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## Research Article

### MORPHOLOGICAL ANALYSIS OF A HISTORICAL URBAN LANDSCAPE: THE CASE OF CONTAI, AN EARLY URBAN CENTRE OF EASTERN INDIA

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#### ABSTRACT

In Urban geography, the study of the pattern and morphology of building in urban centres concerted with land use categories, has a cherished legacy which started with formulating mode of the plan that underlies the expression of spatial heterogeneity in housing, commercial activities and industrial activities carried out in an urban system. The present treatise is a humble attempt to analyze the morphological components of Contai urban centre, Eastern India. It seeks to explain this urban landscape of historical importance as a post-modern space where built heritage and innovation design of space have become the competitive facets of the urban centre in terms of metamorphosis of urban structure under the influence of processes like urban redevelopment, gentrification, sprawling and intra-urban competition in economic and social context etc. In arriving at the above object, intensive survey has been conducted taking homogeneous building block as the basic unit of study. Building blocks separated by arterial roads were identified from the high resolution satellite images downloaded from open source. Information for each of such building blocks was collected and recorded using pre-designed field manual and questionnaires. Thus a model of urban morphology has been formulated.

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## INTRODUCTION

Urban morphology can be defined as an approach that provides an understanding of the form, creation and transforming processes, spatial structure and character of human settlements through an analysis of historical development processes and the constituent parts that compose the settlements (Larkham, 1987). In this essence, urban morphology is used as an important assessment tool or method in determining the change-transformation processes of urban fabrics, making sense of historical roots of spatial and functional structures and bringing them to the present day (Conzen, 1981). The development of urban morphology, which constituted a component of urban geography as a subject, as an independent scientific discipline and it is use as a method in the analysis of the physical structures of the urban centres dates back to the first half of the Twentieth century (Whitehand, 1986). Buildings (residential and commercial), architectures, streets and monuments are among the main elements of morphological analysis (Larkham, 1987). These elements, however, are considered as organisms which are constantly used and hence transformed through time. They also exit in a state of tight and dynamic interrelationship: built structures shaping and being shaped by the open space around them, public streets serving

and being used by the private land owners along them. The dynamic state of the urban centres, and the pervasive relationship between elements have led many urban morphologists to prefer the term “urban morphogenesis” to describe their field of study (Moudon, 1997). In the course of time, various approaches have emerged for morphological analysis; in ISUF (International Seminar of Urban Form), the coming together of researchers from different language areas and disciplines is described as founded on common ground. First, there is agreement that the urban centre can be “read” and analyzed via the medium of its physical form. Further, there is widespread acknowledgement that, at its most element level, morphological analysis is based on three principles.

1. Urban morphology is defined by three fundamental physical elements: building and their related open space, plots or lots, and streets.
2. Urban morphology can be understood at different levels of resolution. Commonly, four are recognized, corresponding to the building/lot, the street/block, the city and the region.
3. Urban morphology can only be understood historically since the elements of which it is comprised undergo continuous transformation and replacement (Moudon, 1997).

