
Research Paper

Regional Competitiveness Analysis: A Prime Focus on Region's Spatio-Functional Gap and Median Population Threshold Assessment

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Abstract

Counter-balancing the spatio-functional gaps of service facilities is considered to be the foremost task of Regional Planning. The functional gap analysis and median population threshold helps to identify and analyze the adequacy or inadequacy of the services within each complementary region. Therefore, this particular research tries to understand the requirement and availability of socio-economic facilities and its distribution in the optimum location in the study area through the analysis of functional gap and median population threshold. This study deals with several services facilities as growth center, rural market, educational and healthcare facilities like high school, primary school, upazilla health complex, community clinic and so on. As an overall finding the study reveals that, service facilities like community clinic, growth center requires a very small population to be supported whereas facilities like police station, healthcare center do not demand such a high population to be existed. The main reason behind that can be facility like community clinic is of major importance for the people and it is a basic need in comparing to the other supplementary services like police station. In regards of functional gap, the service facilities are inadequate in almost all of the unions and upazillas of Khulna district. Finally, the study concludes to an interesting finding that, though the secondary needs of the people of this region is not served properly, the basic needs of common people is well served in this region.

Keywords

Regional Competitiveness, Functional Gap, Median Threshold Population, Service Facilities, Optimum Location.

1. Introduction

Bangladesh is a densely populated country of the world. The country is experiencing a high pace of urbanization, though the rate of urbanization is uneven throughout the regions or districts of the country. The long-term convergence in per capita income between national and sub-national regions is increasing (Huang and Leung, 2009). Competitiveness exists in all of the regions of Bangladesh in respect of investment, infrastructure, resource, Institutions, Macroeconomic stability, Health and primary education, Higher education and training, Goods market efficiency, Labour market efficiency etc. as a consequence of this uneven urbanization (Ara and Rahman, 2014).

In case of economic policy making both at the national and regional level, the enhancement of competitiveness is a popular target (Bekes, 2015). Regional competitiveness is often defined as the derivation of macroeconomic competitiveness. It can also be defined as the ability of offering an attractive and sustainable environment for firms and residents to live and work (Bekes, 2015). The Global Economic Forum (GEF) defines competitiveness as “the set of institutions, policies, and factors that determine the level of productivity of a country” (Ara and Rahman, 2014). The characteristics of a region which is competitive are more debated by the concept than the literature. The key determinants of regional competitiveness are productive capital, human capital, infrastructure, technological readiness, market size, innovation, the competitiveness of firms and the interaction among these factors (Ara and Rahman, 2014; Bekes, 2015). Private investment in a particular region or the infrastructural development of a particular region can affect the regional competitiveness (Bekes, 2015). The strength of export base of a particular region also affects its regional competitiveness (Gardiner, Martin and Tyler, 2004).

There are several measures of regional competitiveness. Functional gap analysis and the assessment of median threshold population are the prime focus of regional competitiveness analysis in this study. Functional gap analysis describes the differences between required and actual service facilities (Chron, 2013). It aims to identify gaps in various types of functions and determines whether the gaps are critical or whether the users of that activity can accommodate them (Santini, Marco, Boitani, Maiorano, and Rondinini, 2014). The method of analyzing the gaps includes identifying the magnitude and the direction of the gap. If the direction of the gap is positive, the existing facility exceeds requirements or vice-versa (Chron, 2013). The population threshold is the minimum population required to support a service facility. Threshold population for different service facilities varies widely (Glasson, 1978). The frequency of use of different services has a vital influence on the threshold population for that specific service activity. If the population of a region falls below the threshold population for a specific service activity, the activity will run at a loss and will face closure in the long run. In the meantime, if the population increases above the threshold, the activity will increase its profit (Glasson, 1978).

The study aims to analyse the regional competitiveness through the assessment of median population threshold and analysis of functional gap for different service facilities of different upazilla of Khulna district. The study provides insight about the comparative functional gap and median threshold population for various facilities and services which ultimately depicts the competitiveness of different regions of Khulna district.

