Imperial Journal of Interdisciplinary Research (IJIR)
Vol-2, Issue-6, 2016
ISSN: 2454-1362, http://www.onlinejournal.in

Intra-District Educational scenarios in North Bengal, W.B., India

Jayatra Mandal

Part-time Lecturer, Dept. of Geography, P. K. H. N. Mahavidyalaya, Howrah, W.B.

Abstract: *Education is fundamental in maintaining economic growth, infrastructure and social development. Naturally, availability of existing educational institutions of block level plays important role to delineate the balanced or imbalanced scenario of the district.*

In this paper seven districts of north Bengal were assessed for identification of deficient blocks by ***residual*** *mapping. The* ***co-efficient of correlation (r)*** *and the* ***coefficient of determination (r ^{2})*** *ware used for determined of degree of relationship between educational institution and total population.*

The result show that the blocks of Mirik, Matigara, Naxalbari, Kharibari and Phansidewa in ***Darjiling****; Rajganj and Dhupguri in Jalpaiguri; Madarihat-Birpara and Kalchini in* ***Alipurduar****; Mathabhanga-I, Mathabhanga-II, Sitalkuchi, Coochbehar-II, Dinhata –I and Sitai in* ***Koch Bihar****; Goalpokhar-I and Karandighi in* ***Uttar Dinajpur****; Banshihari and Gangarampur in* ***Dakshin Dinajpur****; Harishchandrapur-II, Chanchal-II, Ratua-I, Ratua-II, Kaliachak-I and Kaliachak-III in* ***Maldah*** *have deficiency of educational institutions. It also found that Koch Bihar and Dakshin Dinajpur have almost perfect positive relation (r) between educational institution and total population; Darjiling, Jalpaiguri and Uttar Dinajpur have strong positive relation; Maldah have moderate positive relation and Alipurduar have poor positive relation.*

As per ***coefficient of determination,*** *Darjiling belong with 74 percent of the total variation in y can be explained by the linear relationship between total population (x) and total educational score (y). Similarly, Jalpaiguri-78 percent, Alipurduar- 24 percent, Koch Bihar-97 percent, Uttar Dinajpur-74 percent, Dakshin Dinajpur-96 percent and Maldah-52 percent can be explained.*

These deficiencies are not fruitful towards planning for development. To alleviate such situation, few new and high-quality schools and colleges are needed to be established.

Keywords*: residual mapping, co-efficient of correlation (r), coefficient of determination (r ^{2}), educational institutions, surplus-deficit.*

INTRODUCTION

Development of a region, country or a district has various facets. Broadly speaking development constitutes the elements like economic growth, infrastructure and social development. The status of education is an integral part of social development. Education is an important avenue which provides a wide range of opportunities for all round development. Recognizing the value of education, our central government has always tried to reconstruct the educational system for betterment of the masses. Deep attention was paid to education as a factor vital to national progress and security. For the harmonious development of the society, education is imparted in different levels through various institutions. In West Bengal the general educational structure is divided into five stages, viz. primary school (class I - IV), middle school (class V - VIII), high school (class IX - X), higher secondary school (XI - XII), college (3 years in B.A/ B.Sc. / B.Com.) and university (2 years in M.A/ M.Sc. /M. Com.). The qualitative outcome of each and every stages based on availability of spatial distribution of educational institution. This reasons induced the author to wage the present study on a district level. The study is designed to recognize the variation in the distribution of educational institution in north Bengal.

STUDY AREA

The north Bengal (*fig.1*) geographically lies between 24°40′20″ to 27°13′ North latitude and 87°45′50″ to 89°53′ East longitude. It is constitutes by the districts Darjiling, Jalpaiguri, Alipurduar, Koch Bihar, Uttar Dinajpur, Dakshin Dinajpur and Maldah. These districts are under **Jalpaiguri Division**. These regions cover variable relief features viz, Himalayan Mountain region, Tarai region and Northern plain region. It covers an area of 21,855 Sq.km. and 17,207,410 populations with density of population 787 persons./sq.km as per census 2011.

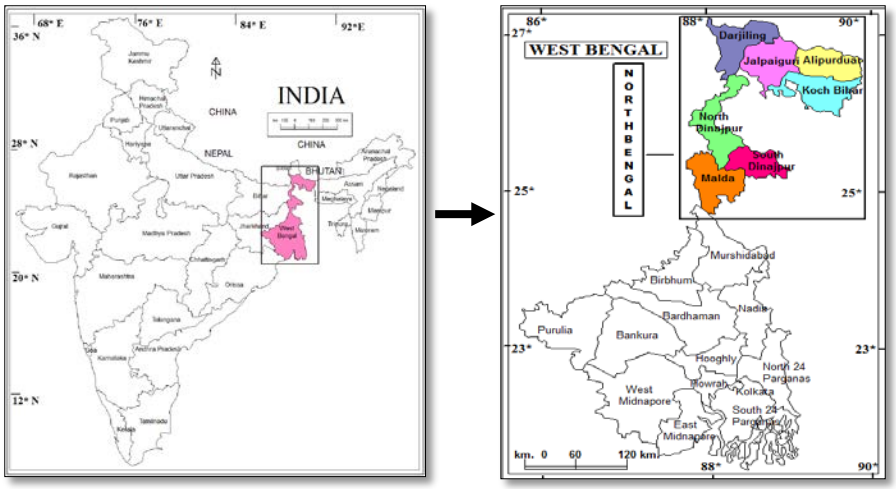

Fig.1 Location of the study area

OBJECTIVES

The major objectives are as follows:

1. To analyze the block-wise disparity in the distribution of educational institutions.
2. To locate the gap where there is surplus or deficit of educational institutions.
3. To identify the degree of relationship among districts of north Bengal.

