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Smart Community Participation for Revitalization of Urban Green Spaces Over Time: Case Study New Delhi

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1 ABSTRACT

The cornerstone of turning the Indian city a smart city, is towards an integrated approach of ecology and the conservation of the natural resources for City Planning. During the last century Urban Population of India increased ten folds from 27 million to some 270 million. Cities today are in the centre-stage of environmental pollution, and degradation and loss of bio-diversity. Concentration of intense economic processes and high level of consumption in cities increase their resource demands. The main problem with cities today is that they have become centres of mobilisation rather than civilisation. They are nodes of an increasingly intense economic activity, with the volume of travel having reached unprecedented levels in recent years. The urban economic culture has a deep impact on the human mind, which has become too pre-occupied with the pursuit of personal gain. The city of the future, to be sustainable, will have to re-establish the concept of green spaces development and mangement, with greater dependence on smart local community partcipation, with concern on the liveability of local environments and with a greater emphasis on creating public spaces for people to enjoy.

New Delhi, the fast growing Capital City of India has presently a population of about 17 million persons (census 2011) and is estimated to grow in a 23 million population Mega City by the year 2021. After Independence Delhi had 1.43 million populations by 1951 and has increased to 8.42 million by 1991. Despite a land locked situation and with such a big concentration of population, it is a liveable city with natural landscape and with very high percentage of landuse under green/open spaces. Out of total area of 1483 sq km in NCT Delhi, about 150 sq km has been proposed as Green Belt at the peripheral area of the city to act as lung spaces for City, 100 sq km land is in River Zone as Green Space to facilitate ground water recharge and about 90 sq km of Aravali ranges and water bodies with biodiversity parks for enriching the environment and natural flora and fauna in its original style in the city. The built up areas also contain more than 15 % area in form of city and neighbourhood level parks allocating about 5 sq km open space per person at city level. The area under recreational/ green use i.e. 7145 ha is in the form of District Parks, City Parks, Community Parks etc. comprising around 15 % of the total urban land area. The norms for City green for Delhi as Master Plan of Delhi 2021 varies from City Park for 100 ha to housing area parking as 0.5 ha for certain population.

The present paper analysed about how New Delhi lungs spaces can be used though smart community participation over time. Whether this open space is utilized by the comuniy for the community and to the community? The paper explores the upcoming virtual technology for transformation of community ideas and design to influence the decision making, strategy planning and predictive modelling for conservation and sustainable development of urban green spaces local level and management of problem of climate change at global level. Smart Community participation through 'Bhagidari System' to improve the urban environment and to revitalized Green Spaces of New Delhi over time was also analysed in the current paper.

2 INTRODUCTION

The cornerstone of turning the Indian city a smart city, is towards an integrated approach of ecology and the conservation of the natural resources for City Planning. During the last century Urban Population of India increased ten folds from 27 million to some 270 million. Cities today are in the centre-stage of environmental pollution, and degradation and loss of bio-diversity. Concentration of intense economic processes and high level of consumption in cities increase their resource demands. The main problem with cities today is that they have become centres of mobilisation rather than civilisation. They are nodes of an increasingly intense economic activity, with the volume of travel having reached unprecedented levels in recent years. The urban economic culture has a deep impact on the human mind, which has become too pre-occupied with the pursuit of personal gain. The city of the future, to be sustainable, will have to re-establish the concept of green spaces development and mangement, with greater dependence on smart local

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The early urban life in Delhi was environment centric and full of plant lore, intimately concerned with the day to day life of our ancestors the hermitages. With the increase in population and the rapid spread of townships Delhi urban community have become more and more alienated from Nature. The scale of present urbanization is unprecedented and posses daunting requirements for Capital city of India to transform the urban community to, "Green Urban Community". Deforestation is increasing alarmingly and is disastrous. Apart from the aesthetic aspect, the loss of vegetation cover affects the soil, air and water balance adversely. The environment is badly affected due to deforestation and the consequent ecological imbalance. The capital city of India Delhi now face the mounting challenges with unprecedented rural and urban migration and population growth. The growth of Delhi/ National Capital Teritory (NCT) cities is beyond manageable limits. Therefore, complex urban issues demand smart, innovative actions and increasing attentions to combat. The natural landscape provides a vital background to urban community. The ever increasing urbanization process escalating socio-economic demands which alter the lunges spaces of the city. It is essential to emphasize the role of green spaces or urban forest for planning in New Delhi. The information technology and rich heritage of urban community offer significant opportunities for green cover to improve its quality through smart community participation or existing Bhagidari System. (Bhagidari System is a participatory approach addopted by the Government of Delhi in 2003 for provision of public services through involvement of the local Resident Welfare Organisations, local stakeholders, local professionals, local polititions, local City Government, local police and NGOs etc) refer website: www.delhigovt.nic.in/bhagi.asp .

