Regional Planning for Social Facilities: A Study of Kushtia District

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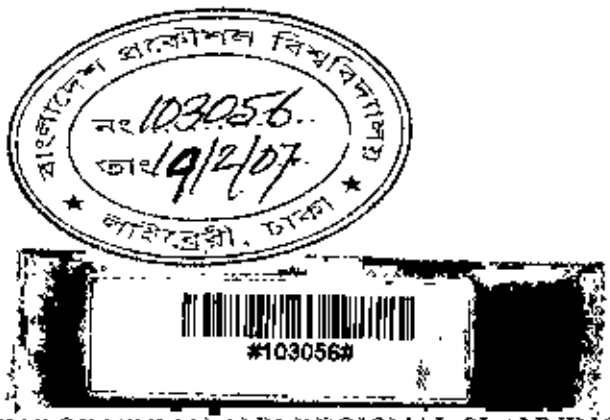

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2006

This Project titled "Regional Planning for Social Facilities: A Study of Kushtia District" submitted by Md. Ashiq Iqbal, Roll no. 040215019F, Session April 2002 has been accepted as satisfactory in the partial fulfillment of the requirement for the degree of Master of Urban and Regional Planning (MURP) on 26th November 2006.

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ABSTRACT

One of the objectives of regional planning is to achieve a balanced growth. In developing countries disparity in terms of service facilities between regions is increasing. Most of the time in developing countries like Bangladesh selection of implementation areas for development projects is based on apparent conditions rather than a comprehensive study of requirements too often leading to an unbalanced growth. No methodology or selection criteria for identifying areas with priority need for particular development initiatives exist. This study follows Population Threshold method to identify areas within Kushtia district deprived of social facilities compared to other areas within the region.

Provision of service facilities is always bounded by resource constraints, especially in the third world countries like Bangladesh. Therefore service facility planning requires a well developed method for the critical examination of existing facilities and their distribution to avoid wastage of resources. This paper applies such a method to identify disparities among the thanas of Kushtia district in terms of educational, commercial, health and other selected social services and includes policy recommendations to reduce the imbalance.

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CHAPTER 1
INTRODUCTION

বাংলাদেশ উন্মুক্ত বিশ্ববিদ্যালয়
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CHAPTER 1: INTRODUCTION

1.1 Introduction

The question of equity – social and spatial – has now come to the forefront in the development policy. Greater emphasis is being laid on achieving balanced regional development. The emphasis seems to be shifting from a macro-economic sectoral approach to a regional approach. There is increasing awareness today that planning has to be responsive to the emerging problems of society at various territorial levels (Misra *et al.* 1978). One of the problems for developing countries today is the increasing disparity in terms of service facilities between regions. Provision of service facilities is always bounded by resource constraints, especially in the third world countries like Bangladesh. Therefore service facility planning requires critical examination of existing facilities and their distribution.

Major intention of regional planning is to achieve a balanced regional growth. Regional planning usually involves both physical and economic planning (Glasson, 1975). Though service facility planning is basically a form of physical planning, this contributes towards the economic growth of a region in the long run. Bangladesh lacks resources to provide all areas with adequate social facilities. So care needs to be taken in planning for future social facilities in order to avoid wastage of resources. In this regard an inventory of existing social facilities in different areas and identification of areas deprived of such facilities is crucial. This study intends to find out regional disparities in terms of available social facilities in Kushtia (one of the 64 districts of Bangladesh).

Kushtia, located at the western border of Bangladesh, is inhabited by 1713224 people (BBS, preliminary report of population census 2001), while the projected population for 2003 is 2169306.034. The district is divided into 6 thanas.

In this study, distribution pattern of social facilities within the district has been analyzed, disparities in terms of available social facilities among the thanas have been identified and the requirements for additional facilities have been explored for both

individual thanas and the district itself. Based on the identified gaps, the study includes recommendations to aid location decisions of future social facilities within the region.

1.2 Objectives

General goal of the study is to identify existing disparity in different areas within Kushtia district in terms of social facilities to facilitate location decisions of future facilities with a view to achieve a balanced regional growth. Following are the specific objectives fulfillment of which will contribute towards the achievement of the goal of the study:

I. To explore existing distribution pattern of social facilities.
II. To study the extent of disparities among different areas for these facilities.
III. To provide recommendations based on existing conditions.

1.3 Methodology

Following methodology has been adopted to fulfill the above objectives:

1.3.1 Selection of study area and social services/facilities

The study area and the social services/facilities for the study has been selected mainly considering the data availability and the researchers access to the avilable data. While any average district of the country could be selected under this study, selection of the services/facilities within the study area is restricted by data constraints. The study requires GIS (Geographic Information System) mapping of the facilities and not all the services/facilities of the country are mapped. Social services/facilities selcted for this study are broadly categorised into four groups. Primary schools, high schools, colleges and madrasas has been selected as education facilities. Hats/bazaars and growth centres are taken as commercial facilities. Thana health complex/Hospitals and family welfare centres are taken as health facilities and post offices has been selected as the social services.

1.3.2 Data collection

Following are the required information for this study:

- Population data of the study area

- Map of the study area showing location of existing social facilities

All data required for the study has been collected from secondary sources. Population data was collected from BBS publications. Maps for each thanas of Kushtia district showing location of different social facilities were collected from the LGED.

1.3.3 Population forecast

As population data for the current year is not available, BBS data from population survey of 1981 and 1991 has been used to project the data to the current year (2003).

1.3.4 Identification of threshold population for different service facilities

Population threshold for each service has been identified in Reed-Muench method. The inner concept of the Reed-Muench method is that there is a zone of population size for each function, at the lower limit of which all settlement lack that function, while at the upper limit all settlement posses it.

Population threshold is defined as the minimum number of customers required to support a given service. For example, if the population threshold of a service facility is 1000 then it means that normally all settlements having that population should have that facility. It is then necessary to identify settlements that have that amount of population but lacks the facility to aid location decisions of future service facilities.

In this study population threshold for each of the facilities has been calculated to identify thana and district wise gap of service facilities.

1.3.5 Identification of gaps

Disparity in terms of availability of social facilities has been calculated in two phases. At the first phase gaps has been identified between the thanas. This considers each thana separately and comparison of level of services was made between individual thanas. At the second phase gaps were identified for different facilities for the district itself considering the total population and the total number of facilities.

1.4 Study area

Kushtia district is bounded on the north by the river Padma that separates it from the districts of Pabna and Rajshahi, on the west by the district of Faridpur and Pabna, on the south by the district of Jhinaidaho, and on the west by the district of Nadia of West Bengal, a province of India. The district lies between $23^0$21' and 24^0 11' north latitudes and 88^0 35' and 89^0 22' east longitudes. Location of the Kushtia district in respect of the country map is shown on Map 1.1.

Total area of the district is 1621.15 sq.km. with a population of 1713224 in 2001 (BBS, preliminary report of population census 2001) and 2169306 for 2003 (projected). The district comprises of 6 thanas with 60 unions, 711 unions and 3 municipalities.

The thanas are namely-

- Bheramara thana
- Daulatpur thana
- Khuksa thana
- Kumarkhaly thana
- Kushtia sadar thana and
- Mirpur thana

Although majority of the district's population is engaged in the agriculture sector, industrial development of the district is significant within the region and playing an important role in the nation's economy.

Among the thanas, Kushtia sadar thana has shown significant development during the last two decades. Development has concentrated around this thana and for many of the necessities people of the other thanas are dependent on it.

Brief descriptions of the individual thanas are given below.

Bheramara thana

Bheramara is the second smallest thana of Kushtia district in respect of its area. It came into existence in 1906. Previously it was a part of Mirpur thana. The thana

occupies an area of 153.72 sq. km. including 18.29 sq. km. river area. It is located between 23°59' and 24°07' north latitudes and between 89°00' and 89°12'east longitudes (Bangladesh population census, 1991, BBS). The projected population of the thana for 2003 is 226870 and consists of 6 unions and a paurasava with 3 wards.

Daulatpur thana

Daulatpur thana is the largest in Kushtia district in respect of the area. The thana occupies an area of 468.76 sq. km. including 17.71 sq. km. river area. It is located between 23°52' and 24°12' north latitudes and between 88°42' and 89°58'east longitudes (Bangladesh population census, 1991, BBS). Total population of the thana for 2003 (projected) is 548032. Daulatpur thana consists of 14 unions.

Khoksa thana

Khoksa is the smallest thana in Kushtia in respect of its area. The thana occupies an area of 99.17 sq. km. including 4.69 sq. km. river area. It is located between 23°44' and 23°53' north latitudes and between 89°15' and 89°22'east longitudes (Bangladesh population census, 1991, BBS). Projected population of the thana for 2003 is 129375and the thana consists of 3 unions.

Kumarkhali thana

Kumarkhali, the third largest thana of Kushtia district in terms of its area, has an area of 265 89 sq. km. including 11.91 sq. km. river area. It is located between 23°44' and 23°58' north latitudes and between 89°09' and 89°22'east longitudes (Bangladesh population census. 1991, BBS). Projected population of the thana for 2003 is 368520.8582 and the thana consists of 10 unions and a paurasava with 5 wards.

Kushtia Sadar thana

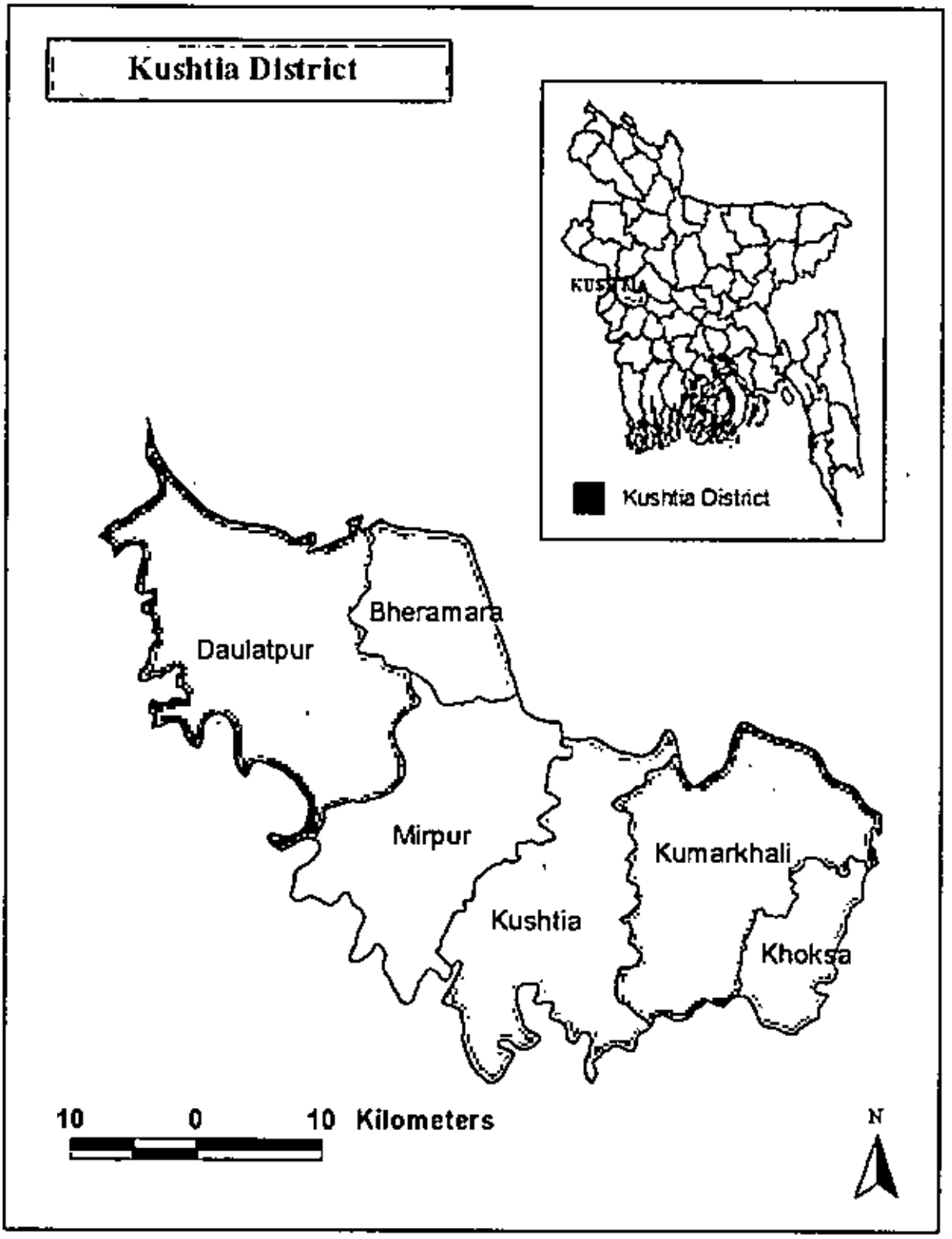
According to the population census of Bangladesh 1991, Kushtia Sadar thana is the largest in Kushtia district in respect of the total population, although the projected population of 2003 shows the total population a little lower than that of Daulatpur thana. The thana occupies an area of 316.26 sq. km. including 7.38 sq. km. river area. It is located between 23°42' and 23°59' north latitudes and between 88°55' and 89°04'east longitudes (Bangladesh population census, 1991, BBS). Total population

of the thana for 2003 (projected) is 520449. Kushtia Sadar thana consists of 14 unions and a paurasava with 4 wards.

Mirpur thana

Mirpur is the second largest thana of Kushtia district in terms of its area. Total area of the thana is 317.35 sq. km. including 3.11 sq. km. river area. It is located between 23°45' and 24°00' north latitudes and between 88°50' and 89°06'east longitudes (Bangladesh population census, 1991, BBS). Total population of the thana for 2003 (projected) is 376060. Mirpur thana consists of 13 unions.

Map 1.1: Kushtia district in Bangladesh



CHAPTER 2

DISTRIBUTION PATTERN OF SOCIAL FACILITIES

CHAPTER 2: DISTRIBUTION PATTERN OF SOCIAL FACILITIES

2.1 Introduction

This chapter shows the spatial distribution of social facilities in different thanas of Kushtia district.

While planning for service facilities, it is not enough to study only the available and required number of such facilities. Although it is beyond the scope of this study to analyze the impact of geographic distribution of facilities, a fair knowledge on the distribution pattern of the same over space is no less important.

Number of different types of facilities included in this study that are available in Kushtia district is given in Table 2.1.

Table 2.1: Total number of facilities available in Kushtia district

Primary School	High School	College	Madrasa	Hat/Bazaar	Growth Center	Thana Health Complex/ Hospital	Family Welfare Center	Post Office
418	94	13	55	118	23	8	35	19

Source: LGED 2003

Following sections are presentations of spatial distribution pattern of the facilities in concern in different thanas of Kushtia district.

2.2 Bheramara Thana

Table 2.2 shows the number of different facilities available in the unions of Bheramara thana.

Table 2.2: Union wise number of facilities of Bheramara thana

Union Name	Educational facilities				Commercial		Health		Social services
	Primary school	High school	College	Madrasa	Hat/ Bazaar	Growth center	Thana health complex/ Hospital	Family welfare center	Post office
BAHADURPUR	3	0	1	1	1	1	0	1	0
MOKARIMPUR	10	0	0	3	4	0	0	1	3
JUNIADAHA	6	1	0	3	3	1	0	1	1
BAHIRCHAR	3	1	0	2	2	0	1	1	2
DHARAMPUR	5	0	0	2	1	1	0	1	0
BHERAMARA	0	0	0	0	0	0	0	0	0
CHANDGRAM	5	0	0	0	1	0	0	0	0

Source: LGED 2003

Geographic distribution of these facilities is shown in Map 2.1.

2.3 Daulatpur Thana

Number of available facilities in the unions of Daulatpur thana is given Table 2.3.