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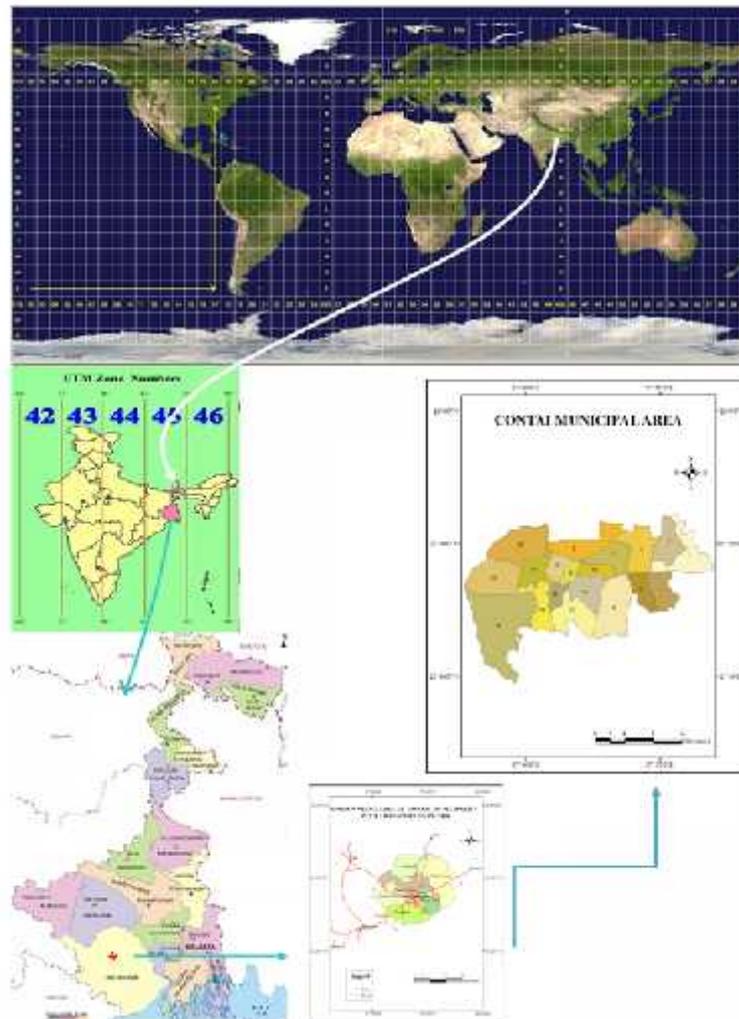
In Conzen's approach, urban morphology is the study of the form and shape of settlements. Initial work in the field focused on analyzing evolution and change in traditional urban space (Lane, 1991). Conzen considered land uses, building structures, plot pattern and street pattern to be the most important (Conzen, 1960). Buildings, particularly the land uses they accommodate, are usually the least resilient elements. Although more enduring, the plot pattern changes over time as individual plots are subdivided or amalgamated. The street plan tends to be the enduring element (Lane, 1991). The main topic of the studies conducted by Krier, was the examination of urban history and historical urban pieces through morphological and topological analyses, (Davies, 1968) the study of sociological, cultural and psychological reasons for the formation of urban form and fabric (Glasson, 1978). Urban morphology has become a common and important research method for the analysis of the physical structures of urban centres through the numerical content (Space Syntax) brought in these studies by Hillier specially with the support of the technological developments experienced in recent years (Murphy, 1974). Space syntax is a technique that can be used for morphological analyses of buildings, architectural plans, urban areas, and urban plans.

It has seen that there are countless studies about Urban Morphology by space syntax method. But the present study is a humble attempt to analyze the morphological component of Contai, a historical urban centre of Eastern India. It seeks to explain the urban landscapes of historical importance where built heritage and innovation design of space have become the competitive facets of the urban centre in terms of metamorphosis of urban structure under the influence of processes like urban redevelopment, gentrification, sprawling and intra-urban competition in economic and social context. The basic goal is to identify the urban morphological pattern and landscape view of Contai as an early urban centre of Eastern India. For fulfilling the above goal, the objective has been pigeonholed into three components. These are to classify residential areas based on socio-economic and morphological characteristics; to classify commercial areas on the basis of nature and type of activities and regional importance and to develop a morphological model of the internal structure of the city.

## MATERIALS AND METHODS

### Study area

Contai is headquarters of Contai sub-division in Purba Medinipur district, West Bengal.



**Fig.1** Location map of the study area

In its early phase of evolution the area, 27 miles in and from Rasulpur estuary was occupied by an outstretched sand dune elevated and elongated enough to appear in the form of a long walls, locally known as ‘Kanth’s and these ‘kanth’s gave the place its name (O’Malley, 1911). Consequent marine regression left this beach ridges inland for development of settlements like Majna, Kandi etc over them about 6000 years ago (Majumdar, 1971). After eighth century, port Tamralipta lost its importance (O’Malley, 1911) and Hijili became a great trade centre (O’Malley, 1911). European trade appears to have flourished during colonial period around Contai (Roy, 2006 & O’Malley, 1911). In 1852 A.D., the East India Company announced as a sub-division consisting of six police stations – Contai, Khejuri, Ramnagar, Egra, Bhagabanpur and Pataspur and the sub-divisional office was at Nega (Hunter, 1876). Bankim Chandra Chattopadhyaya served as the deputy magistrate of Contai from January to November, 1860 (Sharma, 2003). In 2002, Medinipur district was divided into two – Purba and Paschim Medinipur for the sake of administrative efficiency. Purba Medinipur district consists of four sub-divisions – Contai, Tamluk, Egra and Haldia. Contai urban area is under Contai block and Contai block is under Contai sub-division. Presently, Contai urban area is about 30 kilometres away from the beach town Digha, a famous tourism centre of West Bengal as well as Eastern India. Now-a-days, Contai is famous for cashew nut industry, salt processing industry and also for kansa and madur production.

