

Morphological analysis of a Historical Urban Landscape: the case of Tamluk, 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 Tamluk 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.

Index Terms- Legacy, Morphological Component, Built Heritage, Innovation Design, Gentrification.

I. 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. 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. 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. These elements, however, are considered as organisms which are constantly used and hence transformed through time.

They also exist 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, 1992). 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.

I. Urban morphology is defined by three fundamental physical elements: building and their related open space, plots or lots, and streets.

II. 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.

III. Urban morphology can only be understood historically since the elements of which it is comprised undergo continuous transformation and replacement (Moudon, 1992).

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 (Carter, 1972). Conzen considered land uses, building structures, plot pattern and street pattern to be the most important (Conzen, 1978). 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 (Carter, 1972). The main topic of the studies conducted by Krier, was the examination of urban history and historical urban pieces through morphological and topological analyses, (Lane, 1991) the study of sociological, cultural and psychological reasons for the formation of urban form and fabric (Kropf & Samuels, 1993). 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 (Larkham, 1987). Space syntax is a technique that can be used for morphological analyses of buildings, architectural plans, urban areas, and urban plans.

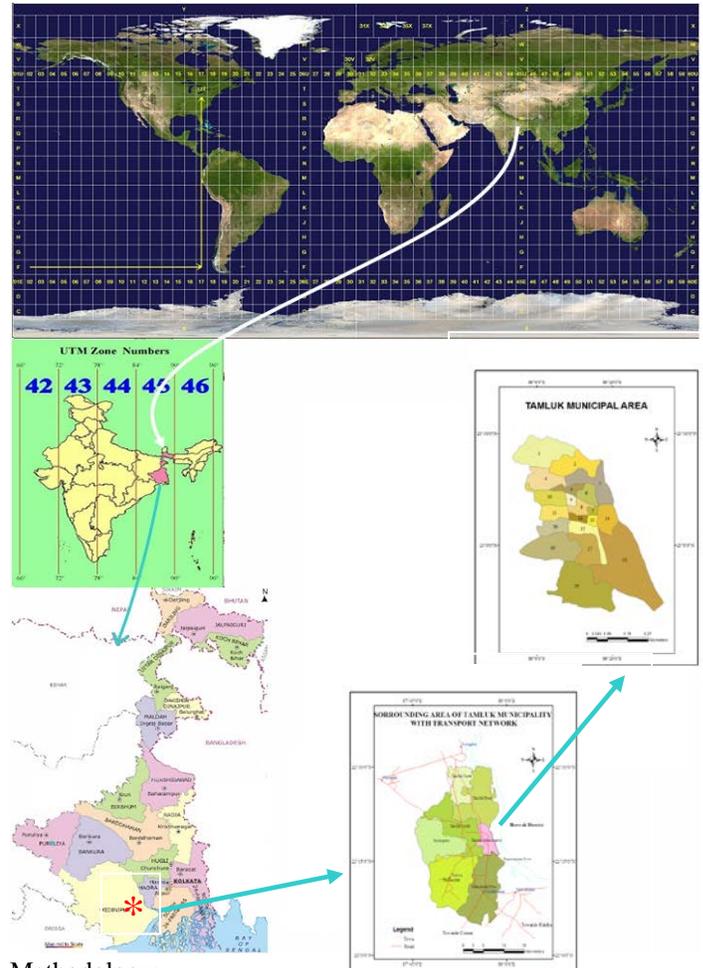
It has seen that there are countless studies about Urban Morphology by space syntax method (Conzen, 1981). But the present study is a humble attempt to analyze the morphological component of Tamluk, a historical urban centre of Eastern India. It seeks to explain the urban landscapes of historical importance 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 (Verma, 2008). The basic goal is to identify the urban morphological pattern and landscape view of Tamluk 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.