DATA BASE AND METHODOLOGY

The present study was conducted based on secondary data sources e.g.

1. DSHB of Darjiling, Jalpaiguri, Koch Bihar, Uttar Dinajpur, Dakshin Dinajpur and Maldah (2012)

2. DCHB of Darjiling, Jalpaiguri, Koch Bihar, Uttar Dinajpur, Dakshin Dinajpur and Maldah (2011)

Firstly, the block-wise data of total no. of educational institutions (i.e., primary school, middle school, high school, higher secondary school and college or university) of each block in the districts are collected and tabulated (Table 1, 2, 3, 4, 5, 6 and 7) to get individual scores.

Secondly, based on the score of educational institutions (y) with respect to the total populations (x) the residual value was calculated and tabulated (Table 8, 9, 10, 11, 12, 13 and 14).

Residual mapping: Residual is used to identify and regionalize the areas having negative and positive impact over y. There are two variables are taken as independent (total population) and dependent (total score of educational institutions). They are considered as x and y. The equation is:

$$Yc = a+bx$$

Where, a= y intercept, b= regression coefficient and yc = estimated score. The constant **a** and **b** are determined by:

$$b = \frac{N\sum XY - \sum X \sum Y}{N\sum X^2 - (\sum X)^2}, \quad a = \frac{\sum Y - b\sum X}{N}$$

Now, residual is being calculated by differentiation between actual score (Y) to estimated score (Yc).

Thirdly, isopleths map has been drawn to portrait the intra-district diversity with the help of residual value.

Finally, the degree of relationship among districts shown by **Correlation Co-efficient (r)** and **Coefficient of Determination (r^2)**

$$r = \frac{n\sum xy - \left(\sum x\right)\left(\sum y\right)}{\sqrt{n\left(\sum x^2\right) - \left(\sum x\right)^2}\sqrt{n\left(\sum y^2\right) - \left(\sum y\right)^2}}$$

Where, n is the number of pairs of data.

If we denote y_i as the observed values of the dependent variable, $\bar{y}$ as its mean, and $\hat{y}_i$ as the fitted value, then the coefficient of determination is:

$$r^2 = \frac{\sum(\hat{y}_i - \bar{y})^2}{\sum(y_i - \bar{y})^2}$$

Table-1. Score of Total Educational Institutions of Darjiling district, 2012

CD Block	Primary School	Middle School	High School	Higher Secondary School	College and University	Total Score
Darjeeling-Pulbazar	295	13	26	15	4	353
Sukhiapokhri-Jorebunglow	157	8	7	5	3	180
Rangli Rangliot	112	7	4	3	-	126
Kalimpong-I	143	9	14	7	2	175
Kalimpong-II	91	6	7	3	-	107
Gorubathan	99	4	4	2	-	109
Kurseong	212	3	28	9	1	253
Mirik	76	3	6	2	1	88
Matigara	290	13	29	40	8	380
Naxalbari	121	7	6	9	2	145
Kharibari	98	5	5	6	-	114
Phansidewa	152	5	6	12	-	175
Metiali	69	6	4	3	-	82
Nagrakata	56	3	3	5	-	67

Source: Compiled by the Author

Table-2 Score of Total Educational Institutions of Jalpaiguri district, 2012

CD Block	Primary School	Middle School	High School	Higher Secondary School	College and University	Total Score
Rajganj	163	5	13	11	2	194
Jalpaiguri	307	5	22	34	3	371
Maynaguri	208	7	15	14	1	245
Dhupguri	208	3	13	27	1	252
Mal	191	13	21	22	1	248

Table-3 Score of Total Educational Institutions of Alipurduar district, 2012

CD Block	Primary School	Middle School	High School	Higher Secondary School	College and University	Total Score
Kumargram	127	13	5	10	1	156
Falakata	159	5	5	16	1	186
Madarihat-Birpara	97	1	9	10	1	118
Kalchini	111	5	12	10	1	139
Alipurduar-I	139	3	11	10	1	164
Alipurduar-II	200	8	11	22	2	243

Source: Compiled by the Author

Table-4 Score of Total Educational Institutions of Koch Bihar district, 2012

CD Block	Primary School	Middle School	High School	Higher Secondary School	College and University	Total Score
Mekhliganj	120	10	2	10	1	143
Haldibari	95	4	2	8	1	110
Mathabhanga-I	154	10	4	16	1	185
Mathabhanga-II	152	4	4	11	2	173
Sitalkuchi	125	11	6	9	1	152
Coochbehar-I	231	14	22	32	5	304

Coochbehar-II	210	8	11	21	1	251
Tufanganj -I	167	11	10	17	1	206
Tufanganj -II	142	12	6	10	1	171
Dinhata -I	191	7	12	13	1	224
Dinhata-II	171	6	11	9	-	197
Sitai	68	4	4	3	-	79

