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SR. NO.	CONTENT PAGE	PAGE NO.
1	<b>THE STUDY OF RISK PRICING IN INDIAN FINANCIAL MARKETS BY APPLYING GARCH-M MODEL</b>  <b>DR. KOEL ROYCHOUDHURY</b>	1-16
2	<b>STOCK MARKET VOLATILITY DURING DIVIDEND ANNOUNCEMENT - A CASE OF SELECTED COMPANIES IN CONSTRUCTION INDUSTRY IN INDIA</b>  <b>DR.V.CHITRA, DR. T.HEMALATHA</b>	17-23
3	<b>EVALUATING SECTION 12(1) (C) OF RIGHT TO EDUCATION (RTE) IN DELHI</b>  <b>MAHIMA, KRITI ARORA, NIKITA YADAV, SIDDHANT MADAN, SUMIT ABHISHEK</b>	24-35
4	<b>A STUDY ON WORKING CAPITAL MANAGEMENT OF ELECTRICITY DISTRIBUTION COMPANIES IN KARNATAKA STATE</b>  <b>MR. BANGARAPPA BANKAPUR, DR.A.S. SHIRALASHETTI</b>	36-45
5	<b>AN EMPIRICAL STUDY ON WOMEN EMPOWERMENT THROUGH MICRO FINANCE</b>  <b>DR.K.NAGARAJA NAIDU, DR.P.V.NARASIAH</b>	46-53
6	<b>GROWTH OF MSME SECTOR AND ITS CONTRIBUTION TO EXPORTS OF INDIA IN POST REFORM PERIOD</b>  <b>ISRAR AHMED, DR. SHAUKAT HASEEN</b>	54-65
7	<b>INFLATION ACCOUNTING METHODS: A STUDY OF PREFERENCE BY INDIAN CORPORATE SECTOR</b>  <b>DR. RUPINDER SINGH</b>	66-70

8	<p><b>ASSETS ADMINISTRATION AND MANAGEABLE IMPROVEMENT</b></p> <p><b>MEDA RANJITH KUMAR</b></p>	71-76
9	<p><b>TRADITIONAL METHODS OF CASHEW PROCESSING</b></p> <p><b>Dr. KRISHNA BANANA, V.VEERANJANEYA KUMAR.POLISETTY</b></p>	77-96
10	<p><b>AN APPRAISAL OF URBANIZATION STATUS OF VILLAGES IN A PARTICULAR BLOCK OF WEST BENGAL: AN EXPLORATION THROUGH CONSTRUCTION OF A GENERALIZED URBANIZATION INDEX</b></p> <p><b>SUBIKASH MOOKHERJEE, SANJOY KUMAR PATTANAYEK, DEBASISH MONDAL</b></p>	97-110
11	<p><b>A COMPARATIVE ANALYSIS OF FINANCIAL PERFORMANCE OF PUBLIC AND PRIVATE SECTOR FIRMS IN INDIAN CAPITAL GOODS INDUSTRY</b></p> <p><b>OMBIR</b></p>	111-123
12	<p><b>A NEW STEP TOWARDS GREEN BANKING –AN EMPIRICAL STUDY</b></p> <p><b>MAHAMMAD IRSHAD M</b></p>	124-129
13	<p><b>FACTOR INFLUENCING JOB SATISFACTION OF EMPLOYEES: A STUDY ON BEML: INDIA</b></p> <p><b>DR. AKANKSHAKHANNA, MR. AJAY KUMAR, MR. RAVI KUMAR</b></p>	130-139
14	<p><b>EMPLOYEES TRUST AS PREDICTOR OF COUNTERPRODUCTIVE WORK BEHAVIOUR</b></p> <p><b>PROF. RISHIPAL</b></p>	140-156

**AN APPRAISAL OF URBANIZATION STATUS OF VILLAGES IN A  
PARTICULAR BLOCK OF WEST BENGAL:  
AN EXPLORATION THROUGH CONSTRUCTION OF A  
GENERALIZED URBANIZATION INDEX**

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## **ABSTRACT**

Growing urbanization is a significant phenomenon of socio-economic development in developing countries. Urbanization means intensive economic activities by a large number of people in a relatively small plot of land, where secondary and tertiary sectors play a dominant role and where certain amenities are bound to be available. In India, the Census Authority usually looks after and provides data regarding the nature of a few urbane characteristics for the village units and thereby classifies a place as Census Town, which is considered as the lowest unit of urbanization. Census also provides data about availability of basic amenities for the common citizens living in a place, but these data are not considered so far to judge urbanization. This paper intervenes at this juncture and focuses on construction of a Generalized Urbanization Index for all the village units of a particular block, which will be comprised of both the census criteria for being classified as a census town and the amenities available to that place. Clearly the index, thus constructed, will provide us an exhaustive idea of urbanization of a rural place and statistical techniques become crucial in determining the relative weights of different parameters related with urbanization.

**KEY WORDS:** Amenities Index, Census Town, Equal Weights, Principal Component Analysis, Urbanization.

**JEL Classification Codes:** C51, H54, O18

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## **1. INTRODUCTION**

Growing urbanization is a significant phenomenon of economic development in less developed countries. With the passage of time in developmental course, if take-off stage in growth process has been achieved, LDCs generally strive for urbanization. Urbanization, in

economic sense means intensive economic activities by a large number of people in a small plot of land where secondary and tertiary sectors play a dominant role. At the initial stage, urbanization occurs because of natural advantage or due to trade and commerce perception; however its sustainability requires large scale and varied economic activities with significant interactions among residents or migrants.

The fundamental necessity for urban growth is found in rural areas. The extent of urbanization is limited by the food surplus available to the city. The world has been as urbanized as the level of agriculture made possible throughout the recorded history. The difference between current levels of urbanization and historical levels is due to the massive improvements in agricultural productivity and transportation technology arising from and contributing to the Industrial Revolution.

Since independence the strategies for economic development in West Bengal explored different paths. During the 50s and 60s of the last century, urbanization was given sufficient importance and this brought rapid changes in socio-economic life and political scenario in then West Bengal. As a result of this policy, new towns like Durgapur, Kalyani, Barakar etc. came up and steps were taken to form other towns like Salt Lake and Haldia. Urban outgrowths were also observed during that period in Barrackpore industrial as well as Hooghly industrial areas taking the advantage of the river Ganges by its location.

In the above context, we have decided to pursue a study about the ongoing urbanization process in the block areas of West Bengal and in this particular study we shall concentrate on Mahishadal, a community development block with 74 village units, located in Haldia sub-division of Purba Medinipur district in southern West Bengal. And we are to see whether there are adequate urbanization measures acting actively to keep pace with developmental aspirations.

