



Open Green Spaces in Urban Indian Cities, Its Importance, Rapid Decline and Restoration Strategies.

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ABSTRACT:

An open space is a piece of land that is undeveloped (has no buildings or any other type of construction) and is accessible to the public. Open space may include: Green space (land that is partly or completely covered in grass, trees, shrubs, or other vegetation). Green space may include parks, community gardens, and cemeteries, Schoolyards, Public plazas, vacant lots, Playgrounds, Public seating areas. Seven ecosystem services were evaluated: carbon sequestration, erosion prevention, water purification, air purification, aesthetic value and habitat quality. Green space exposure is associated with a number of health benefits in intervention and observational studies. These results are indicative of a beneficial influence of green spaces on a broad spectrum of health outcomes. Green prescriptions involving green space use may have substantial health benefits. Our findings should encourage practitioners and policymakers to give due regard to how they can create, maintain, and improve the existing accessible green spaces in deprived localities.

Due to rapid urbanisation and unplanned construction we have converted our green spaces to a concrete jungle which has dis-balanced our ecosystem. A number of restoration strategies can be employed to restore our rapidly vanishing green spaces which are discussed in this paper.

Keywords: *Open green spaces; concrete jungle; urbanisation; urban parks; carbon sequestration;*

1. INTRODUCTION:

An open space is a piece of land that is undeveloped (has no buildings or any other type of construction) and is accessible to the public. Open space may include: Green space (land that is partly or completely covered in grass, trees, shrubs, or other vegetation). Green space may include parks, community gardens, and cemeteries, Schoolyards, Public plazas, vacant lots, Playgrounds, Public seating areas. Open space provides recreational areas for residents and helps to enhance the beauty and environmental quality of the neighbourhood. But with this broad range of recreational sites comes an equally broad range of environmental concerns. Just as in any other land uses, the way parks are managed can have good or bad environmental implications, from pesticide runoff, siltation from overused hiking and logging trails, and destruction of habitat. Lack of community and public access to safe open and green space is a critical area of concern for urban residents in India.

Green spaces such as parks and sports fields as well as woods and natural meadows, wetlands and other ecosystems, represent the fundamental component of any urban ecosystem. Green urban areas facilitate physical activity and relaxation, and form an absorbent from noise. Trees produce fresh oxygen, and help



filter out harmful air pollution, including airborne particulate matter. Urban parks and gardens play a very critical role in cooling cities, and also provide safe routes for walking and cycling for transport purposes as well as sites for physical activity, social interaction and for recreation. Recent estimates show that the physical inactivity, linked to poor walkability and lack of access to recreational areas, accounts for a number of global deaths.

Green spaces also are important to the mental health of humans. Having access to green spaces can considerably reduce health inequalities, improve well-being, and aid in treatment of mental illness. Some analysis suggests that physical activity in a natural environment can help reduce mild depression and reduce physiological stress indicators.

Benefits of open green spaces in urban Indian cities:

1. Temperature & Climate Change: urban temperatures are typically 1-2° Celsius higher than the surrounding rural areas. This urban heat island (UHI) effect occurs because of the materials used to build towns and cities do absorb more of the sun's energy than the natural surfaces they replaced. These Urban green spaces reduce the Urban Heat Island effect by providing shade and by cooling the air through the process of evapotranspiration. During evapotranspiration, the sun's energy is used to transfer water from the leaves of plants and into the atmosphere. Urban green spaces are on average around 1° Celsius cooler, during both the day and night time, than built-up regions in the same town or the city, and this cooling effect can extend beyond the green space itself, into its surrounding urban areas. During the summer this may reduce the need for air conditioning, and associated energy use, in the nearby buildings and places.