Table 2.3: Union wise number of facilities of Daulatpur thana

Union Name	Educational facilities				Commercial		Health		Social services
	Primary school	High school	College	Madrasa	Hat	Growth center	Thana health complex	Family welfare center	Post office
CHILMARI	2	1	0	1	2	0	0	1	0
MARICHA	3	2	0	0	1	0	0	1	0
RAMKRISHNAPUR	9	3	0	0	2	1	0	0	0
PHILIPNAGAR	4	2	0	0	3	0	0	1	0
HOGALBARIA	5	3	1	2	3	0	0	0	0
MATHURAPUR	7	3	1	2	3	1	0	0	1
PRAYAGPUR	3	2	0	0	3	0	0	0	0
PEARPUR	5	2	0	1	1	0	0	1	0
DAULATPUR	13	3	0	2	0	1	1	0	0
ADABARIA	5	1	0	0	2	0	0	1	0
REFAYETPUR	6	1	1	0	1	0	0	0	0
BOALIA	4	1	0	0	1	0	0	0	0
ARIA	8	3	0	0	0	1	0	0	0
KHALISHAKUNDI	3	0	0	0	1	0	0	0	0

Source: LGED 2003

Map 2.2 shows the geographic distribution of these facilities between the unions.

2.3 Khoksa Thana

Table 2.4 represents the number of different facilities available in different unions of Khoksa thana.

Table 2.4: Union wise number of facilities of Khoksa thana

Union Name	Educational facilities				Commercial		Health		Social services
	Primary school	High school	College	Madrasa	Hat	Growth center	Thana health complex /Hospital	Family welfare center	Post office
SAMASPUR	17	6	0	4	7	0	0	1	0
KHOKSA	13	4	1	2	7	1	1	1	0
JANIPUR	11	3	0	1	4	0	0	0	0

Source: LGED 2003

Map 2.3 shows the spatial distribution of these facilities in the unions of Khoksa thana.

2.4 Kumarkhali Thana

Table 2.5 the number of different social facilities available in the unions of Kumarkhali thana.

Table 2.5: Union wise number of facilities of Kumarkhali thana

Union Name	Educational facilities				Commercial		Health		Social services
	Primary school	High school	College	Madrasa	Hat /Bazaar	Growth center	Thana health complex /Hospital	Family welfare center	Post office
SHELAIDAHA	7	1	0	1	0	1	0	0	1
KAYA	7	1	0	1	0	1	0	0	0
JAGANNATHPUR	4	1	0	2	2	0	0	0	0
CHAPRA	8	1	0	0	1	0	0	0	1
NANDALALPUR	7	3	0	0	1	0	0	1	0
SADAKI	9	2	0	0	1	1	0	0	0
KUMARKHALI	2	0	0	0	1	0	0	0	0
JADUBOYRA	6	1	0	0	3	0	1	0	0
BAGULAT	9	3	0	3	6	1	0	1	1
PANTI	9	2	1	2	1	1	0	0	1
CHANDPUR	12	1	0	1	1	0	0	2	0

Source: LGED 2003

Spatial distribution of these facilities of Kumarkhali thana is shown on map 2.4.

2.5 Kushtia Sadar Thana

Number of different social facilities available in the unions of Kushtia Sadar thana is shown in the table no 2.6.

Table 2.6: Union wise number of facilities of Kushtia thana

Union Name	Educational facilities				Commercial		Health		Social services
	Primary school	High school	College	Madrasa	Hat/ Bazaar	Growth center	Thana health complex/ Hospital	Family welfare center	Post office
HATAS HARIPUR	6	1	0	0	1	0	0	0	0
BARKHADA	7	1	0	0	3	0	0	0	0
KUSHTIA	10	6	2	1	0	0	1	0	1
JAGATI	6	2	0	1	0	0	0	1	0
MAJAMPUR	3	0	0	0	0	0	0	0	0
ALAMPUR	8	1	0	0	2	0	0	0	1
AILCHARA	7	1	0	1	2	0	0	1	0
JIRAKHI	11	2	0	0	0	0	1	1	0
PAITKABARI	7	1	0	1	2	0	0	1	1
UJANGRAM	4	1	0	0	0	2	0	1	1
JHAUDIA	10	0	0	1	1	1	0	1	0
GOSAIN DURGAPUR	6	1	0	0	3	0	0	0	0
HARINARAYANPUR	4	2	0	0	0	1	1	2	0
ABDULPUR	9	0	1	0	0	0	0	0	0
MONOHARDIA	9	1	0	0	1	0	0	0	0

Source LGED 2003

Map 2.5 is a presentation of the geographic distribution of these facilities.

2.6 Mirpur Thana

Number of different facilities available in the unions of Mirpur thana is shown in Table no 2.7.

Table 2.7: Union wise number of facilities of Mirpur thana

Union Name	Educational facilities				Commercial		Health		Social services
	Primary school	High school	College	Madrasa	Hat/ Bazaar	Growth center	Thana health complex /Hospital	Family welfare center	Post office
CHITHALIA	8	1	0	2	2	1	0	1	0
BAHALBARIA	7	0	0	0	3	0	0	1	0
TALBARIA	4	1	0	1	2	0	0	1	0
BARUIPARA	8	1	0	0	4	0	0	0	0
MIRPUR	7	2	1	2	3	1	1	1	1
AMLA	9	2	1	0	2	1	0	1	1
PORADAHA	6	3	1	1	4	1	0	1	1
SARDARPUR	6	1	0	2	2	1	0	1	0
CHHATIAN	8	2	0	2	3	0	0	1	0
MALIHAD	8	0	0	1	4	0	0	1	0
KURSHA	4	2	0	1	3	0	0	1	0
AMBARIA	6	1	1	2	1	1	0	1	1

Source: LGED 2003

Geographic distribution of these facilities between the unions is shown in map 2.6.

2.7 Distribution pattern analysis

Distribution pattern of individual facilities within individual thanas has been analyzed using Nearest Neighborhood Index developed by two botanists in 1950s (Clark and Evans, 1954). The nearest neighborhood index compares the distance between nearest points and distances that would be expected on the basis of chance. Through this method it is possible to identify if facilities (considered as point locations on the earth surface) are distributed randomly, uniformly or in clustered form. If only one occasion of a facility exists in a thana, the calculation of nearest neighborhood index is omitted as more than 1 facility is required for any pattern of distribution to exist. GIS (Geographic Information System) tools are used to identify the index. Details on the calculation process of Nearest Neighborhood Index and GIS procedure are given in Annexure I.

2.7.1 Bheramara thana

For primary schools, high schools, madrasas, growth centers and post offices it has been found that the facilities are distributed randomly within the thana. For hats/bazaars and family welfare centers the nearest neighborhood index refers that tendency towards a regular pattern (uniformity) exists.

As only one college and one thana health complex exists in the thana, no distribution pattern exists for these two cases.

2.7.2 Daulatpur thana

For colleges, madrasas, hats/bazaars and growth centers random distributions are found. For primary schools, high schools and family welfare centers of Daulatpur thana, uniform patterns are identified.

No distribution patterns found for thana health complex/hospitals and post offices as only one occasion for each exists in the thana.

2.7.3 Khoksa thana

Uniform pattern of distribution has been identified for most of the facilities of Khoksa thana. Only for family welfare centers a random distribution pattern has been found while primary schools, high schools, madrasas and hats/bazaars show a uniform pattern of distribution.

One occasion of college, growth center and thana health complex/hospital found in Khoksa thana. So no distribution pattern exists for these facilities. Also no pattern of distribution for post offices of Khoksa thana exists due to the absence of this facility within the thana.

2.7.4 Kumarkhali thana

Uniform distribution pattern has been found for Primary schools, High schools, Hat/Bazaars, Growth centers and Post offices of Kumarkhali thana while Madrasas and Family welfare centers are randomly distributed within the thana.

As one Thana Health Complex/Hospital and one College exists in the thana no distribution pattern for these facilities exist.

2.7.5 Kushtia thana

All facilities of Kushtia sadar thana shows a distribution pattern as for all of them more than one occasion is found.

While primary schools and family welfare centers show tendency towards a regular pattern (uniformity), High schools, Colleges, Madrasas, Hat/Bazaars, Growth centers, Thana health complex/Hospitals and Post offices of the thana represents a random distribution pattern.

2.7.6 Mirpur thana

While uniform distribution pattern has been found for Primary schools, Colleges, Madrasas, Family welfare centers and Post offices of Mirpur thana, a tendency towards randomness has been found for High schools, Hat/Bazaars and Growth centers of the thana.

As only one Thana health complex/Hospital exists in the thana, no distribution pattern exists for this type of facility.

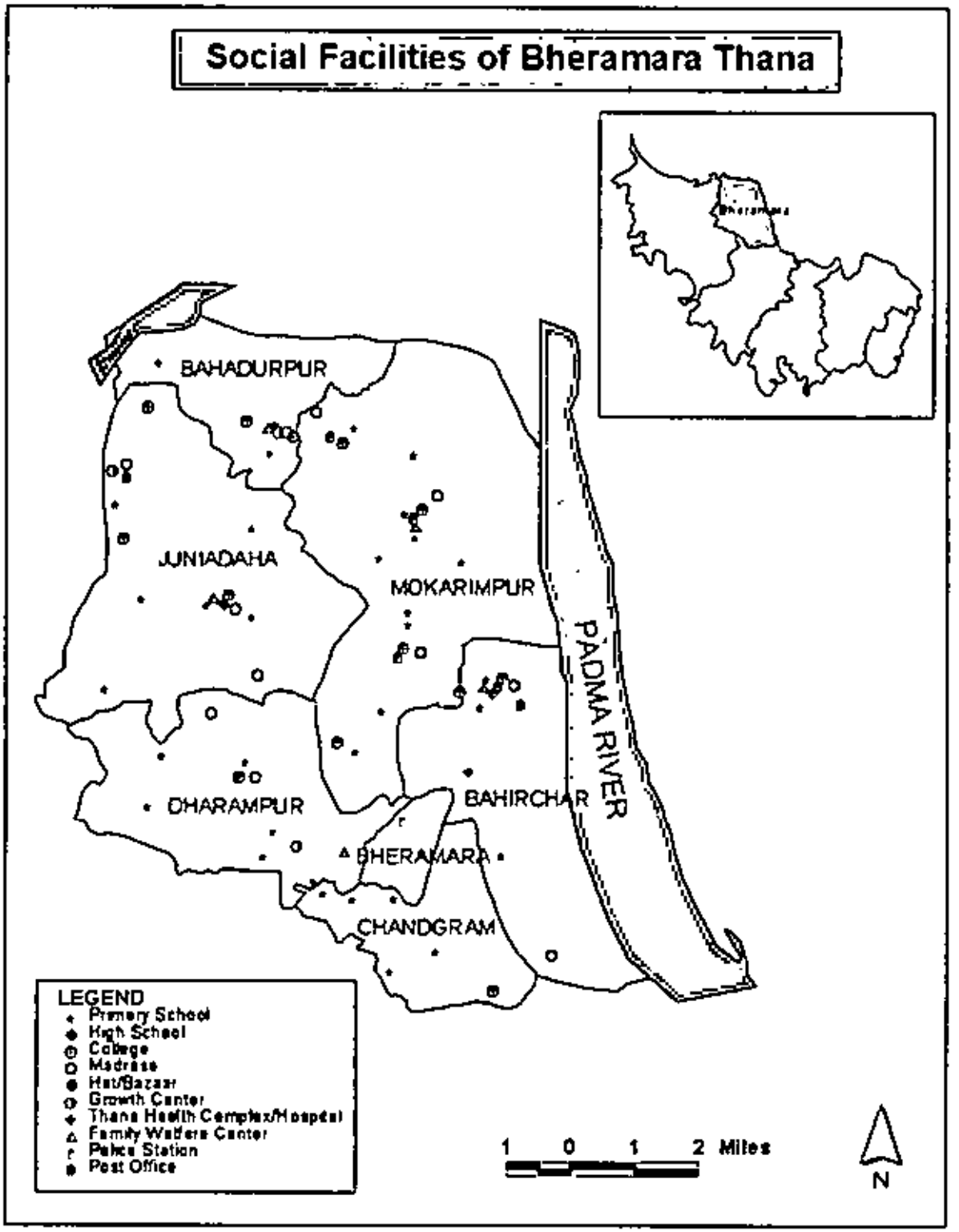
Distribution pattern for all the thanas of Kushtia district for all selected services/facilities has been summarised in the following table:

Table 2.8: Distribution pattern for all services for all thanas

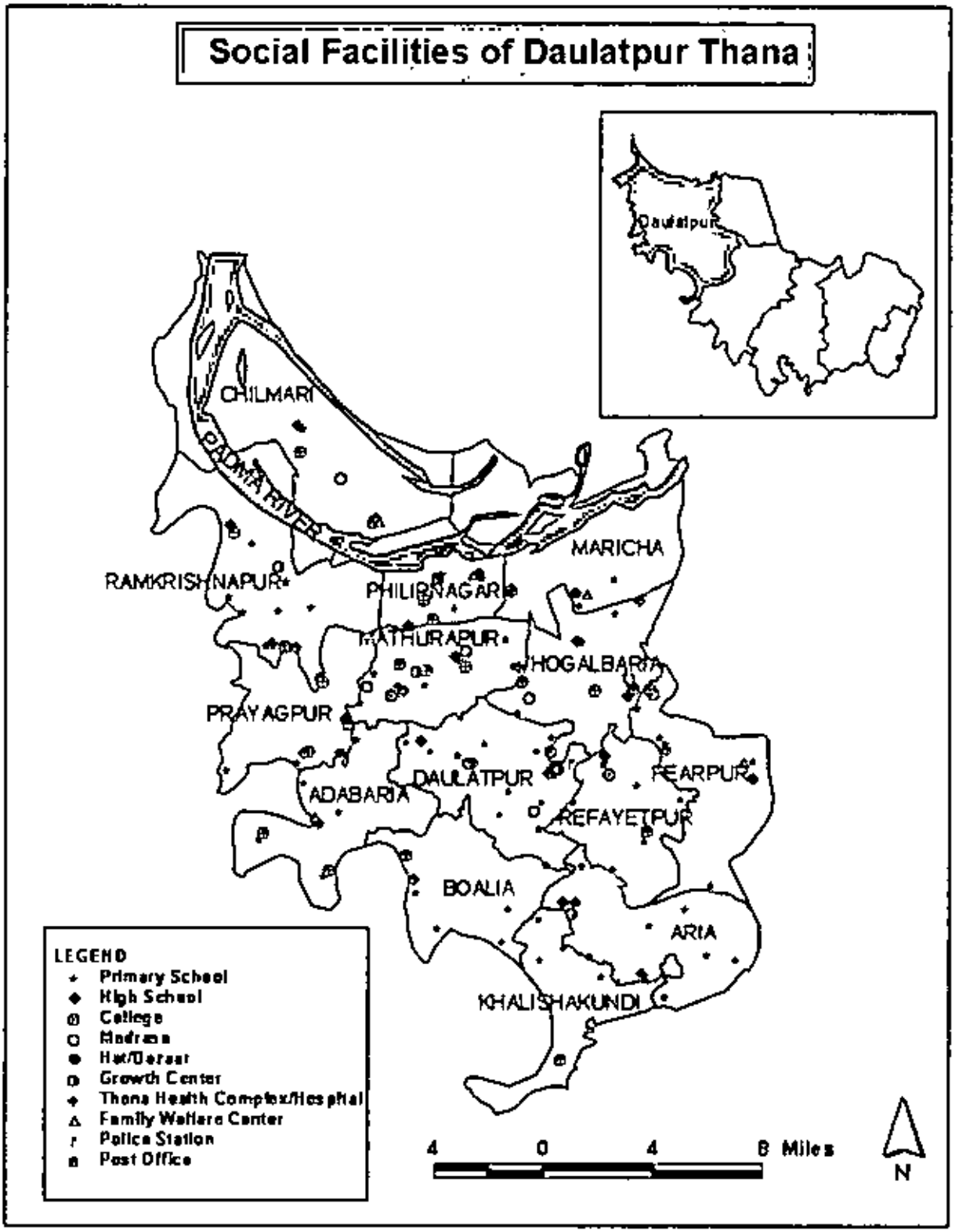
Service/Facility	Distribution Pattern					
	Bheramara	**Daulatpur**	**Khoksa**	**Kumarkhaly**	**Kushtia sadar**	**Mirpur**
Primary School	Random	Uniform	Uniform	Uniform	Uniform	Uniform
High School	Random	Uniform	Uniform	Uniform	Random	Random
College	N/A	Random	N/A	N/A	Random	Uniform
Madrasa	Random	Random	Uniform	Random	Random	Uniform
Hat/Bazaar	Uniform	Random	Uniform	Uniform	Random	Random
Growth Center	Random	Random	N/A	Uniform	Random	Random
Thana Health Complex/ Hospital	N/A	N/A	N/A	N/A	Random	N/A
Family Welfare Center	Uniform	Uniform	Random	Random	Uniform	Uniform
Post Office	Random	N/A	N/A	Uniform	Random	Uniform

The calculated NNI (Nearest Neighborhood Index) values are given in Annexure 1. When analyzing the distribution pattern of facilities, the avenue script (ArcView 3.0) used in the study not only assesses these NNI values, but also applies a simple test of significance for deviation from randomness, using the standard error of the expected difference.