**METHODOLOGY**

In arriving at the above object, an intensive survey has been conducted taking homogeneous building block as the basic units of study. Building blocks separated by arterial roads were identified with the help of high resolution satellite images downloaded from open source (wikimapia.org). Information for each of such building block was collected and recorded using predesigned field manual and questionnaires. Thus, collected spatial information were organized and classified on the basis of external form, mode of functioning etc. All the categories of classified information were then employed in mapping in spatial segregation and /or aggregation of residential, commercial and industrial functions across the area under study. This had led to the identification of morphological analysis of Contai, a historical urban landscape in Eastern India in question, each of which can be considered as an expression of urbanization process operative over a long period of time since pre-historic period.

**DISCUSSION AND RESULTS**

**Residential Areas**

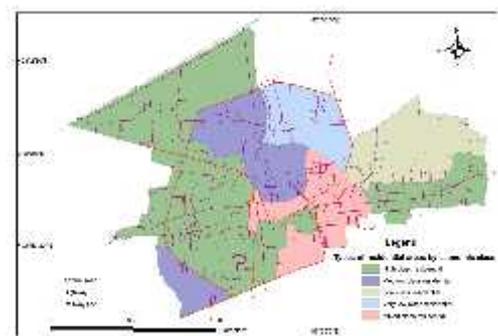
Residential pattern of various groups of urban centre have received considerable attention in past few decades in both the urban academic literature and urban morphological analysis (Davies, 1968). Residential land use is the largest sector of the urban spatial structure. Housing constitutes one of the most basic human needs and ranks second behind feeding (Pacione, 2004). Housing and the housing environment have been defined variously by different scholars as encompassing the entire residential environment including the structural characteristics of the house occupied as well as the internal and external facilities that contribute towards a conducive

condition of living (Rao, 1964). According to Carter (1972), the bases used in identifying residential areas have been grouped into two major classes, namely: Environmental characteristics of residential areas, and Socio-economic characteristics of the residential areas. This paper, however, concentrates on the second class of the criteria. In order to properly understand the component of the residential structure of the study building blocks, first of all, examine the residential characteristics of the households covered by this study. Residential class may be defined as relatively permanent and homogeneous divisions in a society into which individuals or families sharing similar values, life styles, interests and behaviours can be categorized. Social scientists have not found it easy identifying one particular variable of residential status; hence use is often made of proxy variables such as income, occupation and so on, to characterize the residential areas.

**Tab.1** Bases for the classification of residential building blocks

Bases for Classification of residential areas	
•	Characterization of residential areas by economic class
•	Characterization of residential areas by Social class
•	Morphological pattern of the residential areas according to average height of the buildings
•	Length, spacing and organization of the building blocks
•	Morphological pattern of the building blocks according to dominant architectural design

Characterization of residential areas by economic class: Residential segregation by income has increased during the past three decades across the developing countries (Roy, 2006). Usually, a household in a developing country utilizes its income to take care of the housing, clothing, educational, transportations and medical expenses, among many other competing needs. Thereafter it may consider savings. Household income plays a crucial role in the housing and neighbourhood preferences of residents. If the income is low or very low, the household may use mud or single floor house in the backward periphery of the urban centre, but as the income increases, it may then decide to own one, either by building or buying from the housing market (Roy, 2006).



