

A REVIEW PAPER ON CRITICAL STUDY OF GREEN INFRASTRUCTURE FACILITIES AND IT'S IMPLEMENTATION

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Abstract: Green infrastructure planning in India has the potential to rationalize current development issues relating to economic growth and rapid urban expansion. The impact of this process has been a decoupling of human-environmental approaches to urban planning and reliance on the utilization of landscape resources beyond their capacity Green infrastructure approaches to urban investment are proposed in this paper to create equilibrium between the difficulties of balancing economic growth with sustainable urban development. This paper proposes that urban greening can form a mainstream framework to facilitate a sustainable approach to urban expansion. The paper concludes by stating that approaching investments in green infrastructure through an understanding of GI components and study provides scope to plan economic development and ecological sustainability effectively.

Keywords: green infrastructure; urban development; Indian scenario

I. INTRODUCTION

Green Infrastructure can be broadly defined as a strategically planned network of high quality natural and semi-natural areas with other environmental features, which is designed and managed to deliver a wide range of ecosystem services and protect biodiversity in both rural and urban settings.



Green Infrastructure (GI) is the opportunity to use resources more efficiently while creating an infrastructure with eco-friendly manner with minimum environmental damage. Going green has been one of the most noticeable trends in construction industries because of GI is the need of time GI is the way forward for the earth to survive for the sustainable and green development^[5].

GI is the green network to directly plan design and manage to support the live ability, sustainability and resilience of urban area and it is directly affect to the climate changes GI directly effect to the following:

- clean air and water
- conserving and enhancing biodiversity
- cleaning and reducing storm water runoff
- supporting physical, mental, emotional health and well being
- reducing energy use and emissions
- useful in Erosion control
- water shed protection
- waste water management
- cooling up built-up areas
- enhancing commerce and property values

GI is connecting plant and habitat to the concrete structure. It delivers socio-economic and environment functions compare to single purpose infrastructure.

Components of Green Infrastructure

- Urban Green Space
- Parks and gardens
- Green roofs and green wall
- Wet land
- Sub urban street trees
- Urban agriculture
- Urban forest,
- Urban woodlands
- Informal Recreation Areas(Only low key provision of facilities)
- Incidental Green Space (No clear recreation function and little significant value as habitat)
- Functional Green Space (Farming, horticulture, burial grounds and educational and other institutional use)

II. OBJECTIVES

- To study the foreign policies for Green Infrastructure.
- To study the existing Indian scenario of green infrastructure.
- To study the framework of implementation for green infrastructure.

III. OVERVIEW OF FOREIGN& INDIAN SCENARIO

San Francisco

Neighborhood's socioeconomic status (SES) increases and people experience and reinforce a connection with nature, results in broadly shared social and environmental benefits for all, in addition to improving the health and wellbeing of specific vulnerable communities and individuals

Melbourne, Australia.

They made a policy for GI and working on reducing urban heat Maximize the cooling value of existing GI.

Germany

They protect existing sites and ecological network, planed landscape with particular green quality and settled areas.

Europe

In 2013, the European Union (EU) launched a project entitled to identify, develop, and test ways of connecting green spaces, biodiversity , people, and the green economy in order to meet the major urban challenges related to land use conflicts, climate change adaptation, demographic changes, and human health and well-being. "GREEN SURGE" is expected to provide a sound evidence base for green infrastructure (GI) planning and implementation, for exploring innovation potential and linking environmental, social and economic services with local communities

United States of America

In USA runs a more than 11 GI programs for protecting and enhancing green with all suitable techniques and they engaged the people and help to design their own parkland, open green space and the government also succeed in filtering sediments, absorbing nitrogen, or protecting our streets from flooding.

Indian scenario

Construction companies, whether small or big, have become more cautious about adopting green practices to build eco-friendly buildings. Surprisingly however, there has not been any conscious effort to implement eco-friendly infrastructure, which has immense scope and relevance in the present scenario. Over the years, even as Indian cities have experienced tremendous growth in population, the infrastructure upgrades have been sporadic. Besides, cities are increasingly facing the problem of air and water pollution because of haphazard planning and unplanned construction. The role of green infrastructure in Indian cities may therefore appear, at present, to be marginalized compared to other built development needs. However, as New Delhi has experienced, reducing a city's ecological resource is viewed as effectively decreasing livability and increasing unsustainable development.

