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# Social Infrastructure in Assam: A Study of its Inter District Disparities

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**Structured Abstract:**

**Purpose:** The Main Purpose of this paper is to study the Social infrastructure development in Assam as well as to analyze the district level variation on the same.

**Methodology:** This is a district level study of the state of Assam of India of their Social Infrastructure development. To measure the development status a composite index is prepared for thirty selective variables and ranked the districts on the basis of the value of index. For data reduction Principal Component analysis (PCA) is used. The time reference period is 2014.

**Findings:** Main findings of the study are wide spread disparities in the levels of development have been observed in different districts of the State. Nalbari is found to be highest developed and the district Udalguri is on the lowest in the overall social infrastructure development among the districts of Assam.

**Originality of the paper:** Inter district ranking of the districts of Assam on the basis of Social Infrastructure Development.

**Key words:** Infrastructure, Social Infrastructure, development, District Variation, Principal Component Analysis etc.

**Paper Type:** Scholarly article.

## Introduction

Infrastructure is the basic facilities of a particular region, institution or organization. It is the backbone of a country and part and parcel for development of that particular area. It is broadly categorized as mainly economic and social infrastructure. Social infrastructure is that part of infrastructure which directly or indirectly enhances the quality of life of a person and played a vital role in promoting economic as well as human development and also can be considered as an appropriate indicator to measure the real development of a particular region. When we think about infrastructure always first priority put on economic infrastructure and neglected the social part and wellbeing of human beings. Even most of the researchers also studied widely on economic infrastructure and neglected the subject. So attempt has been made to study particularly on social infrastructure development of Assam.

On the other hand regional disparities now a day's a growing consensus in the field of development. The paper attempted to study the disparity as district level of the state of Assam in India. Assam together with the North Eastern states is a geographically isolated area with a very narrow connectivity to the rest of India. As compared to the other states of the country, its infrastructure is very poor for which its entire development process is retarded. More even within the state also seen so many diversities for what regional variation arises among the districts. So in the paper attempt has been made to study specially Social Infrastructure development as district level. Till now, neither research work has been found in this particular field in Assam as district level study.

**Review of Literature**

Social infrastructure is a subset of infrastructure, which are mostly neglected by the researchers as well as policy makers. While discussing about development we always think about physical infrastructure. This has been proved while the researcher surveyed literature particularly on the subject. But it has been suggested by the researchers that unless and until proper development of social Sector, a country never attains their goals of development. Few literatures are discussed very briefly on the following.

Mehta Pooja (n.d.) discusses very systematically about Infrastructure, their types and their relationships with development in her article "Meaning, Types and Development of Economic Infrastructure in India**".** In another paper entitled "How Do Different Categories of Infrastructure Affect Development? Evidence from Indian States", Ghose B. and De P. (2004) studied about the relationship between infrastructure and economic development. They studied both physical infrastructure and social infrastructure simultaneously for a period of time and used principal Component analysis for preparing index. Similarly Economist Jerome A. (1999) differently stresses the role of social Infrastructure in his paper Infrastructure in Africa: The Record. I have been reviewed so many other literatures relating to district level study and social sector development. few of them are such as Raychaudhuri A. and Haldar S. K.'s (2009) An Investigation into the Inter-District Disparity in West Bengal 1991-2005, Myat Thein and Khin Maung Nyo's Social Sector Development in Myanmar The Role of the State etc. In most of these papers priorities is being given to social sector development as district levels and the role of government.

**Objectives**

1. To study the status of district level social infrastructure development in Assam.
2. To study the inter district rankings of the districts of Assam.
3. To categories the districts on the basis of their development.

**Hypothesis**

$H_0$: There is no significant difference of the development among the districts of Assam on the basis of social infrastructure.

$H_1$: There is significant difference of the development among the districts of Assam on the basis of Social Infrastructure.

**Limitations**

The analysis described in this paper is necessarily limited. Further work is needed in order to carry out comparisons over different time periods. In this way it may be possible to assess more precisely the progress of particular states or regions. It should be worth mentioning here that though the study is trying to analyze the disparities among the districts of Assam in respect of social infrastructure development, so many indicators still remaining out of our purview. Further the study is static in nature which is based only on one time period. So wide spread opportunities are there in the field for further research which may cover more and more indicators. The study is static in nature; all the results are based on a particular point of time. Development index is prepared only using 2014s data.

**Methodology**

In this paper, attempt has been made to calculate inter-district disparity on the basis of social infrastructure in Assam among the districts. It will trace the Ranking of districts for the period 2014. As far as infrastructural variables are concerned, there are a large number of variables on social infrastructure in Assam. No single indicator can capture the complexities of development. Based on the availability of data a large set of variables are taken in to consideration for the study, but among them few variables are rejected as their variability are very low which can influence rarely in their rankings. Further neither raw data have been used for analysis. At first all of them make into ratios, percentage as requirement for smooth

comparability. As we know that Assam is neither geographically nor size of the population are equal among the districts.

Here Principal Component Analysis (PCA) is used as data reduction method. Before running the PCA, the following procedure is adopted to convert raw data into a normalized form. This is done to make the raw data unit free as well as to get the relative position of each district in respect of infrastructure. First, the best and worst values in a particular indicator (infrastructure) are identified. In case of a positive indicator, the highest value is treated as the best value and the lowest, as the worst value and vice versa.