In Section 2 of this article, a brief review of available literature on our topic has been presented and in Section 3 the major objectives of this work are mentioned. In Section 4, a brief description of the study area (i.e., Mahishadal) is put forward. In the following section 5, we would acknowledge the data sources and explain the specific methodologies applied in this article to obtain the desired results. In section 6, the results of our findings are presented with observations and interpretations. Finally, in Section 7 of this article, the concluding remarks are mentioned with some implications.

## **2. REVIEW OF LITERATURE AND THE RESEARCH GAP**

There has been considerable volume of useful studies available for understanding the various facets of the process of urbanization. Among them, the most important studies are performed by the Census Authority of India over decades to analyze the degree and gravity of urbanization in India and more specifically in Indian states. Secondly, private research bodies like universities, research institutes and individual researchers contribute significantly at the field of literature about Urban Economics. This ongoing article is clearly based on the available literature, studied so far and indebted to the field of Urban Economic Studies.

### **2.1 REVIEW OF CENSUS REPORTS**

The Indian Census, since the very beginning, besides giving the basic count of population of various towns and cities in the country, produces and presents data on various demographic, social and economic characteristics separately for rural and urban areas. The conceptual unit for urban areas is 'town'. But this concept can be segregated in three sections: **metropolitan cities** or **urban agglomeration**, **municipal towns** and thirdly the **census towns** which are primarily non-municipal in nature. In reality, urbanization in a broad sense depends primarily on the development of census towns. We can have one or two metropolitan cities or a few

municipalities in a state but larger the number of census towns in a state, larger the volume of urbanization there.

No statistical study of urbanization is possible unless adequate note is taken of the Census definition of ‘town’ which varies from country to country and from one census year to another. In the case of India, we find that, the Census definition of ‘town’ remained more or less the same for the period 1901 – 1951 and it was only in 1961 that several modifications were introduced to make the definition more satisfying from the statistical point of view. But an interesting feature of the Indian Census has been the latitude given to Census Superintendents in regard to the classification of places on the border-line of ‘rural’ and ‘urban’. We shall deal with this aspect here and also refer briefly to the impact on urbanization of the new definition of ‘town’ adopted in 1961.

The definition of a ‘town’ as given in the *first general report* of the Census of India, 1901 is as follows: **Town includes:** (a) Every municipality of whatever size, (b) All civil lines not included within municipal limits and (c) Every other continuous collection of houses, permanently resided by not less than 5000 persons, which the Provincial Superintendent may decide to treat as a ‘town’ for census purposes.

Thus, the primary consideration, for deciding whether a particular place is a town or not lied at the hands of administrative set-up and not on the size of its population. Not all municipalities, civil lines areas and cantonments had a population of over 5000 and yet these were classified as towns. At the same time, all places over a population of 5000 were not necessarily towns. These were over-grown villages and the Census Superintendents had the *discretionary power* to call them as such. The Census Superintendents even had the discretion to treat as a town, any place irrespective of its administrative set-up or population size for special reasons.

The **Census of 1961** adopted a two-fold categorization to identify urban centers.

**Firstly**, the settlements that were given urban civic status like Corporation, Municipality and Cantonment, by the state governments were identified as Statutory Towns. As urban development is a state subject (and so is the responsibility of assigning civic status), there is a wide variation in the criteria adopted in assigning civic status across the states. Whichever settlements were assigned such a status by the state governments were included in the urban frame by the census and listed as Statutory Towns. Keeping these in view, and to make the data on urbanization spatially comparable, the census added a category of non-statutory or Census Towns.

**Secondly**, three demographic criteria were applied to identify these Census Towns. These were

- a. Population size of 5000 or more.
- b. Density of at least 400 persons per square kilometer
- c. At least 75% of the male main workers to be engaged outside agriculture.

The adoption of such a theory, based on two-fold categorization of ‘statutory’ and ‘census’ towns, were expected to rationalize the base of the urban frame at that time. The definition of ‘town’ therefore is not totally objective in as much as it is not based on a rigid statistical test. The census authorities however were aware of these limitations but they preferred administrative expediency to statistical precision.

## 2.2 REVIEWS ON WEST BENGAL URBANIZATION

Towns in Bengal have grown up and / or have changed their character – both structurally and functionally – in course of the last 200 or so years. With the advent of European traders in India, new river-based towns began to grow up as ports-cum-trading centers. In the course of

political and military advancement and due to trading interests of these Europeans, their settlements were gradually acquiring the character of port-markets with fortresses. In about a century, these were assuming the added character of administrative centers. In their manifold economic and social functions these towns from the very beginning, were dragging into orbit settlements spread out within a communicable distance under the given technology. Through this process different towns came up at the early decades of urbanization in then Bengal. During the colonial rule, it was found that the level of urbanization was one of the highest in the country and quite ahead of the all-India average. But it was concentrated in few places of colonial interest like the Calcutta industrial region (around port), Raniganje coal belt and tea gardens of North Bengal. Other towns were mainly isolated market towns (ganjas) on transport routes (water, railways and roads) apart from administrative towns in princely states like Cooch Behar.

However, during the post-independence period it was observed that, the level of urbanization was still higher than the all-India average but the gap was decreasing successively. In 1951, West Bengal was fourth in rank among the major states but it came down to seventh in 2001. The rate of urbanization in West Bengal was remarkably slower than the all-India rate. The urban growth rate in the state was lower than the country (except in 1951) and it was decreasing. The converse was true for rural growth rate. The rural urban growth differential was decreasing over the years.

Moreover, the urbanization pattern is spatially concentrated, with the dominance of Kolkata. The Kolkata Urban Agglomeration, spread over the five districts along the river Hooghly continues to dominate the urban scenario. In 1951, it contained about 75% of the urban population of the State. In 50 years, it came down to only 50%. This is due to the rising share of Asansol–Durgapur in the sixties, followed by Siliguri and finally emergence of the port-cum-industrial complex at Haldia. In the eighties, there were some changes in state policy, which tried to rectify the imbalances, but in liberalized era, those forces weakened.

The other major features of West Bengal urbanization are about three-fourth of the urban population lives in big cities and towns. This has remained almost constant over five decades. The rest of the urban population is distributed over the other five size-classes. The percentage share for the class II towns is also increasing over time. The combined share of other four classes is decreasing; the most noticeable decline is for class III towns. However, the growth rate of the smaller towns exceeded that of bigger towns since the sixties, which became most prominent in the eighties. But all these changed during the nineties, when stronger exogenous force affected the State.