2. Air Quality: Urban air pollution consists of numerous tiny particles, known as particulate matter (PM), and gases such as ozone (O_3), nitrogen dioxide (NO_2) and sulphur dioxide (SO_2). These pollutants are primarily formed as a result of vehicle and industrial emissions. Poor and bad air quality is a serious threat to human health, causing problems for the respiratory system and cardiovascular diseases [1]. Current studies suggest that the presence of urban vegetation results in an overall reduction in air pollution [2]. For example, schools surrounded by green space have been observed to experience lower levels of traffic-related pollution in their classrooms. However, more research is required to fully understand the multiple ways in which urban vegetation can affect our air quality

3. Flooding & Water Quality: Urban green spaces store and filter lot of water, reducing the risks of flooding and improving water quality in streams, lakes and rivers. In urban areas, the impermeable materials used for roads and pavements mean that rain is not percolated and remains on the surface. During periods of heavy rainfall this water accumulates and when the drainage capacity of the area is exceeded, flooding will happen. A further consequence of high levels of surface water run-off is that rainwater washes pollutants away from the surfaces it falls onto, transporting them into other water courses. This can be detrimental to the water quality in streams, rivers and lakes and lead to high pollutant loading at water treatment facilities.[3]



4. Wildlife & Habitats: Our towns and cities are typically considered to host a less diverse range of plants, animals and birds as compared to nearby rural areas. However, green spaces within an urban area can be home to numerous same species that are more commonly associated with rural settings, including those that are rare or threatened [4] For some species, urban areas can provide a much more favourable habitat than intensively farmed countryside, suggesting that towns and cities could make an important contribution to the national conservation efforts. Large parks and woodland regions can support the widest range of species, but even small areas of vegetation such as roundabouts, roadside verges and green roofs [5] can support a range of plants, insects and birds.

5. Economic Impacts: The presence of green space affects the urban region in the many different ways described in this document; the economic impacts of which are not straightforward to quantify and estimates can differ widely. The creation, maintenance and management of these green space also generates employment opportunities, and may have indirect benefits to local economies by encouraging further investment and property development in the area. However, it is not clear whether the assignment of monetary values can fully defend the importance of non-monetary effects, such as increased biodiversity or the cultural significance of woodland. Further research is required to develop approaches that may combine both monetary and non-monetary valuations in order to assess the true value of urban green spaces.

6. Carbon sequestration: Green open space is the fundamental solution to this problem. The presence of urban green space will reduce the amount of CO₂ emission.

Sustainability is the principle of living between human well-being and our planet . According to The United Nation's 1987, Report of The World Commission on Environment Derivation from the Sustainable Development Goals targets, urban green space is part of the contributors to the sustainable development agenda and as a comprehensive tool to serve a long-term protection of environmental sustainability for the city [6]. It is the natural element that is responsible to ensure the quality of life in urban areas remains functional. Over the years, the green spaces within the cities play a role as the urban lungs, oxygen to reduce the city's heat, and the wall for harmful air pollution [7]. However, despite the benefits offered by the green space to city Environment enhancement, rapid urban development has led to the destruction of green space and driving in the city unsustainable [8]. Just as other land use activities, the way of green space preserved, control and manage can cause an environmental impact for Example flood, destruction of natural habitats and climate change [9]. Thus, it is very important for developing countries to race for the greenest city and to protect our mother earth in order to create such a great live able place for human to live in. One important aim of having greenery in urban plans is to prevent or at least limit the degradation of the environment to a minimum while increasing, as far as possible, 'creativity' in order to meet the developmental needs.



Objectives of the study:

1. To assess the area covered by open green spaces in the study area.
2. To understand and study the importance of open green spaces.
3. To examine the effect of these areas on the neighbourhood.
4. To find the reasons of their decline.
5. To suggest measures for restoring the open green spaces.

2. METHODOLOGY

The main question of this research is what the main terms of urban open green spaces are, how they can be defined, what does these spaces mean to the local inhabitants, why are the open green spaces declining and what measures can be taken to restore them. We decided to conduct semi-structured, qualitative interviews with experts about their general knowledge and ideas in order to gain a basic understanding. We attempted to choose experts who have experience enough to interact openly and reveal new information about this topic. The locals were also asked and responses recorded to the best of their knowledge, then discussed with experts.

STUDY AREA:

Jammu and Kashmir is divided into three provinces namely Jammu, Kashmir and Ladakh. The province of Jammu is situated on a sub hilly area between 32°01' and 37°05' N and 74°04' and 80°03' E at an altitude of 400 m above mean sea level. This study is confined to Sunjwan, Bathindi, Chowadi areas of district Jammu. Jammu, situated at an altitude of 336 m above the sea level and (32.69380)N and (74.90630)E are the respective latitude and longitudes of the study area. This area was selected for research work because of its rapidly changing demography. In the last decade the open green spaces have vanished fast in the study area due to rapid urbanisation and unplanned constructional activities.