Once the best and worst values are identified, the following formula is used to obtain normalized values:

$$NV_{ij} = 1 - \frac{[\text{best } Xij - \text{observed } Xij]}{R}$$

Where NV= Normal value, R=best $X_{ij}$ – worst $X_{ij}$, i= ith observation and j=jth district

Normalised values always lie between 0 and 1.

Once the normalized values are obtained for all the infrastructural variables across the districts, the next step is to assign factor loadings and weights. The PCA is used to compute the factor loadings and weights of following development indicators of the year 2014.

The following steps have been used in SPSS for the result:

**Step 1** - finding normal values.

**Step 2** - identified the Initial Eigen Values (Total) which is more than one.

**Step 3** - multiplied 1st Eigen value with 1st Extracted Component Column and 2$^{nd}$ Eigen value.

*With 2$^{nd}$ Component column and so on. We have considered absolute values (irrespective of sign, negative values are treated as positive)*

**Step 4** - after summing up all components for each variable separately produced Weights of the indicators.

*Secondary data for the study was collected from the following sources:*

- Data was collected from the relevant Census reports of India, directorate of census operations, Assam.
- Statistical Hand Book Assam 2014.
- Directorate of Economics and Statistics, Guwahati, Assam.
- Economic Survey Reports.

It has been taken 30 variables.

**Discussions**

Development is a multidimensional process. Its impact cannot be evaluated fully by any single indicator. A number of indicators when analyzed individually do not provide an integrated and easily comprehensible picture of reality. (Narain P, S.D. Sharma and et. al., (2004). Hence in the present study, index of development has been built up for different districts on the basis of optimum combination of various indicators. Indicators which are common to all the districts have been included in the analysis for evaluating the level of development. The composite indices of development have been calculated for different districts by using the data on the following developmental indicators. Doubtless to say that the perception SID depends on so many indicators which influenced the sector fully? Some of the basic indicators used for Social Infrastructure development are listed in table 1. **B**ased on the availability of data these variables are used for preparing Index.

The various normalized values are in the table 2a to 2d

Once the normalized values are obtained for all the infrastructural variables across the districts, the next step is to assign factor loadings and weights. The PCA is used to compute the factor loadings and weights of these indicators (infrastructures)

Running the PCA in the software package SPSS, we have identified the Initial Eigen Values (Total) which is more than one. In our present case, these are 8.637, 4.522, 4.409, 2.834, 2.004, 1.621, and 1.195. The number of Eigen values above one varies from data to data. The seven components explain 84.070% variance of the variables included in the analysis.

The different weights of the variables are shown in the table 3

The following formula is used to determine the index:

$$\mathbf{I = \frac{\Sigma\, Xi\ (\ \Sigma|Lij|.Ej)}{\Sigma\ (\ \Sigma|Lij|.Ej}}$$

Where I is the index,

$X_i$ is the i-th Indicator;

$L_{ij}$ is the factor loading of the i-th variable on the j-th factor;

$E_j$ is the Eigen value of the j-th factor.

The following is an example for 1 district.

The total weight of the indicators is 203.4782

The ranking of the districts on the basis of Social Infrastructure Index (SII) are shown on the table 4

The composite indices of development have been worked out for different districts for social infrastructure. The districts have been ranked on the basis of developmental indices. The composite indices of development along with the rank of the districts are given in table 4. In case of development, Nalbari was found to be the best developed district of the State whereas the district of Udalguri was on the last place. The composite indices of development varied from 0.255385 to. 0.530136. On the basis of the rank from top to bottom the districts are Nalbari, Dima Hassao, Kamrup (R), Jorhat, Kamrup Metro, Sivasagar Lakhimpur, Bongaigaon, Dibrugarh, Barpeta, Tinsukia, Nagaon, Darrang, Golaghat, Dhubri, Hailakandi, Kokrajhar, Goalpara, Dhemaji, Sonitpur, Cachar, Karbi Anglong, Karimganj, Baksa and Udalguri

In a study by Bishweshwar Bhattacharjee found that in case of human development in the districts of Assam both Kamrup Metro and Kamrup Rural achieved first and second rank respectively and chirang and Dhubri achieved last $26^{th}$ and $27^{th}$ position respectively. Similarly Nagaon achieved $17^{th}$ position. In another study by government of Assam on backwardness of the districts of Assam reveals more or less same picture in this field. Udalguri Dhubri Dhemaji identified as the most backward place and both Kamrup Metro and Kamrup Urban identified as the most develop place among the districts of Assam. This is the most irony of the state where social sector is always neglected by the policy makers.

The main reasons behind Nalbari for top among the districts of Assam are due to highly developed in health and education sector. On the other hand from the study it has been found

that udalguri is least developed only because of very poor development status of few social infrastructure variables such as Health, Education, Employment and fair price shop.