Source: Compiled by the Author

Table-5 Score of Total Educational Institutions of Uttar Dinajpur district, 2012

CD Block	Primary School	Middle School	High School	Higher Secondary School	College and University	Total Score
Chopra	171	17	6	17	-	211
Islampur	234	14	7	25	1	281
Goalpokhar-I	148	16	7	7	-	178
Goalpokhar-II	156	14	3	13	-	186
Karandighi	199	11	8	20	1	239
Raiganj	366	31	9	59	2	467
Hemtabad	109	13	3	16	-	141
Kaliaganj	246	15	3	36	1	301
Itahar	210	17	6	26	1	260

Source: Compiled by the Author

Table-6 Score of Total Educational Institutions of Dakshin DInajpur district, 2012

CD Block	Primary School	Middle School	High School	Higher Secondary School	College and University	Total Score
Kushmandi	141	4	10	9	-	164
Banshihari	78	11	5	7	1	102
Harirampur	91	10	8	7	1	117
Gangarampur	193	7	12	17	1	230
Kumarganj	139	10	14	7	-	170
Tapan	201	10	10	8	-	229
Balurghat	260	13	25	23	3	324
Hili	72	2	6	4	-	84

Source: Compiled by the Author

Table-7. Score of Total Educational Institutions of Maldah district, 2012

CD Block	Primary School	Middle School	High School	Higher Secondary School	College and University	Total Score
Harishchandrapur-I	105	9	7	7	1	129
Harishchandrapur-II	109	9	14	10	-	142
Chanchal-I	102	11	9	8	1	131
Chanchal-II	85	4	14	5	-	108
Ratua-I	119	10	12	10	1	152
Ratua-II	85	6	11	10	-	112
Gazole	196	21	22	13	1	253
Bamongola	105	10	4	8	1	128
Habibpur	147	9	5	9	-	170
Old Malda	121	11	8	6	1	147
English Bazar	218	10	25	29	3	285
Manikchak	148	4	12	10	-	174
Kaliachak-I	109	10	13	11	1	144
Kaliachak-II	126	16	13	4	-	159
Kaliachak-III	120	3	12	10	1	146

Source: Compiled by the Author

Table-8 Residuals of Total Educational Institutions of Darjiling district, 2012

CD Block	Total Population (x)	Total Score (y)	yc = a+bx	Residuals
Darjeeling-Pulbazar	245740	353	250.737	102.263
Sukhiapokhri-Jorebunglow	113516	180	158.1802	21.8198
Rangli Rangliot	70125	126	127.8065	-1.8065
Kalimpong-I	124149	175	165.6233	9.3767
Kalimpong-II	66830	107	125.5	-18.5
Gorubathan	60663	109	121.1831	-12.1831
Kurseong	136793	253	174.4741	78.5259
Mirik	57887	88	119.2399	-31.2399
Matigara	491824	380	422.9958	-42.9958
Naxalbari	165523	145	194.5851	-49.5851
Kharibari	109251	114	155.1947	-41.1947
Phansidewa	204522	175	221.8844	-46.8844

Source: Compiled by the Author

Table-9 Residuals of Total Educational Institutions ofJalpaiguri district, 2012

CD Block	Total Population (x)	Total Score (y)	yc=a+bx	Residuals
Rajganj	373776	194	258.5269	-64.5269
Jalpaiguri	430786	371	298.4339	72.5661
Maynaguri	329032	245	227.2061	17.7939
Dhupguri	459573	252	318.5848	-66.5848
Mal	324774	248	224.2255	23.7745
Metiali	117540	82	79.1617	2.8383
Nagrakata	127397	67	86.0616	-19.0616

Source: Compiled by the Author

Table-10 Residuals of Total Educational Institutions of Alipurduar district, 2012

CD Block	Total Population (x)	Total Score (y)	yc=a+bx	Residuals
Kumargram	199609	156	155.6155	0.3845
Falakata	290722	186	201.172	-15.172
Madarihat-Birpara	202026	118	156.824	-38.824
Kalchini	298458	139	205.04	-66.04
Alipurduar-I	216931	164	164.2765	-0.2765
Alipurduar-II	283504	243	197.563	45.437

Source: Compiled by the Author

Table-11 Residuals of Total Educational Institutions of Koch Bihar district, 2012

CD Block	Total Population (x)	Total Score (y)	yc = a+bx	Residuals
Mekhliganj	164377	143	141.6119	1.3881
Haldibari	118373	110	109.4091	0.5909

Mathabhanga-I	242081	185	196.0047	-11.0047
Mathabhanga-II	227397	173	185.7259	-12.7259
Sitalkuchi	185353	152	185.7259	-33.7259
Coochbehar-I	404493	304	309.6931	-5.6931
Coochbehar-II	343901	251	267.2787	-16.2787
Tufanganj -I	269593	206	215.2631	-9.2631
Tufanganj -II	186726	171	157.2562	13.7438
Dinhata -I	322393	224	252.2231	-28.2231
Dinhata-II	244066	197	197.3942	-0.3942
Sitai	110333	79	103.7811	-24.7811

Source: Compiled by the Author

Table-12. Residuals of Total Educational Institutions of Uttar Dinajpur district, 2012

CD Block	Total Population (x)	Total Score (y)	yc = a+bx	Residuals
Chopra	284403	211	205.9438	5.0562
Islampur	362858	281	253.0168	27.9832
Goalpokhar-I	326120	178	230.974	-52.974
Goalpokhar-II	291252	186	210.0532	-24.0532
Karandighi	405262	239	278.4592	-39.4592
Raiganj	613833	467	403.6018	63.3982
Hemtabad	142056	141	120.5356	20.4644
Kaliaganj	277672	301	201.9052	99.0948
Itahar	303678	260	217.5088	42.4912