2. MATERIALS AND METHODS

Study area:

Tamluk is the headquarters of Tamluk sub-division (O'Malley, 1911), situated on the north bank of river Rupnarayana, 16 miles south west from Panskura railway station and with which it is also connected by road (Roy, 2006). Tamluk came into being about 1500 to 2000 years B.P. and at that time it was characterized by marshy land topography, halophytic plants and salt marshes (Roy, 2006). The low lying marshy area was filled up by depositional reworking of the rivers Hoogly and Rupnarayana. Thus, the area came into existence as an elevated land surface where port activities began to be carried out. By 700 B.C., Tamluk became a renowned port (Roy, 2006). But after the eighth century A.D., due to downfall of the port, Tamralipta lost its importance (Basham, 1975) and existed as a Portuguese settlement (Majumdar, 1971 & O'Malley, 1911). Presently, the Tamluk urban area exists as the centre of operations of district Purba Medinipur and has a strong control over the regional economy as a trade centre (Johnston, 2000). Different cultural traits left their imprints over the physical space. Some of which are still existent e.g. Bargabhim temple (Buddhist architecture) and Sakti temple (Oriya type architecture) (Basham, 1975).

Fig.1 Location map of the study area



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 Tamluk, 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.

3. DISCUSSION AND RESULTS

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. 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 (Conzen, 1978). 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 (Davies, 1968). 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

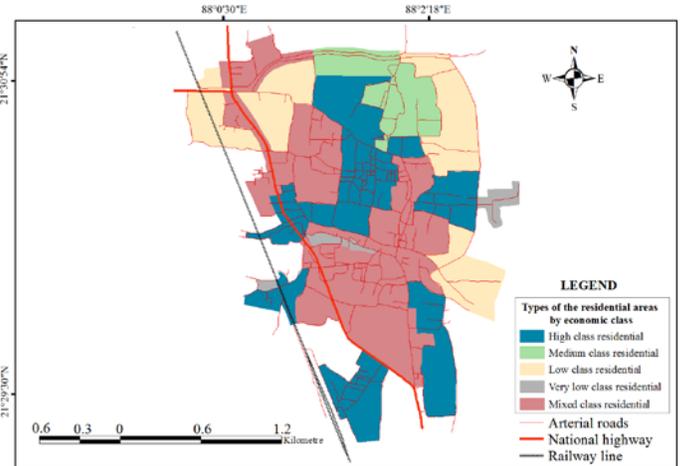
| Bases for Classification of residential areas | |
|---|---|
| • | Characterization of residential areas by economic class |
| • | Characterization of residential areas by Social class |
| • | Morphological pattern of the residential areas according to average height of the buildings |
| • | Length, 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 (Pacion, 2004). 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. In case of present study, household incomes of Tamluk urban area have been classified into five economic classes, namely, high, medium, low, very low and mixed income class. 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 21 percent and very low constituting about 4 percent of the total Tamluk urban area and have been located in Rupnarayana river side areas of Stimarghat, Barabazar and Matangini rail station. On the other hand, medium income makes up 14 percent of the total urban area. Building blocks with high concentrations of medium income earners include Jaikhana more and Tamluk college area. Those building blocks in the high income category

constitute 27 percent of the total urban area and have been concentrated mainly in the Courtpara, Tamluk station para, Hospital more and Sankarara. But sometime along highway i.e. along Mecheda-Haldia road, Srirampur road mixed class residential areas have been developed like in ward no.-20 and 25.

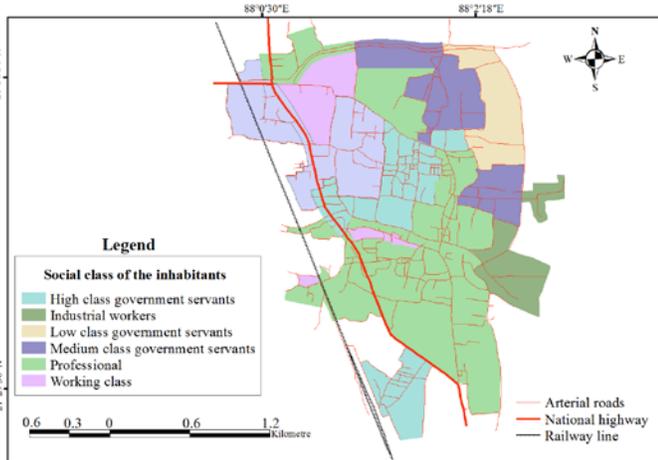
Fig.2. Residential areas by economic class