The spatial concentration of urban population is also reflected in the district wise variation in the level of urbanization. Apart from Kolkata, the highest level of urbanization (1951) was in undivided 24 Parganas and the lowest was in Maldah. This has not changed in five decades though there are some ups and downs. The average level of urbanization in the State is 25%. If Kolkata is taken out, it decreases to 20%. There is slight decline in the primacy of Kolkata. However, if Kolkata is excluded, the inter-district disparities in urbanization become more prominent.

### **2.3 REVIEW OF STUDIES ON SMALL TOWNS**

Generally the small towns appear mostly in the semi-urban or rur-urban conditions, just as the gateway or focal point of the rural surplus enclave having network of communications all around. There are various potential factors for which these small towns develop here and there. Sometimes multiple factors are responsible for the growth of a small town, but initially, there must be at least one prominent factor, which facilitates the growth of a small town (Manna, 1994).

Now we are going to present some important studies on small towns conducted over last four decades. Corwin (1977) has worked on the elites of Mahishadal (which is our study area), as there were a significant number of rich businessmen, which was unbecoming of a small rural town. The 'Analysis of the Growth of Small and Medium Towns in West Bengal' (Giri, 1988) and 'A Case Study of Durgapur' (Basak, 1988) are very much important at the present context. Basak's paper contributed notably to understand the nature of growth process in steel town Durgapur and its spatial impact on the surrounding region. Further, her extensive study of the five Indian steel towns namely Jamshedpur, Durgapur, Bhilai, Rourkela and Bokaro covering the period 1961–1991 also examined the nature, direction and the degree of interaction of the steel towns with the surrounding region (Basak, 2003).

We are immensely benefited through this considerable volume of useful studies which are easily available for understanding the various facets of the process of West Bengal urbanization.

It is clear that the main impulse for urban growth in West Bengal continues to be derived from industrial and manufacturing activities (Dasgupta et al, 1988) -- particularly in cases of the new towns. However, a good number of new towns -- particularly in Howrah and North 24 Parganas, appear to be 'transformed agricultural settlements', which also account for a high proportion of promoted and high-growth towns. Generally speaking, the more urbanized districts are usually also the ones with better agricultural performance; but within each of these districts the agricultural and industrial areas tend to be clearly demarcated. This is particularly true for Burdwan, (where industrial mining activities are concentrated in Durgapur–Asansol region); North 24 Parganas, (where the western part is industrially developed while the eastern part is predominantly agricultural) and Hooghly, where industrial areas are located along the river Ganges.

The western part of the State, particularly Bankura and Purulia, continues to show low rates of urban growth, which are considerably below the state-average and indicate large-scale net outmigration. Birbhum, comparable to those two districts in other respects, however, shows a high rate of urban growth. Figures suggest the need for promoting urbanization in that area.

The backward North Bengal districts, in contrast, show very high rates of urbanization, far exceeding the state-average (excepting Cooch Behar). At the other end, the rates of urban growth for Kolkata, Howrah and Hooghly appear to be modest, while that for Kolkata isolated is disastrously low. This is a welcome development, though, as we have already noted, this are continues to account for a high proportion of new towns and promoted towns (Dasgupta et al, 1988).

#### **2.4 RESEARCH GAP**

As we have gone through the available literature on urbanization of area units (villages or census towns, as may be classified) in West Bengal, we have found that even if urbanization is defined as an index of transformation; however no indexing is done by anybody comprising the indicators of urbanization with justifiable weights. In other words, degree of urbanization of any place is not tried to be properly measured or evaluated till date.

Undoubtedly, amenities play a crucial role in determining urbanization of a place. The census authority collects and publishes data regarding amenities available in a place; however these data are not considered to determine the level of urbanization of a place. There are some indicators of urbanization and these are bound to affect urbanization in a place. In this study, we are to address the above mentioned problem and we shall try to construct a true urbanization index, based on certain well-accepted indicators, on which urbanization of a place can be measured and compared with that of others. Basically a normal yard-stick for measurement of urbanization of all places is to be obtained from our adopted methodology.

### 3. OBJECTIVES OF THIS STUDY

On the basis of the above mentioned literature review, we want to deal with the following objectives.

- (a) Identification of urban characteristics, both in the forms of town criteria and amenities, which are prevalent in villages and census towns of a block in West Bengal.
- (b) Construction of a Town Criteria Index (i.e., TCI) for a village unit on the basis of census town criteria, put forward by the Census authority.
- (c) Construction of different Factor Indices (i.e., FIs) affecting availability of amenities in a place which will help us in determining different Dimension Indices.
- (d) Construction of different Dimension Indices (i.e., DIs) for amenities available in a place and these will help us to obtain the Amenities Index (i.e., AI).
- (e) Construction of a Generalized Urbanization Index (GUI) for a place (i.e., village unit) on the basis of its Town Criteria Index (TCI) and Amenities Index (AI).
- (f) Determination of appropriate weights for the above mentioned town criterion index, factor index and dimension index on the basis of *Principal Component Analysis* (PCA) and comparison of these values with those obtained through *Equal Weights Principle* (EWP).

### 4. DESCRIPTION OF THE STUDY AREA

The area of our study, Mahishadal is a community development block, comprised of 74 villages, in the district of PurbaMedinipur in West Bengal. Among these 74 villages, GarhKamalpur is classified as *census town* according to 2011 Census (total population 6664 and the literacy rate 89.73%) and this place is surrounded by some agro-rich villages. It is observed from primary survey that Mahishadal maintains a good communication network with the state-capital Kolkata and other important business centers. The area has good quality of human resources and is endowed with good educational institutions. Geographically, Mahishadal is located at 22° 11' North latitude and 87° 59' East longitude in a globe. Greater Mahishadal is situated in the right bank of river Rupnarain where this river meets the Ganges, in the district of PurbaMedinipur. However the actual town area of GarhKamalpur is just about 5 kilometers from that point. The area under the purview of Mahishadal Police Station or Mahishadal Block is 135.2 sq. km. The demographic data of 2001 Census had shown that Mahishadal had a population of 182191 (93284 male and 88907 female) and according to 2011 Census, the total population of Mahishadal is increased to 206277 (106391 male and 99886 female). The literacy picture is somehow bright in Mahishadal. According to the census reports, in 2001, the combined literacy rate was 81.11% and in 2011, it has increased to 86.21%.

