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Need of Preserving Green Spaces - A Case Study of Walled City, Jaipur

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Abstract: ***Urban open/green spaces are one of the major environmental resources of the urban areas. Urban green spaces provide environmental benefits through their effects on negating urban heat, offsetting greenhouse gas emissions, and attenuating storm water. In the walled city, Jaipur, we can see the amount of open spaces i. e. green spaces, backyards; courtyards etc. which are designed for specific population are not able to cater to the present population due to which the quantity of open space per capita criteria is not being met. The quality of green spaces is also in poor condition in some cases where they are not being used. There is thus a need for urban planners to interfere to match the criteria of per capita open space norms and steps to improve the quality of open/green spaces.***

Keywords: Open/green spaces, benefits of green spaces, quantity and quality of green spaces, per capita green space norms

1. Introduction

Urban green spaces could be parks, sports field, wetlands and other natural ecosystem. Urban parks and garden play a critical role in cooling the cities but when we talk in the context of Walled City, Jaipur in our study area (Visheshraji Chowkri). Green spaces are very important for the physical wellbeing as well as the mental health as it helps in reducing physiological stress indicators.

The issue of required open green space per capita in urban systems has remained controversial. In twentieth century, experts in Germany, Japan and other countries proposed a standard of 40 square meters urban green space in high quality or 140 sq. m. In this Research paper the forest area per capita for reaching a balance between carbon dioxide and oxygen, to meet the ecological balance of human well - being. Developed countries adopted a general standard of green space of 20 sq. m. park area per capita is defined (Wang et al 2009). In this paper International minimum standard suggested by World Health Organization (WHO) and adopted by the publications of United Nations Food and Agriculture Organization (FAO) is a minimum availability of 9 sq. m. green open space per city dweller.

2. Literature Review

Significance of Green Spaces: Urban green spaces are necessary for making our cities sustainable, healthy and energy efficient. There are four benefits from green spaces

Ecological Benefits: Pollutants are absorbed by trees and in turn releases oxygen. They help in maintaining of a healthy urban environment by providing clean air, water and soil. " Green vegetation has been shown to lower wall surface temperatures by 17^{o}C, which led to a reduced air conditioning load by an average of 50%. They, improve the urban micro climate and maintain the balance of the city's natural urban environment.

Hysical Benefits: Urban forests act as temperature buffers providing shade in the summer and wind breaks in the winter in addition to reducing noise pollution and co_2 levels. Urban green spaces improves the air, water resources by absorbing air pollutants, increasing ground water level.

Social Benefits: Well managed and maintained green spaces contribute to social interaction by creating opportunities for people of all ages to interact. They can be used for meeting places, community festivals.

Economic Benefits: Property owners value urban greenery by the premium they pay to live in the neighborhood of urban green spaces and public parks.

3. Issues and Challenges

The urbanization in India have led to urban sprawl in the cities and thus leading to the loss of green cover in the periphery and also in the core areas due to increasing densification, the open spaces and green areas are reducing and in places are being encroached upon.

Ever increasing population in India have adversely affected urban green spaces since India has now become the second most populous country in the world and metro cities are affected the most of metropolitan city Chennai and Mumbai have a meager 0.46 m^2 area (Srivathsan 2013) and 0.12 m^2 area (FAO 1998) of green space per capita, respectively, as compared to the UN recommended standard of 9 m^2 of green space per capita.

The most livable cities in the world are famous for their open spaces and they are in abundance and it is the major problem in the Indian cities and especially in the core areas like walled city, Jaipur. Due to shortage of green spaces in urban areas it has led to air pollution, urban heat island effect is occurring due to the shortage of green spaces and formation of concrete jungle thus affecting the climate and moreover affecting the mental and physical well - being of the person.

As in the case of walled city Jaipur roads are highly congested and are overcrowded with vehicles for most of the day because of which there is a problem of noise pollution thus through green spaces noise is buffered and it lessen its impact.

Not just the noise pollution but due to the emission from the vehicles in the walled city; air pollution is another major concern in our stretch and through green spaces the air gets purified and thus it helps in improving the air quality