2. Operational Procedure and Data

Foremost objectives of this study are to determine the median population threshold for different service activities of the study area and to analyze the functional gap between the existing and required number of different service facilities of the study area. Secondary database on different service activities (Khulna district) is collected from Bangladesh Bureau of Statistics (BBS, 2011).

The study commences with the collection of union wise database of area, population, existing number of different service facilities of Khulna district. This study deals with several

services facilities of different unions of Khulna district namely growth center, rural market, police station, upazilla health complex, family welfare center, Post office, community clinic, madrasa, mosque, bank branch, high school, primary school and College. The population levels are selected on the basis of the accuracy and the precision of the study is required. Equal interval class interval method is used for the categorization of population level. In the next step the median threshold populations for different service facilities are determined. The intersecting point of two different equation representing “number of union with college absent at this and greater level” and “number of union with college present at this and smaller level” represent the threshold population of an particular service activity. The median threshold population of an service activity is determined using the following formula (Jahan and Oda, n.d).

$$\text{The horizontal co-ordinate for a specific service activity, } x = \frac{a-c}{d-b} \quad [1]$$

$$\text{Median population threshold} = m + (x - 1) * k \quad [2]$$

Where,

a= Vertical intercept of equation representing number of union with College absent at this and greater level.

b = Slope of equation representing number of union with College absent at this and greater level.

c = Vertical intercept of equation representing number of union with College present at this and smaller level.

d = Slope of equation representing number of union with College present at this and smaller level.

m= Midpoint of first population level.

k= Equal interval between midpoints of population levels.

Afterward the functional gap for different service facilities of different unions is analyzed. For functional gap analysis a rule of thumb is used in this study. The derived fractional number of required service facility for a union is always rounded to its nearest upper value. In this stage at first the required number of service facilities in each of union is determined. It is obtained by dividing the total population of a union by the threshold population of different service facilities attained in the previous stage of calculation. Then the derived required number of service facilities for a union is subtracted from the existing number of different facilities at that specific union. The calculated figure indicates the magnitude of the functional gap and the positive or negative sign indicates the direction of functional gap for that particular facility. If the direction of the gap is positive, the existing facility exceeds requirements or vice-versa. Finally, the database analyzed the overall scenario of Khulna district in respect of different service facilities is represented on the basis of the output derived from functional gap analysis.

3. Data Analysis and Interpretation

The facilities for which the calculated horizontal co-ordinate values are found negative (calculated from equation-1), have been omitted from further analysis of median threshold population or functional gap analysis. The underlying reason is that the median threshold population for these facilities will also be negative and negative population does not have any kind of real implication. For this reason, service facilities like rural market, high school, mosque, primary school and post office are omitted from further analysis (Table 1).

Here, Midpoint of first population level= 15000 and equal interval between midpoints of population levels =2000

Table-1: Calculation of horizontal co-ordinate for a specific service activity

Service facilities	a	b	c	d	x
Rural Market	22.9	2.821	4.272	-0.213	-6.14
Growth Centre	12.89	1.769	23.07	-1.524	3.09
Police station	0	0	54.33	-3.634	14.95
upazilla health complex	40.99	-2.757	0.683	0.826	11.25
Family Welfare Centre	12.41	0.973	36.64	-2.352	7.29
High school	21.05	2.654	6.257	-0.453	-4.76
Post Office	22.05	2.732	4.897	-0.348	-5.57
Community clinic	14.61	1.977	19.14	-1.277	1.39
Madrasa	6.845	2.036	19.25	-1.387	3.62
Mosque	14.8	2.818	5.242	-0.399	-2.97
Primary School	21.86	2.963	1.419	-0.105	-6.66
College	6.051	1.125	33.87	-2.365	7.97

