

Landscape Planning and Design –Case Tumkur City Karnataka, India

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Abstract—Today the fundamental capacity of the urban system to support the quality of urban life has reached a critical threshold due to rapid impairment of biophysical elements. Particularly shrinking green spaces affect the urban environment quality, air, water, and microclimate. Which in turn affects the human health. Numerous researchers exemplifying that trees functions such as carbon sequestration, ground water recharging and regulating local temperature, etc. improves city's environmental quality. Thus green urban infrastructure emerges as an indispensable component of sustainable urban planning in developed countries. So no matter parks, how large and how well designed would provide the citizens with the beneficial influence of nature.

For the study Tumkur city is taken as case study but like any other city, Tumkur city continuously losing most of its green areas due to unplanned rampant development where conservation of natural resources are not at all considered. A study on Tumkur's land cover change indicates that non vegetative surface have increased, as a result, the city's environmental problems have up surged many fold.

This paper addresses the issues related to status of landscape elements like green space and water which is the essential part of biodiversity. To achieve the sustainable habitat for developing cities, sustainable landscape design should be part of the planning processes. This paper also discuss about the processes for the green cover network development to be adapted to develop green infrastructure in the city and also environmental management plan, policies to improve the condition of the landscape elements of the city to upgrade the quality of life of the city.

Key words: Microclimate, Sustainable, Urbanization, landscape elements, quality of life.

1. INTRODUCTION

Today the fundamental capacity of the urban system to support the Quality of Urban life has reached a critical threshold due to rapid impairment of biophysical elements particularly shrinking green space affect the urban environment quality, air water and microclimate which in turn affects the human health. Numerous researchers exemplifying that trees functions such as carbon sequestration, ground water recharging and regulating local temperatur , etc improves city's environmental quality.

Recently some urban managers have begun to equate the benefits of urban green networks to the benefits of others urban infrastructures. Thus Green infrastructure and water infrastructure emerges as an indispensable component of sustainable urban planning in developed countries.

The Green infrastructure widely defined as an interconnected network of greenways, parks, conservation lands, working farms, forest, hills, mountains ,ranches , Agricultural fields and other open spaces that supports native spaces. Maintain natural ecological processes, sustain air, water resources and contribute to the health and quality of life of the city.

Sustainable landscape design is based on the principles by which nature design her ecosystems to efficiently utilize condition of soil, moisture, climate, water bodies and available species to make most efficient use of them .conservation of natural resources is the basic principles of sustainable landscape design. It is practical method of developing ecologically harmonious, efficient and productive systems that can be used by anyone and anywhere.

2. NEED FOR THE STUDY:

Cities are developed in very haphazard manner without considering the Value of ecosystem. Urbanization is the main cause for environmental degradation. Sustainable urban development is one that can sustain itself as it is planned and designed for providing a healthy life style to its inhabitants and has policies that secure natural resources for the future generations. Landscape planning plays very important role in city design to ensure sustainable urban development. Good city planning saves money for an entire community.

3. OBJECTIVES

Objective of the study is to use landscape planning as a tool in city planning and identifying the natural resources and retain them and interconnect them for better environment to create healthier city.

4. METHODOLOGY

The Methodology adopted for the study include primary and secondary data of extended area of Tumkur city to find out

1. Existing natural resources like water body, agriculture fields, mountains, hills, and other open spaces.
2. Identify the sustainable features of the design schemes
3. Analysis of Green infrastructure, Water infrastructure
4. Using Permaculture as methodology which is a globally recognized environmental methodology applicable to both urban and rural contexts. It is a holistic ecological approach to the development of human settlements takes into account energy, natural resources, plant system and social and economic structures.