**Relative Share of Area and Population under Different Level of Development**

For classificatory analysis, a simple ranking of districts on the basis of composite indices is sufficient but a suitable classification of the districts formed on the basis of mean and standard deviation of the composite indices will provide a more meaningful characterization of various stages of development. For relative comparison, The methodology used by S.C. Rai and V.K. Bhatia (2004) it appears appropriate to assume the districts having composite index greater than or equal to (Mean +SD) as highly developed districts and the districts having composite index less than (Mean - SD) as low developed districts. Similarly districts with composite index lying between (Mean and Mean +SD) are classified as middle level developed and districts with composite index lying between (Mean and Mean - SD) are classified as developing districts. Mean value 0.3636 and the value of std. deviation of the series are 0.07665. Based on these mean and Standard Deviation value which are greater than 0.44115 are classified as Highly Developed, the values in between 0.3645 and 0.44115 are classified as middle level developed; values in between 0.288 and 0.365 are classified as developing districts and the values less than 0.288 are considered as low developed districts. The details with classifications are shown in table 5.

From the study it has been found that Nalbari is the most developed districts in the states. On the contrary Udalguri is on the state of least developed district among 27 district of Assam. From the study it has been found that this is only because of very poor development status of few Social Infrastructure variables such as Health, Education, Employment and fair price shop. In case of Baksa the main reasons behind such an underdevelopment is due to under development of Health, Housing, and Education, fair and emergency service etc.

An important aspect of the study is to find out the relative share of area and population affected under various stages of development in the State. Details regarding the area and population under different levels of development are shown in table 6.

With regard to overall development, five districts namely Nalbari, Dima-Hasao, Kamrup, Jorhat and Kamrup Metro were found to be better developed and these districts are classified as highly developed in the State. These districts cover about 16 per cent area and 16 per cent population of the State. On the other hand 0nly 16 % population lived in highly developed

districts. But more than half of the population (i.e. 55.42) lived in developing districts covering approximately 58 % area of the state. More even only six districts covering 23 percent population covers 20 percent area. Two districts namely Baksa and Udalguri categorized as low developed districts occupying 6 % area and 6% population of the state.

When it is categorized the districts on valley wise, all major 4 developed districts are from Brahmaputra valley including one from Hills area, similarly both two low developed districts are from BTAD. The fact is that all the districts of Barak valley are in a state of developing in respect of particularly social Infrastructure. These are shown in Table 7.

**Robustness Check**

A test of Robustness is done with the Ranking of HDI (Bhattcharjee Bishweshwar(2015) and the Ranking found by the Researcher and found Correlation is high (0.786) and significant at 0.01 percent level (two tailed) which suggests that a good number of districts rankings are more or less same in both the ranking process. t statistics is also done and value of t- in case of correlation for both the cases (i.e. 9.165) which is greater than the t table value (1.706) which is lies under the rejection region. Therefore our null hypothesis is rejected.

**Conclusion**

Importance of the Social Infrastructure increases day by day. Development thinkers mostly stress on the Social Sector while they discussing about the subject. This is a broader concept more even than Human Development. This paper tries to find out the social infrastructure development status of the districts of Assam.

It is found quite surprising that a wide spread disparities are seen among the districts of Assam where the low developed district are not low developed in all the fields but some are as high as high level developed districts. With reference to overall Social-Infrastructure development, five districts namely Nalbari, Dima-Hasao, Kamrup, Jorhat, and Kamrup Metro are found to be better developed and two districts namely Baksa and Udalguri are observed to be low developed.

The analysis described in this paper is necessarily limited. Further work is needed in order to carry out comparisons over different time periods. In this way it may be possible to assess more precisely the progress of particular states or regions. It should be worth mentioning here

that though the study is trying to analyze the disparities among the districts of Assam in respect of social infrastructure development, so many indicators still remaining out of our purview. Further the study is static in nature which is based only on one time period. So wide spread opportunities are there in the field for further research which may cover more and more indicators.

So we can conclude here that the districts of Assam are a geographically diversified area from one another with its population, natural boundary, ethnicity and more even its religion also. Most of the ethnic group's customs, habits, and social behaviors are diverse in nature from one another which influence drastically their socio-economic behavior. Further the area is drastically suffered from migration where pressurizes the existing population. These are may be the reason for such disparities among the districts.

On the other hand the problem of regional development in the districts of Assam did not get adequate attention of the policy makers and as a result the development programmes of these districts with glaring regional disparity definitely resulted in lopsided and distributed development.

**Policy Suggestions**

The first and foremost suggestion to the policy makers is that they must have to put first priority on social infrastructure instead of Economic Infrastructure. Further a particular district assign as low developed is not low developed because of all indicators. Only few indicators are responsible for that. Disparities are not only seen among the districts, also seen among the indicators of a particular district. So government should have to identify selective area as well as selective indicators for reducing disparity.