Source: Researcher calculation

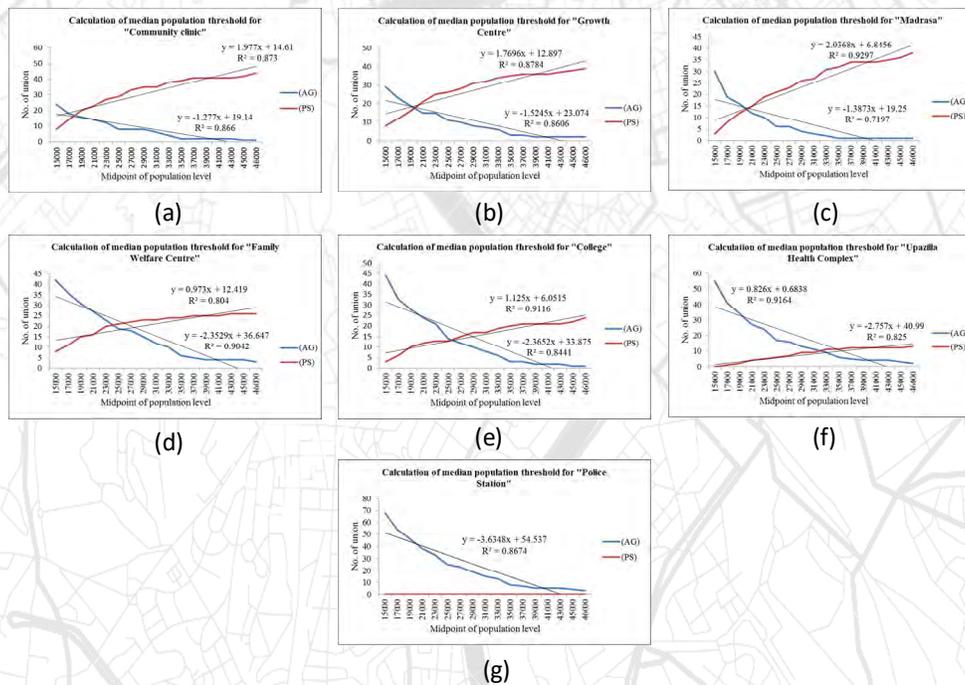


Figure 1: Calculation of median population threshold for (a) community clinic (b) growth center (c) madrasa (d) family welfare center (e) college (f) upazilla health complex and (g) police station

Figure 1 shows the calculation of median threshold population for different facilities and services which result a positive horizontal coordinate value. The linear regression between No. of union with facility absent at this and greater level (AG) and No. of union with facility present at this and smaller level (PS) shows the value of coefficient of determination (R^2) which is about 0.80 or more, which means that the proportion of the variance in the dependent variable explained by the independent variable is about 80% or more.

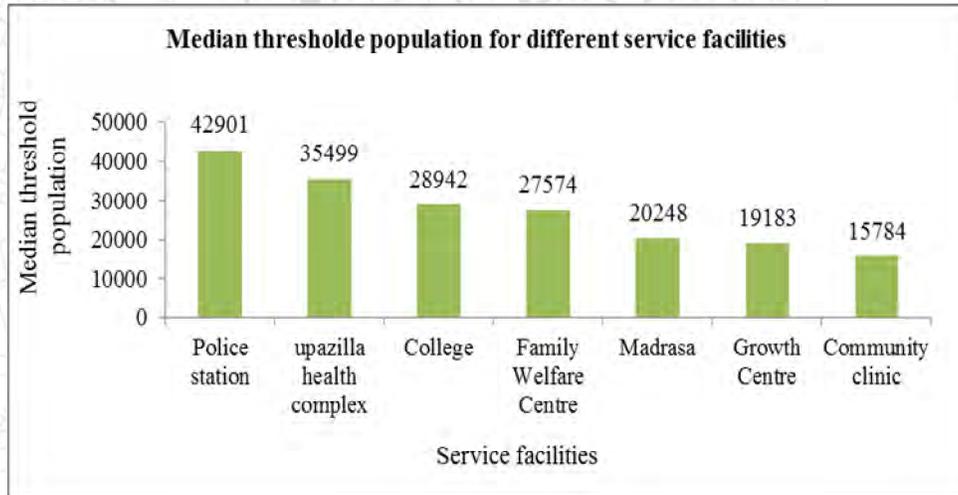


Figure 2: Ranking of median threshold population for different service facilities

