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Planning Strategies for the Development of Urban Fringe of Trivandrum City: A Case of Kazhakkoottam

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Abstract: ***Urbanization has caused the development of residential, commercial and industrial developments beyond the municipal limits of the city, leading to a haphazard development. This has caused the transformation of villages from rural to urban, giving them mixed characteristics of village and city. Trivandrum corporation, being the most highly populated corporation in Kerala, is under constant pressure for development, especially with the technocentric and industrial developments at Kazhakkoottam in its periphery showing a ribbon development which is the most typical form of chaotic fringes in India. The paper aims to provide the recommendations for the development of Kazhakkoottam urban fringe through spatial analysis of land use and infrastructural facilities in the area.***

Keywords: Urbanization**,** Urban fringe, Land use, Infrastructure

1. Introduction

Urbanisation is an index of transformation of traditional rural economies to modern industrial and service based one, whereas the unplanned and unsustainable momentum of urbanization often leads to the decline of natural environments [10].

The spilling over of population from the city into the peripheral areas has been occurring quite rapidly since 1980s in almost all large cities in India [9]. This process has resulted in the emergence of Urban Fringe Areas which is conceptualized as zone of transition in land use, social and demographic characteristics between continuously built-up urban areas and rural hinterland [4]. The emergence of fringe zone with its complex problems in between rural and urban ways of life has led to various land use problems like loss of agricultural land, unauthorized urban sprawl, high land values, speculation in land and related problems and has assumed great importance but always remained a neglected area in the field of urban research [4]. The metropolises overall have better access to services than those elsewhere, but wide variations exist between their cores and peripheries [17]. While 93 percent of households in the core have access to drainage, this proportion falls to 70 percent 5 km from the core [15]. Improved transportation has altered the pattern to include rapid urbanization of land along arterial highways, encirclement of agricultural land, and an uneven diffusion of the urban uses over the countryside [17]. This urbanization process in India is marked by increases in population and expanding of urban bodies by engulfing into their territory [19].

2. Importance of Urban Fringes

A main driver for the increased importance on the urban fringe is the demographic change that many countries are, and will be, experiencing in the coming decades [19]. For a long time the urban fringe was a `temporary zone' waiting for urban expansion. But it is no longer expected that this ongoing process of expansion will continue much longer. This gives the urban fringe a much more permanent character and calls for specific attention [19]. Urban fringes character is deciding based on the availability of amount of land in countries. Countries having less land to accommodate more population, try to settle them in the outskirts of cities, which accelerates the negative impacts on the existing environment. The rural urban fringe developed as FOUR aspects: 1) Spatial interaction with city 2) Social dimensions 3) Physical aspects 4) Economic aspects [19].

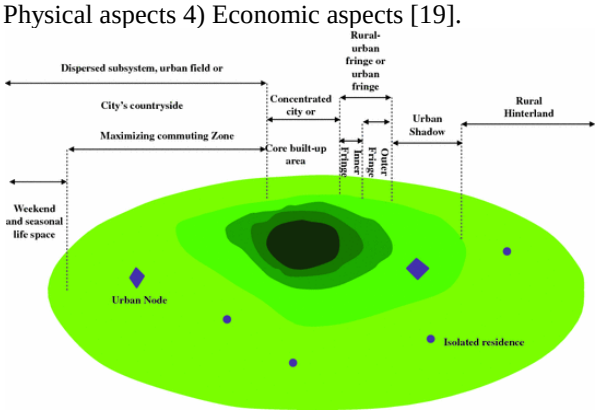

Figure 1 : Schematic representation of Rural – Urban Fringe

3. Aim and Objectives of the study

The study aims to evolve planning strategies for the development of Kazhakkoottam fringe area of Trivandrum city.