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**Table 1**

**Details of the Variables**

| Sl. No. | Variable | Details |
|---|---|---|
| 1 | $X_1$ | District Wise No of Civil Hospital of per lakh population(2014) |
| 2 | $X_2$ | District Wise No of Primary Health Centre of per lakh population 2014 |
| 3 | $X_3$ | District Wise No. of First Referral Units of per lakh population 2014 |
| 4 | $X_4$ | District Wise No of Community Health Centre of per lakh population 2014 |
| 5 | $X_5$ | District Wise No. of Sub Centres of per ten thousand population 2014 |
| 6 | $X_6$ | District Wise No. of Private Clinic/Poly Clinic per lakh population 2014 |
| 7 | $X_7$ | District Wise No. of Diagnostic Centres per lakh population 2014 |
| 8 | $X_8$ | District Wise No of Beds in Civil Hospitals per thousand population 2014 |
| 9 | $X_9$ | District Wise No of beds Block Primary health Centre per '0000 population in 2014 |
| 10 | $X_{10}$ | District Wise No of Mini Primary Health Centre'0000 2014 |
| 11 | $X_{11}$ | District Wise No of Beds in Community Health Centre per'0000 poplatn. in 2014 |
| 12 | $X_{12}$ | District wise Rural Family Welfare Centres '00000 popn. 2014 |
| 13 | $X_{13}$ | District Wise No. of Government Provincialised LP Schools including tea garden schools per sq. km in 2014 |
| 14 | $X_{14}$ | District Wise No of Government Provincialised/recognised Upper primary Schools including tea garden schools per 10 sq. k.m. 2014 |
| 15 | $X_{15}$ | District Wise No of Government Provincialised Upper primary Schools with High Schools per 100 sq. k.m. 2014 |
| 16 | $X_{16}$ | District Wise No of High Schools per 100 sq. k.m. in 2014 |
| 17 | $X_{17}$ | District Wise No of Higher Secondary Schools per 100 sq. k.m. in 2014 |
| 18 | $X_{18}$ | District Wise No of Junior Colleges per 100 sq.k.m. in 2014 |
| 19 | $X_{19}$ | District Wise No of Provincialised Colleges per 100 sq. k.m. in 2014 |
| 20 | $X_{20}$ | District Wise % of Habitations targeted National rural Drinking Water Supply Programme 2014 |
| 21 | $X_{21}$ | District Wise no of Police Stations in Assam in 2014 |
| 22 | $X_{22}$ | District Wise no of Employment Exchanges in Assam in 2014 |
| 23 | $X_{23}$ | District wise fair price shops in per thousand population Assam 2014 |
| 24 | $X_{24}$ | District wise no of Fire and emergency service Stations per lakh population 2014 |
| 25 | $X_{25}$ | District wise % of villages electrified to total inhabited villages 2014 |
| 26 | $X_{26}$ | District wise no of Habitations providing with Drinking Water Facilities in Assam 2014 |
| 27 | $X_{27}$ | District wise Average no. of classroom in Primary School 2014 |
| 28 | $X_{28}$ | District wise Average no. of classroom in U Primary School 2014 |
| 29 | $X_{29}$ | District wise Percentage distribution of Households having Permanent building 2011 |
| 30 | $X_{30}$ | Number and Percentage of Households by availability of Kitchen facility, 2011 |

Data Source, 29, 30:-Census of India, 2011, HH- series Tables on Houses, Household amenities and assets.

Permanent: Permanent houses refer to those houses whose walls & roofs are made of pucca materials, i.e., where burnt bricks, G.I. Sheets or other metal sheets, stone, cement, concrete is used for wall and tiles, slate, shingle, corrugated iron, zinc or other metal sheets, asbestos sheets, bricks, lime and stone and RBC / RCC concrete are used for roof.