After going through the data provided by the Indian census' over the decades, we have found that, in 1961 census, for the first time Mahishadal (in actual sense, four villages of the block which are centrally located) was granted the status of non-municipality Town. This status was maintained in subsequent three censuses (i.e. 1971, 1981 and 1991). However in the census of 2001, the urban status of Mahishadal had been withdrawn. In the earlier occasions (1961 census etc.) when Mahishadal was classified as a non-municipal town, all the conditions including the third (i.e., the per cent of male main workers engaged in non-agricultural pursuit should be no less than 75%) was satisfied. However, during the period of 2001 census, non-holding of the third condition indicates that some socio economic changes took place in that area, probably in the form of population explosion, migration of non-agricultural labourers to some other places and probable decaying of some traditional small scale industries in that area.

Accessibility to basic health facilities is moderate in Mahishadal. There is only one block level hospital run by the government and this does not suffice the need. A few privately run nursing homes are there as well to provide some fillip. The electricity coverage is very high



in this block. All the villages are covered by WBSEB and there is a power substation in Mahishadal. Barring some BPL households others use electricity as a source of power as a whole. Telecommunication facilities are gradually improving in Mahishadal. Apart from basic landline telephone services by BSNL, a few private mobile telephone companies have established their towers in Mahishadal, which has improved its overall connectivity. The number of 'smart mobile phone' users is increasing day by day.

Initially in 1961, four villages (as one unit) in Mahishadal block got urban recognition. Later in 1971, three more joined the list and in accordance with the opinion of the local people these seven villages as a unit forms the town area. The villages are *GarhKamalpur, Rangibasan, Basulya, Jagannathpur, Terapekhya, Ghagra and Sarberya*. The so called town area of Mahishadal block has a population of around 30,000 in which approximately 80% are literate (as shown in 2011 Census). Majority of them are well educated, culturally advanced and active. Economic activities are strong enough in the town area to provide better standard of living in comparison to other places in the district. Given these advantages of the area, this article examines the prospect of urbanization in the village units of Mahishadal through proper planning and investment.

## 5. DATA SOURCE AND METHODOLOGY APPLIED

For our ongoing analysis, we have extensively used secondary data provided by the Director General of Census Operations (DGCO), Ministry of Home Affairs, and Government of India. The required data which have supplied information regarding total population, population density, workers' profile, amenities available etc are collected through visiting their websites or through visiting their offices personally. The books which are consulted for this purpose are (i) Primary Census Abstract (PCA) of West Bengal (2011) – PurbaMedinipur District, (ii) Primary Census Abstract (PCA) of West Bengal (2001) – Medinipur District (undivided) and (iii) Census Village Directory of West Bengal (2011) – PurbaMedinipur District

We have used the tabular form of Census Data (published in Census Website [www.censusindia.gov.in](http://www.censusindia.gov.in) for the year 2011) to obtain information related to area, population and population density of a mouza (village unit) for the concerned block of Mahishadal. Next, we have computed the proportion of *male main workforce engaged in non-agricultural sector* (MMW in NAS) in each village. For this purpose, we have subtracted the number of persons engaged in agriculture and cultivation from the total main male workers (as given in Census publication) and obtain the requisite proportion as MMW in NAS.

Next, we have constructed criterion indices for the above three point criteria for all the villages by applying the standard formula:  $\{(X_a - X_{min}) / (X_{max} - X_{min})\}$ . In fact, this is the ideal form of constructing an index and this method has vast applicability in the field of research. The elements of  $X_{max}$  and  $X_{min}$  are selected on the basis of observed method of goalposts selection (Mondal, 2005). At this juncture, it can be mentioned that normative goalposts are applied in specific cases. In a series of  $X$ , if normative goalposts are adopted, then  $X_a$  is the actual value of a particular criterion for a village,  $X_{min}$  is the minimum justifiable value for that criterion i.e., normative minimum and  $X_{max}$  is the maximum justifiable value i.e., normative maximum. In this study, we have obtained the respective maximum and minimum values from the set of observed values.

At the next step, when the criterion indices are found, we need to construct the *Town Criteria Index (TCI)* by taking a linear combination of all the three criterion-indices, in which three coefficients are to be associated with the indices, acting as their respective weights. Thus, the simple method of weighted arithmetic mean of the individual criterion (or, dimension) indices is used to determine the TCI (or, any final index value) at this study. However, the question regarding the choice of appropriate weights for the criteria might arise and in

response to this we have used two popular techniques to obtain the final weights for the respective criteria. Firstly, we have used the *Equal Weights Principle* (EWP), which is vehemently used by the UNDP in construction of its HDI since 1990, and have obtained the TCI for all the village units. Later, we have used the *Principal Components Analysis* (PCA) to obtain respective weights for the same criteria and found the required TCI. Therefore, we have used two methods simultaneously to determine weights for the individual criterion and obtain two likely different values of Town Criteria Index for the same village units under the block of Mahishadal.

To construct the *Amenities Index (AI)* for all the village units, under the purview of a particular block, we have identified 3 dimensions of different types of amenities which are likely to be available and these could be named as the Dimension of Health (DIH), the Dimension of Education (DIE) and the Dimension of Socio-economic Infrastructure (DISEI) respectively. Moreover, each dimension is comprised of some factors which are essentially related to different types of amenities and these factors are based on various elementary parameters, for which village level data are provided by the census authority. In this study we have selected 70 elementary parameters of different types of amenities and classified these parameters into 11 factors under the heads of 3 dimensions. In detail, the factors belonging to the *Dimension of Health (DIH)* can be listed as: (i) Availability of Basic Health Centers in numbers including Dispensaries and Medicine Shops, (ii) Availability of Recognized Medical Practitioners in numbers with formal and informal degrees, (iii) Availability of government-run and privately run Hospitals and Nursing Homes in numbers, (iv) Available Sources of Drinking Water to a Village like Tap-water, Covered Well, Hand Pumps, Tube Wells etc and (v) Available Systems of Sanitation and Waste Disposal. Similarly, the factors belonging to the *Dimension of Education (DIE)* can be listed as: (i) Available Number of both Government-run and Privately-run Primary Schools, (ii) Available Number of both Government-run and Privately-run Middle Schools, Secondary and Higher Secondary Schools and (iii) Available Number of all sorts of Higher Education Institutions like Degree Colleges, Medical and Engineering Colleges, Management Institutes, Polytechnics etc. Thirdly, the factors belonging to the *Dimension of Socio-economic Infrastructure (DISEI)* can be listed as: (i) Available Coverage of Power Supply Areas, i.e., for domestic usage, for agricultural usage, for commercial usage and for usage by all others, (ii) Available Types of Roadways and Transportation, i.e., National Highways, State Highways, All-weather Roads, District Roads, Bus and Taxi Services, Railway Station etc. and (iii) Available Types of Other Miscellaneous Services like Commercial and Cooperative Banks, Post Office and Courier Services, Telephone and Mobile Services with Internet, Reading Room and News Paper etc.