The objectives of the study are:

- To understand the concept of urban fringe and its transformation due to urbanisation
- To assess the character of development taking place in the fringes of Trivandrum city and the factors governing it

- To delineate Kazhakkoottam as the urban fringe area of Trivandrum city through feasibility study and understand its potentials and drawbacks with respect to land use changes and infrastructural facilities.
- To study the best practices in urban fringe development through case studies
- To analyze the parameters derived from best practices and site study
- To formulate suitable planning strategies and proposals for systematic development of Kazhakkoottam

4. Methodology

Methodology of the study is derived from its objectives, conducted in four stages. It also makes use of geospatial technology, Arc GIS, for base map preparation, which is an inevitable tool for analysis geospatial data. Data collection for the study is done through primary as well as secondary surveys at 8 wards, through questionnaires and field surveys. Literature surveys, spatial analysis of land use/land cover as well as infrastructural facilities area were done to analyze the nature of developments in the fringe area. Demographical data for the study are based on Census 2001 and the delineation of the study area was done by deriving several parameters from various literature surveys. After analyzing the data collected and two case studies of fringe development from the US and China, parameters were derived for the study area, which was then used to derive the recommendations for the systematic development of urban fringes.

5. Results and Discussion

As per Census 2011, the population of Thiruvananthapuram district in absolute numbers is 3,301,427, which is the 2nd most highly populated district in the state and the most populated municipal corporation in Kerala. Though Thiruvananthapuram accounts for 5.64% of the State's area, it comprises 9.88% of State's population[14]. Urban population growth rate has drastically declined to 7.64% in 2001 with a decrease of 87.5% over the preceding decadal urban population growth rate. At the same time the growth rate in total population has decreased from 14.32% to 9.42% only with a decrease rate of 34.2%[14]. This indicates that over the last three decades there is spread effect of population into the rural area. This also puts immense pressure the fringe areas of the city[14]. In 2010, the Corporation boundary was expanded by annexing surrounding Panchayats viz. Kazhakkoottam, Sreekariyam, Vattiyoorkavu, Kudappanakkunnu and Vizhinjam making the geographical area into 214.86 sq km and administrative wards to 100.

5.1 Urbanization Trend

Located in the northern edge of Trivandrum city, Kerala, Kazhakkoottam lies at a latitude of 8.5686° N, 76.8731° E . Kazhakkoottam, popularly known as New Trivandrum, is known for its Technocentric developments, which emerged in the 90's as the 1st IT Hub in Kerala . Kazhakkoottam is major junction where the National Highway 66 and National Highway 66 Trivandrum Bypass is joined. It is connected to the whole major destination by bus services from Kazhakkoottam and others from Thiruvananthapuram city and is only 15 kilometers away from Thiruvananthapuram city. Kazhakkoottam, an extension of Thiruvananthapuram urban agglomeration (2011 census)is a growing techno centric zone characterized by IT/ITES developments forming a special economic zone. The area has the highest number of educational, industrial and IT parks constitutes to the highest area of public and semi public uses compared to other peripheral areas of the city. Shows a special nature of development unlike the other areas of the city, where a ribbon development of commercial uses are visible, which is the most common character of chaotic fringes in India. The industrial and commercial developments near Kazhakkoottam, Sreekariyam, Kudappanakunnu, etc. have contributed to the expansion of urban areas towards the outskirts of the city, mainly after the shifting of collectorate to the area, which has increased the land value from Rs 50,000 to 20 lakhs over the past 3 decades.

For the study, areas where delineated in Trivandrum Corporation, by selecting 8 wards coming under a 5km radius around Kazhakkoottam.