**Table 2a**

**Normal Value of the Variables**

| District | $X_{i1}$ | $X_{i2}$ | $X_{i3}$ | $X_{i4}$ | $X_{i5}$ | $X_{i6}$ | $X_{i7}$ | $X_{i8}$ |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.24134 | 0.39726 | 0.34212 | 0.56633 | 0.52698 | 0.0372 | 0.03534 | 0.36201 |
| 2 | 0.10984 | 0.09155 | 0.15571 | 0.20688 | 0.33116 | 0.03386 | 0.12866 | 0.21968 |
| 3 | 0.24132 | 0.39726 | 0.34212 | 0.56632 | 0.52698 | 0.0372 | 0.03534 | 0.36201 |
| 4 | 0.12642 | 0.22297 | 0.35841 | 0.39042 | 0.43818 | 0.11690 | 0.07404 | 0.12642 |
| 5 | 0.22362 | 0.16815 | 0.31701 | 0.15117 | 0.33393 | 0.03447 | 0.03274 | 0.22362 |
| 6 | 0.24134 | 0.39726 | 0.34212 | 0.56632 | 0.52698 | 0.0372 | 0.03534 | 0.36201 |
| 7 | 0.11127 | 0.14507 | 0.31548 | 0.14998 | 0.38693 | 0.27439 | 0.29327 | 0.21142 |
| 8 | 0.20545 | 0.17851 | 0.29124 | 0.46821 | 0.41100 | 0.18999 | 0.02407 | 0.20545 |
| 9 | 0.31204 | 0.22973 | 0 | 0.41841 | 0.38855 | 0.09619 | 0.18275 | 0.31204 |
| 10 | 0.16123 | 0.02707 | 0.68567 | 0.34736 | 0.31503 | 0.52184 | 0.28328 | 0.16123 |
| 11 | 0 | 0.10997 | 0.45767 | 0.34789 | 0.50773 | 0.67174 | 0.61452 | 0 |
| 12 | 0.18601 | 0.31032 | 0.79104 | 0.11003 | 0.56895 | 0.25801 | 0.43575 | 0.27901 |
| 13 | 0.19602 | 0.32469 | 0.83362 | 0.44245 | 0.34674 | 0.66465 | 0.45921 | 0.39204 |
| 14 | 0.20068 | 0.31123 | 0.28448 | 0.45518 | 0.35866 | 0.18558 | 0.32321 | 0.20068 |
| 15 | 0.22388 | 0.54107 | 0 | 0.51861 | 0.422 | 0.03451 | 0.03278 | 0.22388 |
| 16 | 1 | 0.51431 | 0 | 1 | 1 | 0.15412 | 0.14642 | 1 |
| 17 | 0.12329 | 0.06286 | 0 | 0.17625 | 0.43664 | 0.28502 | 0.32493 | 0.06164 |
| 18 | 0.17425 | 0.04457 | 0 | 0.00192 | 0.51703 | 0.13428 | 0.07654 | 0.17425 |
| 19 | 0.32474 | 0.08056 | 0 | 0.26172 | 0.45104 | 0 | 0 | 0.32474 |
| 20 | 0.2898 | 0.62635 | 0.82162 | 0.54035 | 0.23656 | 0.22332 | 0.67890 | 0.43469 |
| 21 | 0.44405 | 0.46395 | 0 | 0.39215 | 0.5237 | 0.06844 | 0 | 0.66607 |
| 22 | 0.14109 | 0 | 1 | 0.60080 | 0.54707 | 0.76106 | 0.8263 | 0.28217 |
| 23 | 0 | 0.40041 | 0.24204 | 0 | 0 | 1 | 1 | 0 |
| 24 | 0.27746 | 1 | 0.78666 | 0.81675 | 0.44172 | 0.38488 | 0.08125 | 0.27746 |
| 25 | 0.225353 | 0.44491 | 0 | 0.52263 | 0.47382 | 0 | 0 | 0.33803 |
| 26 | 0.230589 | 0.50392 | 0.32688 | 0.28483 | 0.51301 | 0.14216 | 0.303862 | 0.230589 |
| 27 | 0.257437 | 0.189301 | 0 | 0.328859 | 0.517574 | 0 | 0.11308 | 0.386155 |

**Table 2b**

**Normal Value of the Variables**

| District | $X_{i9}$ | $X_{i10}$ | $X_{i11}$ | $X_{i12}$ | $X_{i13}$ | $X_{i14}$ | $X_{i15}$ | $X_{i16}$ |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.32179 | 0.45601 | 0.30246 | 0.32179 | 0.44734 | 0.19789 | 0.00000 | 0.14032 |
| 2 | 0.25629 | 0.16083 | 0.20688 | 0.25629 | 1.00000 | 1.00000 | 0.39401 | 0.46555 |
| 3 | 0.32179 | 0.45601 | 0.30246 | 0.32179 | 0.44734 | 0.19789 | 0.00000 | 0.14032 |
| 4 | 0.37925 | 0.26940 | 0.39042 | 0.29497 | 0.82858 | 0.67280 | 0.79269 | 0.85131 |
| 5 | 0.22362 | 0.24428 | 0.15116 | 0.22362 | 0.76619 | 0.57507 | 0.24558 | 0.46840 |
| 6 | 0.32179 | 0.45601 | 0.30246 | 0.32179 | 0.44734 | 0.19789 | 0.00000 | 0.14032 |
| 7 | 0.29673 | 0.20690 | 0.14998 | 0.29673 | 0.27595 | 0.11362 | 0.15765 | 0.22480 |
| 8 | 0.41089 | 0.21851 | 0.46821 | 0.41089 | 0.77024 | 0.81491 | 0.76361 | 0.81157 |
| 9 | 0.52007 | 0.24898 | 0.41841 | 0.52007 | 0.29034 | 0.28254 | 0.08413 | 0.36178 |
| 10 | 0.21497 | 0.10389 | 0.34736 | 0.21497 | 0.20472 | 0.06994 | 0.06496 | 0.21221 |
| 11 | 0.32285 | 0.16651 | 0.34789 | 0.32285 | 0.36910 | 0.18004 | 0.17341 | 0.32788 |
| 12 | 0.49602 | 0.33478 | 0.11003 | 0.49602 | 0.66888 | 0.31290 | 0.57230 | 0.50342 |
| 13 | 0.45738 | 0.35672 | 0.44245 | 0.45738 | 0.54458 | 0.34763 | 0.40225 | 0.57304 |
| 14 | 0.33446 | 0.36693 | 0.45519 | 0.33446 | 0.26358 | 0.22141 | 0.14476 | 0.30957 |
| 15 | 0.59702 | 0.54760 | 0.51861 | 0.59702 | 0.01463 | 0.00000 | 0.05974 | 0.06251 |
| 16 | 1.00000 | 0.37833 | 1.00000 | 1.00000 | 0.00000 | 0.00776 | 0.00805 | 0.00000 |
| 17 | 0.32876 | 0.11793 | 0.17625 | 0.32876 | 0.46046 | 0.23492 | 0.18061 | 0.23613 |
| 18 | 0.29042 | 0.10692 | 0.00192 | 0.29042 | 0.88498 | 0.46243 | 0.37173 | 0.24861 |
| 19 | 0.43299 | 0.11560 | 0.26171 | 0.43299 | 0.91846 | 0.91356 | 0.46940 | 0.27781 |
| 20 | 0.57959 | 0.63686 | 0.54035 | 0.38639 | 0.72913 | 0.63704 | 0.22409 | 0.55554 |
| 21 | 0.00000 | 0.58537 | 0.39215 | 0.29603 | 0.32852 | 0.13666 | 0.01527 | 0.13486 |
| 22 | 0.61137 | 0.00000 | 0.60080 | 0.56434 | 0.55618 | 0.39692 | 0.52695 | 0.56755 |
| 23 | 0.05691 | 0.51038 | 0.00000 | 0.00000 | 0.48456 | 0.33826 | 0.99079 | 0.76299 |
| 24 | 0.64742 | 1.00000 | 0.81675 | 0.36995 | 0.93671 | 0.62559 | 1.00000 | 1.00000 |
| 25 | 0.00000 | 0.56619 | 0.52263 | 0.45071 | 0.53059 | 0.40939 | 0.13967 | 0.46346 |
| 26 | 0.53804 | 0.52161 | 0.28483 | 0.30745 | 0.63542 | 0.32473 | 0.44345 | 0.57257 |
| 27 | 0.00000 | 0.30880 | 0.32886 | 0.25744 | 0.51423 | 0.21995 | 0.10252 | 0.26634 |