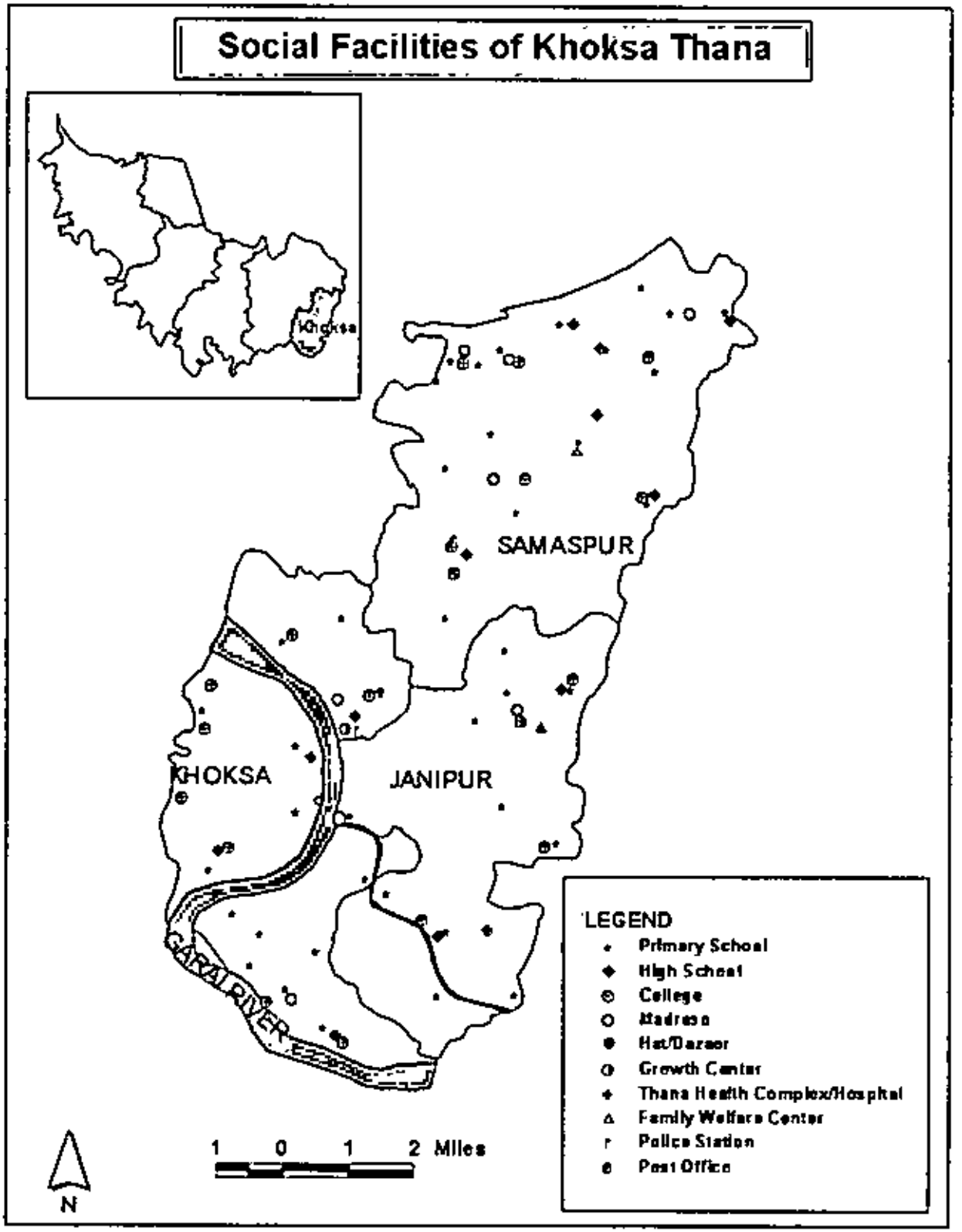
Map 2.1: Social facilities of Bheramara thana



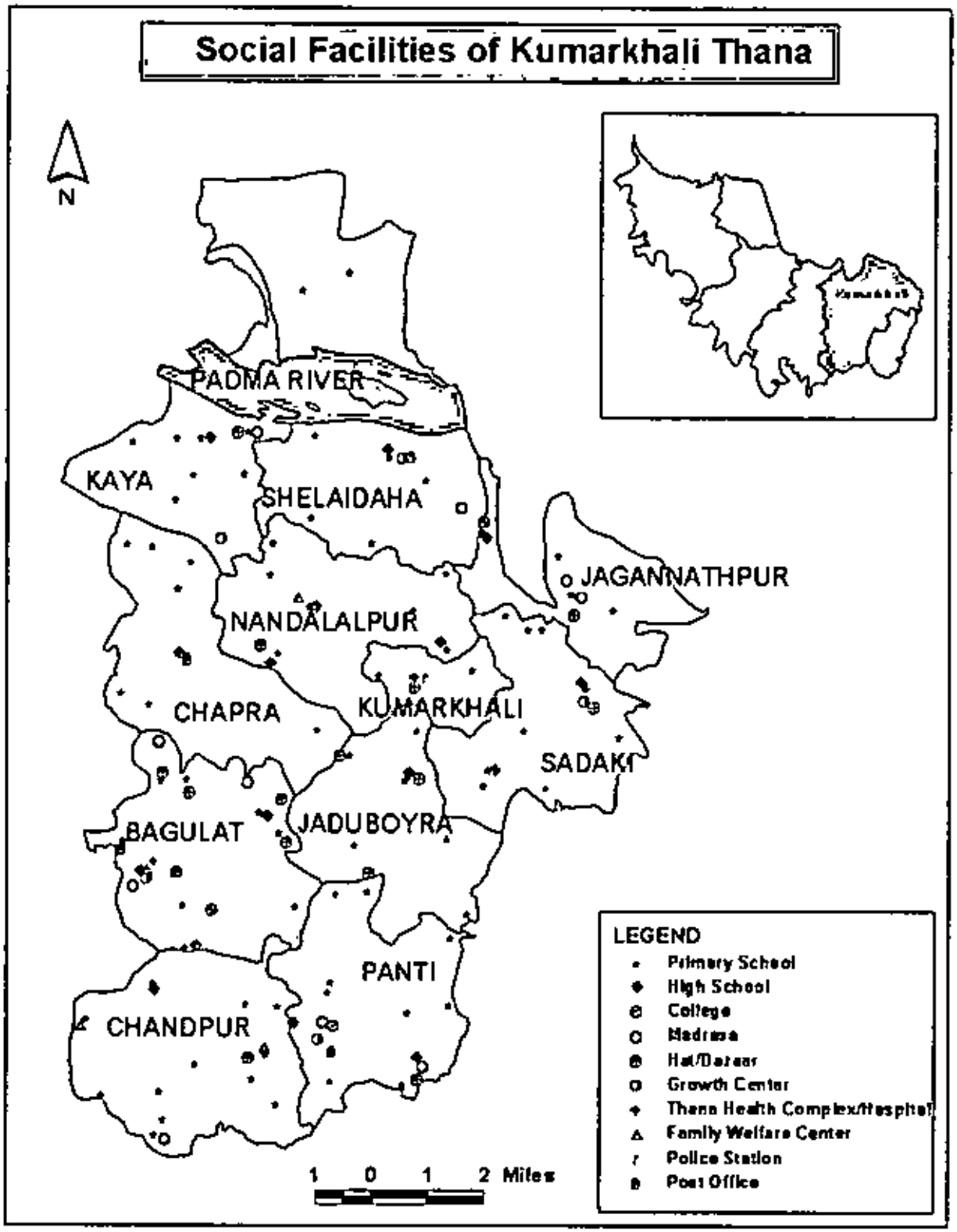
Map 2.2: Social facilities of Daulatpur thana



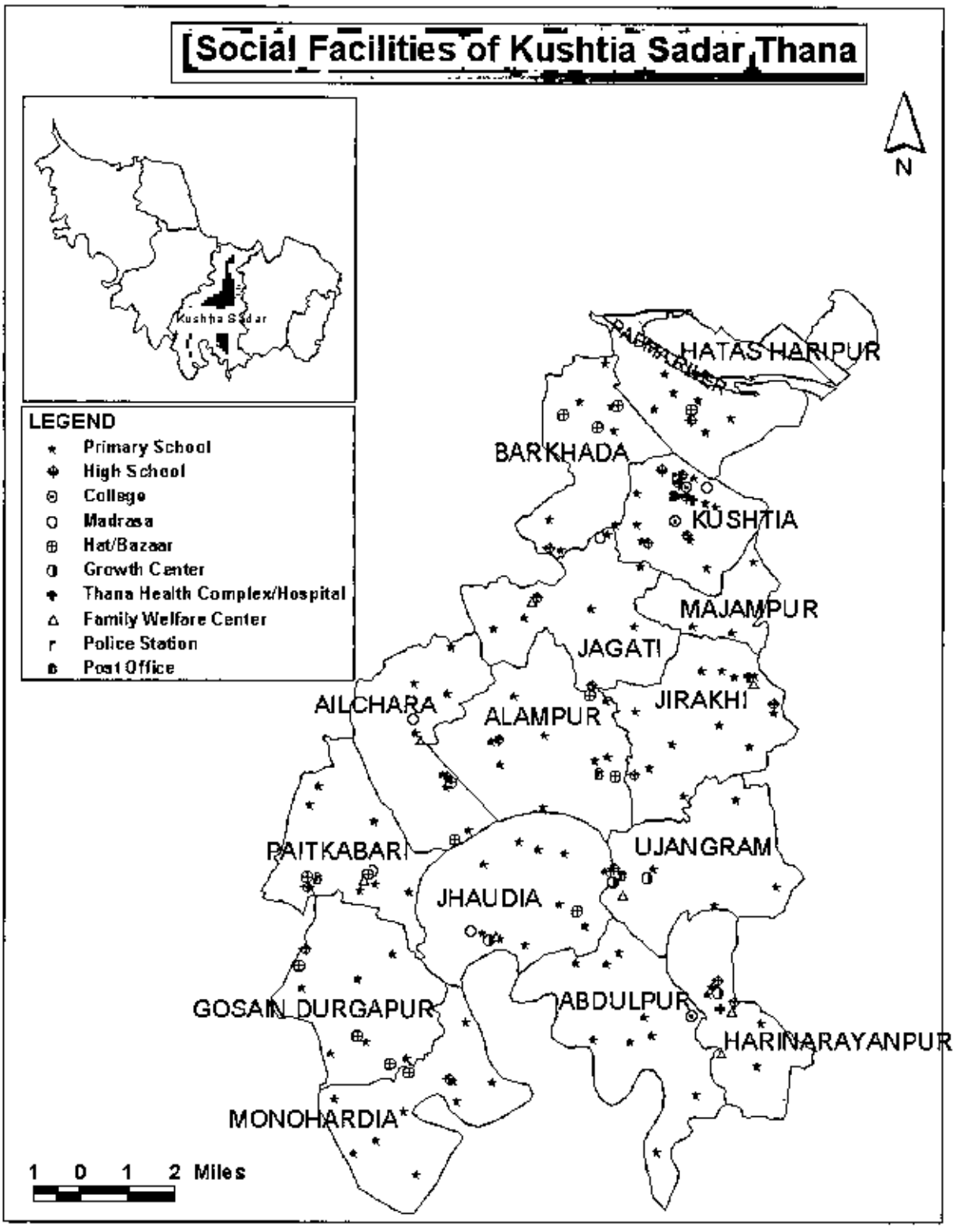
Map 2.3: Social facilities of Khoksa thana



Map 2.4: Social facilities of Kumarkhali thana



Map 2.5: Social facilities of Kushtia Sadar thana



Map 2.6: Social facilities of Mirpur thana

CHAPTER 3

DETERMINATION OF POPULATION THRESHOLDS

CHAPTER 3: DETERMINATION OF POPULATION THRESHOLDS

3.1 Introduction

Population threshold for each service has been calculated using Reed-Muench method which has been further developed by Hagget and Gunawardena. The inner concept of the method is that there is a zone of population size for each function, at the lower limit of which all settlement lack that function, while at the upper limit all settlement posses it.

Population threshold is defined as the minimum number of customers required to support a given service. For example, if the population threshold of a service facility is 1000 then it means that normally all settlements having that population should have that facility. It is then necessary to identify settlements that have that amount of population but lacks the facility to aid location decisions of future service facilities.

The method of calculating population threshold for a particular facility is explained using the following table, which represents number of unions with and without primary schools in Kumarkhali thana of Kushtia district.

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	1	0	0	1	4	2	2	1
With Primary School	0	0	0	1	3	1	1	1
Without Primary School	1	0	0	0	1	1	1	0
With Primary School absent at this and greater levels (Ag)	4	3	3	3	3	2	1	0
With Primary School Present at this and smaller levels (Ps)	0	0	0	1	4	5	6	7

In the above table, cumulative summing of the columns for the number of unions without primary schools gives values for an index **Ag**, which is the index of unions with this particular facility absent at a particular population level and greater levels, and cumulative summing of the two columns for the number of unions with primary

schools gives values for an index **Ps,** which is index of unions with this particular facility present at a certain population level and smaller levels.

Population threshold can also be computed mathematically. Two straight lines can be fitted through the data representing Ag and Ps, which can be described by the linear functions:

$Ag = a + bp$ .....(1)

$Ps = c + dp$ .....(2)

Where b and d are the slopes and a and c are the intercepts.