Source: Compiled by the Author

Table-13. Residuals of Total Educational Institutions of Dakshin Dinajpur district, 2012

CD Block	Total Population (x)	Total Score (y)	yc = a+bx	Residuals
Kushmandi	198752	164	175.1846	-11.1846
Banshihari	141286	102	129.2118	-27.2118
Harirampur	136853	117	125.6654	-8.6654
Gangarampur	293845	230	251.259	-21.259
Kumarganj	169102	170	151.4646	18.5354
Tapan	250504	229	216.5862	12.4138
Balurghat	402180	324	337.927	-13.927
Hili	83754	84	83.1862	0.8138

Source: Compiled by the Author

Table-14. Residuals of Total Educational Institutions of Maldah district, 2012

CD Block	Total Population (x)	Total Score (y)	yc = a+bx	Residuals
Harishchandrapur-I	199493	129	134.6762	-5.6762
Harishchandrapur-II	251345	142	155.417	-13.417

Chanchal-I	204740	131	136.775	-5.775
Chanchal-II	205333	108	137.0122	-29.0122
Ratua-I	275388	152	165.0342	-13.0342
Ratua-II	202080	112	135.711	-23.711
Gazole	343830	253	192.411	60.589
Bamongola	143906	128	112.4414	15.5586
Habibpur	210699	170	139.1586	30.8414
Old Malda	240377	147	151.0298	-4.0298
English Bazar	480148	285	246.9382	38.0618
Manikchak	269813	174	162.8042	11.1958
Kaliachak-I	392517	144	211.8858	-67.8858
Kaliachak-II	210105	159	138.921	20.079
Kaliachak-III	359071	146	198.5074	-52.5074

Source: Compiled by the Author

RESULTS AND DISCUSSION

Case study of Darjiling:

The district of Darjiling shows the significant diversity among 12 blocks. Only 4 blocks have surplus educational institutions in respect to total populations and remaining 8 blocks have deficiency (*table-15*). The isopleths map (*fig. 2*) reveals a lot of information. It is true that higher the residual the lesser is the relationship between the two variables and vice versa. Altogether, there are five zones identified as spatial variance based on four isolines viz. -30, -10, +10 and +30.

The region between (-) 10 to +10 exhibit maximum correspondence between the variables. In other words, it also determines number of educational institutions situated in this region in respect to population. The relationship is seen in the north-eastern and middle-west to middle-east portion like elongated curve line of the district including the blocks of Kalimpong-I and Rangli Rangliot.

The positive surplus regions (> +10) lie in the north-western to central portion of the district and comprising the block of Sukhiapokhri-Jorebunglow, Darjeeling-Pulbazar and Kurseong. These blocks encompass with adequate number of educational institutions. So, there is no urgent requirement for more of them.

On the contrary of deficient regions (< -10) are cover mainly in the southern portion and north-eastern portion of the district comprising the major portion of the blocks of Kalimpong-II, Gorubathan, Mirik, Matigara, Naxalbari, Kharibari and Phansidewa. These blocks are suffering from lack of educational institutions. So, these negative areas need immediate attention in the form of setting up adequate education centers.

Table-15. Surplus and deficient blocks of Darjiling

Score	Surplus	Deficient
High (>30)	Darjeeling-Pulbazar, Kurseong	Mirik, Matigara, Naxalbari, Kharibari, Phansidewa
Moderate (10-30)	Sukhiapokhri-Jorebunglow	Kalimpong-II, Gorubathan
Low (< 10)	Kalimpong-I	Rangli Rangliot
Total	4	8

Source: Compiled by the Author

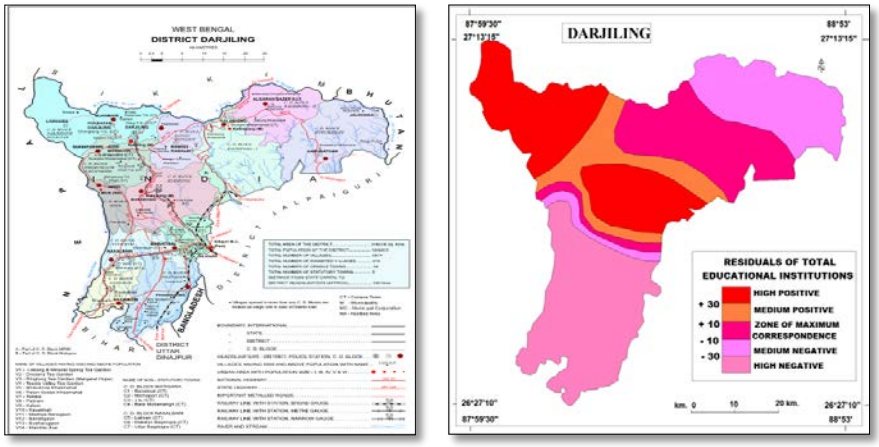

Fig. 2 Residuals of Darjiling district

Case study of Jalpaiguri:

The district of Jalpaiguri shows the significant diversity among 7 blocks. Only 3 blocks have surplus educational institutions in respect to total populations and remaining 4 blocks have deficiency (*table-16*).