**Fig. 2** Characterization of residential areas by economic class

In case of present study, household incomes of Contai urban area have been classified into five economic classes, namely, high, medium, low, very low and mixed income class (Majumdar, 1971). Those in the low income category have monthly incomes lies in between Rs. 5000 and 15000, while those earning between Rs. 15000 and 25000 are in the medium income group. The high income group comprises those whose monthly incomes are in excess of Rs. 25000. The low income

class building blocks constituting about 13 percent and very low constituting about 10 percent of the total Contai urban area and have been located in Puratan Bari and eastern side of Canel Parh i.e. Contai bazar. On the other hand, medium income makes up 16 percent of the total urban area. Building blocks with high concentrations of medium income earners include Damodarpur, Canel Parh, Dhandighi, Padapukuria. Those building blocks in the high income category constitute 46 percent of the total urban area and have been concentrated mainly in Padapukuria (between Contai station and Contai bypass), Banamalipur and School bazaar. But mixed class residential areas have been developed mainly in the core of the city (Block office market, Canal parh bazar) and it is mainly the commercial sector of Contai urban area.

### Characterization of residential areas by social class

Structural approaches of class analysis typically measure social class through indicators of socio-economic status such as income, occupation, and education (Ray & Chattopadhyaya, 1992).

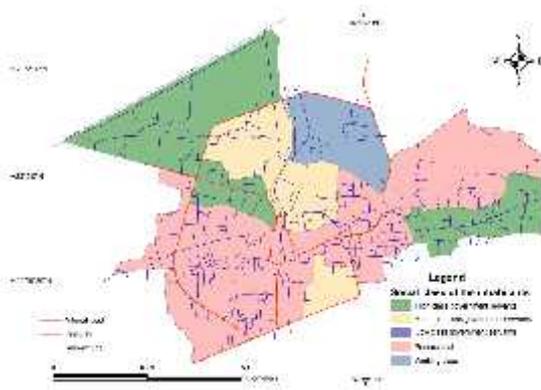


Fig. 3 Characterization of residential areas by social class

Weber (1947) categorized social classes as working class, lower-middle class, intelligentsia, and upper class (Johnston, 2002). Similar to Weber, the stratification of social classes demonstrated through Warner's class model (1949) divides classes into upper, middle, and lower, with subdivisions in each (upper-upper class, lower-upper class, upper-middle class, lower-middle class, upper-lower class and lower-lower class) (Derek, 2009). Newer variations of Warner's model have since been produced by sociologists such as Gilbert (2002) and Thompson and Hickey (2005), and although the variations use different levels, the six hierarchical levels usually remain intact (Livingston, 2000 & Eaton and Richard, 1982).

In case of present study, the occupational distribution of Contai urban centre reflects the economic base of the building blocks and the residents have been made of high, medium and low class government servants, professional and working class workers. All type social class has been found in each and every ward i.e. a mixed type of social class of the inhabitants has been highlighted. But most of the persons have been engaged themselves in working class, professional and low class govt. servants. High and medium class government servants are very much few. There has been some relationship between economic class and social class of Contai urban centre. By superimposing the two maps of residential area by economic

class and by social class, it has been cleared that the high class residential area and high class govt. servants or professional groups of workers have been coincided. It has been also applicable for the area of low class residence and working class or low class servants. The hearth areas of Contai urban centre included Padapukuria (between Contai station and Contai bypass), Banamalipur and School bazaar. These areas and near about these areas have been used for the people living the apex of social class, either belong to high class govt. servants or managerial and professional services. Towards the east outer margin from the urban centre, low class govt. servants and working class has been found due to bad transport facility but towards Bypass or Station or Digha, just opposite view because of good transport facility along with availability of other amenities.

Morphological pattern of the residential areas according to average height of the buildings:

For morphological analysis of Contai urban centre, the urban centre has been classified on the basis of average height of the buildings —Ground floor, 1<sup>st</sup> floor, 2<sup>nd</sup> floor.