We have used the same formula of Index construction, mentioned above, to obtain the respective factor indices (i.e.,  $F_1$ ,  $F_2$ ,  $F_3$  etc.) with actual values, respective observed maximum values and respective observed minimum values for each parameter. Next we have applied the method of arithmetic mean as usual to combine the factor indices and obtained the concurrent Dimension Index with relative weights. Later, we have constructed the Amenities Index (AI) with all three Dimension Indices, applying arithmetic mean, and here also, we have identified the weights by applying both the EWP and PCA. Lastly, the *General Urbanization Index (GUI)* is constructed from the linear combination of both *Town Criteria Index (TCI)* and *Amenities Index (AI)* with their respective shares as weights which have helped us in preparing the ranks of the listed villages of Mahishadal Block in the scale of urbanization and a comparison amongst those area-units in terms of urbanization index can be made possible.

## 6. RESULTS, INTERPRETATION, OBSERVATIONS AND FINDINGS

On the basis of the available data source and methods applied, we have tried to construct a *measurement scale of urbanization with the extreme points as zero and unity (i.e., 0 and 1)* for all the village units (including the only census town) of the block of Mahishadal. This means that, the Generalized Urbanization Index (GUI) of all the concerned area-units will lie between zero and unity and become comparable amongst one another in terms of that particular value. On the basis of GUI, one can know the relative position of a particular village-unit with respect to others in terms of gross urbanization or any part therein (as we have covered a lot of factors, classified under different heads), in a block. Moreover we can extend this method to any other block of the State or Nation to have an overall comparable standing of the village-units. The major findings of our study can be presented as follows:

- (a) We have applied two methods for determination of relative weights of the respective final index values (i.e., either for criteria/factor index, or for dimension index or for GUI), which are the *Equal Weights Principle* (EWP) and the *Principal Component Analysis* (PCA). In EWP, all the weights assigned to the parameters, are assumed equal (as discussed in Section 5) and the sum of all the weights assigned to respective parameters of an index must be unity. In our study, in constructing the TCI on the basis of EWP, the respective weights of the criteria-indices are taken as 0.333 each. In other words, the criteria of index of total population (ITP), index of population density (IPD) and the index of male main workers employed in non-agricultural pursuit (IMMW) all three are having 1/3 weight each in EWP to form TCI. Similarly, for amenities, in constructing the dimension indices of health, education and socio-economic infrastructure we have taken the weights of the concerned comprising factors as 1/5 for all, 1/3 for all and 1/3 for all respectively. In constructing the Amenities Index (AI), we have taken 1/3 as weights to all three dimension indices and lastly, ***we have given 1/2 (i.e., 0.5 each) as weights to both the components (i.e., TCI and AI) in obtaining the final GUI on the basis of EWP.*** (Ref: Table 2)
- (b) However, on the basis of Principal Components Analysis (PCA), the obtained weights are different as these weights are clearly coming out from the data itself and depend heavily on the extent of variability of respective dimensions (or variables). In our presentation, we have found ***0.59 as weight of TCI and 0.41 as weight of AI for GUI***, when computed on the basis of PCA. Similarly, we have found 0.19, 0.28 and 0.52 as respective weights of ITP, IPD and IMMW for TCI (in PCA) and 0.22, 0.24 and 0.54 as respective weights of DIH, DIE and DISEI for AI (in PCA). Clearly these weights are completely different from those assumed in EWP and these are not based on subjective value-judgment of an individual researcher, rather based on used data itself. (Ref: Table 2 )
- (c) It is observed from Table 1 that, in EWP the area-unit of GarhKamalpur got the top ranking amongst all with its GUI at 0.772, and the following four places are Natshal (0.624), Lakshya 1 (0.582), Lakshya 2 (0.558) and Terapekhya (0.517) and only 8 area-units have obtained GUI above 0.5.
- (d) It is observed from the same table (i.e., Table 1) that, in PCA also, GarhKamalpur stood first among all the units in terms of GUI value (0.828), following by Lakshya 2 (0.728), Natshal (0.691), Terapekhya (0.673) and Jagannathpur (0.639). Here we see that as many as 25 villages have crossed the benchmark of 0.5 in GUI.
- (e) However, one notable point is to be mentioned here. We have calculated the values of GUI for the concerned area-units with the help of both the EWP and PCA and obtained high differences in ranking of the units in some cases. As for example, for Chandkhanda village, the ranking difference is 28 (26 in PCA with GUI=0.490 and 54 in EWP with GUI=0.278), which seems to be very high. Similarly, the rank difference for Champi village is 22 (36 in EWP and 58 in PCA) and for Baramrit-Bere is 21 (41 in EWP and 62

in PCA). This means, there exists high possibility of being over-estimated or being under-estimated for the area-units in terms of GUI, if one is not capable of selecting the appropriate method in constructing GUI. This issue can be discussed later on and pursued as a future research agenda.

**Table 1: Computation of Town Criteria Index (TCI), Amenities Index (AI) and Generalized Urbanization Index (GUI) for the Village-units under Mahishadal Block and their Ranks**