Population threshold (PT) can be found where Ag and Ps intersect, that is,

$PT = Ag = Ps$ .....(3)

By substituting (1) and (2) into (3),

$a + bp = c + dp$

Collecting terms,

$a - c = dp - bp$

Dividing both sides by $(d - b)$,

$p = (a - c)/(d - b)$ .....(4)

Substituting (4) into (1),

$PT = Ag = a + b\ ((a - c)/(d - b))$

To simplify the right hand side, a is multiplied and divided by $(d - b)$, which gives $(d - b)$ as a common denominator, whence,

$PT = (a(d-b) + b(a-c))/(d-b)$

$= (ad-bc)/(d-b)$ .....(5)

Using Least Squares Method,

$Ag = 46000 - 8973p$

$Ps = 12895 + 4101p$

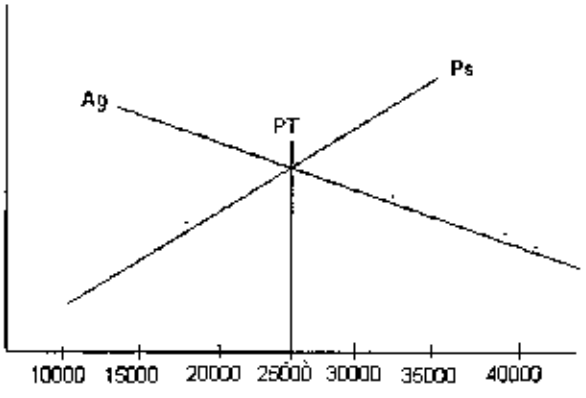
Thus, a = 45691.5, b = -12925.5, c = 16421.8 and d = 3673.66. Substituting these values into (5),

$PT = ((45691.5X\ 3673.66) - (-12925.5\ X\ 16421.8))/\ (3673.66 - (-12925.5))$

$= (167855035.9 - (-212259975.9))/\ 16599.1$

$= 22899$

Population threshold can be identified graphically if best fit regression lines are drawn by the values of **Ag** and **Ps**. Intersect point of the two lines indicate the population threshold for the facility. A symbolic representation of the graph would be as the following:



But if all the settlements posses or lacks a particular facility, this equation fails as it faces a "division by 0" error. With all the unions having a particular facility present, all values of index **Ag** becomes 0 and when all unions lacks a particular facility, all values of **Ps** becomes 0. If all unions of a thana lacks a particular facility, calculation of threshold for that facility of the thana does not apply. But calculation of threshold for the thanas with all unions possessing a particular facility has to be made. This

particular problem can be overcome by considering a group of facility as a single unit. For example, the average number of primary schools in the unions of Kumarkhali thana is 7. If 7 primary schools are considered as a single unit of the facility then some of the unions will have this function and some will lack. Consideration thus shifts from the number of unions having 1 primary school to number of unions having 1 unit of the function that is 7 primary schools. This will facilitate the calculation but will give threshold population for 7 primary schools meaning every union with that population should have 1 unit of that function or in other words, 7 primary schools. Therefore, by dividing this threshold population with 7, threshold population for 1 primary school can be achieved.

3.2 Identification of Population thresholds

In the following sections population thresholds for different types of facilities in different thanas of Kushtia districts are given. For the calculation purpose union populations have been used.

3.2.1 Bheramara Thana

Table 3.1 shows the 7 unions that comprise Bheramara thana with populations of 2003 (projected) and number of different facilities available at those unions.

Table 3.1: Union wise population and available facilities in Bheramara thana

Union Name	Population (2003)	Educational facilities				Commercial		Health		Social service
		Primary school	High school	College	Madrasa	Hat/ Bazaar	Growth center	Thana health complex /Hospital	Family welfare center	Post office
BAHADURPUR	32392	3	0	1	1	1	1	0	1	0
MOKARIMPUR	40027	10	0	0	3	4	0	0	1	3
JUNIADAHA	39274	6	1	0	3	3	1	0	1	1
BAHIRCHAR	22462	3	1	0	2	2	0	1	1	2
DHARAMPUR	36961	5	0	0	2	1	1	0	1	0
BHERAMARA	33950	0	0	0	0	0	0	0	0	0
CHANDGRAM	21804	5	0	0	0	1	0	0	0	0

Source: LGED 2003

3.2.1.1 Population thresholds for educational facilities

Educational facilities included in this study are Primary School, High School, College and Madrasa. Universities have not been included as it is supposed to serve larger areas than a thana, even a district.

32 primary schools are available in Bheramara thana. Number of high schools, colleges and madrasas available are 2, 1 and 11 respectively. 6 out of the 7 unions of Bheramara thana have primary schools, 2 unions have high schools, only 1 of them has a college and 5 unions have madrasas. Table 3.2 represents the population thresholds that have been calculated for these types of facilities within Bheramara thana.

Table 3.2: Population thresholds for Educational facilities

Facility Type	Threshold Population
Primary School	18455
High School	38959
College	44319
Madrasa	23137

Calculation tables for the identification of population thresholds for educational facilities of Bheramara thana are given in Annexure I.

Threshold population for primary schools, high schools, colleges and madrasas of Bheramara thana have been found are 18455, 38959, 44319 and 23137 respectively.

3.2.1.2 Population thresholds for Commercial facilities

Commercial facilities included in the study are Hats/Bazaars and Growth Centers. Total 12 Hats/Bazaars and 3 Growth Centers were found in Bheramara thana. 1 of the 7 unions lack hat/bazaar and 4 of them lack growth centers. Population thresholds identified for these facilities are given in the following table.

Table 3.3: Population Thresholds for commercial facilities

Facility Type	Threshold Population
Hat/Bazaar	15564
Growth Center	32233

Calculation tables for these facilities are given in Annexure I.

Threshold population of 15564 has been identified for Hats/Bazaars where as for Growth Centers this is found to be 32233.

3.2.1.3 Determination of population thresholds for Health facilities

Health facilities included in this study are Thana Health Complex/Hospital and Family Welfare Centers. Total 1 Thana Health Complex/Hospital and 5 family Welfare Centers are available in Bheramara thana. Following table shows identified population thresholds for these types of facilities.

Table 3.4: Population Thresholds for Health Facilities

Facility Type	Threshold Population
Thana Health Complex/Hospital	43598
Family Welfare Center	23137

Calculation tables for the identification of threshold population for health facilities of Bheramara thana are given in Annexure I.

As it can be seen from the above table, population threshold for Thana Health Complex/Hospital identified as 43598 while population threshold for Family Welfare Center have been identified as 23137.

3.2.1.4 Determination of population thresholds for Social Services

Post offices are taken as social facilities. 6 post offices have been identified in Bheramara thana. Following table shows identified threshold population for post offices of Bheramara thana.

Table 3.5: Population thresholds for social services

Facility Type	Threshold Population
Post Office	32780

Calculations table for the identification of threshold population for social services of Bheramara thana is given in Annexure I.

Threshold population for post offices in Bheramara thana has been found to be 32780.

3.2.2 Daulatpur Thana

Daulatpur thana consists of 14 unions. Name of these unions, their populations and available facilities are given in table no. 3.6.

Table 3.6: Union wise population and available facilities in Daulatpur thana

Union Name	Population 2003	Educational facilities				Commercial		Health		Social service
		Primary school	High school	College	Madrasa	Hat	Growth center	Thana health complex /Hospital	Family welfare center	Post office
CHILMARI	18953	2	1	0	1	2	0	0	1	0
MARICHA	22924	3	2	0	0	1	0	0	1	0
RAMKRISHNAPUR	37995	9	3	0	0	2	1	0	0	0
PHILIPNAGAR	41827	4	2	0	0	3	0	0	1	0
HOGALBARIA	57032	5	3	1	2	3	0	0	0	0
MATHURAPUR	51869	7	3	1	2	3	1	0	0	1
PRAYAGPUR	49754	3	2	0	0	3	0	0	0	0
PEARPUR	42672	5	2	0	1	1	0	0	1	0
DAULATPUR	44377	13	3	0	2	0	1	1	0	0
ADABARIA	41497	5	1	0	0	2	0	0	1	0
REFAYETPUR	34799	6	1	1	0	1	0	0	0	0
BOALIA	35675	4	1	0	0	1	0	0	0	0
ARIA	30772	8	3	0	0	0	1	0	0	0
KHALISHAKUNDI	37886	3	0	0	0	1	0	0	0	0

Source: LGED 2003

3.2.2.1 Population thresholds for educational facilities

Number of primary schools, high schools, colleges and madrasas in Daulatpur thana are 77, 27, 3 and 8 respectively. Population thresholds for these facilities are given in table 3.7.

Table 3.7: Population thresholds for Educational facilities

Facility Type	Threshold Population
Primary School	7682
High School	18784
College	54866
Madrasa	41728

Calculation tables for the identification of population thresholds for educational facilities of Daulatpur thana are given in Annexure I.

As it can be seen from table 3.7, threshold population for primary schools in Daulatpur thana is 7682. for high schools, colleges and madrasas threshold population have been found as 18784, 54866 and 41728 respectively.

3.2.2.2 Population thresholds for Commercial facilities

23 hats/bazaars and 4 growth centers are available in Daulatpur thana. Table 3.8 shows population thresholds for these types of facilities in Daulatpur thana.

Table 3.8: Population Thresholds for commercial facilities

Facility Type	Threshold Population
Hat/Bazaar	26289
Growth Center	50430

Calculation tables of population thresholds for these facilities are given in Annexure I.

Threshold population of 26289 has been identified for Hats/Bazaars where as for Growth Centers this is found to be 50430.

3.2.2.3 Population thresholds for Health facilities

1 Thana Health Complex/Hospital and 5 Family Welfare Centers are available in Daulatpur thana. Table 3.9 shows identified population thresholds for these facilities.

Table 3.9: Population Thresholds for Health Facilities

Facility Type	Threshold Population
Thana Health Complex/Hospital	65802
Family Welfare Center	43429

Calculation tables for the identification of threshold population for health facilities of Daulatpur thana are given in Annexure I.

It can be seen from the above table that threshold population for Thana Health Complex/Hospital in Daulatpur thana is 65802 and for Family Welfare Centers, this is found to be 43429.

3.2.2.4 Population thresholds for Social Services

Only 1 post office is available in Daulatpur thana. Following tables shows threshold population of this type of facility in Daulatpur thana.

Table 3.10: Population thresholds for social services

Facility Type	Threshold Population
Post Office	65802

Calculation tables for the identification of threshold population for social services of Daulatpur thana is given in Annexure I.

Threshold population for post offices in Daulatpur thana has been identified as 65802.

3.2.3 Khoksa Thana

Khoksa thana consists of 3 unions. Name of these unions, their populations and available facilities are given in table no. 3.11.

Table 3.11: Union wise population and available facilities in Khoksa thana

Union Name	Population 2003	Educational facilities				Commercial		Health		Social services
		Primary school	High school	College	Madrasa	Hat/ Bazaar	Growth center	Thana health complex /Hospital	Family welfare center	Post office
SAMASPUR	48554	17	6	0	4	7	0	0	1	0
KHOKSA	49228	13	4	1	2	7	1	1	1	0
JANIPUR	31592	11	3	0	1	4	0	0	0	0

Source: LGED 2003

3.2.3.1 Population thresholds for educational facilities

41 primary schools, 13 high schools, 1 college and 7 madrasas are available in the 3 unions of Khoksa thana. Table 3.12 shows population thresholds for these types of facilities.

Table 3.12: Population thresholds for Educational facilities

Facility Type	Threshold Population
Primary School	2947
High School	7021
College	41252
Madrasa	14042

Calculation tables for the identification of population thresholds for educational facilities of Khoksa thana are given in Annexure I.

As it can be seen from table 3.12, threshold population for primary schools in Khoksa thana is 2947. For high schools, colleges and madrasas threshold population have been found as 7021, 41252 and 14042 respectively.

3.2.3.2 Population thresholds for Commercial facilities

18 Hats/Bazaars and 1 Growth center is available in Khoksa thana. All of the 3 unions of Khoksa thana have Hats/Bazaars. Following table shows population thresholds identified for the commercial facilities of Khoksa thana.

Table 3.13: Population Thresholds for commercial facilities

Facility Type	Threshold Population
Hat/Bazaar	4398
Growth Center	41252

Calculation tables of population thresholds for these facilities are given in Annexure I.

Threshold population of 4398 has been identified for Hats/Bazaars where as for Growth Centers this is found to be 41252

3.2.3.3 Population thresholds for Health facilities

1 Thana Health Complex/Hospital and 2 Family Welfare Centers have been identified in the 3 unions of Khoksa thana. Identified population thresholds for these types of facilities are given in the table no 3.14.

Table 3.14: Population Thresholds for Health Facilities

Facility	Threshold Population
Thana Health Complex/Hospital	41252
Family Welfare Center	28084

Calculation tables for the identification of threshold population for health facilities of Khoksa thana are given in Annexure I.

Population threshold for Thana Health Complex/Hospital and Family Welfare Centers have been identified to be 41252 and 28084 respectively in Khoksa thana.

3.2.3.4 Population thresholds for Social services

No post offices are available in Khoksa thana. So no population threshold is available for this facility in the thana.

3.2.4 Kumarkhali Thana

Kumarkhali thana has 11 unions. Name of these unions, their populations and available facilities are given in table no. 3.15.

Table 3.15: Union wise population and available facilities in Kumarkhali thana

Union Name	Population 2003	Educational facilities				Commercial		Health		Social services
		Primary school	High school	College	Madrasa	Hat/ Bazaar	Growth center	Thana health complex /Hospital	Family welfare center	Post office
SHELAIDAHA	43463	7	1	0	1	0	1	0	0	1
KAYA	39806	7	1	0	1	0	1	0	0	0
JAGANNATHPUR	35960	4	1	0	2	2	0	0	0	0
CHAPRA	42270	8	1	0	0	1	0	0	0	1
NANDALALPUR	51148	7	3	0	0	1	0	0	1	0
SADAKI	30637	9	2	0	0	1	1	0	0	0
KUMARKHALI	9200	2	0	0	0	1	0	0	0	0
JADUBOYRA	27871	6	1	0	0	3	0	1	0	0
BAGULAT	25732	9	3	0	3	6	1	0	1	1
PANTI	31006	9	2	1	2	1	1	0	0	1
CHANDPUR	31428	12	1	0	1	1	0	0	2	0

Source: LGED 2003

3.2.4.1 Population thresholds for educational facilities

80 primary schools are available in the 11 unions of Kumarkhali thana. Number of high schools, colleges and madrasas available in the thana are 16 1 and 10 respectively. Following table shows population thresholds identified for these facilities in Kumarkhali thana.

Table 3.16: Population thresholds for Educational facilities

Facility Type	Threshold Population
Primary School	3271
High School	17194
College	52019
Madrasa	29971

Calculation tables for the identification of population thresholds for educational facilities of Kumarkhali thana are given in Annexure I.

As it can be seen from table no. 3.16, threshold population of 3271 has been identified for primary schools, where as for high schools, colleges and madrasas population threshold has been found to be 17194, 52019 and 29971 respectively.

3.2.4.2 Population thresholds for Commercial facilities

A total of 17 Hats/Bazaars and 5 Growth Centers are available in Kumarkhali thana. 9 of the 11 unions have Hats/Bazaars. 5 of them have Growth Centers. Following table shows population thresholds for the commercial facilities of Kumarkhali thana.

Table 3.17: Population Thresholds for commercial facilities

Facility Type	Threshold Population
Hat/Bazaar	16612
Growth Center	34144

Calculation tables of population thresholds for these facilities are given in Annexure I.

Threshold population of 16612 and 34144 has been identified for Hats/Bazaars and Growth Centers of Kumarkhali thana respectively.

3.2.4.3 Population thresholds for Health facilities

1 Thana Health Complex/Hospital and 4 Family Welfare Centers are available in Kumarkhali thana. Table 3.18 shows identified threshold population for these types of facilities in Kumarkhali thana.

Table 3.18: Population Thresholds for Health Facilities

Facility Type	Threshold Population
Thana Health Complex/Hospital	51337
Family Welfare Center	42342

Calculation tables for the identification of threshold population for health facilities of Kumarkhali thana are given in Annexure I.

Threshold population of 51337 has been identified for Thana Health Complex/Hospitals and 42342 has been identified for Family Welfare Centers of Kumarkhali thana.

3.2.4.4 Population thresholds for Social Services

4 Post Offices are available in 4 different unions of Kumarkhali thana. Following table shows the identified population threshold for this facility.

Table 3.19: Population thresholds for social services

Facility Type	Threshold Population
Post Office	33478

Calculation tables for the identification of threshold population for social services of Kumarkhali thana is given in Annexure I.

Population threshold for post offices of Kumarkhali thana has been found as 33478.