Table-16. Surplus and deficient blocks of Jalpaiguri

Score	Surplus	Deficient
High (>30)	Jalpaiguri	Rajganj, Dhupguri
Moderate (10-30)	Mal	Maynaguri, Nagrakata
Low (< 10)	Metiali	-
Total	3	4

Source: Compiled by the Author

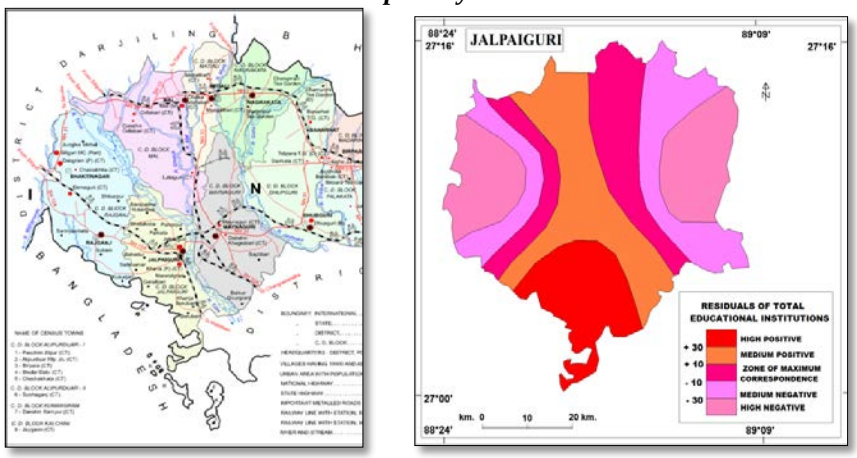

Fig. 3 Residuals of Jalpaiguri district

The isopleths map (*fig. 3*) reveals a lot of information. It is true that higher the residual the lesser is the relationship between the two variables and vice versa. There are five zones identified as spatial variance based on four isolines viz. -30, -10, +10 and +30.

The region between (-) 10 to +10 exhibit maximum correspondence between the variables. In other words, it also determines number of educational institutions situated in this region in respect to population. The relationship is seen in the north to south of the districts which are look like two

separate arcs, including the blocks of Metiali and few portions of Jalpaiguri and Maynaguri.
The positive surplus regions (> +10) lie in central, few portion of south-western and south-eastern portion of the district like a shape of inverted "Y" including the blocks Jalpaiguri and Mal. These blocks encompass with adequate number of educational institutions. So, there is no urgent requirement for more of them.

On the contrary of deficient regions (<-10) are covered in the western and eastern part of the district like shape of arc, comprising the major portion of the blocks of Maynaguri, Nagrakata, Rajganj and Dhupguri. These four blocks are suffering from lack of educational institutions. So, these negative areas need immediate attention in the form of setting up adequate education centers.

Case study of Alipurduar:

The district of Alipurduar also shows the significant diversity among 6 blocks. Only 2 blocks have surplus educational institutions in respect to total populations and remaining 4 blocks have deficiency (*table-17*).

Table-17. Surplus and deficient blocks of Alipurduar

Score	Surplus	Deficient
High (>30)	Alipurduar-II	Madarihat-Birpara, Kalchini
Moderate (10-30)	-	Falakata
Low (< 10)	Kumargram	Alipurduar-I
Total	2	4

Source: Computed by the Author

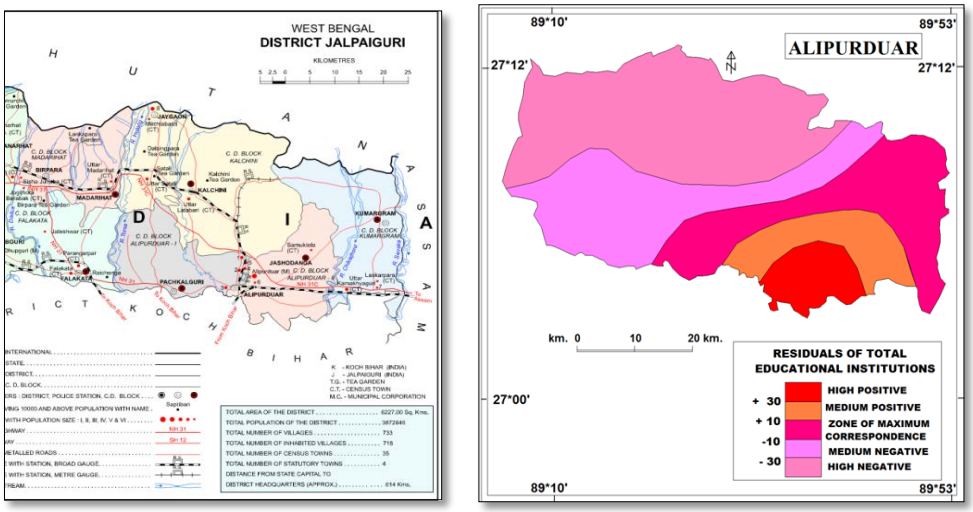

Fig. 4 Residuals of Alipurduar district

The isopleths map (*fig. 4*) reveals a lot of information. It is true that higher the residual the lesser is the relationship between the two variables and vice versa. Altogether, there are five zones identified as spatial variance based on four isolines viz. -30, -10, +10 and +30.