Sl.No.	Name of the Village Units	TCI (PCA)	AI (PCA)	GUI (PCA)	Rank	TCI (EWP)	AI (EWP)	GUI (EWP)	Rank
1	TeraparaJalpai	0.554	0.304	<b>0.450</b>	39	0.410	0.220	<b>0.315</b>	45
2	Lakshya2	0.853	0.550	<b>0.728</b>	2	0.761	0.354	<b>0.558</b>	4
3	BaramritBere	0.358	0.349	<b>0.354</b>	62	0.353	0.294	<b>0.324</b>	41
4	Danipur	0.207	0.480	<b>0.320</b>	67	0.185	0.279	<b>0.232</b>	68
5	Magori	0.211	0.276	<b>0.238</b>	72	0.195	0.193	<b>0.194</b>	71
6	Kesabpur	0.336	0.627	<b>0.456</b>	37	0.322	0.467	<b>0.395</b>	19
7	Amritberya	0.496	0.529	<b>0.510</b>	25	0.431	0.332	<b>0.382</b>	21
8	Bholsara	0.283	0.494	<b>0.370</b>	59	0.257	0.293	<b>0.275</b>	55
9	Bamanpur	0.430	0.159	<b>0.318</b>	68	0.362	0.131	<b>0.246</b>	66
10	KhalsaBamanpur	0.211	0.135	<b>0.180</b>	73	0.186	0.092	<b>0.139</b>	73
11	Ghasipur	0.471	0.487	<b>0.478</b>	32	0.371	0.282	<b>0.327</b>	39
12	Gopalpur	0.620	0.535	<b>0.585</b>	13	0.613	0.354	<b>0.484</b>	11
13	Basulya	0.661	0.449	<b>0.573</b>	14	0.576	0.456	<b>0.516</b>	6
14	Kamalpur	0.393	0.466	<b>0.423</b>	46	0.295	0.254	<b>0.275</b>	56
15	Latmajnur Uttar Chak	0.000	0.380	<b>0.157</b>	74	0.000	0.133	<b>0.067</b>	74
16	Banka	0.159	0.462	<b>0.284</b>	69	0.154	0.253	<b>0.204</b>	70
17	Gajipur	0.439	0.416	<b>0.429</b>	45	0.403	0.186	<b>0.295</b>	51
18	Rangibasan	0.657	0.606	<b>0.636</b>	6	0.544	0.463	<b>0.504</b>	8
19	Jagannathpur	0.713	0.533	<b>0.639</b>	5	0.600	0.339	<b>0.470</b>	12
20	Terapekhya	0.713	0.616	<b>0.673</b>	4	0.590	0.445	<b>0.517</b>	5
21	Gopalpur	0.591	0.582	<b>0.587</b>	12	0.489	0.385	<b>0.437</b>	14
22	Machhlandapur	0.664	0.549	<b>0.616</b>	8	0.559	0.348	<b>0.454</b>	13
23	KismatnaiKundi	0.683	0.316	<b>0.531</b>	20	0.577	0.233	<b>0.405</b>	18
24	Malubasan	0.454	0.480	<b>0.465</b>	36	0.356	0.269	<b>0.312</b>	46
25	Tajpur	0.499	0.553	<b>0.521</b>	21	0.373	0.361	<b>0.367</b>	25
26	Itamagra	0.365	0.535	<b>0.435</b>	42	0.347	0.345	<b>0.346</b>	31
27	DakshinKasim Nagar	0.584	0.621	<b>0.599</b>	11	0.435	0.427	<b>0.431</b>	15
28	Rajarampur	0.440	0.521	<b>0.473</b>	33	0.410	0.325	<b>0.368</b>	24
29	Uttar Kasim Nagar	0.296	0.511	<b>0.384</b>	53	0.270	0.297	<b>0.283</b>	53
30	KanchanpurJalpai	0.328	0.324	<b>0.326</b>	65	0.286	0.249	<b>0.268</b>	59
31	KeshabpurJalpai	0.616	0.589	<b>0.605</b>	10	0.599	0.418	<b>0.509</b>	7
32	Bamunya	0.438	0.539	<b>0.480</b>	29	0.380	0.346	<b>0.363</b>	27
33	Kapaserya	0.455	0.529	<b>0.486</b>	27	0.397	0.333	<b>0.365</b>	26
34	Kapurda	0.485	0.480	<b>0.483</b>	28	0.393	0.263	<b>0.328</b>	37
35	Kanchanpur	0.747	0.293	<b>0.560</b>	16	0.679	0.317	<b>0.498</b>	9
36	Bagda	0.203	0.486	<b>0.320</b>	66	0.185	0.282	<b>0.233</b>	67
37	SarBerya	0.448	0.466	<b>0.456</b>	38	0.344	0.250	<b>0.297</b>	49
38	Ghagra	0.565	0.457	<b>0.520</b>	22	0.443	0.241	<b>0.342</b>	32
39	Sundra	0.552	0.465	<b>0.516</b>	24	0.424	0.251	<b>0.337</b>	34
40	Ektarpur	0.599	0.460	<b>0.541</b>	18	0.483	0.240	<b>0.362</b>	28
41	Basudebpur	0.357	0.441	<b>0.392</b>	52	0.290	0.221	<b>0.255</b>	62
42	Jhaupatra	0.386	0.518	<b>0.441</b>	40	0.321	0.350	<b>0.336</b>	35

Table 1 Continued...

Sl.No.	Name of the Village Units	TCI (PCA)	AI (PCA)	GUI (PCA)	Rank	TCI (EWP)	AI (EWP)	GUI (EWP)	Rank
43	Madhya Hingli	0.541	0.571	<b>0.553</b>	17	0.453	0.380	<b>0.417</b>	17
44	Chanpi	0.407	0.325	<b>0.373</b>	58	0.401	0.258	<b>0.330</b>	36
45	BaksiChak	0.378	0.439	<b>0.403</b>	50	0.280	0.217	<b>0.248</b>	65
46	KalikaKundu	0.552	0.514	<b>0.536</b>	19	0.512	0.324	<b>0.418</b>	16
47	ChakGajipur	0.279	0.464	<b>0.355</b>	61	0.241	0.256	<b>0.249</b>	64
48	Mashurya	0.465	0.497	<b>0.478</b>	31	0.404	0.295	<b>0.349</b>	29
49	Ajra	0.566	0.328	<b>0.468</b>	35	0.453	0.241	<b>0.347</b>	30
50	Rambag	0.719	0.507	<b>0.632</b>	7	0.678	0.306	<b>0.492</b>	10
51	Chand Khanda	0.549	0.406	<b>0.490</b>	26	0.376	0.179	<b>0.278</b>	54
52	Pahlanpur	0.431	0.440	<b>0.435</b>	43	0.327	0.219	<b>0.273</b>	58
53	Purbba Srirampur	0.446	0.525	<b>0.478</b>	30	0.433	0.324	<b>0.379</b>	23
54	Raj Chak	0.451	0.492	<b>0.468</b>	34	0.375	0.281	<b>0.328</b>	38
55	Natshal	0.691	0.691	<b>0.691</b>	3	0.702	0.546	<b>0.624</b>	2
56	Andulya	0.333	0.509	<b>0.406</b>	49	0.327	0.313	<b>0.320</b>	43
57	GoyalBerya	0.141	0.421	<b>0.257</b>	71	0.138	0.196	<b>0.167</b>	72
58	Chandipur	0.312	0.464	<b>0.375</b>	57	0.275	0.254	<b>0.264</b>	61
59	Lakshya 1	0.509	0.764	<b>0.614</b>	9	0.519	0.645	<b>0.582</b>	3
60	DwariBeryaChak	0.593	0.516	<b>0.561</b>	15	0.458	0.317	<b>0.387</b>	20
61	Jagatpur	0.347	0.324	<b>0.338</b>	63	0.323	0.249	<b>0.286</b>	52
62	Betkundu	0.418	0.314	<b>0.375</b>	55	0.409	0.244	<b>0.326</b>	40
63	Shuklalpur	0.509	0.190	<b>0.377</b>	54	0.474	0.166	<b>0.320</b>	42
64	TentulBerya	0.464	0.202	<b>0.356</b>	60	0.370	0.176	<b>0.273</b>	57
65	GopalChak	0.491	0.309	<b>0.416</b>	48	0.408	0.223	<b>0.316</b>	44
66	Hirarampur	0.605	0.165	<b>0.423</b>	47	0.460	0.139	<b>0.300</b>	48
67	Dhamait Nagar	0.607	0.196	<b>0.438</b>	41	0.440	0.172	<b>0.306</b>	47
68	BhangaGara	0.609	0.186	<b>0.434</b>	44	0.522	0.156	<b>0.339</b>	33
69	Badur	0.570	0.150	<b>0.397</b>	51	0.422	0.111	<b>0.267</b>	60
70	Deulpota	0.425	0.198	<b>0.331</b>	64	0.332	0.178	<b>0.255</b>	63
71	Dharmapur	0.313	0.184	<b>0.259</b>	70	0.258	0.168	<b>0.213</b>	69
72	Ichhapur	0.431	0.295	<b>0.375</b>	56	0.386	0.205	<b>0.296</b>	50
73	Mayachar	0.523	0.511	<b>0.518</b>	23	0.455	0.307	<b>0.381</b>	22
74	GarhKamalpur	0.783	0.891	<b>0.828</b>	1	0.749	0.795	<b>0.772</b>	1

