# Hierarchical Distribution of Towns in Industrial Belt of West Bengal: A Study of Burdwan District.

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## I. INTRODUCTION

The hierarchy of urban settlements was first brought within the purview of geographical enquiries by G. K. Zipf in 1931, when he coined the term Central Places. The concept of Central Places was further developed by Walter Christaller in his monumental work on "Central Places in Southern Germany (1933)". The theory postulates that to maintain efficiency of the settlements, the number of hierarchical central goods and services (functions) fall into categories. The theory is based on a distinction between centres, which are the seats of a supply of goods and services, and peripheries (regions complementing the centre) where demand, i.e. population using them, resides. The notion of centrality justifies clustering in a same place production of service of same level and of same range intended at the population which is scattered in the complementary region (or influence area), whose customers are polarised by the centre. The centres are indeed hierarchised, due to the existence of several levels of services defined by their spatial ranges (distance that the consumer is willing to travel in order to acquire the service, defined by the additional transport cost which can be afforded when buying the product) and by emergence thresholds (fixed by the volume of customers needed for the service supply to be profitable). Generally low order goods or services are necessities that need to be bought frequently, hence the desirability that they should be near the consumer. They are therefore ubiquitous, appearing in both low and high order centres. On the other hand higher the order of central functions the fewer the number of centres providing them and the farther the consumer have to travel to obtain them. Thus they have a wider range than lower order functions. According to the theory, influence areas of centres fit inside each other (for Christaller), because centres of upper level generally provide all service of lower level, or more or less apart from each other (for Lösch). The hypothesis of rational behaviour of consumers, which visit the closest centre, and competition between centres that share the customers have as consequence that cities are regularly spaced, and services of services levels is translated into a smaller number and a wider spacing of cities when moving upward in urban hierarchy. Quite numerous observations carried on in various areas of the world have shown how useful the theory is to understand spatial organisation of most services to resident population. The theory gives well enough account of differentiation of urban networks at middle levels scales, in relatively homogeneous regions. The hierarchy of urban centres fits in large part with a hierarchy of levels of services they concentrate, organised by frequency of use, amplitude of their spatial range and size of their thresholds of emergence

The concept that centres can be graded in a hierarchical class system is implied in the theory. Each order of the hierarchy has the characteristics central functions and discrete population level. Low order centres posses less complex functions than those of higher order while the latter possess both the group of functions characterizing their order as well as those functions available at low order centres. The higher the order of the centre the greater is its centrality. The theory further states that higher order centres are more widely spaced than those of lower order with spacing varying in mathematical ratios.

The theoretical spatial result of the model is that the area of influence of centres is arranged in geometric pattern with the area of influence of low order centres nesting within those of higher order. Associated with this is the fixed K idea which states that a fixed number K of settlements exist for each settlement in the next higher order. In the special cases considered within the Christaller – Losch model, the resulting spatial pattern in a regional system is such that K = 3, 4 or 7 according to the market, transport, administrative principles respectively. The rigidity of the fixed idea is well known . Therefore, the historical and geographical conditions need to be considered in explaining the pattern of urban centres in an area.

In the present study we try to see the hierarchy of settlements with respect to the infrastructure. The general view is that larger the number of population better will be the infrastructure and it will have a higher place in the hierarchy and lesser the population lesser will be the infrastructure facilities and lower place in the hierarchy. We will try to see if it holds good in the case of the study area taken for this analysis. The study area for the analysis is Burddhaman. All the towns are taken into consideration. Burddhaman lags behind the other Indian states in human, economic development terms. The economy of Burddhaman is largely industry and service oriented, but it also has a significant agricultural base. The district also has a largel industrial sector. Burddhaman has a grossly adequate educational infrastructure creating a huge match between demand and supply. This problem further gets compounded by the growing aspirations of the people and an increase in population. The craving for higher education among the general population of Burddhaman has led to a massive migration of the student community from the state. Burddhaman has a robust cinema industry for the Hindi and Bengali language. According to the 2001 census Burddhaman occupies a place second from the top with respect to the level of urbanisation which is almost 35% compared to the state average of 30%.

The Census recognizes three categories of urban places: metropolitan areas, cities and towns. The Census typology of urban places is entirely based on the population criterion. The

term ‘metropolitan area’ is applied to places with a population of a million or more, while the term ‘city’ is applied to all places with a population of one lakh or more. All other urban places with a population of one lakh or less are designated as ‘towns’. Towns are further subdivided into class II towns ( with population between 50,000 and 1,00,000 ), class III towns ( with population between 20,000 to 50,000 ), class IV towns ( 10,000 to 20,000 ), class V towns ( 5,000 to 10,000 ), class VI towns ( less than 5000 ).

## II. AIMS AND OBJECTIVES

a) To see the hierarchy of towns with respect to infrastructure.

b) To see if the population level affect the availability of infrastructure.