The region between (-) 10 to +10 exhibit maximum correspondence between the variables. In other words, it also determines number of educational institutions situated in this region in respect to population. The relationship is seen in the southern to eastern portion like an elongated arc of the district including the blocks of Kumargram and Alipurduar-I.
The positive surplus regions (> +10) lie in south-eastern part of the district and comprising the block of Alipurduar-II and few portion of other blocks. These blocks encompass with adequate number of educational institutions. So, there is no urgent requirement for more of them.
On the contrary of deficient regions (< -10) are covered the major portion of the district. It is found in the northern, western, central part of the district comprising the major portion of the blocks of Falakata, Madarihat-Birpara and Kalchini. These

three blocks are suffering from lack of educational institutions. So, these negative areas need immediate attention in the form of setting up adequate education centers.

Case study of Koch Bihar:

The district of Koch Bihar shows the significant diversity among 12 blocks. Only 3 blocks have surplus educational institutions in respect to total populations and remaining 9 blocks have deficiency (*table-18*).

Table-18. Surplus and deficient blocks of Koch Bihar

Score	Surplus	Deficient
High (>10)	Tufanganj -II	Mathabhanga-I, Mathabhanga-II, Sitalkuchi, Coochbehar-II, Dinhata –I, Sitai
Moderate (5-10)	-	Coochbehar-I, Tufanganj -I
Low (< 5)	Mekhliganj, Haldibari	Dinhata-II
Total	3	9

Source: Compiled by the Author

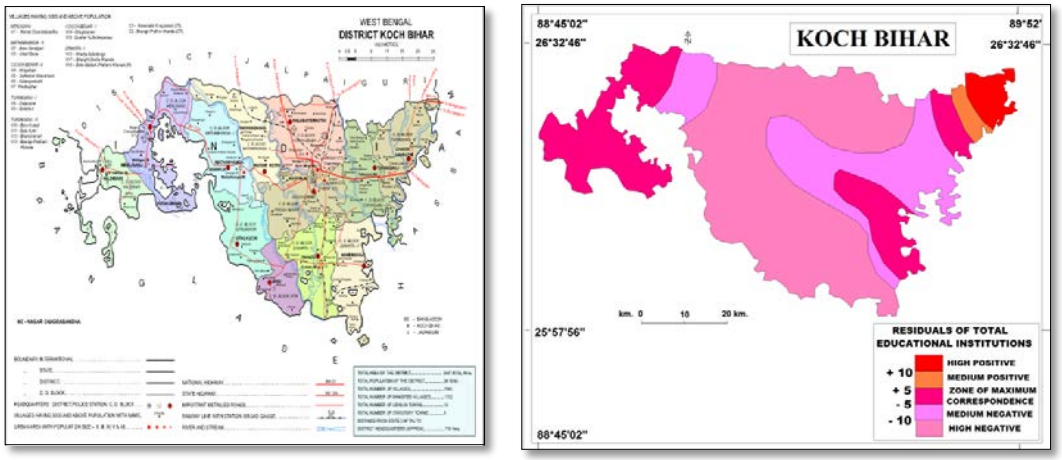

Fig. 5 Residuals of Koch Bihar district

The isopleths map *(fig. 5)* reveals a lot of information. It is true that higher the residual the lesser is the relationship between the two variables and vice versa. The highest positive and negative residual value are 14 and (-)-34 respectively. There are five zones identified as spatial variance based on four isoclines viz. -10, -5, + 5 and +10. The similar lines are not chosen (i.e. 30, 10,-10 and -30) for the nature of data.

The region between (-) 5 to + 5 exhibits the maximum correspondence between the variables. In other words, it also determines number of educational institutions situated in this region in respect to population. The relationship is seen in the north-western part, north-eastern part and south-eastern part of the district including the blocks of Mekhliganj, Haldibari and Dinhata-II.

The positive surplus regions (> +5) lie in the extreme north-eastern portion of the district and comprising the block of Tufanganj -II. This is the only block encompass with adequate number of educational institutions. So, there is no urgent requirement for more of them.

On the contrary of deficient regions (< -5) are cover major part of the district except few pocket of north-west, north-east and south-east. It comprising of the blocks of Coochbehar-I, Tufanganj -I , Mathabhanga-I, Mathabhanga-II, Sitalkuchi, Coochbehar-II, Dinhata –I and Sitai. These blocks are suffering from lack of educational institutions. So, these negative areas need immediate attention in the form of setting up adequate education centers.

Case study of Uttar Dinajpur:

The district of Uttar Dinajpur shows the significant diversity among 9 blocks. Only 3 blocks have deficiency educational institutions in respect to total populations and remaining 6 blocks have surplus (*table-19*).

Table-19. Surplus and deficient blocks of Uttar Dinajpur

Score	Surplus	Deficient
High (>30)	Raiganj, Kaliaganj, Itahar	Goalpokhar-I, Karandighi
Moderate (10-30)	Islampur, Hemtabad	Goalpokhar-II
Low (< 10)	Chopra	-
Total	6	3

