) are registered below than the regional average. Due to the highest share (more than three-fourth) of population in these districts to the total population of NES. Government should take initiatives for the expansion of colleges in these areas to fulfil the needs of the people.

It is concluded that the Nagaland and Manipur holds the highest rank than the regional average both in area and population served by colleges among the NES.

3.3. Area served by Universities
At the national and regional average, ten thousand square km is served by 1.90 and 1.53 universities respectively. Where approximately six lakh fifty three thousand and five lakh twenty six thousand are served by one university, respectively. Area served by universities is highest in Sikkim (7.00) to lowest in Arunachal Pradesh (0.40). (Fig. 3) Four states namely, Sikkim, Meghalaya, Tripura and Nagaland are above the national as well as
regional average because of their small size. Rest of the four are below both of the averages.

(Refer Table 4 here)

These states are categorized below and above the regional average. It is given below one by one:

3.3.1 Above regional average: Sikkim (7.00), Tripura (2.90), Meghalaya (4.00), and Nagaland (2.40) are registered above the regional average. Due to their small size of area which constitutes less than one-fourth area to the total NES.

3.3.2 Below regional average: Assam (1.30), Mizoram (1.40), Manipur (1.30) and Arunachal Pradesh (0.40) are fall under this category. These states hold more than three-fourth shares of area.

3.4. Population served by universities

Among the NES population served by universities represents uneven distribution. At the national level ten lakh population served by 0.50 and 0.87 universities at national and regional level (Refer Table 4 Here).

Where approximately twenty lakh and eleven lakh forty nine thousand population is served by one university. It is highest in Sikkim (8.20) to lowest in Assam (0.30). Three-fourth districts are above the national and regional average. (Fig. 3)

(Refer Figure 3 here)

3.4.1 Above regional average: Sikkim (8.20), Meghalaya (3.00), Nagaland (2.00), Mizoram (2.70), Manipur (1.10) and Arunachal Pradesh (2.70) are listed above the regional average and served the population appropriately among NER. Mizoram, Meghalaya and Nagaland too have experienced the role of Christian missionaries for the spread of education.

3.4.2 Below regional average: The lowest distribution of universities is found in Tripura (0.80) and Assam (0.30). They have constituted three-fourths share of population where only three-tenth share of universities.

It can be concluded that the ten lakh population is served by 0.50 universities and most of the states performed better than the national average. Only Assam (0.30) and Tripura (0.80) are below the national and regional average. Sikkim and Meghalaya are two states achieved the highest rank both in area and population terms in universities context. Against this,
some states are performing better in area terms such as Tripura and Assam than the population terms such as Mizoram and Arunachal Pradesh and vice versa. It is concluded that the Sikkim state is performed better due to its small size and low population. Meghalaya, Nagaland, Mizoram, Manipur and Arunachal Pradesh constitute largest share of universities than the population resides here. Low share of universities are found in Assam and Tripura as NES comprises of 45 million and 68 percent population resides in Assam, as the educational institution is low as per the requirement of the population.

4. Higher Education: Regional Pattern
A picture of availability of higher education among NER has been arrived at with the help of the indicators which are discussed in methodology. 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. Accordingly the composite index of north east states has been ranked four times according to their spatial distribution of each of the four indicators. The states having highest score value has been assigned the first rank and the next highest the 2\textsuperscript{nd} rank and so on and divide 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 map. Therefore the composite rank given in the last column shows the overall higher education scenario of all the north east states of India. Finally, Sikkim is recorded as the highest availability of higher educational institutes because its value of the composite score is the least. Meghalaya is the next state followed by Nagaland, Manipur and so on.

The least spatial distribution state is Arunachal Pradesh whose composite rank is eighth. The ranking method, in spite of having the advantage of simple computations, has some disadvantages also. Suppose when we rank the states as per the distribution, the absolute differences are ignored such as the highest distribution of colleges/universities is 3.50; its next highest value is 3.49, and the third highest value 3.30. We will rank them 1, 2 and 3. Thus, the difference of 0.01 units in the first two states adds one rank to the second state, where as the difference of 0.19 units in the 2\textsuperscript{nd} and 3\textsuperscript{rd} states also adds only one rank third state. Another
drawback of this method is that the ranks of all the indicators are treated with equal importance, irrespective of their proportional of area and population respectively.