3.2.5 Kushtia Sadar Thana

Kushtia Sadar thana has 15 unions. Union wise population and available facilities are given in table no. 3.20

Table 3.20: Union wise population and available facilities in Kushtia Sadar thana

Union Name	Population 2003	Educational facilities				Commercial		Health		Social service
		Primary school	High school	College	Madrasa	Hat/ Bazaar	Growth center	Thana health complex /Hospital	Family welfare center	Post office
HATAS HARIPUR	26068	6	1	0	0	1	0	0	0	0
BARKHADA	50224	7	1	0	0	3	0	0	0	0
KUSHTIA	82160	10	6	2	1	0	0	1	0	1
JAGATI	56252	6	2	0	1	0	0	0	1	0
MAJAMPUR	65242	3	0	0	0	0	0	0	0	0
ALAMPUR	29865	8	1	0	0	2	0	0	0	1
AILCHARA	19777	7	1	0	1	2	0	0	1	0
JIRAKHI	30270	11	2	0	0	0	0	1	1	0
PAITKABARI	21356	7	1	0	1	2	0	0	1	1
UJANGRAM	23553	4	1	0	0	0	2	0	1	1
JHAUDIA	22963	10	0	0	1	1	1	0	1	0
GOSAIN DURGAPUR	19235	6	1	0	0	3	0	0	0	0
HARINARAYANPUR	25239	4	2	0	0	0	1	1	2	0
ABDULPUR	29501	9	0	1	0	0	0	0	0	0
MONOHARDIA	18744	9	1	0	0	1	0	0	0	0

Source: LGED 2003

3.2.5.1 Population thresholds for educational facilities

There are 107 primary schools, 20 high schools, 3 colleges and 5 madrasas available in Kushtia Sadar thana. Table 3.21 is a presentation of the identified population thresholds for these types of facilities in the thana.

Table 3.21: Population thresholds for Educational facilities

Facility Type	Threshold Population
Primary School	3444
High School	16533
College	41950
Madrasa	34121

Calculation tables for the identification of population thresholds for educational facilities of Kushtia thana are given in Annexure I.

Population threshold for primary schools has been identified as 3444 while for high schools, colleges and madrasas have been found to be 16533, 41950 and 34121 respectively in Kushtia Sadar thana.

3.2.5.2 Population thresholds for Commercial facilities

15 Hats/Bazaars and 4 Growth centers were found in Kushtia Sadar thana. Population thresholds calculated for these types of facilities in Kushtia Sadar thana is given in the following table.

Table 3.22: Population Thresholds for commercial facilities

Facility Type	Threshold Population
Hat/Bazaar	24377
Growth Center	40022

Calculation tables of population thresholds for these facilities are given in Annexure I.

It has been found that hats/bazaars in Kushtia Sadar thana requires a threshold population of 24377 while a threshold population of 40022 is required by the growth centers.

3.2.5.3 Population thresholds for Health facilities

3 Thana Health Complexes/Hospitals and 5 Family Welfare Centers have been found in Kushtia Sadar thana. Population thresholds found for these facilities in the thana are given in the following table.

Table 3.23: Population Thresholds for Health Facilities

Facility Type	Threshold Population
Thana Health Complex/Hospital	38934
Family Welfare Center	29333

Calculation tables for the identification of threshold population for health facilities of Kushtia Sadar thana are given in Annexure I.

According to the table no. 3.23. a threshold population of 38934 is required for a Thana Health Complex/Hospital in Kushtia Sadar thana while by Family Welfare Centers a threshold population of 29333 is required.

3.2.5.4 Population thresholds for Social Services

4 post offices are available in Kushtia Sadar thana. Population threshold calculated for post offices in the thana are given in the following table.

Table 3.24: Population thresholds for Social services

Facility Type	Threshold Population
Post Office	34155

Calculation tables for the identification of threshold population for social services of Kushtia Sadar thana is given in Annexure I.

Population threshold required by post offices in Kushtia sadara thana has been identified as 34155.

3.2.6 Mirpur Thana

Mirpur thana has 12 unions. Union wise population and available facilities are given in the table no. 3.25.

Table 3.25: Union wise population and available facilities in Mirpur thana

Union Name	Population 2003	Educational facilities				Commercial		Health		Social services
		Primary school	High school	College	Madrasa	Hat/ Bazaar	Growth center	Thana health complex /Hospital	Family welfare center	Post office
CHITHALIA	36507	8	1	0	2	2	1	0	1	0
BAHALBARIA	24857	7	0	0	0	3	0	0	1	0
TALBARIA	18706	4	1	0	1	2	0	0	1	0
BARUIPARA	27567	8	1	0	0	4	0	0	0	0
MIRPUR	42606	7	2	1	2	3	1	1	1	1
AMLA	29022	9	2	1	0	2	1	0	1	1
PORADAHA	46842	6	3	1	1	4	1	0	1	1
SARDARPUR	33639	6	1	0	2	2	1	0	1	0
CHHATIAN	27252	8	2	0	2	3	0	0	1	0
MALIHAD	26444	8	0	0	1	4	0	0	1	0
KURSHA	24739	4	2	0	1	3	0	0	1	0
AMBARIA	16320	6	1	1	2	1	1	0	1	1

Source: LGED 2003

3.2.6.1 Population thresholds for educational facilities

81 primary schools, 16 high schools, 4 colleges and 14 madrasas are available in Mirpur thana. Following table represents the population thresholds for these types of facilities.

Table 3.26: Population thresholds for Educational facilities

Facility Type	Threshold Population
Primary School	3527
High School	15993
College	33258
Madrasa	18966

Calculation tables for the identification of population thresholds for educational facilities of Mirpur thana are given in Annexure I.

It has been found that a threshold population of 3527 is required by a primary school, 15993 is required by a high school, 33258 is required by a college and 18966 is required by a madrasa in Mirpur thana.

3.2.6.2 Population thresholds for Commercial facilities

There are 33 hats/bazaars and 6 growth centers available in Mirpur thana. Table 3.27 shows calculated population thresholds for these types of facilities in the thana.

Table 3.27: Population Thresholds for commercial facilities

Facility Type	Threshold Population
Hat/Bazaar	7486
Growth Center	27389

Calculation tables of population thresholds for these facilities are given in Annexure I.

As it can be seen from the above table, population threshold for Hats/Bazaars have been identified as 7486 where as for Growth Centers it has been found to be 27389.

3.2.6.3 Population thresholds for Health facilities

There is 1 Thana Health Complex/Hospital and 11 Family Welfare Centers are available in Mirpur thana. Table 3.28 represents the identified population thresholds for these types of facility within Mirpur thana.

Table 3.28: Population Thresholds for Health Facilities

Facility Type	Threshold Population
Thana Health Complex/Hospital	22143
Family Welfare Center	13029

Calculation tables for the identification of threshold population for health facilities of Mirpur thana are given in Annexure I.

As shown in the above table, a threshold population of 22143 is required by a Thana Health Complex/Hospital and for Family Welfare Centers this requirement is of a population of 13029.

3.2.6.4 Population thresholds for Social services

4 post offices are available in 4 different unions among the 12 unions of Mirpur thana. Following table is a presentation of the calculated population thresholds for post offices within Mirpur thana.

Table 3.29: Population thresholds for Social services

Facility Type	Threshold Population
Post Office	33258

Calculation tables for the identification of threshold population for social services of Mirpur thana is given in Annexure I.

As the table no 3.29 shows, a threshold population of 33258 is required by a post office in Mirpur thana.

CHAPTER 4
GAP IDENTIFICATION

CHAPTER 4: GAP IDENTIFICATION

4.1 Introduction

This chapter includes calculation of gaps in respect to different service facilities included in the study based on thana population and identified population thresholds for respective service facilities.

Gap of a facility is calculated by dividing the total population of a thana with the average population threshold of that particular function for all thanas and subtracting the result from the number of available facilities in the thana. A negative result indicates surplus of that function in that particular thana.

Following formula is used to calculate existing gap (additional need) for a function:

$$F_g = N - (P / P_t)$$

Where, F_g = Gap for a particular facility in a thana

N = Existing number of facility in concern

P = Thana population

P_t = Average Population threshold for the facility

4.2 Thana wise gap identification

Calculations of threshold population for different facilities are given in chapter 3. Following section identifies gaps for different facilities in the thanas of Kushtia district.

4.2.1 Educational Facilities

Gaps or additional need for educational facilities (Primary school, High school, College and Madrasa) identified for different thanas of Kushtia district is given in the following section.

4.2.1.1 Primary School

Average population threshold for primary schools in different thanas of Kushtia district is 6554. Table 4.1 shows the number of available primary schools in the thanas, number of primary schools needed in those thanas and additional number of primary schools required or the number of surplus primary schools in the thanas along with their population.

Table 4.1: Thana wise gap for Primary School

Thana Name	Population	AVG Threshold Population	No. of facility available	No. of facility required	Gap
BHERAMARA	226870	6554	32	35	3
DAULATPUR	548032	6554	77	84	7
KHOKSA	129375	6554	41	20	-21
KUMARKHALI	368521	6554	80	56	-24
KUSHTIA	520449	6554	107	79	-28
MIRPUR	354502	6554	81	54	-27

It can be seen that Daulatpur thana needs an additional 7 primary schools, which is the highest gap in the region. On the other hand Kushtia Sadar thana has a surplus of 28 primary schools.

4.2.1.2 High School

The scenario of high school requirements for different thanas of Kushtia district along with their population is given in table no. 4.2:

Table 4.2: Thana wise gap for High School

Thana Name	Population	AVG Threshold Population	No. of facility available	No. of facility required	Gap
BHERAMARA	226870	19081	2	12	10
DAULATPUR	548032	19081	27	29	2
KHOKSA	129375	19081	13	7	-6
KUMARKHALI	368521	19081	16	19	3
KUSHTIA	520449	19081	20	27	7
MIRPUR	354502	19081	16	19	3

The highest gap of 10 high schools have been found for Bheramara thana followed by 7 for Kushtia Sadar thana, 3 for both Mirpur thana and Kumarkhali thana, 2 for Daulatpur thana. Surplus of 6 high schools is found in Khoksa thana.

4.2.1.3 College

Table 4.3 shows requirements for colleges in different thanas of Kushtia district.

Table 4.3: Thana wise gap for College

Thana Name	Population	AVG Threshold Population	No. of facility available	No. of facility required	Gap
BHERAMARA	226870	44611	1	5	4
DAULATPUR	548032	44611	3	12	9
KHOKSA	129375	44611	1	3	2
KUMARKHALI	368521	44611	1	8	7
KUSHTIA	520449	44611	3	12	9
MIRPUR	354502	44611	4	8	4

Highest additional requirement has been found for Kushtia Sadar thana and Daulatpur thana of 9 colleges followed by 7 for Kumarkhali thana. Lowest gap has been identified for Khoksa thana which needs additional 2 colleges.

4.2.1.4 Madrasa

Highest gap for Madrasa have been found for Kushtia Sadar thana. 14 additional madrasas are needed for the thana. Bheramara thana Khoksa thana and Mirpur thana shows surplus of 3, 2 and 1 madrasas respectively.

Table 4.4 shows the gaps and surplus data of madrasa for different thanas of Kushtia district.

Table 4.4: Thana wise gap for Madrasa

Thana Name	Population	AVG Threshold Population	No of facility available	No. of facility required	Gap
BHERAMARA	226870	26994	11	8	-3
DAULATPUR	548032	26994	8	20	12
KHOKSA	129375	26994	7	5	-2
KUMARKHALI	368521	26994	10	14	4
KUSHTIA	520449	26994	5	19	14
MIRPUR	354502	26994	14	13	-1

As the table shows, 12 more madrsas are needed for Daulatpur than and 4 for Kumarkhali thana.

4.2.2 Commercial Facilities

Following section presents the gaps and surplus of commercial facilities (Hat/Bazaar and Growth Center) for different thanas of Kushtia district.

4.2.2.1 Hat/Bazaar

Table 4.5 shows additional needs and surplus of Hats/Bazaars in different thanas.

Table 4.5: Thana wise gap for Hat/Bazaar

Thana Name	Population	AVG Threshold Population	No. of facility available	No. of facility required	Gap
BHERAMARA	226870	15788	12	14	2
DAULATPUR	548032	15788	23	35	12
KHOKSA	129375	15788	18	8	-10
KUMARKHALI	368521	15788	17	23	6
KUSHTIA	520449	15788	15	33	18
MIRPUR	354502	15788	33	22	-11

As it can be seen from the above table, Kushtia sadar thana has the highest gap of Hat/Bazaar of 18 while Daulatpur thana needs additional 12 of such facility. Kumarkhali and Bheramara thana needs additional 6 and 2 of such facilities respectively while Mirpur and Khoksa thana shows a surplus of 11 and 10 of such facility.

4.2.2.2 Growth Center

All of the thanas of Kushtia districts are in short of Growth Centers. None of the the thana shows surplus. Table 4.6 shows the gaps identified for different thanas in terms of growth centers.

Table 4.6: Thana wise gap for Growth Center

Thana Name	Population	AVG Threshold Population	No. of facility available	No. of facility required	Gap
BHERAMARA	226870	37578	3	6	3
DAULATPUR	548032	37578	4	15	11
KHOKSA	129375	37578	1	3	2
KUMARKHALI	368521	37578	5	10	5
KUSHTIA	520449	37578	4	14	10
MIRPUR	354502	37578	6	9	3

The highest gap has been identified of 11 growth centers for Daulatpur thana followed by a gap of 10 for Kushtia Sadar thana, 5 for Kumarkhali thana, 3 for both Bheramara and Mirpur thana and 2 for Khoksa thana.

4.2.3 Health Facilities

Need for health facilities (Thana Health Complex/Hospital and Family Welfare Center) or surplus of such facilities in different thanas of Kushtia district is given in the following section.

4.2.3.1 Thana Health Complex/Hospital

All of the thanas of Kushtia district are in need of additional health complexes or hospitals. Gap identified for this facility has been given in table 4.7.

Table 4.7: Thana wise gap for Thana Health Complex/Hospital

Thana Name	Population	AVG Threshold Population	No. of facility available	No. of facility required	Gap
BHERAMARA	226870	47051	1	5	4
DAULATPUR	548032	47051	1	12	11
KHOKSA	129375	47051	1	3	2
KUMARKHALI	368521	47051	1	8	7
KUSHTIA	520449	47051	3	11	8
MIRPUR	354502	47051	1	8	7

Highest gap has been found again for Daulatpur thana for 11 additional health complexes/hospitals followed by 8 for Kushtia Sadar thana and 7 for Mirpur and Kumarkhali thana. Additional 4 facilities are needed for Bheramara thana, 2 by Khoksa thana.

4.2.3.2 Family Welfare Center

Highest gap is for 13 family welfare centers in Daulatpur thana and lowest of 1 for Mirpur thana. Table 4.8 shows gap identified for family welfare centers for different thanas of Kushtia district.

Table 4.8: Thana wise gap for Family Welfare Center

Thana Name	Population	AVG Threshold Population	No. of facility available	No. of facility required	Gap
BHERAMARA	226870	29892	5	8	3
DAULATPUR	548032	29892	5	18	13
KHOKSA	129375	29892	2	4	2
KUMARKHALI	368521	29892	4	12	8
KUSHTIA	520449	29892	8	17	9
MIRPUR	354502	29892	11	12	1

Additional 9 of this type of facility is needed by Kushtia Sadar thana, 8 by Kumarkhali thana, 3 by Bheramara thana and 2 by Khoksa thana.

4.2.4 Social Services

Gaps or additional need for Post Offices identified for different thanas of Kushtia district is given in the following section.

4.2.4.1 Post Office

It has been found that Khoksa thana completely lacks this facility. No post offices were found in that thana. So, calculation of population threshold of post office for that thana was not possible, which made the gap identification of the facility for Khoksa thana impossible as well. Gaps for post offices identified for the rest of the thanas of Kushtia district is given in table 4.9.

Table 4.9: Thana wise gap for Post Office

Thana Name	Population	AVG Threshold Population	No. of facility available	No. of facility required	Gap
BHERAMARA	226870	39895	6	6	0
DAULATPUR	548032	39895	1	14	13
KHOKSA	129375	39895	0	Not Available	Not Available
KUMARKHALI	368521	39895	4	9	5
KUSHTIA	520449	39895	4	13	9
MIRPUR	354502	39895	4	9	5

Highest gap for the facility has been identified for 13 post offices in Daulatpur thana, followed by a gap of 9 for Kushtia Sadar thana, 5 by both Kumarkhali and Mirpur thana. 6 post offices are available in Bheramara thana while the calculated required number is also 6. So no gap or surplus for post offices found for Bheramara thana.

