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Interfaces of Periurban areas: A multidisciplinary study of Peri Urban Landscape ecology

Ar .Geetanjali Patil

Associate Professor, MVP College of Architecture, Nashik

Abstract

The process of urbanization in India has a tremendous impact on small towns, district places, villages and the agricultural belt present. Cities have been constantly changing since the beginning of civilization.In response to economic and social factorsthey have grown, declined or undergone major restructuring. The villages adjoining the boundaries of the existing city are the immediate spillover of this fast growing scene. The pressure of urbanization affects the existing set up of the rural areas-the physical and the cultural.

The picture of cities today is of fast growing urbanising hub which consumes the natural resources haphazardly. The urban population in India is fast growing and would be equal to the rural population in the coming years. With such an increased flux of migration towards the urban areas, the natural resources in the urban areas and in the immediate surroundings of city are at highest risk. The fringe areas of the urban settlement are the most sensitive zones which face the pressures of urban and rural contexts at the same time. The urban regenerative methodology in planning for these areas have to be adopted to address the issues of landuse distribution, infrastructure development, preservation of existing built and cultural heritage and ecosystems. .

The existing biodiversity in these areas have to be studied and taken into consideration for the future planning for expansion of the city limits. A multidisciplinary approach is necessary to facilitate the action plan to be devised for development of the periurban (fringe) areas holistically. This paper presents the study of periurban area in Nashik and discusses the effect on urban ecology, which forms the basis of urban regeneration in the said area.

Keywords:Peri urban areas, urban ecology, urban-rural regeneration.

Introduction:

Cities have been constantly changing since the beginning of civilization.In response to economic and social factorsthey have grown, declined or undergone major restructuring (Couch, 1990).

The physical extents of urban areas are expanding faster than urban populations, suggesting that the world will require increasingly more land to build cities and supply urban consumption as urban populations continue to increase. In some urban areas that are shrinking in population or economic activity, new and emerging challenges are associated with vacant or abandoned land and buildings.The continued outward growth of cities will often consume prime agricultural land, with knock-on effects on habitats, biodiversity and ecosystem services elsewhere.

Urbanization:

In 1900, only 9% of the world's human population lived in "urban environments" (so called by the World Bank, 1984). This figure had increased to 40% by 1980, 50% by 2000, and is expected to increase to over 66% by 2025 (World Bank, 1984; Simpson, 1993; Rodick, 1995; Brockerhoff, 1996).

The process and the resulting spatial form of urbanization is a function of many factors and are arguably different for each urban centre. With variations, however, there is a general consensus that the process becomes more integrated as the urban center develops and the spatial form of growth can be broadly classified as concentric, sectoral or multiple nuclei in form. In urbanizing Asia, excluding the older more established major urban centers, the rapidly emerging new urban centers are primarily following the multiple nuclei form of development. This is of particular importance in that multiple nuclei development tends to create the largest amount of fringe area.

Urban regeneration:

Urban regeneration is a way to reorganise and upgrade existing places rather than planning new urbanisation (Puppim de Oliveira and Balaban, 2013).

Urban regeneration at its most basic contributes towards the implementation of sustainable development through the 'recycling' of land and buildings, reducing demolition waste and new construction materials, as well as reducing demand for peripheral urban growth and facilitating intensification and compactness of existing urban areas (Turcu, 2012).

We understand sustainable urban regeneration as regeneration actions, policies and processes within a city, which address interrelated technical, spatial and socio-economic problems in order to reduce environmental impact, mitigate environmental risk, and improve environmental quality of urban systems, lifestyles and assets.

Peri Urban Area:

The peri urban interface is a complex region in itself, being transitional in nature and characterized by neglect, especially in the developing countries. Being neither urban nor completely rural, it falls beyond the purview of planners on either side, but continues to host the spill-over population from the urban vicinity, albeit without necessary infrastructural support. Land in the peri-urban interface is of vital importance as theregion is impacted by a lack of clarity in land use planning and policies, while being a part of the city's
hinterland, which has its typical economic as well as ecological role in the sustenance of both the urban and rural zones.(Sayantani Sarkar and Sumona Bandyopadhyay,)

The rural – urban fringe is an area of mixed rural and urban population and land use which begins at a point where agricultural land uses appear near the city and extends up to a point where villages have distinct urban land uses or where some persons, at least, from the village community commute to the city daily for work or other purposes. The area beyond the city limits but contiguous to it, having other municipal towns, Census towns or fully urbanized villages, constitute so-called urban fringe, which is the part of the rural urban fringe zone (Ramachandran, 1989).