Levels of higher educational institutes

There are wide variations in the levels of scenario of higher education in NER. The composite index varies from a high of 3.00 in Sikkim to a low of 6.25 in Arunachal Pradesh. The range difference is 3.25. In other words, the state at the top has a composite index value two times higher than that of the state at the bottom. The states are categorised into three levels: high, moderate and low (Fig. 4).

(Refer Figure 4 here)

4.1.1 States with high level:

Three states out of eight falls in this category. Sikkim attained the index value is 3.00. It is followed by Meghalaya (3.50) and Nagaland (3.75). Sikkim the smallest state, both in size and population keeps it in the high category. The colleges and universities are higher than the population required which constitute only 4.32 percent in the state of Nagaland. Early advent of granted statehood in Nagaland (1963) is responsible for the higher availability of educational services.

4.2.2 States with moderate level:

In three out of eight states higher education is at the moderate level. The states falling in moderate category are Manipur (4.00), Mizoram (4.50) and Tripura (5.00). In Tripura state because of their lowest share of area and second largest density of population or high proportion of persons in the state as well as absence of missionary influence in Tripura are responsible for moderate index value. Due to the influence of the Christian missionaries and growing impact of modernization and urbanisation the states of Mizoram and Manipur depicts the moderate level of higher education.

4.3.3 States with low level:

In two out of eight states the higher education availability as a low level. Assam has the index value of 5.50 and Arunachal Pradesh of 6.75. In Assam as it is demarcate by the report given by GIZ (Deutsche Gesellschaft fur Internationale Zusammenarbeit) that the large part of the Assam’s population lives in the riverine islands alongside the Brahmaputra river,
this area is frequented by annual floods, other natural disasters and bi-annual migration of the people in the area and in such conditions, developing permanent infrastructure is challenging and prohibitive. Although the distribution of colleges and universities served to the population are very low in Assam and these state is also categorised by the highest density recorded with 398 among the north eastern states. Secondly, Arunachal Pradesh is educationally backward state. Historically speaking, during British era this region was treated separately from other regions. Inter Ethnic clashes have largely discouraged the educational institutions to be established there. These are the areas where physical constraints, low population density, past neglect in developmental matters have been responsible for their low levels of availability of educational institutes. Therefore it is concluded that lack of connectivity has almost segregated NER from the rest of the country but also within itself. Overall, these states characterized with hilly and difficult terrain with difficult accessibility, low population density or sizeable share of tribal population, poor density of rail and road transportation, inadequate infrastructure, strategic location along borders with neighboring countries as well as frequent floods and landslides during the monsoons. These are the similar geographical attributes binding them into homogenous region. Number of initiatives has taken for the development and expansion of higher education institutes in NER by the central government and University Grants Commission.

5. Conclusion
Although, there has been remarkable growth in the availability of educational institutions in the NES but Arunachal Pradesh and Assam are backward. Physical existence of institutions is important aspects to spread the higher education among the NES as per the requirement of area and population. Due to the paucity of higher educational institutes, students migrate to other cities. A report of Indian Chamber of Commerce (2010) analyzed that majority of the students migrate to the other states such as Delhi and Bangalore not only to pursue higher education like research but also a basic level of higher education like graduation because it lacks quality education. Secondly, technical and professional educational centres within the region provide outdated and irrelevant
curriculum which also push the students to another area. In this direction eleventh five years plan of the planning commission has also laid emphasis on quality of education in this region. Efforts of the government such as NES included in the category of special category states of India are accountable for the increased educational infrastructure in this region and has resultant that some of the NES are performing well than the national average. It reflects the plans and policies of government are playing the pivotal role for the enhancement of education sector. NES suffers from economic isolation. Absence of adequate institutional and physical infrastructure has slowed down the NER’s development process.

**Recommendation**

- The foremost objective of the central and state government should take strong steps to overcome the infrastructural bottlenecks. Physical (library, laboratory, playground, computer centre) and Human infrastructure (Permanent teachers, female teachers, and professors) should be provided at higher education level. There should be focused at the rail-road network for the easy access to education institutes.
- Government should take initiative to establish the universities and colleges according to the proportion of population and area context.

**References**


Internationale Zusammenarbeit (GIZ) 
August, New Delhi pp. 35-37.