Source: Census of India 2011, Govt. of India

Table 2: Weights of Different Components to Obtain Final Index Values like GUI, TCI and AI on the basis of both EWP and PCA with reference to Table 1

COMPOSITE INDEX	COMPONENTS	EQUAL WEIGHTS PRINCIPLE (EWP)	PRINCIPAL COMPONENT ANALYSIS (PCA)
GUI	TCI	<b>0.50</b>	<b>0.59</b>
	AI	<b>0.50</b>	<b>0.41</b>
TCI	ITP	<b>0.33</b>	<b>0.22</b>
	IPD	<b>0.33</b>	<b>0.25</b>
	IMMW	<b>0.33</b>	<b>0.54</b>
AI	DIH	<b>0.33</b>	<b>0.19</b>
	DIE	<b>0.33</b>	<b>0.28</b>
	DISEI	<b>0.33</b>	<b>0.52</b>

Source: Calculation by the Author(s)

## 7. CONCLUDING REMARKS

It is worth mentioning that the block level or more specifically the village level analysis of urbanization is meaningful for planners, policy-makers and administrators of a state. A distinct feature of village level urbanization is that, it has a tendency of being encouraged by the factors of greater accessibility to market, labour force and raw materials. Another feature is that the vast expanse of productive and rich agricultural areas supports urban centers at a subdued level. In our study of a particular agro-based block and its village-units within, we have seen that both the above mentioned features are present.

Understanding about the extent and nature of urbanization of a few small places, called village-units is done in this study on the basis of construction of various indices. In general sense, an index is defined as a statistical device which summarizes a collection of data in a single base figure. The composite figure serves as a benchmark for measuring changes in a particular field. In accordance with this perception we have tried to construct a GUI for a place and its underlying dimension and factor indices. The entire study is focused in such a way that a scale of urbanization can be evolved and through that measurement scale, one can have an exhaustive idea about urbanization, urban facilities and urban amenities of an area, and consequently of a block, district and finally the state. We have successfully fulfilled our objectives of this study which are mentioned in Section 3 of this article and constructed the respective town criteria indices, factor indices, dimension indices and finally the generalized urbanization index and have made all the places of any nature be comparable in terms of urbanization. We, on the basis of this study, propose that, in this world, no area-unit is non-urban. What actually matters is their relative position in the *Generalized Urbanization Measurement Scale (GUMS)* which is to be obtained by applying our method of constructing the GUI. Clearly this study will help us in analyzing the highs and lows of urbanization features in small places as agenda for further research.

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**APPENDIX: TABLE 1**

Sl.No.	Name of the Village Units	ITP	IPD	IMMW	DIH (PCA)	DIE (PCA)	DISEI (PCA)	DIH (EWP)	DIE (EWP)	DISEI (EWP)
1	TeraparaJalpai	0.230	0.058	0.941	0.146	0.194	0.417	0.133	0.194	0.333
2	Lakshya 2	0.311	1.000	0.973	0.187	0.293	0.814	0.185	0.278	0.600
3	BaramritBere	0.327	0.367	0.365	0.198	0.403	0.386	0.213	0.403	0.267
4	Danipur	0.053	0.272	0.228	0.213	0.081	0.771	0.225	0.079	0.533
5	Magori	0.071	0.298	0.215	0.178	0.081	0.404	0.200	0.079	0.300
6	Kesabpur	0.315	0.275	0.377	0.217	0.646	0.784	0.195	0.639	0.567
7	Amritberya	0.348	0.275	0.670	0.288	0.226	0.765	0.233	0.231	0.533
8	Bholsara	0.176	0.263	0.332	0.222	0.211	0.733	0.213	0.199	0.467
9	Bamanpur	0.130	0.396	0.559	0.153	0.113	0.183	0.160	0.116	0.117
10	KhalsaBamanpur	0.058	0.254	0.245	0.076	0.081	0.183	0.080	0.079	0.117
11	Ghasipur	0.102	0.328	0.684	0.076	0.371	0.707	0.080	0.366	0.400
12	Gopalpur	0.732	0.423	0.685	0.191	0.307	0.778	0.185	0.310	0.567
13	Basulya	0.405	0.454	0.868	0.599	0.145	0.526	0.648	0.153	0.567
14	Kamalpur	0.148	0.092	0.646	0.222	0.113	0.726	0.213	0.116	0.433
15	Latmajnur Uttar Chak	0.000	0.000	0.000	0.000	0.000	0.707	0.000	0.000	0.400
16	Banka	0.058	0.266	0.139	0.168	0.145	0.726	0.173	0.153	0.433
17	Gajipur	0.212	0.520	0.478	0.076	0.081	0.707	0.080	0.079	0.400
18	Rangibasan	0.226	0.515	0.892	0.293	0.273	0.886	0.341	0.282	0.767
19	Jagannathpur	0.147	0.755	0.898	0.199	0.145	0.846	0.198	0.153	0.667
20	Terapekhya	0.138	0.700	0.931	0.622	0.032	0.880	0.530	0.037	0.767
21	Gopalpur	0.265	0.372	0.830	0.484	0.130	0.827	0.403	0.120	0.633
22	Machhlandapur	0.297	0.484	0.897	0.430	0.113	0.796	0.363	0.116	0.567
23	KismatnaiKundi	0.236	0.608	0.887	0.250	0.179	0.404	0.238	0.162	0.300
24	Malubasan	0.132	0.255	0.680	0.241	0.113	0.745	0.225	0.116	0.467
25	Tajpur	0.129	0.188	0.803	0.337	0.211	0.796	0.318	0.199	0.567