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3 CONCEPT OF SMART URBAN GREEN COMMUNITY SYSTEM (SUGCS)

A Bhagidari Green Community System (BGCS) to revitalize the green spaces for urban cities to act as the engine of smart growth and transforming the urban system to a smart sustainable system. BGCS will create the functional connectivity between physical and green spaces within the cities on the one hand and act as a buffers and recreational opportunities for urban fringe communities on the other hand. Such system might also promote greater ecological and biological diversity development, greater use of green infrastructure and multifunctional green spaces. By increasing the density of green through BGCS can also help to mitigate the climate discomfort generated within urban heat island as a result of concentration of roads, concrete buildings and pavement. Generation of micro-climate through provision of shading trees in the parking lots and pavement control the heat generated by buildings.
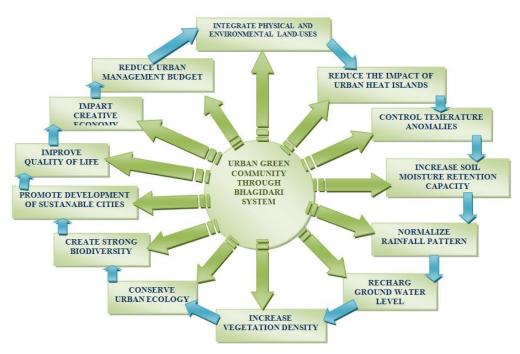
Figure 1: Impact of Urban Green Community through Bhagidari System

However, it is important to select or grow trees that will perform the best in the city climate. In addition to helping cut down carbon emissions globally, BGCS may aid in improving urban air quality. The problem of air pollution is one of the most important problems faced by Indian cities like smoke, noise, chemical effluents, garbage dust which act as the chief pollutants of the atmosphere. In the technical term there are main five elements responsible for creating pollution in the NCT like sulfur dioxide, nitrogen dioxide, ozone, particulate matter, and carbon monoxide and with the help of BGC System these can be combat with low cost. It is estimated that in order to remove one pound of pollutants required Rs200/- cost to mitigate while cost with the BGC System the same can be mitigated for Rs. 20/- or even less. Through management of green space strategically in combination with the watersheds region can reduce runoff and recharge the ground water and thereby controlling the problems of floods in the Delhi. Apart from creating strong biodiversity and ecosystem BGC System also generate the psychological and public health benefits. Implementation of BGC System will focus on the framework of Green Urban Land-use policies in order to create environmental justices. Thus, more effective partnership is required between the planner and local communities to establish the BGC System. In short, BGC System is urban and regional planning and environmental management efforts where green land-use located in the designated city area. BGC System is developed in pursuit of synergies derived from combined efforts in waste treatment, environmental preservation and promotion of industrial development.

3.1 Features of BGC System

- Strong regulation development control in support towards a recycling based community.
- Centre, State and local Government spearheading the drive to propagate the concept of BGC System.
- Foster the research and training in the field of environment and town planning through public and private sectors.
- Creating the Knowledge base for environmental system technologies and innovative solutions to solve the urban and regional problems.
- Focusing on energy conservation, eco-material development and integrated waste management
- Promoting the eco-business market domestically and internationally.
- Contribute to reducing, reusing and recycling of resources.
- Promoting the establishment of a sound material-cycle by local community involvement

For Urban and regional Planner, the development and implementation of BGC System provide incentives on a number of issues that may go beyond their professional boundaries. This, therefore, calls for

comprehensive multi-disciplinary partnerships that will enable the achievement of the goals and objectives of a BGC System. The Planner will need to provide inputs and facilitate such partnerships to plan and develop a BGC System.

3.2 Support infrastructure to Establish BGC System

a) Policy and Strategy Development: BGC System requires adopting environmental base Urban and Regional Planning regulation and development control to succeed. Standards and codes to achieve targets and development goals need to establish besides integrating BGC System into Master and Zonal Plans of the Delhi. It should also have financial and other incentives to ensure that local community will adopt voluntarily.

b) Develop Networking and creative economy: BGC System will be stronger if networking system should be developed by involving the local community for the community and from the community. Creation of common ground provides opportunities for private and public to meet and exchange information, solve problems and plan together of green environmental friendly infrastructure and services (eco-services). A group of technical professional will be formed to work across the professional boundaries and support to generate the propulsive creative economy.

c) Application and Implementation of Environmentally sound technologies: BGC System can implement cutting edge and innovative technology demonstrations that are environmentally-friendly and also provide opportunities for capacity building and training on related issues.

d) Information Access: BGC System will provide reliable and credible information to ensure the success of cites towards sustainable development. Software support and decision making tools will be generated to evolve the sustainable strategies and technologies for the development control concept. To take advantage of research and development in the international and national marketplace and private experts.