CHAPTER 5

THANA WISE ANALYSIS OF SERVICE PROVISION

CHAPTER 5: THANA WISE ANALYSIS OF SERVICE PROVISION

This chapter provides a thana wise comparison on all the selected facilities to aid better understanding of regional disparities that exists between the thanas of Kushtia district. Table 4.1 to 4.9 of the previous chapter gives the existing and the calculated required number of all the facilities under consideration followed by the number of additional facilities that are required by each thana to mitigate disparities between them. While the absolute required number of additional facilities helps to plan for future facilities, the gap in percentage terms helps even better to judge the existing levels of service provision and disparities between the regions. Table 5.1 provides the percentage gap that exists for different facilities in all the six thanas of Kushtia district.

Table 5.1: Percentage gap for different service facilities

Thana Name	Bheramara	Daulatpur	Khoksa	Kumarkhali	Kushtia	Mirpur	Average gap
Primary School	8 6	8 3	-105.0	-42 9	-35 4	-50 0	-36 1
High School	83 3	6 9	-85 7	15.8	25 9	15 8	10.3
College	80 0	75 0	66.7	87 5	75 0	50 0	72 4
Madrasa	-37 5	60 0	-40 0	28 6	73.7	-7.7	12 8
All Education	**33.6**	**37.6**	**-41.0**	**22.3**	**34.8**	**2.0**	**14.9**
Hat/Bazaar	14.3	34 3	-125 0	26 1	54 5	-50 0	-7.6
Growth Centre	50 0	73 3	66 7	50 0	71.4	33 3	57.5
All Commercial	**32.1**	**53.8**	**-29.2**	**38.0**	**63.0**	**-8.3**	**24.9**
Thana Health Complex/ Hospital	80 0	91 7	66 7	87.5	72.7	87.5	81.0
Family Welfare Centre	37 5	72 2	50 0	66 7	52.9	8.3	47.9
All Health	**58.8**	**81.9**	**58.3**	**77.1**	**62.8**	**47.9**	**64.5**
Post Office	0 0	92 9	N/A	55 6	69 2	55 6	54 6
Average	**35.1**	**57.2**	**-13.2**	**41.6**	**51.1**	**15.9**	**31.3**

5.1 Bheramara Thana

In most of the cases Bheramara shows a deficit of facilities. Even for primary schools, where the six thanas shows an average surplus of 36.1 per cent, Bheramara thana shows a need for three additional units which is 8.6 per cent gap between existing and required number of primary schools. For high schools, Bheramara thana shows the largest deficit of 10 additional units which is also the largest percentage gap of 83.3 per cent. With another 80.0 per cent gap for colleges, Bheramara is one of the most deprived thana within Kushtia district in terms of education facilities. However, only

in the case of madrasa, Bheramara thana shows a surplus of 3 units which is a 37.5 per cent surplus. While the average gap for education facilities for all six thanas is 14.9 per cent, Bheramara thana shows a gap of 33.6 per cent.

For commercial facilities also, Bheramara thana records a lower standard than the average standard of the six thanas. While the average gap for all commercial facilities of the six thanas is 24.9 per cent, Bheramara thana demonstrates a gap of 32.9 per cent. A significant gap of 50 per cent exists for growth centres while another 14.3 per cent gap is found for hats/bazaars.

Kushtia district shows a poor condition in terms of provision of health facilities as the average gap for all six thanas stands to 64.5 per cent. Bheramara thana, although showing a bit better situation than the average, shows a significant gap 58.8 per cent. Only 20 per cent of the requirement for thana health complex/hospital is met (80 per cent gap) in Bheramara thana while another 37.5 per cent gap exists for family welfare centres.

For social facilities (in terms of post offices). Bheramara thana fulfills the requirement of 6 post offices while an average gap of 54.6 per cent exists for all six thanas.

Considering all the selected facilities, Bheramara thana shows a below standard level of provision as the average percentage gap for all the facilities stands to be 35.1 per cent while this average for all six thanas is 31.3 per cent.

5.2 Daulatpur Thana

In the case of primary schools. colleges and madrasas Daulatpur thana shows a lower standard of provision than the average of the six thanas. However, although there is a percentage gap of 6.9 per cent, only in the case of high schools, Daulatpur thana shows a better situation than the average as the average gap for high schools for all six thanas stands to 10 3 per cent. Combindly, for all education facilities, Daulatpur thana demonstrate a below standard provision of facilities as the average for the thana and average for all six thanas records 37.6 per cent and 14.9 per cent gap respectively.

With 34.3 per cent and 73.3 per cent respective gap for hat/bazaar and growth centre, Daulatpur thana records an average 53.8 per cent gap for all commercial facilities while the average gap for all six thanas stands to 24.9 per cent.

For Health facilities, Daulatpur records the poorest level of provision with the highest average gap of 81.9 per cent gap (91.7 per cent for thana health complex and 72.2 per cent for family welfare centres) within the six thanas.

With another 92.9 per cent gap for post offices, Daulatpur thana records the highest average gap of 57.2 per cent for all facilities within the six thanas.

5.3 Khoksa Thana

Due to the small size, both in terms of geographic boundary and population. Khoksa thana shows reasonable provision of social facilities with respect to the average level of provision in all six thanas. In average, for all facilities, Khoksa thana shows an average surplus provision of 13.2 per cent.

For primary schools, high schools and madrasas Khoksa thana shows large surpluses. However, there exists a 66.7 per cent gap for colleges. For all education facilities, Khoksa thana shows an average surplus of 41.0 per cent.

In the case of commercial service provisions also, Khoksa thana demonstrates an average surplus of 29.2 per cent (with high surplus of 125 per cent for hat/bazaar and 66.7 per cent deficit for growth centres).

However, like the average for all six thanas, Khoksa thana shows large gap for health provisions with 66.7 per cent gap for thana health complex/hospitals and 50 per cent gap for family welfare centres.

Notwithstanding the fact that Khoksa thana records an average surplus provision of all the facilities, the thana completely lacks in the provision of post offices. This may be the reflection of its small size, but considering the level of service provision in the locality, the thana should be provided with post offices.

5.4 Kumarkhali Thana

Other than primary schools, where a surplus of 42.9 per cent is found, for all other facilities a deficit is found in Kumarkhali thana. Also, average percentage gap for all the selected facilities (41.6 per cent) is larger than the average for all six thanas of Kushtia district (31.3 per cent).

High schools, colleges and madrasas shows gaps of 15.8 per cent, 87.5 per cent and 28.6 per cent respectively. Gap for colleges in Kumarkhali thana is the highest among the six thanas. Average gap for education facilities of Kumarkhali thana is 22.3 per cent, which is, however a smaller gap than that of Bheramara, Daulatpur and Kushtia sadar thana, but higher than that of Khoksa and Mirpur thana.

With 26.1 per cent and 50.0 per cent gaps respectively for hat/bazaar and growth centres, average gap for commercial facilities in Kumarkhali thana is found to be 38.0 per cent, which is again better than Kushtia sadar thana, Bheramara thana and Daulatpur thana, but the gap is larger than that of Khoksa and Mirpur thana.

After Daulatpur thana, Kumarkhali thana shows the second largest average gap for health facilities (77.1 per cent) and a 55.6 per cent gap for post offices.

5.5 Kushtia Sadar Thana

Kushtia sadar thana, mainly due to the larger population, shows deficit of provision of social services in almost all of the selected cases. Other than the case for primary school, all other facilities shows deficit. 35.4 per cent surplus for the provision of primary schools has been found. With 25.9 per cent, 75.0 per cent and 73.7 per cent respective gaps for high schools, colleges and madrasas, the average gap for education facilities found to be 34.8 per cent, which is only better than Bheramara and Daulatpur thana but worst than the rest three.

Average percentage gap for commercial facilities in Kushtia sadar thana is the largest (63.0 per cent) within the six thanas. Hat/bazzar shows a gap of 54.5 per cent, while the gap for growth centre is found to be 71.4 per cent.

It is only the health facilities where Kushtia sadar thana shows a better level of provision (62.8 per cent average gap) than the average of six thana (64.5 per cent average gap). For post offices Kushtia sadar thana again shows a much larger gap (51.1 per cent) than the average gap for the six thanas (31.3 per cent).

5.6 Mirpur Thana

Mirpur thana, in terms of the average gaps for three broad categories, other than the social services category (post offices), shows a better level of service provision than the average level of six thanas. With 50.0 per cent and 7.7 per cent respective surplus for primary schools and madrasas and 15.8 per cent and 50.0 per cent respective gaps for high schools and colleges, average gap for education facilities stands to 2.0 per cent, which is the better level of provision of education facilities among the six thanas.

In terms of hat/bazaar, Mirpur thana shows a large surplus of 50.0 per cent. For growth centres a gap of 33.3 per cent is found, not withstanding the fact that this is the minimum gap among the six thanas. On an average, all commercial facilities shows a surplus provision of 8.3 per cent in Mirpur thana.

Mirpur thana shows a large percentage gap (87.5 per cent) in terms of the provision of thana health complex/hospitals. However, with a small gap of 8.3 per cent for family welfare centres, the average gap for health facilities has been found to be 47.9 per cent, which is again the minimum among the six thanas.

With a larger 55.6 per cent gap for post offices, average gap for all facilities of Mirpur thana stands to be 15.9 per cent, which indicates a better level of provision of social facilities in the thana.

To summarise, in terms of average gap for all the selected facilities, Khoksa and Mirpur thana shows a better level of service provision among the six thanas, while Daulatpur thana followed by Kushtia sadar thana demonstrates the worst case scenarios.

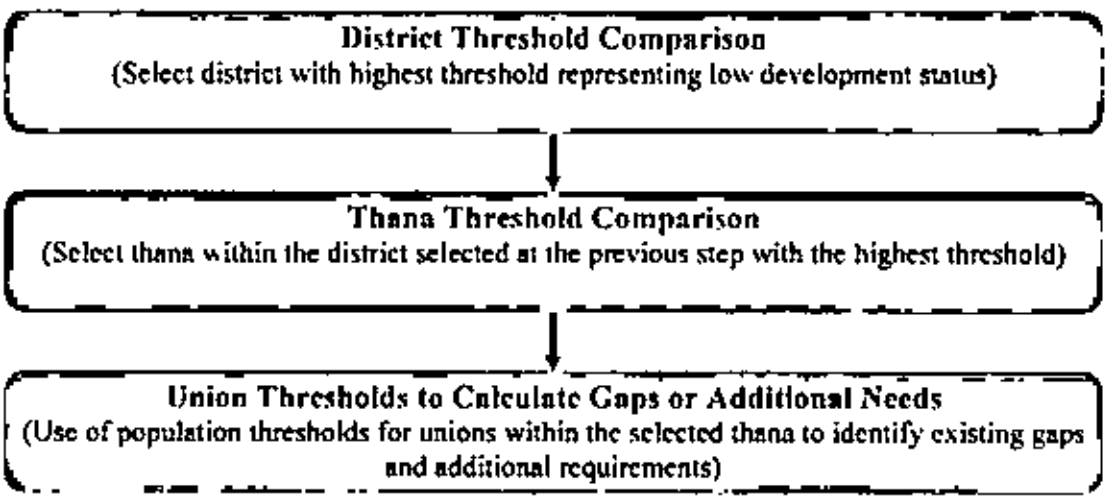
CHAPTER 6

RECOMMENDATIONS AND CONCLUSION

CHAPTER 6: RECOMMENDATIONS AND CONCLUSION

6.1 Recommendations

Population thresholds for different facilities indicate development status of a region when compared to other regions. This can be very much useful when identifying regions with priority need for development initiatives. While the higher level thresholds are to be used for identifying areas with priority need, only the thresholds at the lowest level should be used to identify gaps or additional requirements. So it is recommended that district thresholds for all other districts of Bangladesh be calculated as well to facilitate comparison at the district level and then go on to the thana level comparison and gap identification. It is even better to calculate union thresholds as well so that thana thresholds can also be used to identify thanas within the district at priority need and union thresholds can be used to identify gaps. Following flow diagram represents the recommended steps in selecting areas for development initiatives for a particular facility.



In this study thana thresholds are the lowest level thresholds calculated. So thana thresholds have been used to identify both areas with priority need and gaps or additional requirements. Following is a facility wise discussion to identify areas with top priority need in Kushtia district.

6.1.1 Primary School

Highest gap for primary school has been found for Kushtia Sadar thana (44) while the lowest gap is found for Bheramara thana (surplus of 20). Following list shows the thanas in a hierarchy of priority according to the identified gaps in this sector:

1. Kushtia Sadar thana (gap 44, threshold 3444)
2. Kumarkhali thana (gap 33, threshold 3271)
3. Mirpur thana (gap 20, threshold 3527)
4. Khoksa thana (gap 3, threshold 2947)
5. Daulatpur thana (surplus 6, threshold 7682)
6. Bheramara thana (surplus 20, threshold 18455)

6.1.2 High School

Highest additional requirement of 11 high schools have been found for Kushtia Sadar thana (threshold 16533) and the lowest has been identified for Daulatpur thana (threshold 18784) of 2 additional high schools. So it is recommended that Kushtia Sadar thana is given the highest priority while initiating development plans for high schools. The 2nd, 3rd, 4th and 5th priorities have been identified for Mirpur (gap 6, threshold 15993), Kumarkhali (gap 5, threshold 17194), Khoksa (gap 5, threshold 7021) and Bheramara (gap 4, threshold 38959) thana respectively.

6.1.3 College

For college highest amount of additional requirement has been found for Kushtia Sadar thana (gap 9, threshold 41950). The lowest gap is found for 2 colleges by Khoksa thana (threshold 41252). So in this sector Kushtia sadar thana should have the 1st priority. 2nd, 3rd, 4th and 5th priorities have been identified for Daulatpur (gap 7, threshold 54866), Mirpur (gap 7, threshold 33258), Kumarkhali (gap 6, threshold 52019) and Bheramara (gap 4, threshold 44319) thana respectively.

6.1.4 Madrasa

Highest gap for Madrasa has been found for Kushtia Sadar thana (gap 10, threshold 34121). So highest priority should be given to this thana in this sector. Only thana that shows surplus of madrasa is Bheramara thana (surplus 1, threshold 23137). 2nd, 3rd, 4th and 5th priorities have been identified for Daulatpur (gap 5, threshold 41728), Mirpur

(gap 5, threshold 18966), Kumarkhali (gap 2, threshold 29971) and Khoksa (gap 2, threshold 14042) thana respectively.

6.1.5 Hat/Bazaar

It is recommended that highest priority be given to Mirpur thana and then to Khoksa thana while planning for hat/bazaars in Kushtia district as the highest amount of gap has been identified for these two thanas of 14 and 11 respectively. 2nd, 3rd, 4th and 5th priorities have been identified for Kushtia Sadar thana (gap 6, threshold 24377), Kumarkhali (gap 5. threshold 16612) thana, Bheramara thana (gap 3, threshold 15564) and Daulatpur thana (surplus 2, threshold 26289) respectively.

6.1.6 Growth Center

Highest gap of 9 growth centers have been found for Kushtia Sadar thana (threshold 40022) while the lowest is of 2 for Khoksa thana (threshold 41252). So it is recommended that Kushtia be given the highest priority for future programs in this sector. 2nd, 3rd, 4th and 5th priorities have been identified for Daulatpur (gap 7, threshold 50430), Mirpur (gap 7, threshold 27389). Kumarkhali (gap 6, threshold 34144) and Bheramara (gap 4, threshold 32233) thana respectively.

6.1.7 Thana Health Complex/Hospital

It is recommended that Kushtia Sadar thana again be given the highest priority while planning for development in this sector in Kushtia district as the highest gap of 10 Thana Health Complexes/Hospitals has been identified for this thana. Lowest gap has been found for Khoksa thana of 2. 2nd, 3rd, 4th and 5th priorities have been found for Mirpur (gap 8, threshold 41382), Daulatpur (gap 7, threshold 65802). Kumarkhali (gap 6, threshold 51337) and Bheramara (gap 4, threshold 43598) thana respectively.