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. Weber (1947) categorized social classes as working class, lower-middle class, intelligentsia, and upper class. 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). 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. In case of present study, the occupational distribution of Tamluk 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, working class and industrial 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. Industrial and managerial workers are very much few. Only ward no. 18 has been belonged to industrial workers and has been engaged themselves mainly in brick field. There has been some relationship between economic class and social class of Tamluk 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 Tamluk urban centre included Barabazar, Parbatipur, Bhimarbar, Stimarghat, Salgachia. These areas and near about these areas

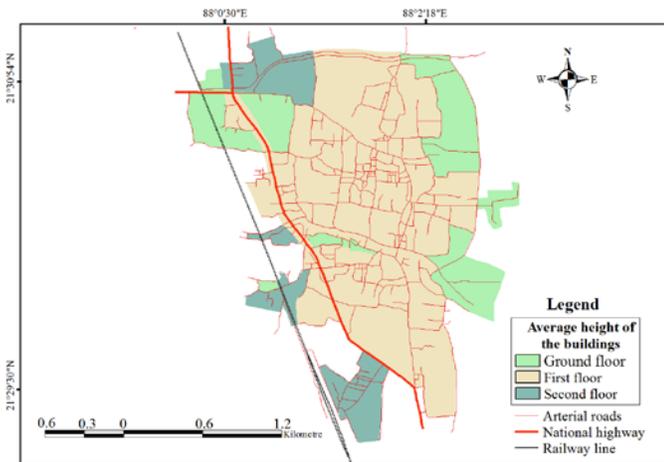
have been used for the people living the apex of social class, either belong to high class govt. servants or managerial and professional services. Towards the outer margin from the urban centre, low class govt. servants and working class has been found. There has no such ward which has been fully composed with a particular type of social class.
Fig.3. Residential areas by social class



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

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

Fig.4. Average height of the building block



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

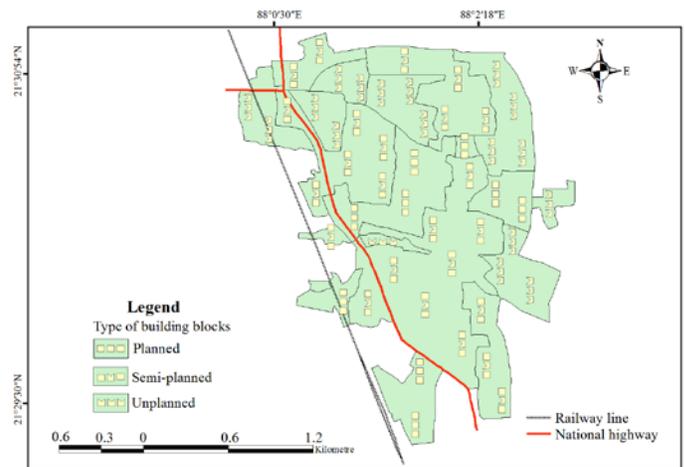
From the floor map Tamluk urban centre, it has been cleared that first floor are generally concentrated in the city centre and sometimes it has been seen in Jailkhana more, Panskura bus stand, Stimarghat, Bhimarbazar, Parbatipur, Nimatala, Hospitalmore, Salgachia etc. The outer margin of the urban centre has been comprised with ground floor but muds made houses are rarely seen in the periphery region. Second floor buildings have been found in the newly developed area of the

urban centre namely Tamluk station areas, from Hospital more towards Nimtouri, Sankarara and near Maniktala more area.

Characterization of residential areas by 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 metre 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 done and for this reason “Urban Heat Island” come into being. In Tamluk urban centre, the entire urban areas are not spacing plan fully. Near C.B.D. of the urban centre i.e. the Panskura bus stand, Stimarghat, Bhimarbazar, Salgachia, Nimatala the spacing between the buildings are is less than 1m but from the city centre outwards region the average spacing between and among the buildings increases rapidly. The amount is >1m.

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



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

As Tamluk is a historical urban centre, so history plays an important role over the architectural design of Tamluk urban centre. The city centre has been comprised with Square shaped architecture along with different historical architecture. Arched and curving works style architecture has been found in Tamluk Rajbai, dome and curving works style architectures have been found in two old masjid, Arched shaped architectures have been found in Tamluk court and Mahaprabhur mandir, Square and curving works style architectures have been seen in Tamluk irrigation bungalow and in Matangini sahid smarak and Hindu, Buddhist and Oriya type architecture has been found in Bargabhima temple. 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. Some of the above historical architectures are as under.