**Table 2c**

**Normal Value of the Variables**

| District | $X_{i17}$ | $X_{i18}$ | $X_{i19}$ | $X_{i20}$ | $X_{i21}$ | $X_{i22}$ | $X_{i23}$ | $X_{i24}$ |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.08289 | 0.2265 | 0.0648 | 0.1784 | 0.7200 | 0.4286 | 0.5123 | 0.0927 |
| 2 | 1.00000 | 0.5446 | 0.2499 | 0.2304 | 0.4400 | 0.4286 | 0.1231 | 0.1959 |
| 3 | 0.08289 | 0.2265 | 0.0648 | 0.1784 | 0.7200 | 0.4286 | 0.5123 | 0.0927 |
| 4 | 0.66473 | 0.5881 | 0.3258 | 0.3362 | 0.2800 | 0.2857 | 0.0966 | 0.1466 |
| 5 | 0.45149 | 0.5312 | 0.1470 | 0.3595 | 0.0400 | 0.4286 | 0.1258 | 0.1606 |
| 6 | 0.08289 | 0.2265 | 0.0648 | 0.1784 | 0.7200 | 0.4286 | 0.5123 | 0.0927 |
| 7 | 0.12349 | 0.2094 | 0.0766 | 0.4892 | 0.6400 | 0.4286 | 0.0972 | 0.1594 |
| 8 | 0.53638 | 0.7519 | 0.2737 | 0.4275 | 0.2000 | 0.4286 | 0.1743 | 0.1409 |
| 9 | 0.05900 | 0.7206 | 0.1529 | 0.4483 | 0.0400 | 0.2857 | 0.2844 | 0.2562 |
| 10 | 0.10604 | 0.0000 | 0.0976 | 0.5351 | 0.7200 | 0.5714 | 0.3117 | 0.1512 |
| 11 | 0.30479 | 0.3143 | 0.1698 | 0.8676 | 0.8000 | 0.8571 | 0.1745 | 0.0933 |
| 12 | 0.38872 | 0.7387 | 0.2775 | 0.3898 | 0.7200 | 0.8571 | 0.2374 | 0.1869 |
| 13 | 0.24270 | 0.3753 | 0.2732 | 1.0000 | 0.5200 | 0.7143 | 0.4394 | 0.2720 |
| 14 | 0.14209 | 0.2878 | 0.1522 | 0.5689 | 0.4400 | 0.5714 | 0.6393 | 0.2081 |
| 15 | 0.00160 | 0.0468 | 0.0072 | 0.2568 | 0.4400 | 0.7143 | 0.2910 | 0.1608 |
| 16 | 0.00000 | 0.0293 | 0.0000 | 0.0000 | 0.3200 | 0.7143 | 0.9602 | 1.0000 |
| 17 | 0.30151 | 0.3629 | 0.1084 | 0.4587 | 0.5200 | 0.4286 | 0.2531 | 0.2742 |
| 18 | 0.69688 | 0.0737 | 0.1692 | 0.3787 | 0.0400 | 0.4286 | 0.2709 | 0.1700 |
| 19 | 0.18400 | 0.1852 | 0.1732 | 0.5170 | 0.0800 | 0.1429 | 0.7621 | 0.1529 |
| 20 | 0.28971 | 0.1794 | 0.2487 | 0.2157 | 0.0400 | 0.2857 | 0.5146 | 0.1277 |
| 21 | 0.08195 | 0.0960 | 0.0335 | 0.3366 | 0.4000 | 0.0000 | 1.0000 | 0.2389 |
| 22 | 0.41699 | 0.1903 | 0.2114 | 0.4015 | 0.3600 | 1.0000 | 0.2690 | 0.2747 |
| 23 | 0.80178 | 0.3734 | 1.0000 | 0.4132 | 1.0000 | 0.0000 | 0.3092 | 0.2880 |
| 24 | 0.92509 | 0.7395 | 0.2969 | 0.5897 | 0.1600 | 0.4286 | 0.0912 | 0.3188 |
| 25 | 0.09008 | 0.2226 | 0.0244 | 0.3216 | 0.6000 | 0.0000 | 0.2857 | 0.0000 |
| 26 | 0.53428 | 0.7195 | 0.1437 | 0.4284 | 0.0000 | 0.2857 | 0.2225 | 0.1681 |
| 27 | 0.11861 | 0.1174 | 0.0317 | 0.3802 | 0.4000 | 0.1429 | 0.0000 | 0.1043 |