6.1.8 Family Welfare Center

For Family Welfare Center highest gap of 16 has been found for Mirpur (threshold 13029) thana and the lowest gap of 3 for Khoksa (threshold 28084) thana. So Mirpur thana should get the top most consideration in this sector for future development initiatives. 2nd, 3rd, 4th and 5th priorities have been found for Kushtia Sadar (gap 10, threshold 29333), Daulatpur (gap 8, threshold 43429), Kumarkhali (gap 5, threshold 42342) and Bheramara (gap 5, threshold 23137) respectively

6.1.9 Post office

It has been found that Khoksa thana with a population of 129375 and with 3 unions have no post offices at all. Among the other thanas highest gap between available and required number of post offices has been found of 11 for Kushtia Sadar thana (threshold 34155) and lowest of 1 for Bheramara thana (threshold 32780). 2nd, 3rd and 4th priorities have been identified for Daulatpur (gap 7, threshold 65808), Kumarkhali (gap 7, threshold 33478) and Mirpur (gap 7, threshold 33258) respectively.

6.2 Conclusion

While undertaking development projects for social facilities, selection of the area of implementation is of immense importance. If this factor goes without sufficient consideration the project may well lead to greater disparity between regions. Most of the time in developing countries selection of implementation areas is based on apparent conditions rather than a comprehensive study of requirements too often leading to an unbalanced development. Methods such as population threshold concept can play a vital role in this type of situation. While identified gaps through this method can help revealing the extent of additional need, thresholds are beneficial to make comparison of level of development between regions.

But this method should not be treated as complete as it has its own limitations. This concept does not incorporate the weight factor of regions. One region can serve as the center of development to the surrounding regions and hence may require higher level of development then the surrounding ones. So to use this method more effectively a weight factor should be developed for all the regions under consideration and be used in conjunction with the identified thresholds rather then the thresholds alone. Also it would be wise to conduct a study on the causes of differences between thresholds of regions as this method assumes a population less then the threshold do not support a facility. But in developing countries a higher threshold than the actual can be found as availability of resources too often is the cause of providing less number of a facility then the required number.

Despite of the limitations this method can be a vital tool to identify areas with prior need for a development initiative in a particular sector. If thresholds from larger to a smaller level of regions can be identified and comparison of thresholds is carefully undertaken this method can well serve to obtain a balanced growth. But one prerequisite for the success of this method is the availability of data relevant to the existing facilities. This aspect is not very much developed in Bangladesh liker most of the other developing countries of the world. So a databank for all the facilities available in the country should be developed and maintained not only to facilitate this task but for all other development activities as well.

Bangladesh is one of the poorest countries of the world with one of the highest population densities. So any development activity requires careful examination of the requirement factor and should be directed towards the settlements in prior need. Otherwise regional disparity may follow and more importantly resources may be wasted which this country must avoid with its limited resources. So, methods like population threshold concept should be used with care before going for the implementation of a development project to ensure a balanced regional growth within the country and the most effective use of its resources.

Annexure

1. Distribution pattern analysis: Nearest-Neighbor method

2. Calculation tables for Thana Population Thresholds

Annexure I

Distribution pattern analysis: Nearest-Neighbor method

Nearest-Neighbor method identifies distribution pattern of points. Three types of distribution pattern may exist:

- **Random** any point is equally likely to occur at any location and the position of any point is not affected by the position of any other point. There is no apparent ordering of the distribution.
- **Uniform** every point is as far from all of its neighboring points as possible.
- **Clustered** many points are concentrated close together, and large areas that contains very few, if any, points.

Nearest-Neighbor method calculates NNI (Nearest-Neighbor Index). The index is an average distance from the closest neighbor to each point with a distance that would be expected on the basis of chance. If the observed average distance is the same as the mean random distance, then the ration will be 1, representing a uniform distribution. If the observed distance is smaller than the mean random distance then the NNI is less than 1, representing a clustered distribution. If the observed distance is higher than the mean random distance, the NNI is greater than 1, representing a random distribution pattern.

In this method at first the mean random distance is calculated from the area of the polygon region and the number of points. Then the NNI is interpreted and compared with the value of mean random distance. This script used in the study also applies a simple test of significance for deviation from randomness, using the standard error of the expected difference. Avenue script (ArcView 3.0) used for the distribution pattern analysis in this study is based on the script written by Colin Brooks (1998):

The calculated NNI values are given in the following table:

Thana	NNI Values								
	Primary School	High School	College	Madrasa	Hat/ Bazaar	Growth Centre	Heath Complex/ Hospital	Family Welfare Centre	Post Office
Bheramara	1.03	1 46	NA	1 23	1.4	1.57	NA	1 49	0 89
Daulatpur	1 17	1 21	0.66	0.95	1.19	1.23	NA	1 48	NA
Khoksa	1.34	1.3	NA	1.58	1.31	NA	NA	1.54	NA
Kumarkhali	1.19	1.42	NA	1.23	1.31	1.77	NA	1.42	1 69
Kushtia Sadar	1 21	1 02	1 21	1.03	0.84	0.63	1 5	1 39	1.47
Mirpur	1 33	0.95	1.62	1.48	1.09	1.38	NA	1.62	1.85

Annexure II

Calculation tables for Thana Population Thresholds

Bheramara

1. Primary School

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	0	2	0	2	2	1
With Primary School	0	0	0	2	0	1	2	1
Without Primary School	0	0	0	0	0	1	0	0
With Primary School absent at this greater levels (Ag)	1	1	1	1	1	1	0	0
With Primary School Present at this and smaller levels (Ps)	0	0	0	2	2	3	5	6

Intercept a = 40000
Intercept c = 12950

Slope b = -20416.7
Slope d = 5216.67

Threshold = 18455

2. High School

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	0	2	0	2	2	1
With High School	0	0	0	1	0	0	1	0
Without High School	0	0	0	1	0	2	1	1
With High School absent at this greater levels (Ag)	5	5	5	5	4	4	2	1
With High School Present at this and smaller levels (Ps)	0	0	0	1	1	1	2	2

Intercept a = 52314 81
Intercept c = 12179 49

Slope b = -7129.63
Slope d = 14294 87

Threshold = 38958.61

3. College

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	0	2	0	2	2	1
With College	0	0	0	0	0	1	0	0

Without College	0	0	0	2	0	1	2	1
With College absent at this greater levels (Ag)	6	6	6	6	4	4	3	1
With College Present at this and smaller levels (Ps)	0	0	0	0	0	1	1	1

Intercept a = 52578 13
Intercept c = 17000

Slope b = -6197 917
Slope d = 20500

Threshold = 44318.67

4. Madrasa

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	0	2	0	2	2	1
With Madrasa	0	0	0	1	0	1	2	1
Without Madrasa	0	0	0	1	0	1	0	0
With Madrasa absent at this greater levels (Ag)	2	2	2	2	1	1	0	0
With Madrasa Present at this and smaller levels (Ps)	0	0	0	1	1	2	4	5

Intercept a = 41022 73
Intercept c = 14855 07

Slope b = -13068 2
Slope d = 6050.725

Threshold = 23136 58

5. Hat/Bazaar

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	0	2	0	2	2	1
With Hut	0	0	0	2	0	1	2	1
Without Hut	0	0	0	0	0	1	0	0
With Hut absent at this greater levels (Ag)	1	1	1	1	1	1	0	0
With Hut Present at this and smaller levels (Ps)	0	0	2	2	3	5	6	6

Intercept a = 40000
Intercept c = 9508 929

Slope b = -20416.7
Slope d = 5059.524

Threshold = 15564.4

6. Growth Center

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+

No of Union	0	0	0	2	0	2	2	1
With Growth Center	0	0	0	0	0	1	2	0
Without Growth Center	0	0	0	2	0	1	0	1
With Growth Center absent at this greater levels (Ag)	4	4	4	4	2	2	1	1
With Growth Center Present at this and smaller levels (Ps)	0	0	0	0	0	1	3	3

Intercept a = 47731 48
Intercept c = 17912.62

Slope b = -8379.63
Slope d = 7742.718

Threshold = 32233 06

7. Thana Health Complex/Hospital

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	0	2	0	2	2	1
With Up Health Complex	0	0	0	1	0	0	0	0
Without Up Health Complex	0	0	0	1	0	2	2	1
With Up Health Complex absent at this greater levels (Ag)	6	6	6	6	5	5	3	1
With Up Health Complex Present at this and smaller levels (Ps)	0	0	0	1	1	1	1	1

Intercept a = 52606 38
Intercept c = 11666.67

Slope b = -5877.66
Slope d = 20833.33

Threshold = 43597.74

8. Family Welfare Center

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	0	2	0	2	2	1
With Family Welfare Center	0	0	0	1	0	1	2	1
Without Family Welfare Center	0	0	0	1	0	1	0	0
With Family Welfare Center absent at this greater levels (Ag)	2	2	2	2	1	1	0	0
With Family Welfare Center Present at this and smaller levels (Ps)	0	0	0	1	1	2	4	5

Intercept c = 14855.07

Intercept a = 41022.73

Slope b = -13068.2
Slope d = 6050.725

Threshold = 23136.58

9. Post Office

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	0	2	0	2	2	1
With Post Office	0	0	0	1	0	0	1	1
Without Post Office	0	0	0	1	0	2	1	0
With Post Office absent at this greater levels (Ag)	4	4	4	4	3	3	1	0
With Post Office Present at this and smaller levels (Ps)	0	0	0	1	1	1	2	3

Intercept a = 45185.19
Intercept c = 13750

Slope b = -7129.63
Slope d = 10937.5

Threshold = 32780.27

Daulatpur

1. Primary School

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	1	1	0	2	3	7
With Primary School	0	0	0	0	0	2	1	2
Without Primary School	0	0	1	1	0	0	2	5
With Primary School absent at this greater levels (Ag)	9	9	9	8	7	7	7	5
With Primary School Present at this and smaller levels (Ps)	0	0	0	0	0	2	3	5

Intercept a = 88400.9
Intercept c = 17671.6

Slope b = -8355.86
Slope d = 5612.75

Threshold pop for 6 = 46091 4
Threshold pop for 1 = 7681.91

2. High School

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	1	1	0	2	3	7
With High School	0	0	1	1	0	2	2	7
Without High School	0	0	0	0	0	0	1	0
With High School absent at this greater levels (Ag)	1	1	1	1	1	1	1	0
With High School Present at this and smaller levels (Ps)	0	0	1	2	2	4	6	13

Intercept a = 42500
Intercept c = 15836.1

Slope b = -20357 1
Slope d = 2528 41

Threshold = 18783.7

3. College

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	1	1	0	2	3	7
With College	0	0	0	0	0	1	0	2
Without College	0	0	1	1	0	1	3	5
With College absent at this greater levels (Ag)	11	11	11	10	9	9	8	5
With College Present at this and smaller levels (Ps)	0	0	0	0	0	1	1	3

Intercept a = 76228 8
Intercept c = 18809.5

Slope b = -5572.03
Slope d = 9404.762

Threshold = 54866.28

4. Madrasa

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	1	1	0	2	3	7
With Madrasa	0	0	1	0	0	0	0	4
Without Madrasa	0	0	0	1	0	2	3	3
With Madrasa absent at this greater levels (Ag)	9	9	9	9	8	8	6	3
With Madrasa Present at this and smaller levels (Ps)	0	0	1	1	1	1	1	5

Intercept a = 61990
Intercept c = 17321

Slope b = -4892 2
Slope d = 5892.86

Threshold = 41728.1

5. Hat/Bazaar

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	1	1	0	2	3	7
With Hut	0	0	1	1	0	1	0	6
Without Hut	0	0	0	0	0	1	3	1
With Hut absent at this greater levels (Ag)	5	5	5	5	5	5	4	1
With Hut Present at this and smaller levels (Ps)	0	1	2	2	3	3	9	9

Intercept a = 51193 7
Intercept c = 12734 7

Slope b = -6058.56
Slope d = 3297.32

Threshold = 26288 9

6. Growth Center

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	1	1	0	2	3	7
With Growth Center	0	0	0	0	0	1	1	2
Without Growth Center	0	0	1	1	0	1	2	5
With Growth Center absent at this greater levels (Ag)	10	10	10	9	8	8	7	5
With Growth Center Present at this and smaller levels (Ps)	0	0	0	0	0	1	2	4

Intercept a = 80800
Intercept c = 18529.4

Slope b = -6700
Slope d = 7037.82

Threshold pop for 1 = 50430 3

7. Thana Health Complex/Hospital

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	1	1	0	2	3	7
With Up Health Complex	0	0	0	0	0	0	0	1
Without Up Health Complex	0	0	1	1	0	2	3	6

With Up Health Complex absent at this greater levels (Ag)	13	13	13	12	11	11	9	6
With Up Health Complex Present at this and smaller levels (Ps)	0	0	0	0	0	0	0	1

Intercept a = 75758.9
Intercept c = 22142.9

Slope b = -4642 86
Slope d = 20357.14

Threshold pop for 1 = 65801.66

8. Family Welfare Center

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	1	1	0	2	3	7
With Family Welfare Center	0	0	1	1	0	0	0	3
Without Family Welfare Center	0	0	0	0	0	2	3	4
With Family Welfare Center absent at this greater levels (Ag)	9	9	9	9	9	9	7	4
With Family Welfare Center Present at this and smaller levels (Ps)	0	0	1	2	2	2	2	5

Intercept a = 65423.5
Intercept c = 12250

Slope b = -5013.66
Slope d = 7107 14

Threshold pop for 1 = 43428.8

9. Post Office

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	1	1	0	2	3	7
With Post Office	0	0	0	0	0	0	0	1
Without Post Office	0	0	1	1	0	2	3	6
With Post Office absent at this greater levels (Ag)	13	13	13	12	11	11	9	6
With Post Office Present at this and smaller levels (Ps)	0	0	0	0	0	0	0	1

Intercept a = 75758.9
Intercept c = 22142.9

Slope b = -4642.86
Slope d = 20357 14

Threshold pop for 1 = 65801 66

Khoksa

1. Primary School

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	0	0	0	1	0	2
With Primary School	0	0	0	0	0	0	0	1
Without Primary School	0	0	0	0	0	1	0	1
With Primary School absent at this greater levels (Ag)	2	2	2	2	2	2	1	1
With Primary School Present at this and smaller levels (Ps)	0	0	0	0	0	0	0	1

Intercept a = 60416.7
Intercept c = 22142.9

Slope b = -20416.67
Slope d = 20357.14

Threshold pop for 14 = 41251.82
Threshold pop for 1 = 2946.559

2. High School

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	0	0	0	1	0	2
With High School	0	0	0	0	0	0	0	2
Without High School	0	0	0	0	0	1	0	0
With High School absent at this greater levels (Ag)	1	1	1	1	1	1	0	0
With High School Present at this and smaller levels (Ps)	0	0	0	0	0	0	0	2

Intercept a = 40000
Intercept c = 22142.9

Slope b = -20416.7
Slope d = 10178.57

Threshold pop for 4 = 28083.66
Threshold pop for 1 = 7020.914

3. College

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	0	0	0	1	0	2
With College	0	0	0	0	0	0	0	1
Without College	0	0	0	0	0	1	0	1

With College absent at this greater levels (Ag)	2	2	2	2	2	2	1	1
With College Present at this and smaller levels (Ps)	0	0	0	0	0	0	0	1

Intercept a = 60416 7
Intercept c = 22142.9

Slope b = -20416 7
Slope d = 20357.14

Threshold pop for 1 = 41251 82

4. Madrasa

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	0	0	0	1	0	2
With Madrasa	0	0	0	0	0	0	0	2
Without Madrasa	0	0	0	0	0	1	0	0
With Madrasa absent at this greater levels (Ag)	1	1	1	1	1	1	0	0
With Madrasa Present at this and smaller levels (Ps)	0	0	0	0	0	0	0	2