3.1 Literature review of the various cities having green infrastructure

Mikias Biazen Molla (2012), Bio-retention area takes runoff from the street through a trench drain in the sidewalk as well as runoff from the sidewalk through curb cuts Pervious pavers used in the roadway of a neighborhood development in Wilsonville Root Paths direct tree roots under paving and into better soil areas for tree root growth Silva cell structures support the sidewalk while providing root space for street trees Structural soils provide void space for root growth and load-bearing for sidewalk. Green Infrastructure provides a high quality environmental setting attracting new businesses and which directly serve the tourism, recreation, leisure and health sectors. People satisfy most of their recreational needs within the locality where they live. Urban green spaces serve as a near resource for relaxation. Vegetation has a great contribution in order to reduce the energy costs of cooling buildings has been increasingly recognized as a cost effective reason for increasing green space and tree planting in temperate climate cities. Studies show that, green roofs, street trees, and increased urban green spaces have the effect of making individual buildings^[9].

Collins Adjei Mensas (2015), Urban green spaces are useful natural assets that support the development of cities in diverse ways. However, statistics show that these spaces are under severe threat with the situation in Africa been critical. This study sought to assess the governance of urban green spaces and develop sustainable strategies to address problems affecting the development of urban green spaces in the context of Africa. The case study design was used and Kumasi Metropolis (Ghana) was selected as the study area. Different qualitative research techniques were employed whilst representatives of green spaces organizations and the local people constituted the study population. The study revealed that there is poor state of urban green spaces in Kumasi with

factors such as urbanization, poor enforcement of development controls, conflicting land ownership rights on green spaces, and lack of priority to green spaces being among the major causes for that. This problem was further exacerbated by complexity in the governance of green spaces, poor regulation of power among stakeholders, lack of community participation, and lack of consensus in decisions on green spaces. Sustainable strategies recommended to address the situation include controlling encroachment of green spaces, prioritizing green spaces and building stronger collaborative governance for green spaces^[2].

Madurai Corporation (2014), The purpose of the action plan is to provide a mechanism for building the city's current and future resilience, as well as the capacity to act among communities, institutions, and government. The aim is to foster collaboration between sectors and communities, in order to arrive at an integrated approach and to generate momentum for early action around the priority issue of blue-green infrastructure. The action plan for Madurai charts a clear way forward. It helps the city respond to climate hazards and promote a transition to a low carbon economy while reducing poverty and catalyzing economic development. It supports and enhances the local creation and ownership of policies, interventions and projects aimed at future proofing Madurai. The frame of reference for the plan is to cover the period up to 2031 which aligns with the upcoming revision to the Madurai Master Plan. The plan considers ongoing actions required over the whole plan period together with actions required to build resilience and tackle vulnerability over the short term while preparing for measures to tackle slow on-set climate change risks which would be fully implemented post 2020^[6].

3.2 Major Finding

Building is a most noticed urban fabric in neighborhood so it is necessity to focus on a green building. In INDIA there is lots of diversity easily identify. Just need to collect data of greenery parameters such as a type, age, density. The role of GI under stable for the planners, policy makers and developers. They must to understand relationship between GI-economic growth-sustainable forms in urban development. Urban development should happen in balance with natural resources only then will infrastructure development cost curtsied and it protect the human and environmental health.

IV. URBAN GREEN STRUCTURE

It can be divided into four phase:

1. The spatial dimension: All land of the urban landscape that is neither covered nor sealed including for instance parks, play grounds, sport fields, allotments, private gardens, green spaces of housing districts, industrial properties as well as along streets and railroads.
2. The ecological dimension: Flora and fauna and their habitats. Urban climate, technical support systems.
3. The cultural dimension: History, identity, green as design elements.
4. The social dimension: Recreation, health, and leisure.

4.1 Green Structure Planning

The planning of the GI is moderate into three phases:

1. **Pre urban layer** - Natural and cultural landscape that were already present in a city, features such as hills, and in particular along the streams in a linear form.
2. **Urban layer** - This layer includes public parks, playing fields, cemeteries but also the green spaces within the different land uses such as gardens in residential areas, green space on institutional grounds, in commercial developments, as well as land where the former use was abandoned (derelict land).
3. **Linear layer** - Infrastructures such as major roads, railway lines and canals can include important green spaces. They can offer an opportunity for creating green space corridors when the railways and adjacent land are not needed anymore. Large green spaces can also be found along motorways, big roads and other linear infrastructures^[3].

4.2 Urban Green Spaces – A Perspective

Urban green spaces provide a range of benefits at both the national and the local level and offer many use opportunities to people in different ways and also play a key role in improving the livability of towns and cities. They help to define and support the Identity of towns and cities, which can enhance their attractiveness for living, working, investment and tourism. Therefore, they can contribute positively to the competitiveness of cities. On the other hand, urban green spaces provide many contributions to social and economic life, and to the ecological and planning system, and as a whole to the urban quality of life. Many previous studies have highlighted the contributions of urban green spaces from several perspectives including social, economic, ecological or planning dimensions^[1].