Picture 1: Upper morh Bathindi.



Picture 2: North of Sunjwan bus stand.



Pic. 3: Iconic Ficus religiosa tree-Bus stand Sunjwan. Pic 4: Vegetation on community land.

3. Observations:

Semi-arid naturally growing shrubs dominate the vegetation of the open green spaces in the study area. Distance or walking time from home has appeared to be the single most important precondition for use of the green spaces. People in close proximity to a green space use it much more frequently. Studies have shown that the location and distribution of green spaces in and around the city influences people's participation. A study in Helsinki, Finland, demonstrated that a good amount of green areas and easy access (i.e. short distance) to a recreational space increase the number of visits and people living close (<0.5 km) visited the green spaces more frequently (>4 times per week) [10]. A similar study conducted in Swedish cities showed that overall, people with immediate access to fine and verdant gardens or green yards are also most likely to visit public green spaces. Indeed, those with gardens of their own also spend more time in public green spaces than those without a garden of themselves [11]. Public green space should be in the centre of the neighbourhood and not more than five minutes' walk for most residents, public buildings, business or shops. Therefore, the accessibility and proximity are very important factors to consider during planning and designing of any urban green space. The distance one walks or cycles should be adequately small as well as with limited obstructions along the trip. As such, some countries have set up numerous recommendations for the provision of accessible green spaces. For instance, England has standards such as an accessible natural green space less than 300 metres from homes; statutory local nature reserves provided at a minimum level of 1 hectare per thousand populations, at least one accessible 20 hectare site within 2 kilometres from the home; one accessible 100 hectare site within 5 kilometres of the house and one accessible 500 hectare site within 10 kilo-metres of home [12]. In the study area rapid urbanisation and unplanned constructional activities on a large scale are destroying the open green



spaces. Massive inflow of residents from neighbouring districts to Sunjwan, Bathindi and Chowadi areas has led to construction of hundreds of new houses which do not have greenery even in feet inside their premises. The study area is quickly moving towards becoming a concrete forest. Religious believes attached to certain places or trees can also help preserve and maintain a green space. Such is an example of vegetation cover around the temples at Sunjwan.

4. Conclusions:

Urban green spaces fulfil many functions in urban dwelling context that benefits people's quality of life. There is there-fore a broad consensus about the importance and value of urban green spaces in Indian cities towards planning and constructing sustainable or eco-cities of 21st century. Steadily growing traffic and urban heat, especially in the developing countries like ours is not only damaging the environment but also incurring social and economic loses. The ecological benefits bestowed by green spaces which range from protecting and maintaining our biodiversity to helping in the mitigation of change cannot be overlooked in today's sustainable planning strategies. Inner-city green spaces are especially important for improving air quality though uptake of the pollutant gases and particulates which are responsible for many respiratory infections. Green spaces also help in reduction of the energy costs of cooling buildings effectively. Furthermore, due to their amenity and aesthetic, green spaces increase property value also. Examples are Gandhi-nagar and Channi areas of Jammu. However, the most sought out benefits of green spaces in a city are the social and psychological importance. Urban green spaces, especially public parks and gardens provide resources for relaxation and recreational activities. Ideally this helps in emotional relaxation (therapeutic) and physical relaxation. In order to meet social and psychological needs of citizens satisfactorily, green spaces in the city should be easily accessible and in adequately optimal in their quality and quantity. Green spaces need to be uniformly distributed throughout the residential city area, and the total area occupied by green spaces in the city should be large enough to accommodate the city population requirements. Cities are responsible for most of the consumption of the world's resources and are home to most of the world's citizens too. Bringing green space to the urban landscape can also promote and inspire a better relationship with the environment while supporting important services. The promotion and conservation of green space in cities is in the hands of the local and regional authorities. Integrative approach should not be discussed only in writings as a source of contributing instrument to environmental sustainability, but it is also important that how it could be fostered in developing countries in different social settings in which political and cultural factors can influence. And there are many intermediary factors such as lack of investment, proper management, designing an appropriate planning and public policy, and political instability, traditional values, economic circumstances influence to how and what extent the application of integrative approach in developing countries may contribute to environmental sustainability.