**Table 2d**

**Normal Value of the Variables**

| District | $X_{i25}$ | $X_{i26}$ | $X_{i27}$ | $X_{i28}$ | $X_{i29}$ | $X_{i30}$ |
|---|---|---|---|---|---|---|
| 1 | 0.7657 | 0.4758 | 0.3158 | 0.45455 | 0.18986 | 0.37323 |
| 2 | 0.0000 | 0.2215 | 0.6316 | 0.54545 | 0.20087 | 0.00000 |
| 3 | 0.7657 | 0.4758 | 0.3158 | 0.45455 | 0.18986 | 0.37323 |
| 4 | 0.9675 | 0.2949 | 0.5789 | 0.39394 | 0.17325 | 0.24882 |
| 5 | 0.7902 | 0.3883 | 0.4211 | 0.57576 | 0.16556 | 0.39294 |
| 6 | 0.7657 | 0.4758 | 0.3158 | 0.45455 | 0.18986 | 0.37323 |
| 7 | 0.8164 | 0.5174 | 0.7368 | 0.75758 | 0.36836 | 0.67547 |
| 8 | 0.9499 | 0.4209 | 0.4211 | 0.15152 | 0.21346 | 0.85154 |
| 9 | 0.7937 | 0.4021 | 0.3684 | 0.45455 | 0.01871 | 0.74310 |
| 10 | 0.9417 | 0.4144 | 0.9474 | 1.00000 | 0.46503 | 0.88328 |
| 11 | 0.7635 | 0.5988 | 0.5789 | 0.42424 | 0.47045 | 0.99172 |
| 12 | 0.4749 | 0.6684 | 0.4737 | 0.30303 | 0.38234 | 1.00000 |
| 13 | 0.9967 | 0.6213 | 0.3158 | 0.33333 | 0.41521 | 0.99349 |
| 14 | 1.0000 | 0.5656 | 0.5263 | 0.36364 | 0.16696 | 0.93454 |
| 15 | 0.8151 | 0.4997 | 0.6316 | 0.30303 | 0.01381 | 0.71274 |
| 16 | 0.7065 | 0.3708 | 0.2632 | 0.06061 | 0.14983 | 0.82275 |
| 17 | 0.8814 | 1.0000 | 0.3158 | 0.39394 | 0.33584 | 0.90103 |
| 18 | 0.8125 | 0.7284 | 0.3158 | 0.33333 | 0.39843 | 0.87894 |
| 19 | 0.9206 | 0.8334 | 0.0000 | 0.00000 | 0.26678 | 0.87638 |
| 20 | 0.8129 | 0.0000 | 0.4211 | 0.36364 | 0.28112 | 0.34267 |
| 21 | 0.7781 | 0.0893 | 0.3684 | 0.54545 | 0.08671 | 0.34819 |
| 22 | 0.9616 | 0.4957 | 0.4737 | 0.45455 | 0.35787 | 0.51755 |
| 23 | 0.9794 | 0.4436 | 1.0000 | 0.36364 | 1.00000 | 0.96155 |
| 24 | 0.7458 | 0.6243 | 0.6316 | 0.42424 | 0.36696 | 0.86968 |
| 25 | 0.6247 | 0.2963 | 0.3684 | 0.36364 | 0.00000 | 0.61613 |
| 26 | 0.9369 | 0.4038 | 0.6316 | 0.57576 | 0.18619 | 0.03687 |
| 27 | 0.9927 | 0.0098 | 0.4737 | 0.57576 | 0.25997 | 0.40024 |