## III. DATABASE AND METHODOLOGY

The study area for the analysis is Burddhaman and the main source of the information is Census of India. In the 2001 census data for all the towns are provided for the amenities that we have taken in our analysis. The census data is reliable and authentic and takes all the towns into consideration. Hence census data has been used for the present study.

The method employed for the present study consists of selecting the population and a set of significant central functions or services, finding out the proportion of each service out of whole in all the towns, making a composite index and accordingly rank the towns in different orders, making a skelograph.

3. The key functions that are-

Fire fighting services, hospital, dispensary, Tb clinic, family welfare centre, commerce, arts, science, arts-science, arts-commerce, arts-science-commerce, engineering, medical, primary, secondary, senior secondary, middle, stadium, cinema, public library, reading rooms, banks, agricultural society and non agricultural society.

The data is arranged in descending order according to the 2001 population values. For e.g. there are three towns as shown in the table below. We find population mean for each town and then divide the population value for each town by the mean of population and multiply it by hundred as shown below. The same process will be repeated for amenities also. First we will find out the mean of all the amenities that we have taken then the value of each amenity for every town will be divided by that particular amenity mean and multiplied by hundred. This will show what is the propotion of that amenity in that particular state. Then for each town the value of all the averages of each amenity is added to find out the composite index. The towns, their classes and the composite index is then arranged in descending order according to the composite index value. From this new arrangement we find out the town ordering as in how many towns will come under higher order and how many in lower orders.

**TABLE Showing the Calculations**

| Showing the Calculations in Class 1 towns | | | | | | | |
|---|---|---|---|---|---|---|---|
| TOWN_NAME | POP_2001 | pop_avg | TB_CLINIC | tb_clin_avg | AUDITORIUM | | Composite Index |
| DURGAPUR | 493,405 | 1,279 | 2 | 1467.3514 | 10 | 733.35289 | 2200.7(1467.35+733.35) |
| ASANSOL | 475,439 | 1,232 | 1 | 733.67572 | 7 | 513.34702 | 1247.02 |
| KULTI | 289,903 | 751 | 0 | 0 | 0 | 0 | 0 |
| BARDDHAMAN | 285,602 | 740 | 0 | 0 | 8 | 586.68231 | 586.68 |
| JAMURIA | 132,785 | 344 | 0 | 0 | 22 | 1613.3764 | 1613.38 |
| RANIGANJ | 122,781 | 318 | 2 | 1467.3514 | 7 | 513.34702 | 1980.7 |

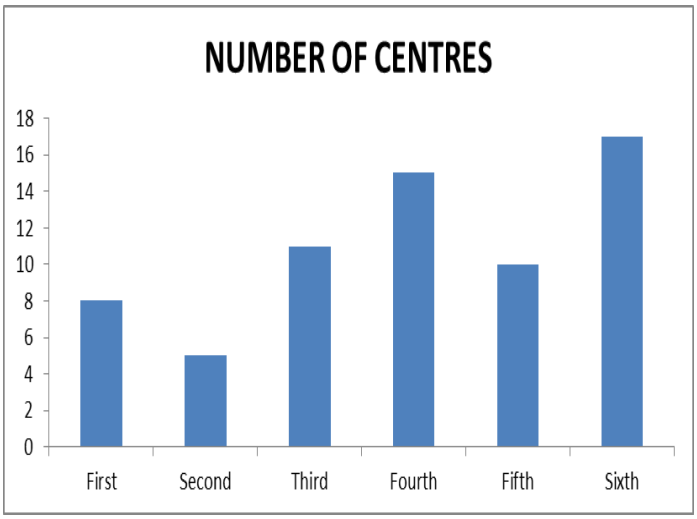
For making a skelograph the availability of the amenities is counted in each town. Where there is 0 values the amenity is not counted and where there is 1 or above that it is counted. According to the total count the numbers of cells are coloured.

## IV. RESULT AND INTERPRETATION

Based on the composite index of the towns of Burddhaman state, a chart depicting hierarchy of centres is presented below-

| ORDER OF TOWNS | NUMBER OF CENTRES |
|---|---|
| First | 8 |
| Second | 5 |
| Third | 11 |
| Fourth | 15 |
| Fifth | 10 |
| Sixth | 17 |

Number of Towns in Each Town Order




Six hierarchical rank orders are identified. The higher order indicates that more number of amenities is present, the infrastructure of the towns under that order is better than the lower order towns.