Development of Urban Fringe Areas

From the above definitions it can be inferred that the fringe area is subject to different definitions and interpretations.
Ramachandran (1989), one of the prominent authors on fringe areas in India, has observed the gradual phase wise development of rural-urban fringe and presented the transformation processes which is taking place using a model called stages model. He postulates that the villages beyond the limit of a rapidly growing city like Indian cities undergo a process of change that ultimately result in the complete absorption within the physical city. This shows that the mechanism of change involves primarily a land use change and then the socio-economic setup of the community. The nature and magnitude of the change, in fact, depends on the interaction between the surrounding villages and the city.

Methodology:

Keeping in mind the complexity of the subject, a multidisciplinary approach needs to be taken. The various research articles and published papers from scholars of diverse fields like, geography, agriculture, ecology and planning were studied to establish a logical way of approaching the problem.
The primary data was collected from the site by site visits and interviews of the concerned authorities on the subject. GIS imagery for initial understanding of the site was taken from a LISSAT image. (Resolution 23m).GIS was used only for mapping, the further inferences for the subject were manually drawn.
The literature review was used as basis of understanding the concepts in periurban area development, quarry redevelopment.
The collected data was used for analysis of the forest cover, the uncultivated lands, and the area of quarries.
There is a common connect between the diverse appearing topics. These common connects underline the importance of preservation of ecology in the urban context, especially in the fringe areas.
The interconnections of varied layers like. Soilerosion, quarryredevelopment and landuse redistribution, policy making are made to offer the design constructs in solution presented.

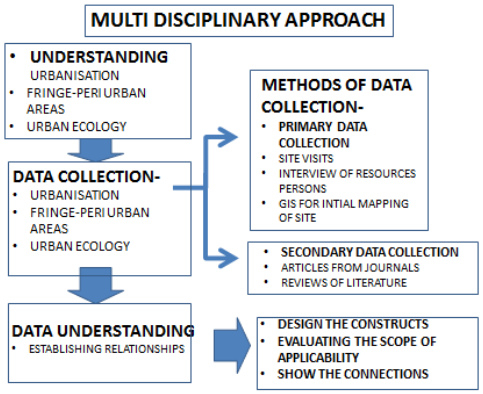

Fig1:Multidisciplinary Approach for Qualitative research method. Source: Author.

Case Study:

The Nashik city is situated between 190 33' and 200 53' North latitude and between 730 16' and 750 06' East longitude. The elevation of the city is varying between 300 meters to 500 metersand it is 185 Kms. away from Mumbai, the capital of Maharashtra and 220 Kms, from Pune.

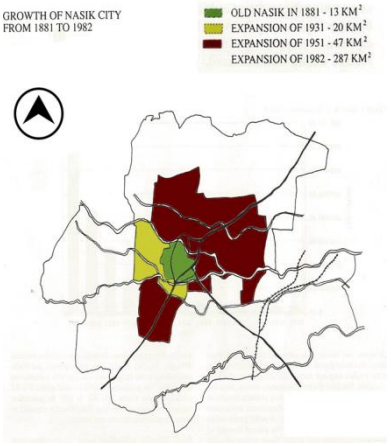

Fig1: Growth of Nasik City From 1881.
The above fig 1 illustrates the growth pattern of the Nashik city in the last 125 years.

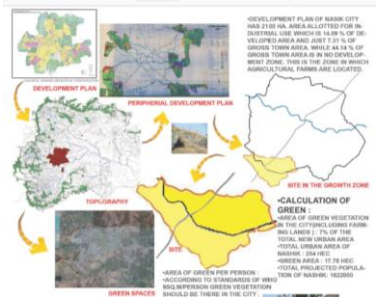

Fig 2: The Periurban Area Near Pandavleni Caves, Nashik.

The Southern Fringe of Nashik,reveals the Last of the western ghat hillocks which are home to theBuddhist caves in the region.Development of peculiar type ofChaitya Hall is seen here.

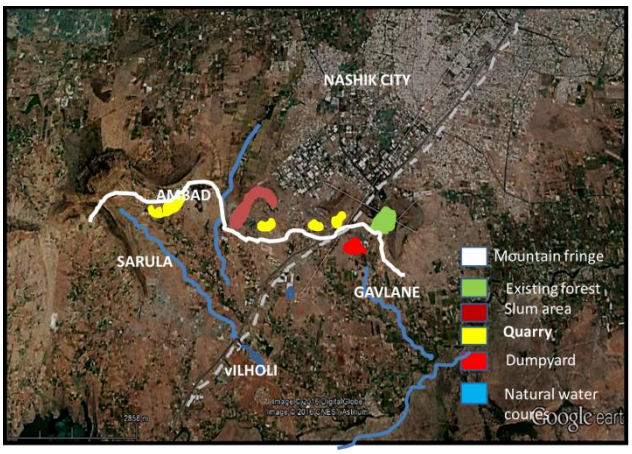

Fig 3:The Fringe Area

The development plan of Nashik City has 2100HA.Area allotted for industrial use which is 14.09percent of developed area and just 7.31 percent of gross town area. While 44.14percent of gross town area is in no development zone, which agricultural farms are located and are susceptible to changes of landuse.