*Source: Prepared by the Researcher*

**Table: 3**

**Weight of the Variables**

| Indicators | Weight | Indicators | Weight |
|---|---|---|---|
| $X_1$ | 9.979051 | $X_{16}$ | 6.732751 |
| $X_2$ | 5.035756 | $X_{17}$ | 7.190624 |
| $X_3$ | 8.521586 | $X_{18}$ | 5.525665 |
| $X_4$ | 9.359137 | $X_{19}$ | 8.923093 |
| $X_5$ | 9.744103 | $X_{20}$ | 4.532406 |
| $X_6$ | 5.635508 | $X_{21}$ | 7.662172 |
| $X_7$ | 5.193748 | $X_{22}$ | 9.67646 |
| $X_8$ | 9.614397 | $X_{23}$ | 6.607821 |
| $X_9$ | 8.866393 | $X_{24}$ | 9.466631 |
| $X_{10}$ | 3.353685 | $X_{25}$ | 3.585916 |
| $X_{11}$ | 9.234383 | $X_{26}$ | 2.79968 |
| $X_{12}$ | 10.39731 | $X_{27}$ | 7.919232 |
| $X_{13}$ | 6.852985 | $X_{28}$ | 7.99282 |
| $X_{14}$ | 6.577453 | $X_{29}$ | 10.23634 |
| $X_{15}$ | 6.722262 | $X_{30}$ | 6.553448 |
| **Grand Total** | | | **=220.4928** |

*Source: Prepared by the research Scholar*

**Table 4**

**Rankings of the Districts of Assam**

| Sl. No. | Districts | SII | Rank | Sl. No | Districts | SII | Rank |
|---|---|---|---|---|---|---|---|
| 1 | Kokrajhar | 0.313962 | **17** | 15 | Karbi Anglong | 0.305102 | **22** |
| 2 | Dhubri | 0.332505 | **15** | 16 | Dima Hasso | 0.504259 | **2** |
| 3 | Goalpara | 0.312669 | **18** | 17 | Cachar | 0.307353 | **21** |
| 4 | Barpeta | 0.37439 | **10** | 18 | Karimganj | 0.297299 | **23** |
| 5 | Morigaon | 0.2965 | **24** | 19 | Hailakandi | 0.321586 | **16** |
| 6 | Nagaon | 0.363755 | **12** | 20 | Bongaigaon | 0.400548 | **8** |
| 7 | Sonitpur | 0.310321 | **20** | 21 | Chirang | 0.288065 | **25** |
| 8 | Lakhimpur | 0.402037 | **7** | 22 | Kamrup | 0.483644 | **3** |
| 19 | Dhemaji | 0.311986 | **19** | 23 | Kamrup Metro | 0.442831 | **5** |
| 10 | Tinsukia | 0.364969 | **11** | 24 | Nalbari | 0.560136 | **1** |
| 11 | Dibrugarh | 0.391171 | **9** | 25 | Baksa | 0.281256 | **26** |
| 12 | Sivasagar | 0.440776 | **6** | 26 | Darrang | 0.356771 | **13** |
| 13 | Jorhat | 0.467992 | **4** | 27 | Udalguri | 0.255385 | **27** |
| 14 | Golaghat | 0.355199 | **14** | | | | |

*Source: Prepared by the Researcher*

**Table 5**

**Categories of the Different Districts**

| Districts | Index Value | Rank | Districts | Index Value | Rank |
|---|---|---|---|---|---|
| **Highly Developed (>0.44115)** | | | **Developing Districts (0.28785-0.3645)** | | |
| Nalbari | 0.560136 | 1 | Nagaon | 0.363755 | 12 |
| Dima Hasso | 0.504259 | 2 | Darrang | 0.356771 | 13 |
| Kamrup | 0.483644 | 3 | Golaghat | 0.355199 | 14 |
| Jorhat | 0.467992 | 4 | Dhubri | 0.332505 | 15 |
| Kamrup Metro | 0.442831 | 5 | Hailakandi | 0.321586 | 16 |
| **Middle Level Developed Districts (0.3645-0.44115)** | | | Kokrajhar | 0.313962 | 17 |
| | | | Goalpara | 0.312669 | 18 |
| Sivasagar | 0.440776 | 6 | Dhemaji | 0.311986 | 19 |
| Lakhimpur | 0.402037 | 7 | Sonitpur | 0.310321 | 20 |
| Bongaigaon | 0.400548 | 8 | Cachar | 0.307353 | 21 |
| Dibrugarh | 0.391171 | 9 | Karbi Anglong | 0.305102 | 22 |
| Barpeta | 0.37439 | 10 | Karimganj | 0.297299 | 23 |
| Tinsukia | 0.364969 | 11 | Morigaon | 0.2965 | 24 |
| | | | Chirang | 0.288065 | 25 |
| | | | **Low developed Districts < 0.28785** | | |
| | | | | | |
| | | | Baksa | 0.281256 | 26 |
| | | | Udalguri | 0.255385 | 27 |

*Source: Prepared by the Researcher*

**Table 6**

**Relative Share of Area and Population**

| Poverty level | No. of States | Area % | Population % |
|---|---|---|---|
| Highly Developed | 05 | 16.3836 | 15.5404 |
| Middle Level Developed | 06 | 19.7493 | 23.3287 |
| Developing Districts | 14 | 58.1695 | 55.4211 |
| Low Developed Districts | 02 | 5.6974 | 5.7096 |

**Table 7**

**Valley wise Category**

| Valley | Category |
|---|---|
| Brahmaputra Valley | Highly Developed/Middle/Developing |
| Hills (Karbi-Anglong, Dima Hasao) | Highly developed/developing |
| Barak Valley (Cachar, Hailakandi, Karimganj) | Developing |
| BTAD(Kokrajhar, Baksa, Chirang, Udalguri) | Low Developed/Developing |