Tamluk Rajbari:

Tamluk Rajbari is one of the popular historic centres due to its cultural significance. History associated with the site dates back to 2500 years. The palace at the complex is believed to be established in 5th century B.C. by Mayuradha dynasty (Peacock dynasty). Besides, the site is also link with the incident of swayamvar sabha of lady Droupadi that occurred in the epic Mahabharata. During colonial rule, freedom leaders like Mahatma Gandhi and Netaji Subhas Chandra Bose also visited the site that hosted the chief events for freedom struggle (Sharma, 2003).

Rakhit Bati:

In the beginning of 19th century it was famous as a secret centre of revolutionary party ‘Anusilan Samiti’ and ‘Gupta Samiti’. Famous historian late Trilakyanath Rakhit rebuilt this building (Das, 2001).

Devi Barghobhima Mandir:

Nearly 1150 years old temple of Kali named as Devi Barghobhima. This temple is a part of 51 Sakti Peethas. Puranas says that the small finger of left feet of Sati Parvati fell her when Lord Vishnu cut the sacred body of Goddess Sati into several pieces to make Lord Shiva quite (Basu, 1921).

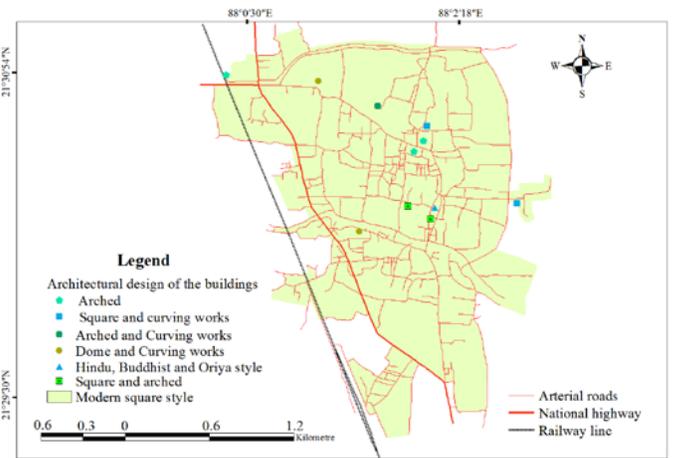
Hamilton High School:

It was founded in Tamluk in 1852 by Robert Charles Hamilton, who was a salt merchant. The school is the oldest institution in the districts of both Purba and Paschim Medinipur and has great significance in the educational history of Bengal (Hunter, 1876).

Matangini Sahid Smarak:

It is the side of a pond called Banpukur at Abasbari para near Tamluk court. During the ‘Ahinsa movement’ of 1942, while a crowd trying to capture Tamluk administrative building, British police opened fire in which Smt Matangini Hazra became ‘sahid’. Later on Mahatma Gandhi appreciated her bravery and titled her as ‘Birangana’. This movement is homage to her (Roy, 2006).

Fig.6.Dominant architectural design



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. In case of Tamluk station area, it is found that the newly developed buildings are characterized by square shaped and first floor with cemented roof.

Classification of commercial areas:

| Bases for classification of commercial building blocks | |
|--|--|
| • | Nature and type of commercial activities |
| • | Hierarchy of the commercial blocks |

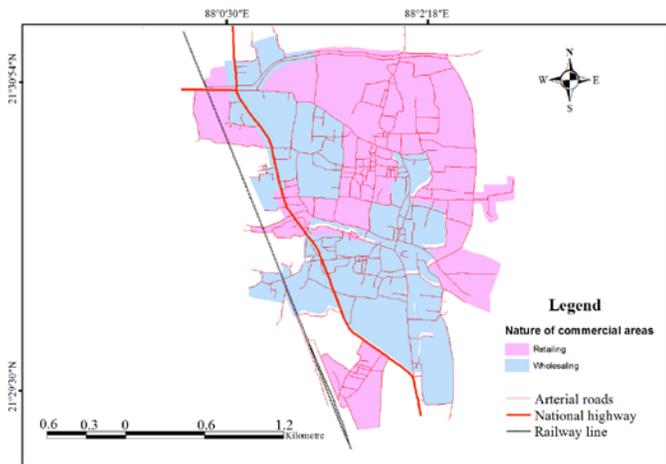
Nature and type of commercial activities:

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

Whole selling areas:

Wholesaling commercial area means from where any trading material sale with large amount and large capital (Derek, 2009). Nature of wholesaling activities is large scale like large capital, large selling material, huge labour etc (David, 2006). Wholesaling activities are found mainly in the urban center. Wholesaling or big market area is mainly dominated by high class society area. Mainly cloths, fruits, iron material etc are found in these areas.