Types of Urban Green Space

A typology of urban green spaces means developing a classification of categories within which sit definitions of types of urban green space. The typology needs to reflect the different types of urban green space that occur and which together form the green fabric of the urban area. Table 1 illustrates the typology developed in this research.

| Level | Pop/unit | Area ha | Sqmts/ capita |
|----------------------------------|----------|---------|---------------|
| Neighborhood level | | | |
| Tot Lot at Housing cluster level | 250 | 0.0125 | 0.5 |
| Housing area Park | 5000 | 0.5 | 1 |
| Neighborhood Park | 10000 | 1 | 1 |
| Sub city level | | | |
| Community Park | 1lakh | 5 | 0.5 |
| District Park | 5lakh | 25 | 0.5 |
| City Park | 10 lakh | 100 | 1 |
| Multipurpose Parks | | | |
| City level | 1 lakh | 2 | 0.2 |
| District level | 5lakh | 4 | 0.08 |
| Community level | 10 lakh | 8 | 0.08 |

Use of the urban green system:

The most important function of the urban system in a city is to provide places for different kinds of human activities. City inhabitants and public institutions use the green spaces in many different ways, e.g. for daily activities, most typically recreation, exercising, education, cultural events, socializing, sport and economic purposes. The purpose of this set of criteria is to identify and analyze the types and range of uses and to determine any general trends in usage patterns. The form and intensity of use varies greatly and it is important to recognize the full spectrum of needs within an urban society and to make suitable provision.

4.3 Benefits of Urban green system:

- Temperature decrease and humidity increase downward through GI.
- Reducing wind movement.
- Ex. Increased road safety in areas subjected to high winds
- Reduce sounds in central business district areas
- Ex. Implementation of GI around shopping center reduces the 25% noise of the pedestrian.
- Properly placed Tree plantings can reduce vehicular noise in residential areas.
- Positioned correctly trees can be used to intercept unwanted secondary glare.
- Ex. edges of ponds, spacing or planting density needed for glare control of roadways, Proper placement of trees along highways and median strips can alleviate early morning and late evening glare hazard.
- In urban environment trees can be used to intercept primary boundaries.
- Ex. Trees and shrub s can be used to direct or channel pedestrian traffic, Plants can be used to link and unify separate entities, Trees can be used in inner city areas to breakup architectural lines and to unify elements, Major street intersections can be emphasized by strong contrasts in the vertical enclosure. This intersection can be emphasized by abrupt changes in tree size color and texture.
- The proper placement of trees can provide a three dimensional effect in certain architectural situations
- Useful in Screen objectionable views
EX. Create privacy, Create background setting, Create shadow patterns

V. CONCLUSION

The distribution of green spaces is not uniform all over the city; in some wards there is high concentration of parks and gardens while the other has very low number. There is a need for the local authority to carry out need assessment, before planning the new green area. They authority should ensure where the new green spaces are needed, they enhance and extend the network and improve its accessibility and relevance to local people Also to ensure that where there are gains in quality, it is sustained for the long term. Comparing the number of green areas with the standards, as per the set hierarchy, there is high deficit of green areas within the city. The local authority is taking an initiative to increase the number of green spaces, but the size, number and location needs should be considered.

REFERENCES

1. Baycan-Levent and Nijkamp(2002), planning and management of urban green space in Europe – A comparative analysis.
2. Collins Adjei Mensas (2015), Sustaining urban green spaces in Africa: a case study of Kumasi metropolis, Ghana.
3. European commission (2013), Building a green for Europe environment infrastructure.
4. Federal green infrastructure concept, Federal agency for nature conservation.2017
5. Green streets –Munciple handbook,2008
6. Ian c.Mell (2015),AIMS environmental science
7. Madurai action plan for blue-green infrastructure, 2014.
8. MahuaMukharji .2013urban India : challenges for green infrastructure
9. MikiasBiazen molla.2014the value of urban green infrastructure and its environmental response in urban ecosystem: a literature review.
10. ThamiCroeser (2014), An estimate of the biological suitability of walls in Melbourne’s CBD.
11. The value of urban green infrastructure and its environmental response in urban ecosystem,2012
12. Tools, strategies and lessons learned from EPA green infrastructure technical assistance projects. United states environmental protection agency .2015