List of Figures and Tables

Figure 1

![Map of North Eastern States](image)

Source: Census of India, Administrative Atlas of India, Registrar General and Census Commissioner, 2011

Table 1: North Eastern States: Area, Population and Density, 2011

<table>
<thead>
<tr>
<th>S. No.</th>
<th>NE States</th>
<th>Area (sq. km)</th>
<th>Population (%)</th>
<th>Density per sq. km</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Arunachal Pradesh</td>
<td>31.94</td>
<td>3.04</td>
<td>17</td>
</tr>
<tr>
<td>2</td>
<td>Assam</td>
<td>29.92</td>
<td>68.60</td>
<td>398</td>
</tr>
<tr>
<td>3</td>
<td>Manipur</td>
<td>8.52</td>
<td>5.65</td>
<td>128</td>
</tr>
<tr>
<td>4</td>
<td>Meghalaya</td>
<td>8.55</td>
<td>6.52</td>
<td>132</td>
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<tr>
<td>5</td>
<td>Mizoram</td>
<td>8.04</td>
<td>2.41</td>
<td>52</td>
</tr>
<tr>
<td>6</td>
<td>Nagaland</td>
<td>6.32</td>
<td>4.35</td>
<td>119</td>
</tr>
<tr>
<td>7</td>
<td>Sikkim</td>
<td>2.71</td>
<td>1.34</td>
<td>86</td>
</tr>
<tr>
<td>8</td>
<td>Tripura</td>
<td>4.00</td>
<td>8.08</td>
<td>350</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100</td>
<td>100</td>
<td>175</td>
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</tbody>
</table>

Source: Census of India, 2011
Table 2: Indicators of Higher Education

<table>
<thead>
<tr>
<th>Subset</th>
<th>Indicators/Components</th>
<th>Dimension Indices</th>
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</thead>
<tbody>
<tr>
<td>Colleges</td>
<td>1 Number of Colleges per thousand kilometers</td>
<td>College Index</td>
</tr>
<tr>
<td></td>
<td>2 Number of Colleges per lakh population</td>
<td>Aggregate Index of Higher Education</td>
</tr>
<tr>
<td>Universities</td>
<td>3 Number of Universities per ten thousand Kilometers</td>
<td>University Index</td>
</tr>
<tr>
<td></td>
<td>4 Number of Universities per ten lakh population</td>
<td></td>
</tr>
</tbody>
</table>

Source: Compiled by the author
Table 3: North Eastern States: Area and Population Served by Colleges, 2011

<table>
<thead>
<tr>
<th>S. No.</th>
<th>North East States</th>
<th>Number of Colleges/1000 km²</th>
<th>Number of Colleges/lakh population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tripura</td>
<td>3.70</td>
<td>1.10</td>
</tr>
<tr>
<td>2</td>
<td>Manipur</td>
<td>3.40</td>
<td>2.80</td>
</tr>
<tr>
<td>3</td>
<td>Nagaland</td>
<td>3.30</td>
<td>2.80</td>
</tr>
<tr>
<td>4</td>
<td>Meghalaya</td>
<td>2.90</td>
<td>2.20</td>
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<td>5</td>
<td>Sikkim</td>
<td>2.10</td>
<td>2.50</td>
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<td>Mizoram</td>
<td>1.30</td>
<td>2.60</td>
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<td>Arunachal Pradesh</td>
<td>0.20</td>
<td>1.50</td>
</tr>
<tr>
<td>9</td>
<td>Assam</td>
<td>6.50</td>
<td>1.60</td>
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<td></td>
<td><strong>Regional Average</strong></td>
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<td><strong>1.75</strong></td>
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<td></td>
<td><strong>India</strong></td>
<td><strong>10.00</strong></td>
<td><strong>2.70</strong></td>
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Source: Higher Education in India at a Glance, University Grants Commission, New Delhi, 2012
Table 4: North Eastern States: Area and Population Served by Universities, 2011

<table>
<thead>
<tr>
<th>S. No.</th>
<th>North East States</th>
<th>No. of Universities/10,000 km²</th>
<th>No. of Universities/10 lakh population</th>
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<tr>
<td>1</td>
<td>Sikkim</td>
<td>7.00</td>
<td>8.20</td>
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<td>Meghalaya</td>
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<td>3.00</td>
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<tr>
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<td>2.90</td>
<td>0.80</td>
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<td>Nagaland</td>
<td>2.40</td>
<td>2.00</td>
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<td>Mizoram</td>
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<td>0.40</td>
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<td></td>
<td><strong>Regional Average</strong></td>
<td><strong>1.53</strong></td>
<td><strong>0.87</strong></td>
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<tr>
<td>India</td>
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<td><strong>1.90</strong></td>
<td><strong>0.50</strong></td>
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</table>

Source: Higher Education in India at a Glance, University Grants Commission, New Delhi, 2012