5. STUDY AREA

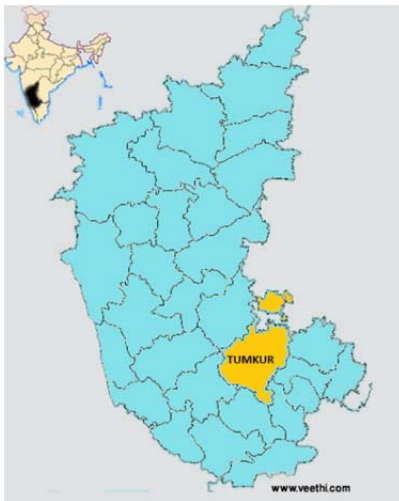


Fig. 1: location map

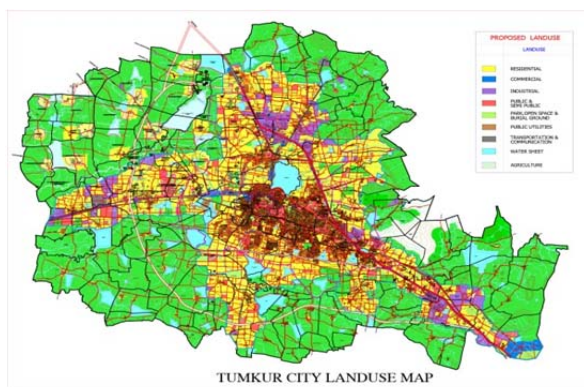


Fig. 2: Tumkur city

Tumkur is located northwest of Bangalore at a distance of about 70 kms. Tumkur City spreads across approx. 50 Sq kms . The district occupies an area of 10,598 square km and had a

population of 26, 81,449 according to the 2011 census. The district is predominantly rural, with the rural population accounting for 80.14 per cent of the total population. The urban population was 19.86 per cent of the total population in the district.

Tumkur district consists chiefly of elevated land intersected by river valleys. A range of hills rising to nearly 4,000 feet (1,200 m) crosses it from north to south, forming the watershed between the systems of the Krishna and the Kaveri. The principal streams are the Jayamangala and the Shimsha. The Water for Tumkur City is Supplied from The Hemavathi river through canals from Hassan Dist.

Tumkur has a daily average temperature of 25o C with an average humidity of 76%.The annual rainfall in Tumkur district is around 650 mm.The maximum temperature in Tumkur City is 35oC and minimum is 15oC.

Tumkuru the City has a population of 3.05 lakh and an of 48.6 square km and a taluk population of 5,96,347. The decennial growth rate of population in Tumkur taluk was 15.4 per cent as against the district average of 3.7 per cent. It is a taluk with heavy degree of urbanization, with the urban population constituting nearly 60 per cent of the total population. This is indicative of considerable migration into this taluk. Because of this migration development are happening rapidly in Tumkur taluk. Because of this unplanned growth Tumkur taluk is losing its natural resources like water bodies and green cover. So it is important to conserve natural resources through sustainable landscape design in the extension of Tumkur city.

Issues in the Context of sustainable urban development:

Urbanization, In addition to the shrinkage, increasing fragmentation of green spaces affects horizontal natural processes in the Tumkur city. Flow of water, air energy, species and other bio geo chemical cycles across the landscape. Cumulatively these cause a wide range of health problems and ultimately the quality of urban life.

6. POTENTIAL OF STUDY AREA:

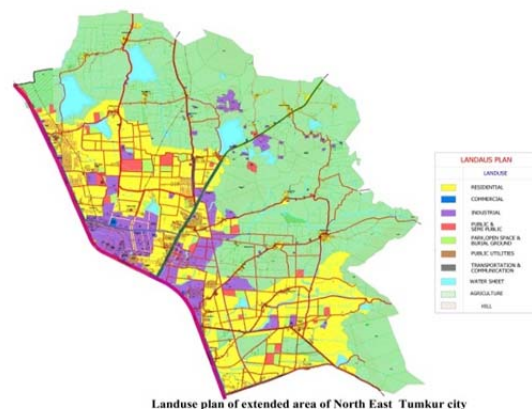


Fig. 3: Landuse plan of extended North East area of Tumkur city.



Fig. 4: Existing water and green infrastructure of extended North East area of Tumkur city.

Processes for the green cover development have been adapted to develop a Green infrastructure in Tumkur city. From that within the Tumkur city, blocks/hubs of natural areas and corridor elements, linear areas, the two forms of potentials areas are identified to establish the green infrastructure. Using these two forms, the green infrastructure and water infrastructure plan for the Tumkur extended city has been carried out at three spatial levels. They are

- Hubs and corridors at Regional levels.
- Neighbourhood or Ward level green pockets
- Linking green corridors at street level.
- Sustainable landscape design is a processes to identify the sensitive areas in the study area. The sensitive area 1 (Table 1 & 2) indicate highly sensitive area that could be declared no development zone and could be used for Recreational purpose. The sensitive area 2 indicates Medium sensitive area that area could be developed for Residential purpose. The sensitive area 3 indicates low sensitive area and could be used for mixed use and commercial purpose. The sensitive area 4 indicates Non sensitive area that could be used for Industrial purpose.