Intercept a = 40000
Intercept c = 22142.9

Slope b = -20416.7
Slope d = 10178 57

Threshold pop for 2 = 28083.66
Threshold pop for 1 = 14041.83

5. Hat/Bazaar

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	0	0	0	1	0	2
With Hut	0	0	0	0	0	0	0	2
Without Hut	0	0	0	0	0	1	0	0
With Hut absent at this greater levels (Ag)	1	1	1	1	1	1	0	0
With Hut Present at this and smaller levels (Ps)	0	0	0	0	0	0	2	2

Intercept a = 40000
Intercept c = 19583.3

Slope b = -20416 7
Slope d = 10208.33

Threshold pop for 6 = 26388.89
Threshold pop for 1 = 4398.148

6. Growth Center

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	0	0	0	1	0	2
With Growth Center	0	0	0	0	0	0	0	1
Without Growth Center	0	0	0	0	0	1	0	1
With Growth Center absent at this greater levels (Ag)	2	2	2	2	2	2	1	1
With Growth Center Present at this and smaller levels (Ps)	0	0	0	0	0	0	0	1

Intercept a = 60416.7
Intercept c = 22142.9

Slope b = -20416.7
Slope d = 20357.1

Threshold pop for 1 = 41251.8

7. Thana Health Complex/Hospital

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	0	0	0	1	0	2
With Up Health Complex	0	0	0	0	0	0	0	1
Without Up Health Complex	0	0	0	0	0	1	0	1
With Up Health Complex absent at this greater levels (Ag)	2	2	2	2	2	2	1	1
With Up Health Complex Present at this and smaller levels (Ps)	0	0	0	0	0	0	0	1

Intercept a = 60416.7
Intercept c = 22142.9

Slope b = -20416.7
Slope d = 20357.1

Threshold pop for 1 = 41251.8

8. Family Welfare Center

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	0	0	0	1	0	2
With Family Welfare Center	0	0	0	0	0	0	0	2
Without Family Welfare Center	0	0	0	0	0	1	0	0
With Family Welfare Center absent at this greater levels (Ag)	1	1	1	1	1	1	0	0
With Family Welfare Center Present at this and smaller levels (Ps)	0	0	0	0	0	0	0	2

Intercept a = 40000
Intercept c = 22142.9

Slope b = -20416.7
Slope d = 10178.57

Threshold pop for 1 = 28083 66

Kumarkhali

1. Primary School

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	1	0	0	0	2	3	2	3
With Primary School	0	0	0	0	1	3	1	3
Without Primary School	1	0	0	0	1	0	1	0
With Primary School absent at this greater levels (Ag)	3	2	2	2	2	1	1	0
With Primary School Present at this and smaller levels (Ps)	0	0	0	0	1	4	5	8

Intercept a = 45691 5
Intercept c = 16421 8

Slope b = -12925 5
Slope d = 3673.66

Threshold pop for 7 = 22899.6
Threshold pop for 1 = 3271.37

2. High School

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	1	0	0	0	2	3	2	3
With High School	0	0	0	0	2	3	2	3
Without High School	1	0	0	0	0	0	0	0
With High School absent at this greater levels (Ag)	1	0	0	0	0	0	0	0
With High School Present at this and smaller levels (Ps)	0	0	0	0	2	5	7	10

Intercept a = 27500
Intercept c = 15843 2

Slope b = -22500
Slope d = 2948.11

Threshold = 17193.6

3. College

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	1	0	0	0	2	3	2	3
With College	0	0	0	0	0	1	0	0
Without College	1	0	0	0	2	2	2	3
With College absent at this greater levels (Ag)	10	9	9	9	9	7	5	3
With College Present at this and smaller levels (Ps)	0	0	0	0	0	1	1	1

Intercept a = 59910.4
Intercept c = 17000

Slope b = -4619.4
Slope d = 20500

Threshold = 52019.31

4. Madrasa

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	1	0	0	0	2	3	2	3
With Madrasa	0	0	0	0	1	2	2	1
Without Madrasa	1	0	0	0	1	1	0	2
With Madrasa absent at this greater levels (Ag)	5	4	4	4	4	3	2	2
With Madrasa Present at this and smaller levels (Ps)	0	0	0	0	1	3	5	6

Intercept a = 63515.6
Intercept c = 16064 1

Slope b = -11093.8
Slope d = 4599.13

Threshold = 29970.8

5. Hat/Bazaar

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	1	0	0	0	2	3	2	3
With Hut	1	0	0	0	2	3	1	2
Without Hut	0	0	0	0	0	0	1	1
With Hut absent at this greater levels (Ag)	2	2	2	2	2	2	2	1
With Hut Present at this and smaller levels (Ps)	1	1	1	3	6	7	9	9

Intercept a = 62857 1
Intercept c = 8815.79

Slope b = -20357 1
Slope d = 3431 72

Threshold = 16611.7

6. Growth Center

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	1	0	0	0	2	3	2	3
With Growth Center	0	0	0	0	1	2	1	1
Without Growth Center	1	0	0	0	1	1	1	2
With Growth Center absent at this greater levels (Ag)	6	5	5	5	5	4	3	2
With Growth Center Present at this and smaller levels (Ps)	0	0	0	0	1	3	4	5

Intercept a = 63947.4
Intercept c = 15627.6

Slope b = -8973.68
Slope d = 5575 31

Threshold = 34144.2

7. Thana Health Complex/Hospital

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	1	0	0	0	2	3	2	3
With Up Health Complex	0	0	0	0	1	0	0	0
Without Up Health Complex	1	0	0	0	1	3	2	3
With Up Health Complex absent at this greater levels (Ag)	10	9	9	9	9	8	5	3
With Up Health Complex Present at this and smaller levels (Ps)	0	0	0	0	1	1	1	1

Intercept a = 59352 4
Intercept c = 14375

Slope b = -4472 9
Slope d = 20625

Threshold = 51336 6

8. Family Welfare Center

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	1	0	0	0	2	3	2	3
With Family Welfare Center	0	0	0	0	1	1	0	1

Without Family Welfare Center	1	0	0	0	1	2	2	2
With Family Welfare Center absent at this greater levels (Ag)	8	7	7	7	7	6	4	2
With Family Welfare Center Present at this and smaller levels (Ps)	0	0	0	0	1	2	2	3

Intercept a = 57901 8
Intercept c = 14937 5

Slope b = -5535 71
Slope d = 9750

Threshold = 42342.3

9. Post Office

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	1	0	0	0	2	3	2	3
With Post Office	1	0	0	0	1	1	0	2
Without Post Office	0	0	0	0	1	2	2	1
With Post Office absent at this greater levels (Ag)	6	6	6	6	6	5	3	1
With Post Office Present at this and smaller levels (Ps)	1	1	1	1	2	3	3	5

Intercept a = 51206
Intercept c = 8214.29

Slope b = -5439 7
Slope d = 7752.1

Threshold = 33478.2

Kushtia Sadar

1. Primary School

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	3	3	4	1	0	4
With Primary School	0	0	2	2	2	1	0	2
Without Primary School	0	0	1	1	2	0	0	2
With Primary School absent at this greater levels (Ag)	6	6	6	5	4	2	2	2
With Primary School Present at this and smaller levels (Ps)	0	0	2	4	6	7	7	9

Intercept a = 50753.77
Intercept c = 8740 458

Slope b = -6319.1
Slope d = 3645.038

Threshold pop for 7 = 24109 59

2. High School

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	3	3	4	1	0	4
With High School	0	0	3	2	3	1	0	3
Without High School	0	0	0	1	1	0	0	1
With High School absent at this greater levels (Ag)	3	3	3	3	2	1	1	1
With High School Present at this and smaller levels (Ps)	0	0	3	5	8	9	9	12

Intercept a = 49318.2
Intercept c = 8637.99

Slope b = -11590.9
Slope d = 2791.22

Threshold = 16533

3. College

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	3	3	4	1	0	4
With College	0	0	0	0	1	0	0	1
Without College	0	0	3	3	3	1	0	3
With College absent at this greater levels (Ag)	13	13	13	10	7	4	3	3
With College Present at this and smaller levels (Ps)	0	0	0	0	1	1	1	2

Intercept a = 46624
Intercept c = 15161

Slope b = -2658.93
Slope d = 15241.9

Threshold = 41950 4

4. Madrasa

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	3	3	4	1	0	4
With Madrasa	0	0	1	2	0	0	0	2
Without Madrasa	0	0	2	1	4	1	0	2
With Madrasa absent at this greater levels (Ag)	10	10	10	8	7	3	2	2
With Madrasa Present at this and smaller levels (Ps)	0	0	1	3	3	3	3	5

Intercept a = 46148 1
Intercept c = 9447 67

Slope b = -3301 63
Slope d = 6773.26

Threshold = 34121

5. Hat/Bazaar

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	3	3	4	1	0	4
With Hut	0	0	3	2	2	0	0	1
Without Hut	0	0	0	1	2	1	0	3
With Hut absent at this greater levels (Ag)	7	7	7	7	6	4	3	3
With Hut Present at this and smaller levels (Ps)	0	3	5	7	7	7	8	8

Intercept a = 58776
Intercept c = 1375.84

Slope b = -6197 9
Slope d = 4144.3

Threshold = 24377

6. Growth Center

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	3	3	4	1	0	4
With Growth Center	0	0	0	2	1	0	0	0
Without Growth Center	0	0	3	1	3	1	0	4
With Growth Center absent at this greater levels (Ag)	12	12	12	9	8	5	4	4
With Growth Center Present at this and smaller levels (Ps)	0	0	0	2	3	3	3	3

Intercept a = 52744.4
Intercept c = 11209.7

Slope b = -3400 84
Slope d = 7701.613

Threshold = 40021.74

7. Thana Health Complex/Hospital

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	3	3	4	1	0	4
With Up Health Complex	0	0	0	0	1	1	0	1
Without Up Health Complex	0	0	3	3	3	0	0	3
With Up Health Complex absent at this greater levels (Ag)	12	12	12	9	6	3	3	3
With Up Health Complex Present at this and smaller levels (Ps)	0	0	0	0	1	2	2	3

Intercept a = 45892 9
Intercept c = 14937.5

Slope b = -2827.38
Slope d = 9750

Threshold = 38934.13

8. Family Welfare Center

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	3	3	4	1	0	4
With Family Welfare Center	0	0	1	3	1	1	0	1
Without Family Welfare Center	0	0	2	0	3	0	0	3
With Family Welfare Center absent at this greater levels (Ag)	8	8	8	6	6	3	3	3
With Family Welfare Center Present at this and smaller levels (Ps)	0	0	1	4	5	6	6	7

Intercept a = 53415 8
Intercept c = 9244.06

Slope b = -5107.3
Slope d = 4260.26

Threshold = 29333

9. Post Office

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	3	3	4	1	0	4
With Post Office	0	0	0	2	1	0	0	2
Without Post Office	0	0	3	1	3	1	0	2
With Post Office absent at this greater levels (Ag)	10	10	10	7	6	3	2	2
With Post Office Present at this and smaller levels (Ps)	0	0	0	2	3	3	3	5

Intercept a = 45942.7
Intercept c = 11770.8

Slope b = -3400 84
Slope d = 6458 33

Threshold = 34155 4

Mirpur

1. Primary School

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	2	2	4	1	1	2
With Primary School	0	0	0	1	4	0	1	1
Without Primary School	0	0	2	1	0	1	0	1
With Primary School absent at this greater levels (Ag)	5	5	5	3	2	2	1	1
With Primary School Present at this and smaller levels (Ps)	0	0	0	1	5	5	6	7

Intercept a = 45142
Intercept c = 12851 6

Slope b = -6818 182
Slope d = 3945.313

Threshold pop for 7 = 24687.5
Threshold pop for 1 = 3526.786

2. High School

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	2	2	4	1	1	2

With High School	0	0	2	1	3	1	1	2
Without High School	0	0	0	1	1	0	0	0
With High School absent at this greater levels (Ag)	2	2	2	2	1	0	0	0
With High School Present at this and smaller levels (Ps)	0	0	2	3	6	7	8	10

Intercept a = 37727.27
Intercept c = 9781.25

Slope b = -11590.9
Slope d = 3312.5

Threshold = 15992.7

3. College

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	2	2	4	1	1	2
With College	0	0	1	0	1	0	0	2
Without College	0	0	1	2	3	1	1	0
With College absent at this greater levels (Ag)	8	8	8	7	5	2	1	0
With College Present at this and smaller levels (Ps)	0	0	1	1	2	2	2	4

Intercept a = 41885.63
Intercept c = 11093.75

Slope b = -3527.82
Slope d = 9062.5

Threshold = 33257.71

4. Madrasa

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	2	2	4	1	1	2
With Madrasa	0	0	2	1	2	1	1	2
Without Madrasa	0	0	0	1	2	0	0	0
With Madrasa absent at this greater levels (Ag)	3	3	3	3	2	0	0	0
With Madrasa Present at this and smaller levels (Ps)	0	0	2	3	5	6	7	9

Intercept a = 38024.19
Intercept c = 9424.342

Slope b = -7620.97
Slope d = 3815.79

Threshold = 18966.5

5. Hat/Bazaar

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	2	2	4	1	1	2
With Hut	0	0	0	2	3	0	0	2
Without Hut	0	0	2	0	1	1	1	0
With Hut absent at this greater levels (Ag)	5	5	5	3	3	2	1	0
With Hut Present at this and smaller levels (Ps)	0	0	2	5	5	5	7	7

Intercept a = 43726
Intercept c = 8186 81

Slope b = -6346 15
Slope d = 4258 242

Threshold pop for 3 = 22457 71
Threshold pop for 1 = 7485.905

6. Growth Center

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	2	2	4	1	1	2
With Growth Center	0	0	1	0	1	1	1	2
Without Growth Center	0	0	1	2	3	0	0	0
With Growth Center absent at this greater levels (Ag)	6	6	6	5	3	0	0	0
With Growth Center Present at this and smaller levels (Ps)	0	0	1	1	2	3	4	6

Intercept a = 38076.1
Intercept c = 12449.4

Slope b = -4119.57
Slope d = 5759.109

Threshold = 27389 35

7. Thana Health Complex/Hospital

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	2	2	4	1	1	2
With Up Health Complex	0	0	0	0	0	0	0	1
Without Up Health Complex	0	0	2	2	4	1	1	1
With Up Health Complex absent at this greater levels (Ag)	11	11	11	9	7	3	2	1
With Up Health Complex Present at this and smaller levels (Ps)	0	0	0	0	0	0	0	1

Intercept a = 44042.19
Intercept c = 22142.86

Slope b = -2815.23
Slope d = 20357.14

Threshold = 41381.63

8. Family Welfare Center

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	2	2	4	1	1	2
With Family Welfare Center	0	0	2	2	3	1	1	2
Without Family Welfare Center	0	0	0	0	1	0	0	0
With Family Welfare Center absent at this greater levels (Ag)	1	1	1	1	1	0	0	0
With Family Welfare Center Present at this and smaller levels (Ps)	0	0	2	4	7	8	9	11

Intercept a = 37500
Intercept c = 9489 49

Slope b = -20500
Slope d = 2965.465

Threshold = 13029 34

9. Post Office

Population level	Less than 10000	10000-15000	15001-20000	20001-25000	25001-30000	30001-35000	35001-40000	40000+
No of Union	0	0	2	2	4	1	1	2
With Post Office	0	0	1	0	1	0	0	2
Without Post Office	0	0	1	2	3	1	1	0

With Post Office absent at this greater levels (**Ag**)	8	8	8	7	5	2	1	0
With Post Office Present at this and smaller levels (**Ps**)	0	0	1	1	2	2	2	4

Intercept a = 41885.6
Intercept c = 11093.8

Slope b = -3527.82
Slope d = 9062.5

Threshold = 33257 71

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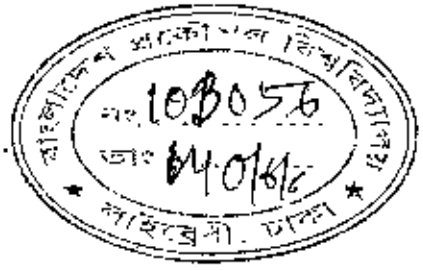
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