4. Study Area

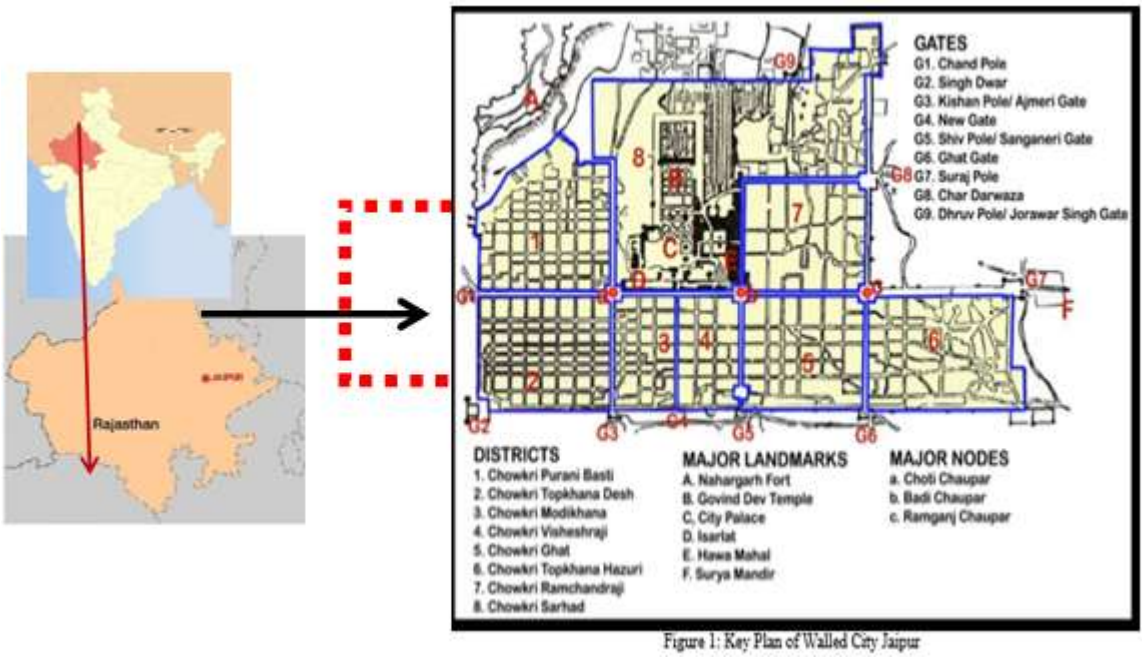

Figure 1: Key Plan of Walled City Jaipur

Visheshraji Chowkri
Area: 47Hectares. (47000sq. mt)
Population: 14355
Density: 305persons per hectare

Figure 1: Map showing built and open space

Figure 2: Built heights

Figure 3: Activity plan

5. Analysis

The Total population of the study area is 14, 355 and area of 47 hectares. Density of the area is coming as 305 pph. The total green space area in the study area is coming out to be 10840 sq. mt. Now the per capita green space is 0.75 sq. mt which is very less compared to the desirable 10 - 12 sq. mt norms of URDPFI guidelines.

The total population in our study area is 14, 355 people.

For the population of 14, 355 there should be 3 housing parks (1 for 5000 population), 1 neighborhood park (1 for 15000 population) as per the URDPFI Guidelines

Total Land Required: -

1) 3 housing park = 3 x 0.50 ha = 1.5 ha
2) 1 neighborhood park = 1 x 1 ha = 1 ha

Total land requirement – 2.5 ha.

And the available green spaces in our study area is 1.08 ha and there is a deficit of 1.42 ha and looking into the compactness of structures it becomes very difficult to give a proposal for the new green space, so techniques like green roofs, Transfer of development Rights (TDR) could be bought in to develop the green spaces in our study area

6. Proposals

The technique which could be used in our study area to increase the quantity of green areas in our stretch is through identification of dilapidated structures and by demolishing them, proposal for green areas could be given there, it has various advantages of its own:

1) It helps to make the premises nearby safe since such structures have always posed a threat to the people living by.
2) By giving TDR rights to the owners of the plots to make them willingly give up on their plots and TDR incentives could be easily given in the case of development of recreational areas.

What is TDR?

"The UDPFI Guidelines of Ministry of urban development, Government of India define as the Transfer of Development Rights as a development right to transfer the potential of a plot designated for a public purpose in execute plan, expressed in terms of total permissible built space calculated on the basis of Floor Space Index or Floor Area Ratio allowable for that plot".

"With the Transferable Development Rights (TDR) is a mechanism, land owners involved in transferring the development rights of a piece of land with own first surrender the land to the local government. In return, with this purpose they receive monetary compensation or the development rights to another piece of land, equal to that surrendered, in another area of the city".