Source: Compiled by the Author

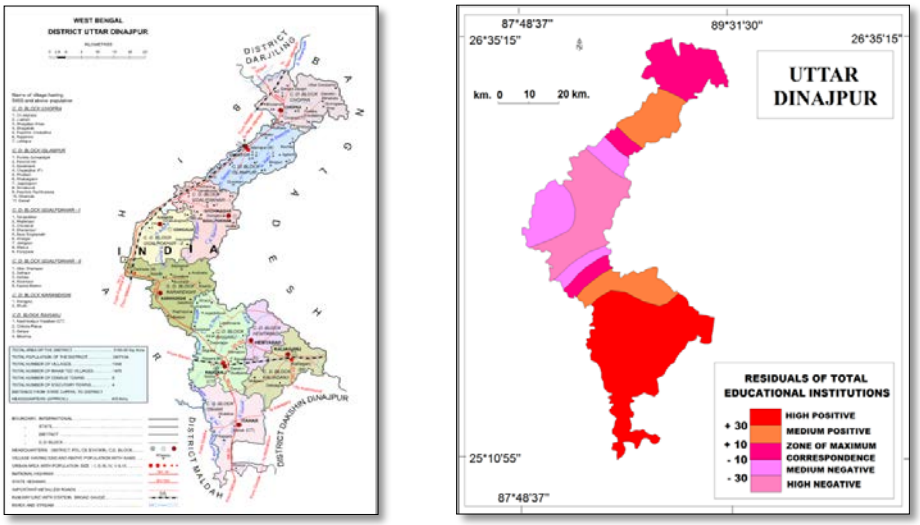

Fig. 6 Residuals of Uttar Dinajpur district

The isopleths map (*fig. 6*) derived a lot of information. Altogether, there are five zones identified as spatial variance based on four isolines viz. -30, -10, +10 and +30.

The region between (-) 10 to +10 exhibit maximum correspondence between the variables. In other words, it also determines number of educational institutions situated in this region in respect to population. The relationship is seen in the just outside of the central part and extreme northern part of the district including the blocks of Chopra and partially Islampur, Karandighi and Raiganj.

Case study of Dakshin Dinajpur:

The district of Jalpaiguri shows the significant diversity among 8 blocks. Only 3 blocks have surplus educational institutions in respect to total populations and remaining 5 blocks have deficiency (*table-20).*

The positive surplus regions (> +10) lie in northern and southern part of the district and comprising the block of Islampur, Hemtabad, Raiganj, Kaliaganj and Itahar. These blocks encompass with adequate number of educational institutions. So, there is no urgent requirement for more of them.

On the contrary of deficient regions (< -10) are cover in the central part of the district comprising the major portion of the blocks of Goalpokhar-II, Goalpokhar-I and Karandighi. These three blocks are suffering from lack of educational institutions. So, these negative areas need immediate attention in the form of setting up adequate education centers.

The isopleths map (*fig. 7*) reveals a lot of information. It is true that higher the residual the lesser is the relationship between the two variables and vice versa. The highest positive and negative residual value are 19 and (-) 27 respectively. The

similar lines are not chosen (i.e. 30, 10,-10 and -30) for the nature of data. There are five zones identified as spatial variance based on four isolines viz. -15, -5, +5 and +15.

Table-20. Surplus and deficient blocks of Dakshin Dinajpur

Score	Surplus	Deficient
High (>15)	Kumarganj	Banshihari, Gangarampur
Moderate (5-15)	Tapan	Kushmandi, Harirampur, Balurghat
Low (< 5)	Hili	-
Total	3	5

Source: Compiled by the Author

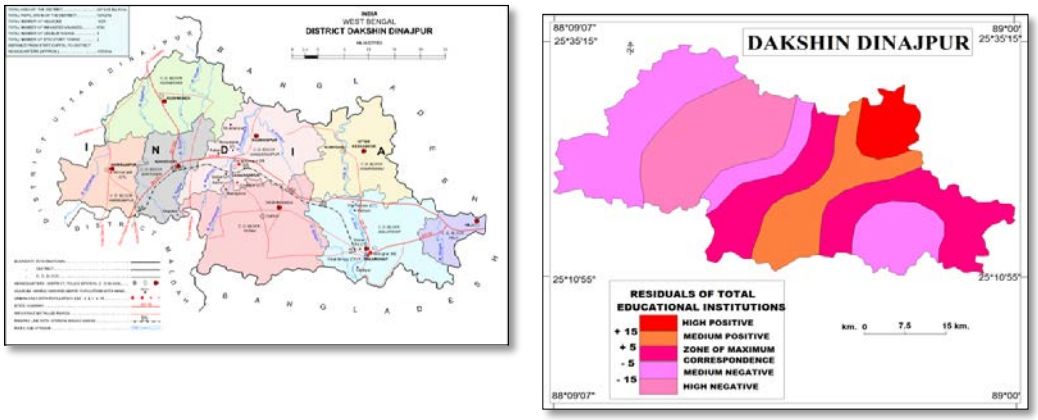

Fig. 7 Residuals of Dakshin Dinajpur district

The region between (-) 5 to +5 exhibit maximum correspondence between the variables. In other words, it also determines number of educational institutions situated in this region in respect to population. The relationship is seen in the central portion north to south which is look like an arc and south-east part of the districts including the blocks of Hili and few portions of Balurghat and Tapan.

The positive surplus regions (> +5) lie in central portion of the district including the blocks Tapan and Kumarganj. These blocks encompass with adequate number of educational institutions. So, there is no urgent requirement for more of them.

On the contrary of deficient regions (< - 5) are covered in the western and south- eastern part of the district, comprising the major portion of the blocks of Kushmandi, Harirampur, Balurghat, Banshihari and Gangarampur. These blocks are suffering from lack of educational institutions. So, these negative areas need immediate attention in the form of setting up adequate education centers.

Case study of Maldah:

The district of Maldah shows the significant diversity among 15 blocks. Only 7 blocks have surplus educational institutions in respect to total populations and remaining 8 blocks have deficiency (*table-21*).