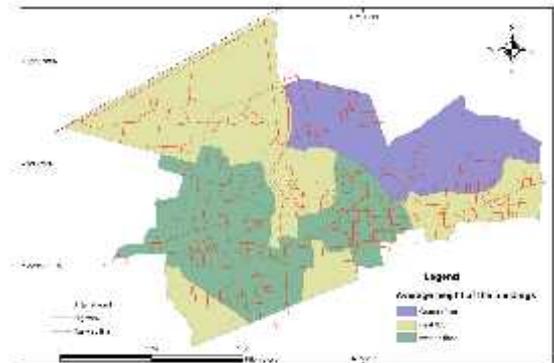


Fig.4 Average height of the building block

From the floor map Contai urban centre, it has been cleared that second floor are generally concentrated in the city centre (commercial area) like Contai central bus stand bazaar, along station road (Padapukuria), along Digha road (Banamalipur), Block office market, Super market etc. and first floor are concentrated mainly in the residential hearth of Contai urban centre like Contai station, along municipality roar (Padapukuria), Damodarpur, School bazaar, Jaganathpur etc. The outer margin of the urban centre (mainly in the Puratanbari bazaar) has been comprised with ground floor but mud's made houses are rarely seen in the periphery region. Except Puratanbari bazaar side, the others outer side of Contai urban centre (end part of Banamalipur, Contai station adjacent area etc.), first floor buildings have been found because these are newly developed area of the urban centre for the people belong to high economic class. They came from other than Contai due to their profession

### Length, spacing and organization of the building blocks

Size and spacing of buildings are important concern of urban morphology. As the land price is high enough in the city centre and adjacent zones, the urban centre is used for commercial purpose, but beside this administrative and high class residential and squatter type settlement are also found. As the land price is high enough, so the entire urban land is used with

fully cover and spacing between or among buildings are near about 1m or <1m. But the essential spacing between the two buildings is 16 m for absolute scattering of solar radiation from the surface of the ground after the critical stage of absorption. In case of every urban centre due to hike land price, the entire urban area is used closely, for this reason the radiation or scattering from the earth surface is not satisfactorily finished.

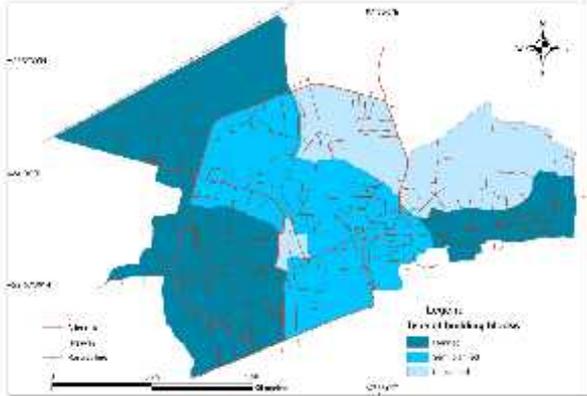


Fig.5 Length, spacing and organization of the building block

In Contai urban centre, the entire urban areas are not spacing plan fully. The main commercial areas of Contai urban centre are Super market, School bazaar, Block office market, Canal Parh bazar etc. The average spacing between the buildings is less than 1m.. But in the residential hearth of Contai urban centre like Contai station area, Dhandighi, Baghmari, Padapukuria etc., the spacing between buildings is greater than 1m and from the city centre towards Contai station, Banamalipur, Dhandighi and Baghmari the average spacing between and among the buildings increases rapidly. The amount is >1.5m.

Morphological pattern of the building blocks according to dominant architectural design:

As Contai is a historical urban centre, so history plays an important role over the architectural design of Contai urban centre (Basu 1921). The city centre has been comprised with mainly square shaped modern architecture along with different historical architecture.

One of the popular attractions is Nimak Mahal office. ‘Nimak mahal’ means ‘Salt factory’. In 1863, when Nimak mahal at Contai ceased functioning, the office shifted from Negua to the abonded Nimak mahal building. The Arch shaped office is located near Contai Prabhat Kumar College.



Fig.6 Dominant architectural designs

Kapal Kundala Kali temple in Puratan bari bazaar is an ancient temple based on which Bankim Chandra’s novel is written. It is an example arch with Ek-ratna (one tower or arch with terracotta sculptures) style architecture.