Advantages of using TDR in our study area: -

1) Preservation of land.
2) More flexible and has the potential to give the fair compensation to the owner

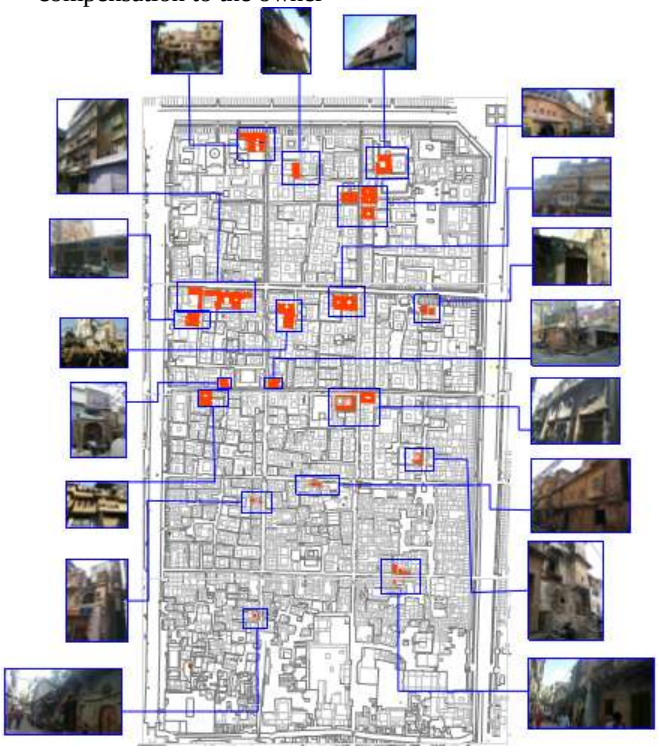

Figure 4: Dilapidated structure

"Green roof can be looked because of its efficiency to reduce the building cooling load in summer and heating load in winter". (Xiao et al, 2014). It can add ecological benefit and landscape value to the community.

What is green roof?

"A green roof is a vegetative layer grown on a rooftop. Green roofs are emerging technologies that can help communities mitigate urban heat islands. "

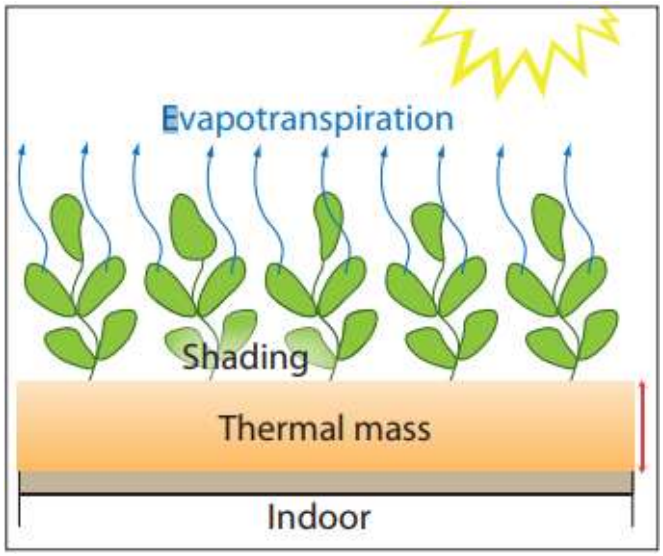

Figure : Evapotranspiration and Shading on a Green Roof
Source: www.epa. gov

Types of Green Roofs

1) Extensive Green Roofs: - The concept of Extensive green roof is that it is made from rugged green roof and the additional advantage which it hold is that it requires very little maintenance which makes it a viable option in our study area.
2) Intensive Green Roofs: - Intensive green roofs as compared to the extensive rofs are heavier and moreover require more initial investment in them, also the maintenance cost is greater.

Why green roof in our study area?

The land in our study area is mostly the privately owned land and very less public land is available so to propose a green space it becomes very difficult to acquire those land thus green roofs could become a very viable option in this case.

How green roofs proposal could be given?

The skyline of the walled city is largely affected as there are structures which are G+3, G+4 and even G+5 and since the buildings are closely packed the adjacent building of lesser height are deprived even of natural air, thus by providing green roofs it can help in purifying the air quality of the area and structures with height more than G+3 should be made mandatory to follow this.

Therefore, we green roofs could be very easily used in retrofitting existing building in the walled city to improve the micro climate on building roofs. It also helps in reducing the energy demand for space cooling during summer which becomes very good for the Indian climate. The thing which has to be taken into consideration is that the building where it has to be done should have an additional load carrying capacity of 100 - 130 kg/m^2.

7. Conclusion

Urban green spaces are very vital in in maintaining the micro climate and providing good environment for the urban citizens. In order to improve the green spaces in core cities which are already having meager amount of green space and there is no land to promote green spaces green roofs technique can be useful but for which green roof development policies should be taken in place and incentives should be given to the citizens who are promoting them. There is also other option to provide ample green spaces in core cities where old/dilapidated structures can be demolished with the consent of owners who are in return will be given TDR.

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