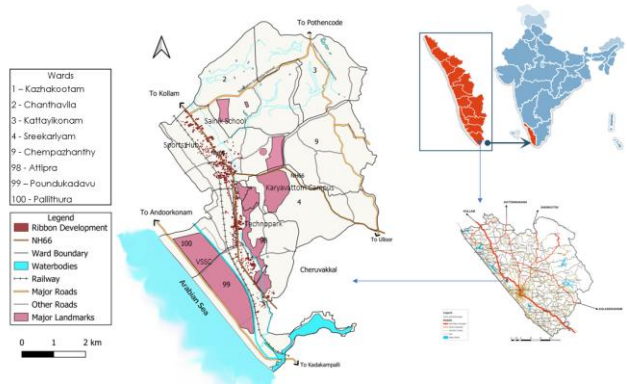

Figure 2 : Location of study area

5.2 Land use

The area is filled with alternate usage of mixed built up and paddy lands. Residential, agricultural, public and semi public uses are seen to be maximum in the area. It contributes to about 80% of the total land use. Concentration of water bodies and wetlands are very low, due to increasing land reclamation and urbanization. Agricultural areas are continuously changing to mixed built up residential uses, which puts a heavy burden on farmers. Parks , open spaces and other recreational land uses accounts for less than 1 % of the total percentage of land uses. Over a time span of 30 years the area has lost 59.79% of its wetlands whereas the built-up area increased 60%. The city has also lost its 16.92% of green vegetation. The main causes of the reduction in vegetation, forest area and wetlands is because of increase in demand of land for habitational purposes due to increase in population and developmental activities making the land unsuitable for farming. It puts tremendous pressure on availability land since land values are increasing

tremendously, changing the existing residential units into mixed-use commercial and lodging facilities.

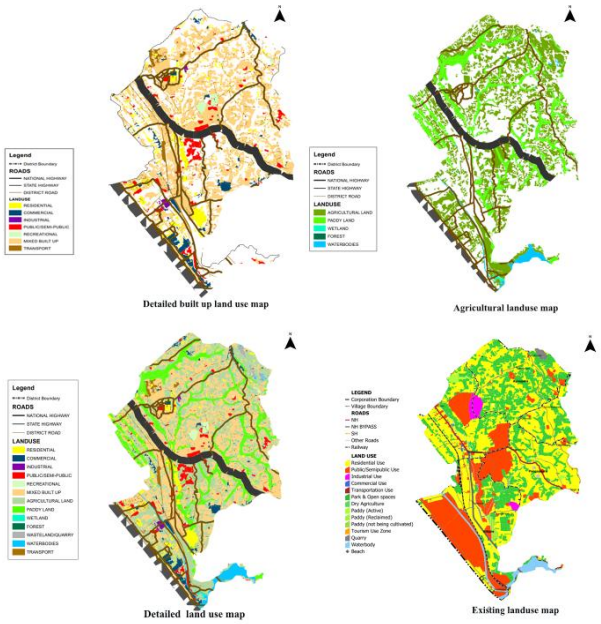

Figure 3 : Land use maps of study area

5.3 Infrastructure

5.3.1 Water Supply and Sewerage System

As per URDPFI guidelines, the recommended water supply level for a city with piped water supply system and existing sewerage system is 135 lpcd, thus requiring 156.6 MLD of water for the entire city at current population .an additional 49 MLD is required for present population of the city. Only wards 3wards have water supply from KWA. The majority of wards depend on open wells and other methods for water supply. It is surmised that the main issue is lack of local storage tanks in many coastal houses, unlike those in the inner areas of the city. Moreover, there is a greater dependence on public taps, rather than domestically provided water supply. The majority of population use septic tanks for sewage disposal, whereas 22 % use other methods which is highly unhygienic.

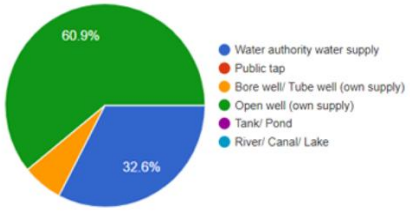

Figure 4: Source of water supply

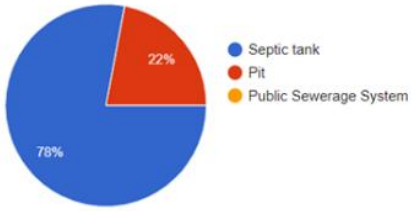

Figure 5: Method of sewage disposal

5.3.2 Solid Waste Management

Presently solid waste management is continuing as a major issue in the area. In Trivandrum corporation, no collection of waste is done in 46% of the wards by Kudumbasree. Frequency of waste collection is also less in these areas compared to other parts of the city. Of the 8 wards in the study area, no waste collection is observed in 2 wards and waste collection is only done once in 2 weeks in 2 wards. There is no collection or processing of e - waste in the area as well as secondary collection points in the area Bio - medical waste is being collected and managed by IMAGE (Indian Medical Association goes Eco Friendly) in Palakkad.