Figure 2 depicts that, service facilities like police station, upazilla health complex requires higher threshold population to be supported. On the contrary, growth center, community clinic requires small threshold population to be supported (Figure 2). The main reason behind that can be the facility like community clinic is of major importance for the people and it is a basic need in comparing to the services like police station. For this reason, the frequency of these types of service facility like police station is too much less in relation to the health care facilities

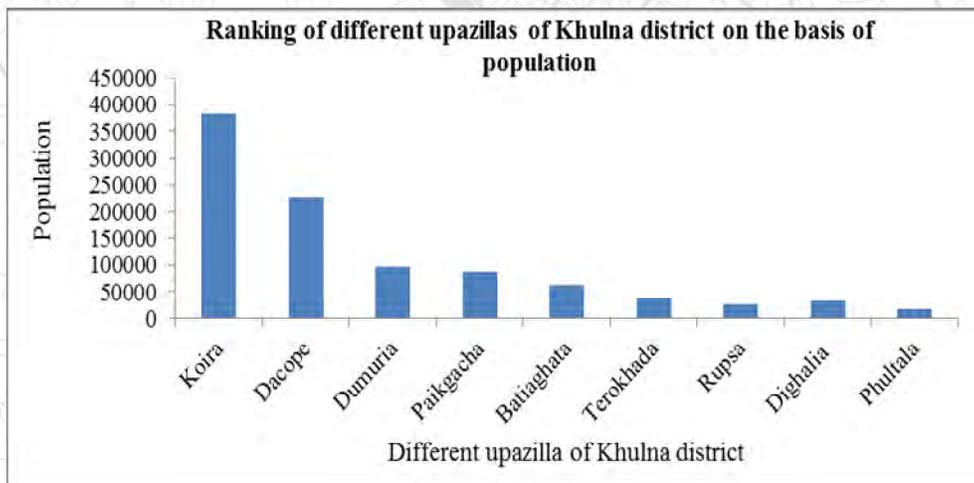


Figure- 3: Ranking of different upazilla of Khulna district on the basis of population.

From the analysis it is found that “Koira upazilla” is the largest upazilla of Khulna district in terms of population (Figure 3). On the other hand, “Dumuria upazilla” is the largest one in terms of geographical area (Figure 4). The relationship among population, area of different upazilla of Khulna district and existing condition of service facilities and functional gaps are analyzed below.