Uttar Darua Shiv temple arched with curving architecture style (Arched) in Uttar Darua built around 16th century A.D. Square with curving works architectural style temple of Athilagori Sitala temple at Athilagori, Harisabha temple at Contai bazaar, Maa Sarada Asharm at Puratanbari bazaar; Mundamari Kali temple (Arched) at Damodarpur; Contai jail (Square and arched) at Puratanbari bazaar; Contai High School (Square and arched) at School bazaar are the others architectural interest.

There are many places of Muslim religious importance as well, like North Darua James mosque (Dome with curving works) at North Darua, Hijili mosque (Dome with curving works) at Puratanbari bazar are the most popular mosques in Contai sub-division.

All types of architecture like square, arch, dome and curving works have been found in the city centre which proves that the urban centre have a historical back ground, but the modern building blocks are generally in square shaped. Due to rapid urbanization and to settle down the spillover or extra population, there are needs of buildings in the periphery region which are mostly square shaped, ground floor to two floors.

**Commercial Areas**

Commercial areas in an urban centre are the areas, primarily composed of commercial buildings, such as commercial strip or shopping center. Commercial activity within the cities includes the buying and selling of goods and services in retail businesses, wholesale buying and selling, financial establishments, and a wide variety of uses that area broadly classified as ‘business’. They provide employment, facilitate the circulation of money, and often serve many others roles important to the community. A commercial area is real estate intended for use for profit businesses, such as shopping malls, street shops, and restaurants.

Tab.2 Bases for the classification of commercial building blocks

Bases for classification of building blocks	
Classification of commercial areas	
•	Nature and type of commercial activities
•	Hierarchic position of the commercial centres

Nature and types of commercial activities:

Contai urban centre has been divided into mainly two types of commercial areas. These are Wholesaling areas and Retailing areas

**Whole selling areas**

Wholesaling (sale without transformation) is the sale of goods mainly cloths, metals, grocery articles etc in large quantities, as for resale by a retailer. Wholesaling commercial area means from where any trading material sale with large amount and large capital. Nature of wholesaling activities is large scale like large capital, large selling material, huge labour etc. Wholesaling activities are found mainly in Baghmari, Block Office Market, Super Market, Canal Parh Bazar, School Bazar, Banamalipur and Dhandighi. Wholesaling or big market area is mainly dominated by high class society area.

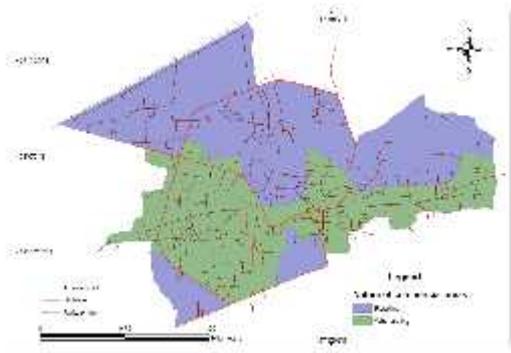


Fig.7 Nature and type of commercial areas

### Retailing areas

Retail involves the process of selling consumer goods or services (Final goods) to customers through multiple channels of distribution to earn a profit. Demand is identified and then satisfied through a supply chain. Nature of retailing type of commercial activity is small scale type. Retailing areas are mainly two types on the basis of the shape of market - stripwise and centrewise. Retailing areas mainly dominated by mixed settlement area and low medium social type area. Different daily using material sales from retail centre.

### Patterns of retailing centers

The pattern of retailing centres is basically two types – stripwise and centrewise.

### Stripwise retailing centers

This type of retailing areas have been developed in Contai urban centre mainly along the urban arterial road and new urban ribbon road oriented. Types of articles of retailing centre are basically fruits, vegetables, flowers, clothes, books, motor vehicle parts etc. Strip wise retailing areas of Contai urban centre have been built up in unplanned manner except the some newly developed periphery area.

### Centre wise retailing centers

When the retailing centres are located in junction of communication or transport, then the retailing centres are developed in a concentric manner. It is termed as centre wise retailing areas. The types of articles of this centre are basically two types- I. Special production like- clothes etc. II. Retail cluster like-fruit, cloths, vegetable, fish etc.