4. This section shows the result from the skelograph.

The skelograph shows the availability of the function in each town it does not show the proportion of amenities. It shows the variations. It can be seen that the number of amenities which has been taken it is present fully in Durgapur & Asansol. No other towns have all the amenities which have been taken into consideration. It can be seen that Burddhaman, Kulti, Katwa, Chittaranjan, Memari, Guskara are the only towns after Durgapur and Asansol, which have a high availability of amenities. In many towns amenities like tb clinics, arts, commerce, science, arts-science, arts-commerce, arts-science-commerce, engineering, medical are not available especially towns classified as fifth class towns in census. As it can be seen in the skelograph Harishpur has the least number of amenities but it has a higher population than other 34 towns, which is shown lowest in the skelograph as it has the lowest population and more number of amenities are available.

The skelograph is arranged in descending order according to the population. Hence if we compare it to composite index in many places we will find that towns having higher composite index have less availability of amenities and fall in higher order of towns and towns having more amenities available has less composite index number and is in lower order of towns.

Hence it is not necessary that a high population town will have more number of amenities and will have a higher order in hierarchy. It depends on the proportion of amenities. Less populated town can also have higher proportion of amenities. It can be due to the economic conditions of the town. Towns earning more revenue will naturally have high proportion of amenities. Political factors also influence the economy of the town.

Four cases can be seen in the case of Burddhaman

1) Towns having same class and different town orders.
2) Towns having different class and town orders.
3) Towns having same class and same town order
4) Towns having same town order different class.

As it can be seen from the above four cases a town irrespective of its population be it low or high a class I town or a class IV town can also have more number of amenities and higher composite index value which means that the the proportion of all the amenities is high. Alternatively a town irrespective of its population can have high composite index but the availabity of amenities can be less. Thus the relationship between population size and the amenities as stated in the central place theory does not prove to be correct in Burddhaman's context.

## V. CONCLUSION

- The notion of hierarchy captures the idea that private firms and public facilities locate so that goods and services can be most efficiently provided to households distributed across the city system. This efficiency is either dictated by competition (adoption) or is created and sustained by rational planning (adaptation). Some places, typically large in population size, offer many economic activities while others, smaller in population size, offer fewer activities. The former places are said to be high order and they occupy a high level on the urban hierarchy; the latter places are said to be low order and they occupy a low level on the urban hierarchy. This is not entirely true in case of Burddhaman. Even there is no geometric progression in the number of towns falling in different order.
- It can be seen that only those services are taken into account which are provided by the government and are considered important for an urban area. Still many of the towns lack all these facilities. This depends on the working and the cost incurred by the government in providing the services. It is quite obvious that a class V town will not have a stadium but the absence of basic facility like a hospital or a nursing home or a dispensary shows the backwardness as well as the inefficiency of the government and even if these facilities are available they would not be fully functional and people would travel to other urban centres. Hence as shown in the skelograph the mere availability of a facility doesn't

mean that people would not travel to other centres to avail those facilities. As it can be seen that Burddhaman is one of the backward as well as the most corrupted state much development cannot be expected from here.

## REFERENCES

[1] Abiodun , Josephine Olu. 1957. Urban hierarchy in a Developing Country. Economic Geography, 43(4): 347 – 367.

[2] Bendavid A. 1991. Regional and Local Economic Analysis for Practitioners, Preager, New York.

[3] Berry, Brian J.L and Garrison, William L., The Functional Bases of the Central Place Hierarchy.

[4] Biswas, S. K. 1955. Hierarachic Arrangement of the Urban Centres of Burdwan District According to the Level of Potentiality. Geographical Review of India, 40(4): 370 – 377.

[5] Carol, Hans, The Hierarchy of Central Functions Within a City. Annals Of The Associations Of American Geographer, 50 : 418 – 438.

[6] Chaudhuri J R. Migration Linkage of a New Town and Its Significance in Town Planning CaseStudy—Durgapur (India)

[7] Department of Urban Development: 2006, City Development Plan for Bodh Gaya Under the JNNURM.

[8] Gore. Charles.1984. Regions in Question, Space development Theory and Regional Policy.

[9] Jain, Jawahar Lal, Urban System of Malwa : An Approach to The Structure And Organization of Urban Hierarchy. Transcations of The Institute of Indian Geographers, 5 (1) : 51 – 64.

[10] Mayor and Cohn. Introduction to Urban Geography.

[11] Pria, City Issue Paper Bihar Sharif

[12] Ramachandran.R . Urbanization and Urban System in India.

[13] Smailes, Arthur E. 1944. The Urban Hierarchy in England and Wales. Geographical Association, 29( 2 ): 41 – 51.

[14] Taaffe, Gauthier and O'Kelly. 1996. Geography of Transportation.

[15] Tyree, Andrea and Smith, Billy G. Smith, 1978. Occupational Hierarchy in the United States. Social Forces, 56 ( 3 ) : 881 – 899.

[16] United Nation Population Division, 2001, World Urbanization Prospects: The 2001 Revision.

[17] Internet Sources : Wikipedia, Science Direct, Jstor.

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