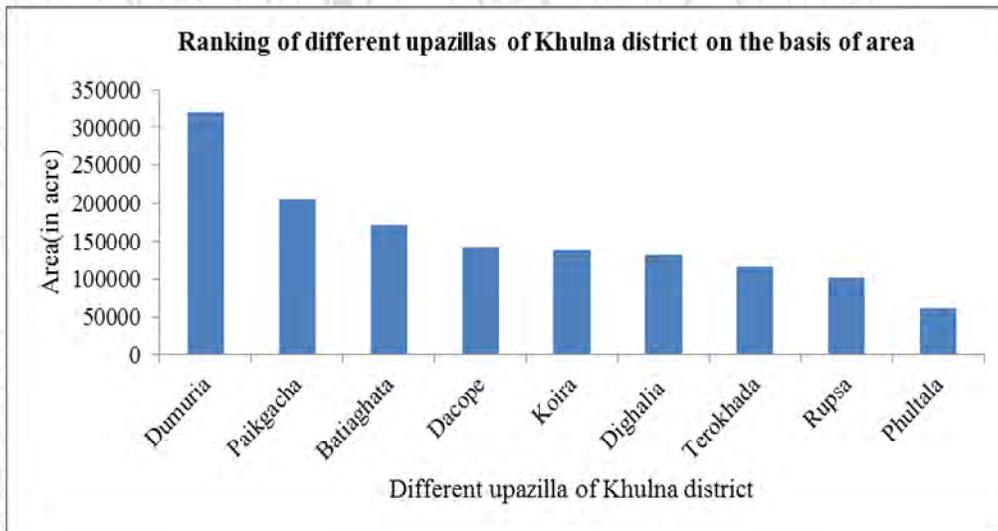


Figure- 4: Ranking of different upazilla of Khulna district on the basis of area.

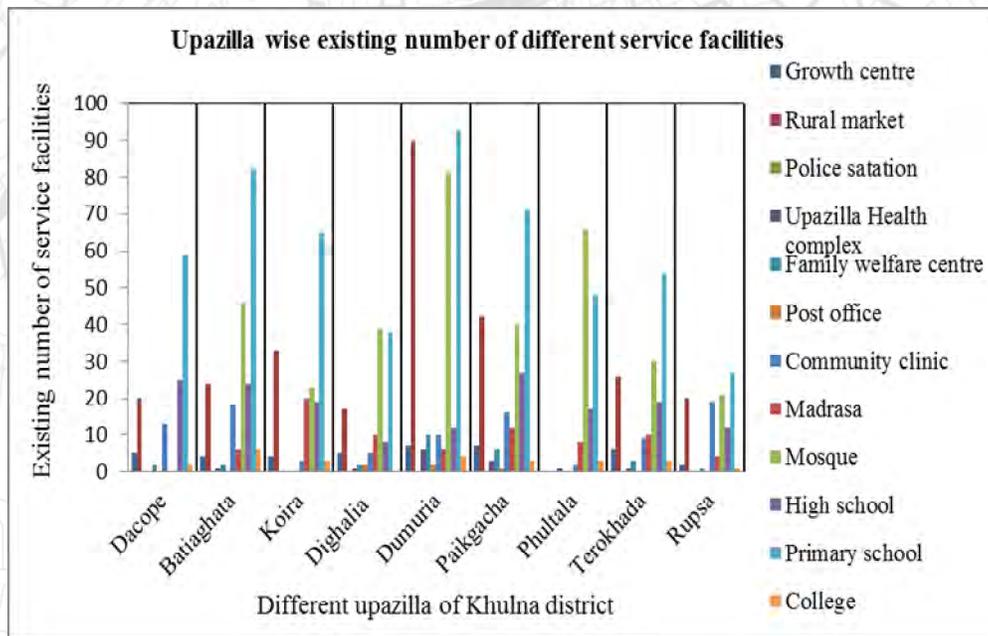


Figure 5: Existing number of different facilities according to different Upazilla.

From the above analysis it is found that the different service facilities exist in quite large number in Dumuria and Paikgacha upazilla than all other upazillas of Khulna district. Dumuria upazilla is the largest upazilla, Paikgacha is the second one among all upazillas in Khulna district in terms of geographical area. On the other hand facilities do not exist in large number in upazilla like Koira , Dacope which are the large one in terms of population (Figure 5). So it can be said that the existing number of service facility largely depend on the area of an upazilla rather than the population of it.