Suggestions:

1. Lack of afforestation programs is one of the major drawbacks of Indian cities. Urbanisation should be complemented with afforestation targeting specific increment in tree count.
 - a. Performance-based incentive programs encourage the competition and result in better output.
 - b. Since low-income residents tend to live in much denser neighbourhoods, special care should be taken to ensure provision of green walls and green/cool roofs. Such measures will prove very crucial in the cooling of microclimate and compensating for dearth of material resources.
2. Road traffic is one of the major sources of pollution in India. Impetus should be given to greening of the transport corridors to reduce atmospheric pollution.
 - a. The high density of Indian roadways can be utilised as green corridors for attenuating the atmospheric pollution, and inducing uniform cooling.
 - (i)Evergreen plants should be selected for roadways to minimise accidents due to leaf shedding from deciduous varieties. This should be backed with guidelines for choosing of tree species and tree spacing.
 - (ii)Special care should be given to ensure complete visibility at traffic intersections and rotaries.
 - b. In keeping with the National Forest Policy, trees should be planted and maintained along the railway lines, canals, and streams. Green belts should be raised in and around derelict lands.
 - c. Incorporation of permeable pavements such as grassed footpaths and greening of parking lots can help to decrease the proportion of paved areas, aid in storm water retention, and reduce surface heating.
3. The observed trend of alarmingly shrinking residential gardens needs to be checked.
 - a. Strict enforcement of bye-laws regulating the size of home gardens, and imposition of penalty for disregard to public laws will help to follow discipline among locals.
 - b. The high percentage of flat-roofed buildings in India provides ample scope for development of beautiful roof gardens. The added benefit of rain water harvesting and storm water runoff collection may be amalgamated to solve acute water shortage in cities.
 - c. Since people remain more amenable to monetary benefits, tax abatements can be provided for maintenance of roof gardens, box plantations, and green terracing.
4. Public participation is a prerequisite for the success of any kind of urban development program and is significantly missing in India.



14th April 2019

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ISBN: 978-93-87793-85-9

- a. Tree giveaways will help to develop a sense of responsibility towards protection of the natural environment.
- b. Minimum threshold values for green cover per plot ratio should be designated in residential areas of Jammu city. Since wealthier neighbourhoods tend to have more plantable areas, while low-income residents tend to live in denser neighbourhoods with lower possible stewardship, the minimum green cover per built-up area should consider the economic stratification.
- 5. Transport corridors and industrial belts are major contributors to the air pollution. Extensive green cover towards the north of Sunjwan helps to maintain pollutant concentrations within permissible limits.
 - a. Presence of greenbelts around islands of pollution such as industrial zones reduces the spread of pollutants.
 - b. Government database should provide information about the choice of tree species as per climatic requirements to ensure maximum efficiency at minimum cost.
 - c. The policy of “right place, right tree” as observed in London provides technical support towards the intelligent greening of cities.
 - d. The greening strategy should be climate driven, and responsive to site demands. This entails potential to explore intra-city site variations for growth of varied variety of the flora. This will help to reduce stereotype, and stimulate creativity amongst the locals.
 - e. Identification of “champion trees”, i.e. trees of ecological importance due to its species richness or physical attributes and policies for their preservation will help to sustain species variety and richness.
- 6. Lack of tree databank providing detailed assessment of the physical, economical, and ecological value of city flora undermines probable afforestation of the Indian cities.
 - a. Tree census should be initiated and must include a study of the physical attributes of trees, such as species variety, richness, health, age, girth etc.
 - b. Tree census should generate the information about the ecological value of species. The findings may be used to educate residents about the intangible benefits of trees.
 - c. Study on increasing property value due to the vegetative presence will provide an assessment of the economic value of city flora, and help to convince residents about the monetary benefits emanating from maintenance and development of green areas.

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12th International Conference on Recent Development in Engineering Science, Humanities and Management



The International Centre Goa, Panjim, Goa (India)



14th April 2019

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ISBN: 978-93-87793-85-9

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