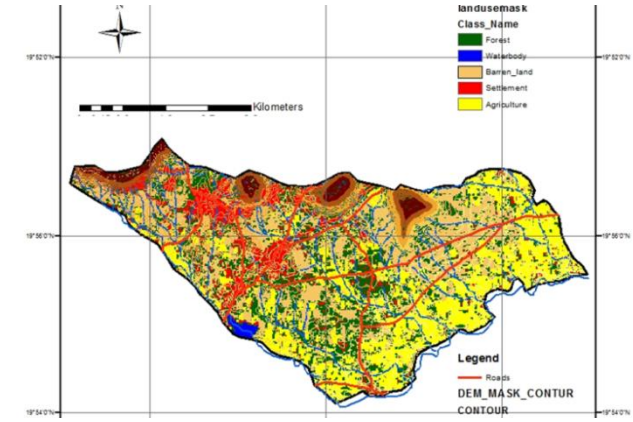

Fig 4: The GIS map of Periurban Area Near Pandavleni Caves, Nashik.

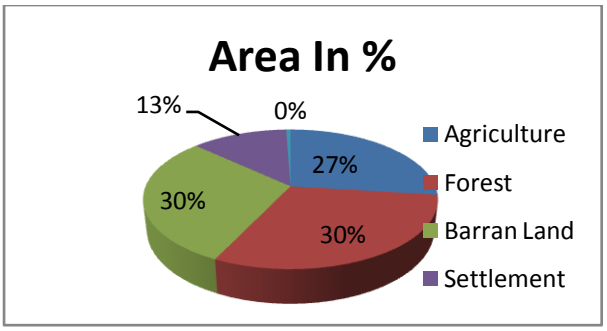

Fig 5: Area Analysis of the Landuse Pattern. Of the selected Site.

The GIS study conducted for this region reveals the deteriorating condition of the topsoil.The forest typefound in the area is dry deciduous forest,with teak tree as it emergent layer tree. The hills have become barren,because defforestation.the quarries.

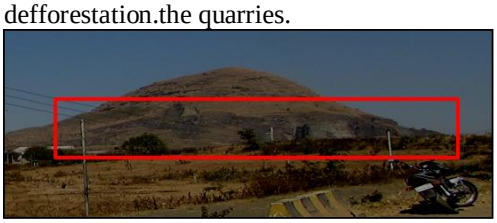

Fig 6 : Stone Quarry on site

The Quarries on the hills are another cause of concern.The study also reveals loss of the existing agricultural lands being polluted by the existance of quarries.

Conclusion:

The natural resources around the city invariably get engulfed by the encroachment of the city limits.

In case of Nashik City ,the particular fringe area has three major concerns:

1. The stone quarries present in the area polluting the conditions of the farmlands around.
2. The defforestation of the hills on the fringes.
3. The erosion of the topsoil from the existing farms.

It was observed that the excavation of the soil present in the area was taken to the city for the gardening purpose.

If we do not take cognizance of the importance of the natural resources like hills,forest patches, the depletion of the urban ecology is inevitable.A multidisciplinary approach is necessary to facilitate the action plan to be devised for development of the periurban (fringe) areas holistically. In case of Southern Fringe of Nashik:

- Policy level decisions are needed so as to counter the further degradation of the topsoil resulting in barren lands which in turn affect the ecological patches prevailing in that region.
- Community involvement of the residents and the farmers of that area in decision making should be fostered.
- Contouring at adequate junctions on the hills and the farms, to be done after surveying the area to restrict the soil erosion further.
- Restoring the abandoned quarries by proposing a different landuse as an urban park. As proposed and executed at the Timba quarries, carrying out exercise of ecological restoration has become a priority.
- Preserve the existing biodiversity features of the forests present.
- The natural fringe of the hills of Sahyadri to be afforested by creating restricted vehicular zones .the area would thus act as buffer zone to counter the pollution produced by the vehicles on the highway.

This paper is an attempt to understand the broader issues of the peri-urban area development with reference to the ecological issues, further study is in progress.
A timely intervention in the development of fringe area at would offer a sustainable solution for the future.

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