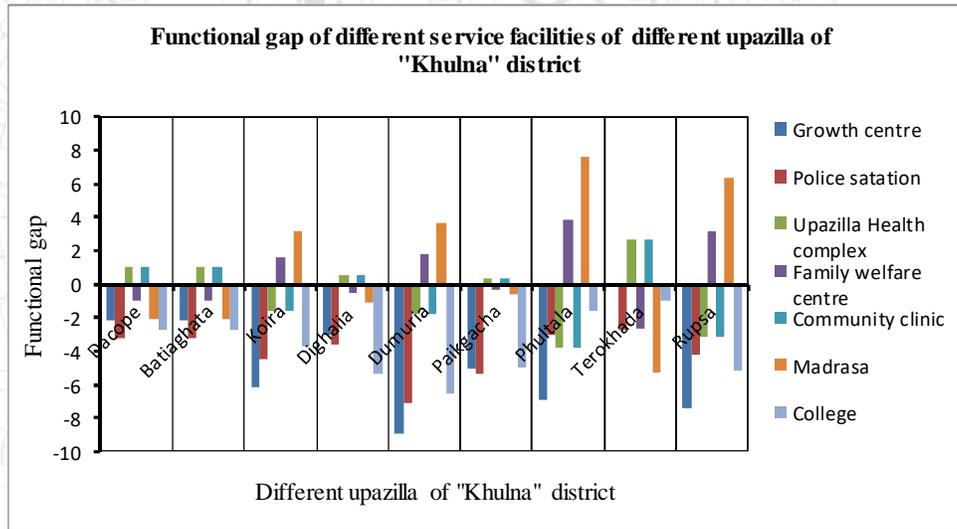


Figure 6: Upazilla wise functional gap of different service facilities.

Figure 6 depicts that almost all the service facilities in different upazilla of Khulna district is inadequate as the functional gaps are negative for almost all of the service facilities. Functional gaps of different service facilities are calculated from the difference between the existence and required number of facilities. Among the different kinds of facilities, the shortage of facilities like growth center, college etc. is acute. As a result, the total economy and higher education of this region is hardly hampered due to the inadequacy of these facilities. On the other hand, the service facilities like family welfare center, madrasa etc. are in quite adequate quantity. So, the healthcare facility and primary education is not yet hampered in this region.

Again, the shortage of different facilities is acute in Paikgacha and Dumuria upazilla although the existing numbers are quite satisfactory. These are two outsized upazilla of Khulna district in term of geographical area. On the other hand, the problems are less acute in case of Koira and Dacope upazilla which are two large upazilla of Khulna district in terms of population. One of the main reasons behind this is that the total population of an upazilla is considered while calculating required service facility for an area but the area is not considered. But in reality, the geographical area of a region is an important factor in determining the required number of service facilities for that specific region.

The main service facilities which are inadequate in different unions of Dumuria and Paikgacha upazilla are identified below:

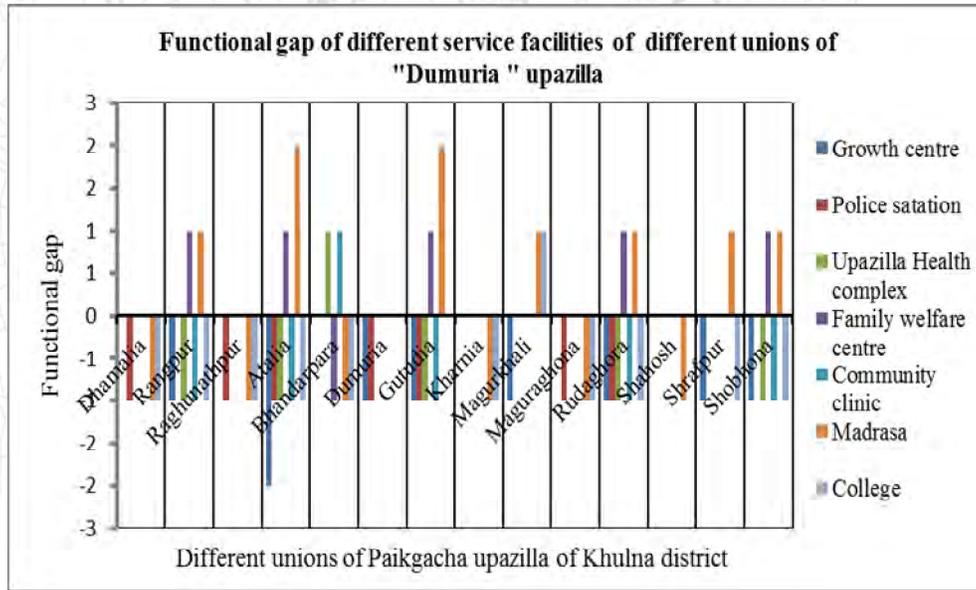


Figure 7: Union wise functional gap of different service facilities of Dumuria Upazilla.