**APPENDIX: TABLE 1 Continued...**

Sl.No.	Name of the Village Units	ITP	IPD	IMMW	DIH (PCA)	DIE (PCA)	DISEI (PCA)	DIH (EWP)	DIE (EWP)	DISEI (EWP)
26	Itamagra	0.355	0.260	0.425	0.253	0.226	0.790	0.238	0.231	0.567
27	DakshinKasim Nagar	0.092	0.287	0.926	0.483	0.359	0.796	0.390	0.324	0.567
28	Rajarampur	0.359	0.357	0.514	0.288	0.096	0.809	0.265	0.111	0.600
29	Uttar Kasim Nagar	0.115	0.373	0.320	0.426	0.032	0.764	0.353	0.037	0.500
30	KanchanpurJalpai	0.254	0.158	0.447	0.285	0.113	0.436	0.265	0.116	0.367
31	KeshabpurJalpai	0.790	0.266	0.742	0.386	0.258	0.822	0.353	0.269	0.633
32	Bamunya	0.313	0.229	0.597	0.127	0.145	0.886	0.120	0.153	0.767
33	Kapaserya	0.332	0.247	0.613	0.197	0.194	0.816	0.173	0.194	0.633
34	Kapurda	0.169	0.322	0.689	0.127	0.032	0.827	0.120	0.037	0.633
35	Kanchanpur	0.493	0.651	0.893	0.240	0.339	0.294	0.220	0.347	0.383
36	Bagda	0.079	0.256	0.219	0.282	0.032	0.777	0.275	0.037	0.533
37	SarBerya	0.101	0.240	0.689	0.222	0.032	0.764	0.213	0.037	0.500
38	Ghagra	0.103	0.406	0.821	0.273	0.032	0.726	0.253	0.037	0.433
39	Sundra	0.056	0.393	0.822	0.250	0.113	0.713	0.238	0.116	0.400
40	Ektarpur	0.174	0.427	0.848	0.076	0.064	0.796	0.080	0.074	0.567
41	Basudebpur	0.083	0.294	0.491	0.153	0.032	0.745	0.160	0.037	0.467
42	Jhaupatra	0.148	0.289	0.526	0.265	0.064	0.827	0.343	0.074	0.633
43	Madhya Hingli	0.287	0.313	0.759	0.267	0.278	0.827	0.263	0.245	0.633
44	Chanpi	0.461	0.295	0.447	0.172	0.258	0.417	0.173	0.269	0.333
45	BaksiChak	0.086	0.141	0.613	0.076	0.032	0.771	0.080	0.037	0.533
46	KalikaKundu	0.566	0.272	0.697	0.146	0.290	0.765	0.133	0.306	0.533
47	ChakGajipur	0.106	0.271	0.347	0.102	0.113	0.771	0.120	0.116	0.533
48	Mashurya	0.336	0.239	0.635	0.177	0.209	0.758	0.158	0.227	0.500
49	Ajra	0.206	0.322	0.830	0.142	0.162	0.480	0.133	0.157	0.433
50	Rambag	0.371	0.927	0.736	0.203	0.145	0.796	0.198	0.153	0.567
51	Chand Khanda	0.032	0.133	0.964	0.118	0.032	0.694	0.133	0.037	0.367
52	Pahlanpur	0.096	0.210	0.675	0.102	0.032	0.764	0.120	0.037	0.500
53	Purbba Srirampur	0.443	0.369	0.488	0.187	0.162	0.827	0.183	0.157	0.633
54	Raj Chak	0.087	0.454	0.584	0.164	0.064	0.820	0.170	0.074	0.600
55	Natshal	1.000	0.341	0.766	0.562	0.533	0.816	0.463	0.542	0.633
56	Andulya	0.333	0.296	0.354	0.383	0.145	0.726	0.353	0.153	0.433
57	GoyalBerya	0.100	0.176	0.137	0.123	0.032	0.720	0.118	0.037	0.433
58	Chandipur	0.180	0.250	0.394	0.234	0.064	0.739	0.223	0.074	0.467
59	Lakshya 1	0.727	0.273	0.556	0.392	0.968	0.822	0.340	0.963	0.633
60	DwariBeryaChak	0.114	0.367	0.892	0.304	0.064	0.809	0.278	0.074	0.600
61	Jagatpur	0.292	0.265	0.412	0.181	0.162	0.457	0.158	0.157	0.433
62	Betkundu	0.435	0.335	0.457	0.190	0.128	0.449	0.183	0.148	0.400
63	Shuklalpur	0.331	0.527	0.565	0.095	0.177	0.234	0.093	0.190	0.217
64	TentulBerya	0.131	0.310	0.670	0.156	0.130	0.253	0.158	0.120	0.250
65	GopalChak	0.193	0.360	0.671	0.353	0.032	0.417	0.300	0.037	0.333
66	Hirampur	0.118	0.329	0.932	0.153	0.064	0.215	0.160	0.074	0.183
67	Dhamait Nagar	0.074	0.245	1.000	0.238	0.032	0.255	0.195	0.037	0.283
68	BhangaGara	0.290	0.481	0.795	0.172	0.064	0.247	0.143	0.074	0.250
69	Badur	0.070	0.288	0.907	0.076	0.032	0.234	0.080	0.037	0.217
70	Deulpota	0.115	0.242	0.638	0.229	0.064	0.247	0.210	0.074	0.250
71	Dharmapur	0.045	0.325	0.404	0.166	0.032	0.260	0.185	0.037	0.283
72	Ichhapur	0.268	0.363	0.528	0.253	0.064	0.417	0.208	0.074	0.333
73	Mayachar	0.384	0.270	0.710	0.120	0.386	0.726	0.090	0.398	0.433
74	GarhKamalpur	0.588	0.831	0.830	0.884	0.742	0.962	0.720	0.731	0.933