In a salinity study conducted for Akkulam lake, 2 samples from Kazhakkoottam were the most polluted ones. These samples were collected from two adjacent streams at Kazhakoottam. These streams are sites of poultry and live stock waste disposal, in addition to the usual wastes [7].

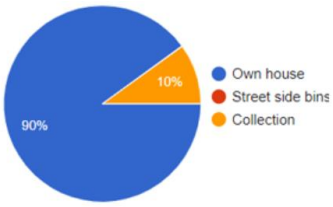

Figure 6: Method of solid waste management

5.3.3 Education and Health

Kazhakkoottam is well known for its educational institutions. Schools and colleges are spread all over the area, which gave rise to playgrounds and libraries. The high number of educational institutions have led to the fragmentation of the place, whereas adequate health institutions are lacking in wards other than Kazhakkoottam and Sreekariyam.

5.3.4 Parks and Open Spaces

Parks, open spaces and other recreational land uses accounts for less than 1 % of the total percentage of land uses. Space for recreation is found only in 3 wards, while the other wards lying adjacent to Kazhakkoottam like Chempazhanthy, Chanthavila and Kattayikonam falls completely under residential and agricultural land uses. A sense of community participation is also lacking in the area. Community halls, and other activities for community development is also absent.

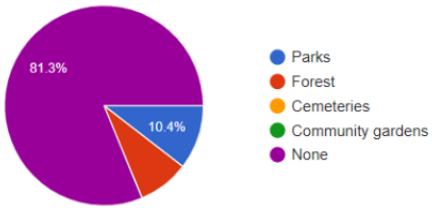

Figure 7: Availability of parks and open spaces

5.3.5 Special Economic Zones

The fast development of techno centric developments and industrial parks such as Kinfra, forming the two special economic zones has led to the migration of new population of students and migrant workers. This has catered to the development of restaurants, banks, lodges etc along the highway. The presence of city-level educational institutions,

technocentric clusters also generates high volume of traffic and causes congestion at the major nodes such as the Kazhakoottam Junction and the Manvila Junction. This has also led to high vehicular and pedestrian traffic near the technocentric developments. Another notable issue in the is the lack of public transportation in wards other than Kazhakkoottam, which is due to the uneven growth of industries, which gobble up large areas of land in the fringe as a result of ribbon development.

The changing lifestyle of the new population is completely in contrast with the rest of the area (wards 3, 4, 9, 100, 99) which marks a great discontinuity in the urban realm.

6. Conclusion

The overall study area needs development in terms of physical and social infrastructure. The area lacks proper water supply, proper sewage and solid waste management, when it comes to physical infrastructure. The new population at Kazhakkoottam are short of open spaces parks and other recreational facilities. Lack of bus stops is also a major concern faced by the people of the area. Land use of the area is continuously changing into built up urban uses, which puts a greater pressure on the farmers. This is due to lack of zoning in land uses in the study area. The increased land values in the area has also paused the opportunities of further industrial development in the study area, which will affect the economy of Trivandrum city.

7. Recommendations

Recommendations for the development of the fringe areas are based on three objectives : Preservation, Growth and Development. From the above analysis, recommendations are to be made for 4 parameters : Land use, Infrastructure, Transportation and Economy.

- Ensure zoning of land uses by managing residential growth in agricultural areas.
- Plan for adequate public infrastructural facilities and services like waste treatment plants, storm waster facilities, street lights, parks, trails and other recreational facilities to serve planned growth
- Ensure increased connectivity of the fringe areas by providing linkages to other important towns and cities to balance the economy of the city through high speed rail networks or express highways.
- Protect the existing transportation corridors through green infrastructure and by improving the existing road conditions
- Preserve the natural areas and water bodies through strict legal policies and laws in order to reduce the pollution of environment, especially lakes and streams.
- Provide a connected system of open spaces and greenway corridors and improve recreational facilities in the areas.
- Encourage community participation and community development through community awareness programs to incorporate a sense of community within the people.

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