The isopleths map (*fig. 8*) reveals a lot of information. It is true that higher the residual the lesser is the relationship between the two variables and vice versa. There are five zones identified as spatial variance based on four isolines viz. -30, -10, +10 and +30.

The region between (-) 10 to +10 exhibit maximum correspondence between the variables. In other words, it also determines number of educational institutions situated in this region in respect to population. The relationship is seen in the central, lower middle part of the districts which including the blocks of Harishchandrapur-I, Chanchal-I and Old Malda.

The positive surplus regions (> +10) lie in eastern and south-eastern portion of the district including

the blocks Bamongola, Manikchak, Kaliachak-II, Gazole, Habibpur and English Bazar. These blocks encompass with adequate number of educational institutions. So, there is no urgent requirement for more of them.

Table-21. Surplus and deficient blocks of Maldah

Score	Surplus	Deficient
High (>30)	Gazole, Habibpur, English Bazar	Kaliachak-I, Kaliachak-III
Moderate (10-30)	Bamongola, Manikchak, Kaliachak-II	Harishchandrapur-II, Chanchal-II, Ratua-I, Ratua-II
Low (< 10)	Old Malda	Harishchandrapur-I, Chanchal-I
Total	7	8

Source: Compiled by the Author

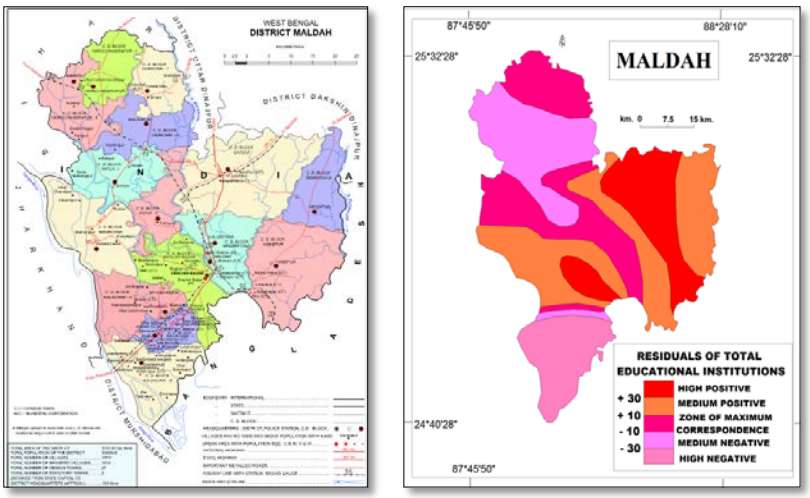

Fig. 8 Residuals of Maldah district

On the contrary of deficient regions (<-10) are cover in the southern and upper central part of the district including the blocks of Harishchandrapur-II, Chanchal-II, Ratua-I, Ratua-II, Harishchandrapur-I and Chanchal-I. These blocks are suffering from lack of educational institutions. So, these negative areas need immediate attention in the form of setting up adequate education centers.

Table-22: Degree of relationship by Karl Pearson's product moment method

Sl no.	*District*	*Co-efficient of correlation (r)*	*coefficient of determination (r^2)*
1	Darjiling	0.85	0.74
2	Jalpaiguri	0.88	0.78
3	Alipurduar	0.48	0.24
4	Koch Bihar	0.98	0.97
5	Uttar Dinajpur	0.85	0.74
6	Dakshin Dinajpur	0.98	0.96
7	Maldah	0.72	0.52

Source: Computed by the Author

Table- 22 shows the degree of relationship by **Co-efficient of correlation (r)** between educational institution and total population. It is found that Koch Bihar and Dakshin Dinajpur have almost perfect positive relation; Darjiling, Jalpaiguri and Uttar Dinajpur have strong positive relation; Maldah have moderate positive relation and Alipurduar have poor positive relation.

The **coefficient of determination (r^2)** represents the percent of the data that is the closest to the line

of best fit. For example of Darjiling, if r =0.85, then r^2 = 0.74, which means that 74 percent of the total variation in *y* can be explained by the linear relationship between total population (*x)* and total educational institution score (*y)*. The other 26 percent of the total variation in *y* remains unexplained. Similarly, Jalpaiguri-78 percent, Alipurduar- 24 percent, Koch Bihar-97 percent, Uttar Dinajpur-74 percent, Dakshin Dinajpur-96 percent and Maldah-52 percent can be explained.

CONCLUSION

The study delineates the disparity in the distribution of the educational institutions in the district of Darjiling, Jalpaigur, Alipurduar, Koch Bihar, Uttar Dinajpur, Dakshin Dinajpur and Malda. This so called disparity or surplus-deficiency cause serious development gap. To alleviate such situation, few new and high-quality schools and colleges are needed to be established, especially in the blocks of Mirik, Matigara, Naxalbari, Kharibari and Phansidewa in Darjiling; Rajganj and Dhupguri in Jalpaiguri; Madarihat-Birpara and Kalchini in Alipurduar; Mathabhanga-I, Mathabhanga-II, Sitalkuchi, Coochbehar-II, Dinhata –I and Sitai in Koch Bihar; Goalpokhar-I and Karandighi in Uttar Dinajpur; Banshihari and Gangarampur in Dakshin Dinajpur; Harishchandrapur-II, Chanchal-II, Ratua-I, Ratua-II, Kaliachak-I and Kaliachak-III in Malda. Besides that, population all over the district is increasing day by day. Hence parallel proper policy and planning is required to mitigate such intra-district disparity.

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