Fig.7.Nature and type of commercial areas



basically two types- I. Special production like- clothes etc. II. Retail cluster like-fruit, cloths, vegetable etc.

Tab.2.Zonation of commercial areas

| Name of the commercial areas | Nature of the commercial areas |
|------------------------------|--------------------------------|
| Sahid matangini | Retailing |
| Maniktala | Wholesaling and Retailing |
| Jaikhana | Retailing |
| Stimarghat | Wholesaling and Retailing |
| Bhimar bazar | Wholesaling and Retailing |
| Parbatipur | Wholesaling and Retailing |
| Beltala | Wholesaling and Retailing |
| Salagechia | Wholesaling and Retailing |
| Nimtala | Wholesaling and Retailing |
| Hospitalmore | Wholesaling and Retailing |
| Bara bazar | Wholesaling and Retailing |
| High road bazar | Wholesaling and Retailing |
| Radhaballavpur | Retailing |
| Tamluk station | Retailing |

Retailing areas:

Nature of this type of commercial activity is small scale type (Glasson, 1978). 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 (Murphy, 1974).

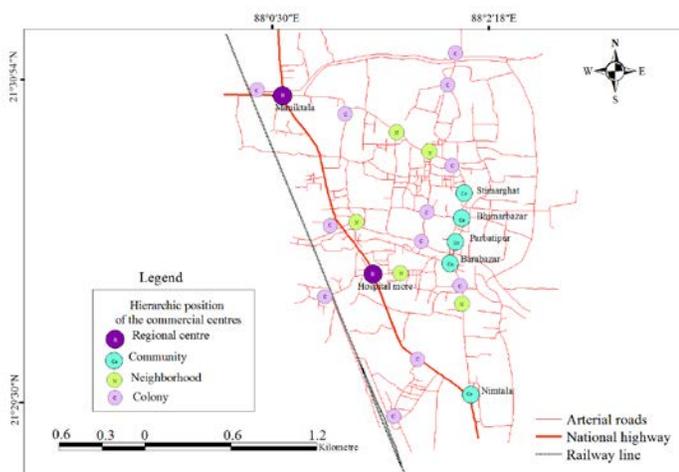
Pattern of retailing centers:

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

Stripwise retailing centers:

This type of retailing areas have been developed in Tamluk 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 Tamluk urban centre have been built up in unplanned manner except the some newly developed periphery area.

Fig.8.Hierarchy of the commercial block

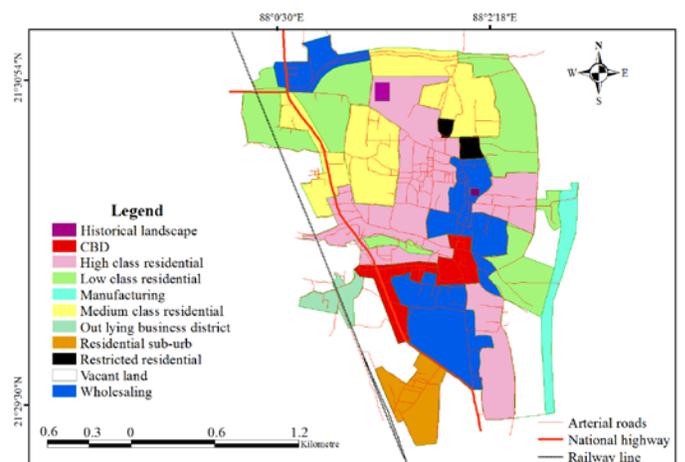


Centre wise retailing centers:

When the retailing centres are located in junction of communication or transport, then the retailing centres are developed in a concentric manner (Rao, 1964). It is termed as centre wise retailing areas. The types of articles of this centre are

4. CONCLUSION:

Fig.9.Application of Harris and Ullman's theory in case of Tamluk urban centre



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

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