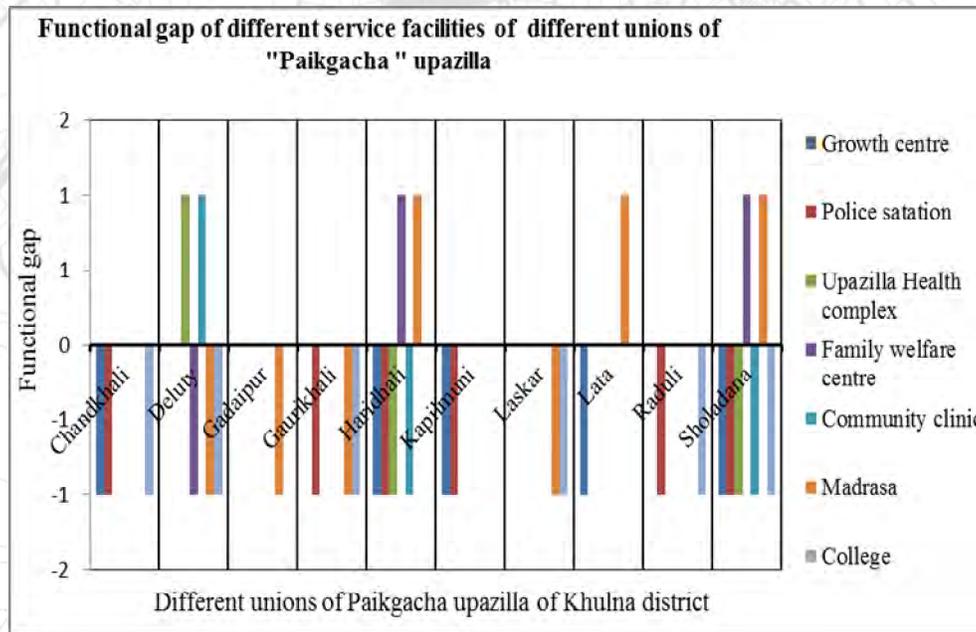


Figure 8: Union wise functional gap of different service facilities of Paikgacha Upazilla.

The analysis shows that there is variation in functional gap of different service facilities of different unions in Khulna district. Moreover, service facilities are not evenly distributed in different unions of an upazilla. In Dumuria upazilla, the most required facilities are growth center and college. This scenario is same for the Paikgacha upazilla where there is also acute lack of facilities like growth center and college (Figure 7 & 8). So, it can be said that here is an overall inadequacy of these two facilities in almost all union of Khulna district.

4. Major Findings and Conclusion

Median population threshold is highly dependent on the type of service facility. For example, whether, it is a primary need of people like healthcare facility or not. Service facilities like growth center, community clinic requires a very small population to be supported whereas facilities like police station, healthcare center do not demand such a high population to be existed. The frequency of these types of service facility like police station is too much less in relation to the health care facilities. In regards functional gap between the existing and required number of different service facilities, the service facilities are inadequate in almost all of the unions and upazilla of Khulna district. The inadequacy of growth center and college is acute. Due to the shortage of these facilities the total economy as well as the higher education is hampered. On the other hand, the service facilities like family welfare center, madrasa etc. are in quite adequate quantity. So finally, it can be said that though the secondary needs of the people of this region is not served properly, the basic needs of common people are well served in this region.

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