Tab.3 Zonation of the commercial areas

Name of the commercial Zones	Nature of commercial activities
Jaganathpur	Retailing
Baghmari	Wholesaling and Retailing
Super Market	Wholesaling and Retailing
Block Office Bazar	Wholesaling and Retailing
Canal Parh Bazar	Wholesaling and retailing
School Bazar	Wholesaling and retailing
Banamalipur	Wholesaling and retailing
Dhandighi	Wholesaling and retailing
Damodarpur	Retailing
Puratanbari Bazar	Retailing
Contai Bazar	Retailing
Padapukuria	Retailing

Hierarchic position of the commercial centres:

The pattern of existing commercial centres within the Contai urban centre in the context of a commercial hierarchy as shown in the Table 4 below.

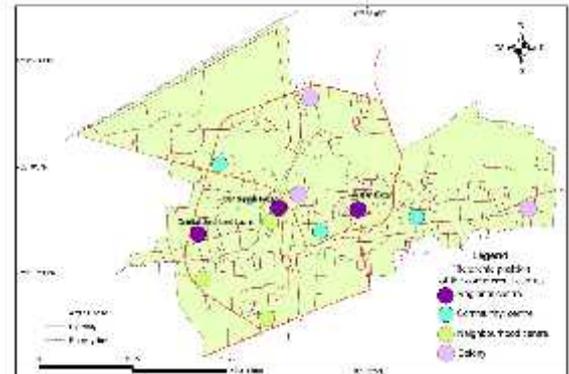


Fig. 8 Hierarchic position of the commercial centres

Commercial activity in the Contai urban centre is essentially concentrated in four centres: the regional centre (Canal Parh Bazar, Central Bus Stand Bazar and Puratanbari Bazar), the community centre (Padapukuria, Super Market and School Bazar), neighbourhood centre (Banamalipur, Dhandighi, Banamalipur Bazar etc.) and colony centre (Contai Bazar, Damodarpur Bazar etc.).

## CONCLUSION

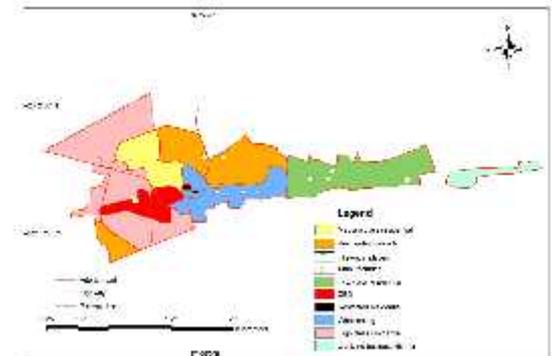


Fig.9 Application of Harris and Ullman's model in case of Contai urban centre

The information collected as above can be superimposed to identify the morphological zones of Contai urban centre. The resultant pattern grossly corresponds to the multiple nuclei model developed by Chauncy Harris and Edward Ullman (1945) (Verma, 2008) with an exception that two new morphological components have been found in case of Contai, namely historical heritage areas (Das, 2001) and restricted residential areas. Moreover, the C.B.D. has largely shifted from Canal parh bazaar through Central bus stand area towards Contai railway station in empower socio-economic dynamics of this age old city.

**Tab.4** Existing hierarchy of commercial centres in Contai urban area

Centres Hierarchy	Key Functions of	Centre		Centre(s)
	Floor Space	Population Served	Average area of Influence	
Regional Centre	Generally seen to comprise 4000 m <sup>2</sup>	Services population more than 1,00,000	80 Kilometre	Canal Parh Bazar, Central Bus Station Bazar, Puratan Bazar
Community Centre	Generally seen to comprise 1000 - 4000 m <sup>2</sup>	Services population between 50,000 - 1,00,000	20 Kilometre	Padapukuria, Super Market, School Bazar
Neighbourhood Centre	Generally seen to comprise 500 - 1000 m <sup>2</sup>	Services population between 5,000 - 50,000	5 Kilometre	Banamalipur, Dhandighi
Colony Center	Generally seen to comprise 100 - 500 m <sup>2</sup>	Services population less than 5,000	2 Kilometre (generally no more than a cluster of 20 shops)	Contai Bazar, Damodarpur

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