(Sensitive area = 2km X 2km)

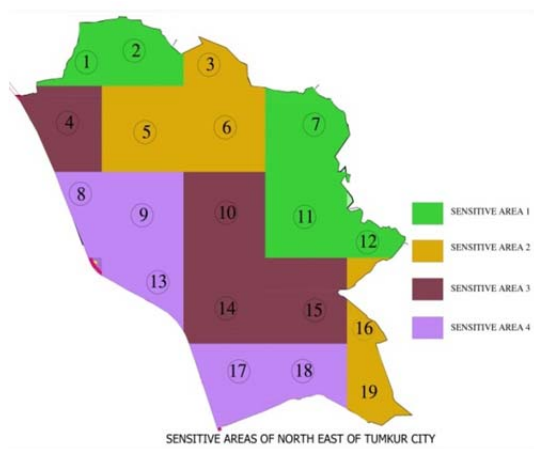


Fig. 5: Sensitive areas of study area

Table 1: Water and green infrastructure of study area.

NORTH-EAST Phase									
GRID NAME	NUMBER OF STREAMS	AGRICULTURE E (IN Sq. mtr.)	SETTLEMENT (IN Sq. mtr.)	WATER BODY IN (Sq. mtr.)	HILLOCK (IN Sq. mtr.)	TOTAL AREA (IN Sq. mtr.)	GRAPH	SENSITIVE AREA (No.)	REMARKS
1	5	11,26,259	50,000	-	-	11,76,259		1	HIGHLY SENSITIVE AREA
2	27	22,65,793	90,000	3,17,022	-	26,72,723		1	HIGHLY SENSITIVE AREA
3	1	3,40,000	4,213	5,462	9,86,122	13,35,797		2	MEDIUM SENSITIVE AREA
4	15	10,80,914	14,08,390	6,06,951	-	31,96,257		3	LOW SENSITIVE AREA

Table 2: Water and green infrastructure of study area

5	40	23,96,754	14,08,237	2,81,009	-	40,85,999		2	MEDIUM SENSITIVE AREA
6	14	26,98,917	4,95,433	4,57,909	3,89,085	39,93,347		2	MEDIUM SENSITIVE AREA
7	20	28,44,717	2,36,843	53,648	2,98,358	34,58,566		1	HIGHLY SENSITIVE AREA
8	4	-	14,66,551	4,079	-	14,70,630		4	NON SENSITIVE AREA
9	9	-	39,25,379	74,621	-	40,00,000		4	NON SENSITIVE AREA

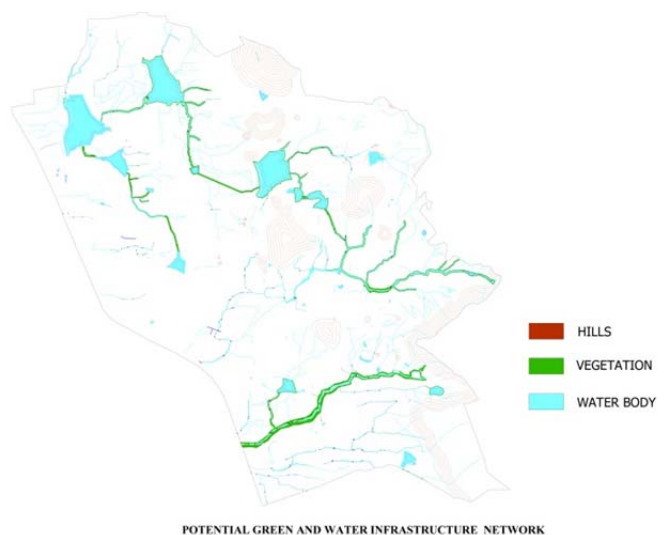


Fig. 5: The potential green network that could connect the green hubs/pockets within the Tumkur extended city.

It's important to understand the potential of study area with respect to Green and water infrastructure that helps to increase ground water percolation, microclimate, and increase in water table and to help to enrich the biodiversity and quality of life of the people of the city. Thus landscape design helps in understanding the Ecosystem of the study area and suggests master plan for the city.

7. CONCLUSION

For any city planning Sustainable landscape design is very crucial .Sustainable landscape design helps in improving the quality of life of people in the city. In the context of emerging issues of sustainable urban development, the initiative that are required to be taken for achieving the sustainable landscape design by Inclusive planning approach are suggested in the form of frame work like policy, Legislative, Implementation and Governance level.

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