4   GENERATION OF KNOWLEDGE MANAGEMENT BANK.

To stay ahead in today's highly unstable and competitive urban environment, Planner needs to develop new ways to organized and deliver services with better quality of life and faster response to the urban community need there by a higher satisfaction. It has become increasingly apparent that potential bottlenecks in achieving these goals lie not just in Planning management or policies frame but also in the ability to effectively manage 'Planner's Knowledge'. Especially the profession like Urban and Regional Planning are defined by working relationships governed by functional interdependencies rather that creating professional boundaries. Knowledge Management is a major challenge for creating Smart Urban Green Community through BGC System. The rapidly growing importance of knowledge is highlighted by the fact that many organizations now attempt to organize and to make available the relevant collective knowledge for Planner to design and plan the sustainable cities. However, at the national level there is a need to build 'Green Community Knowledge Repository System' unlike the one attempted under National Urban Information System (NUIS) Scheme for generation of digital databases at City level. Urban forestry and green research are given us much more detail information and can provide smart way to collect the information and database for sustainable management of green spaces for the region or cities. Invent of information technology, entrepreneur GIS, satellite imagery and aerial photography provides smart ways to plan or monitoring the urban forest or green spaces.

Through the satellite imagery one can measure the degree of canopy cover over urban areas at various time and period and can also identify the urban heat island and increase or decrease of temperature and so can understand the climate change. Since 1972 Land-sat satellite is efficient in even creating documentation of trees in urban areas and help to generate the database on tree cover over time. But Cartosat series of satellites can offer much higher resolution data which help planners to access specific detail data for even tree at the site level, will revolutionize the decision making process. With the help of Aerial Photography technologies we can even identify the ecological system and functions of urban forestry and its linkages with other land-use system within the urban community. Hence, even while analyzing the Google map image, one can smartly generate the base line data for creating or achieving the desired tree density goal. These goals can also be managed by target percentage of green cover/ urban forest in the city.
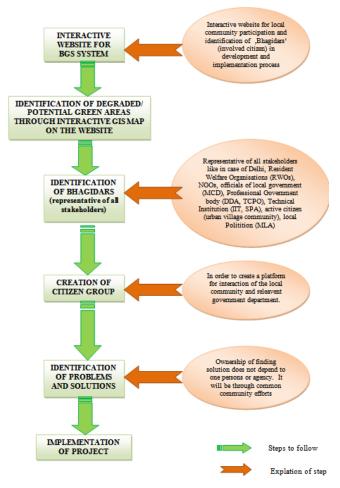
Figure 2: Steps for creation of BCG System

The Corporation's part department in Chennai and the State Forest Department are conducting tree survey for the city covering more than 426 Sq. Km., first of its kind in the country. Even a website – www.hashtrees.in – is also created to help the Chennai Corporation to put the check on trees being axed without permission and plan further to combat climate change. In the similar ways a GIS based software/ database tool is required to be develop at National/ Regional/ and City level in order to analyze the ecological and economic benefit of the green cover/ urban forest. In a way green/ forest based urban ecosystem gives sound money value for the urban community as a whole. Thus every tree is of more money value than only environmental benefit. Hence, BGC System services will provide environmental function by absorbing storm water runoff, removing air and water pollutions, stop soil erosion, reduce energy consumption, maintained ground water and help storing carbon. Municipal Corporation of Delhi (MCD) or Delhi Development Authority (DDA) can even use urban forest as a means of reducing carbon footprint and generate finance through carbon trading. Several studies show that, when urban forest is strategically planned, can reduce the demand of energy based on fossil fuels and consequently reduces the air and water pollution. Now the question arises that how to generate the BGC System for preparation of Master Plan/Zonal Plan and policy level in order to create SMART CITY for sustainable future. This problem can be solved in much way by creating a single knowledge base platform in Town and Country Planning Organization (TCPO) through Bhagidari (involment) of Resident Welfair Organistion, town planner, politicians, city managers, environmentalist, bio-scientist, software expert and ecologist.

5 METHODOLOGY FOR BGS SYSTEM:

Basic idea is to empower citizen to look after there green areas at decentralized community level. This will enhance inter action between the resident civil society ad releavent Government departments. The methodology of creation of BGS System is given in Figure 2.

6   STRATEGY OF REVITALIZATION OF GREEN SPACE THROUGH BGC SYSTEM:

In the above stated background the following three fold approach and strategy needs to be adopted through BGC System:

6.1 Land-use Efficiency Management:

Despite a land locked situation and with such a big concentration of population, it is a livable city with natural landscape and with very high percentage of land-use under green/open spaces. Out of total area of 1483 sq km in NCT Delhi, about 150 sq km has been proposed as Green Belt at the peripheral area of the city to act as lung space for City, 100 sq km land is in River Zone as Green Space to facilitate ground water recharge and about 90 sq km of Aravali Ranges and water bodies with biodiversity parks for enriching the environment and natural flora and fauna in its original style in the city. The built up areas also contain more than 15 % area in form of city and neighborhood level parks allocating about 5 sq km open space per person at city level.

6.2 Regional Park:

The Aravalli Range in the NCT of Delhi comprises of the rocky outcrop stretching from the University in the North to the NCT Border in the South and beyond, and sizeable areas of the same have been designated as the Ridge. This is not a continuum as various intervening stretches have, over a period of time, been brought under urbanization – for example the Central Ridge area was planned as an integral part of New Delhi, at the time of the development of New Delhi as the Capital in the early part of the twentieth century. The Master Plan of Delhi – 2001 identified the Regional Park into four parts as below:

- Northern Ridge 87 ha.
- Central Ridge 864 ha.
- South Central Ridge 626 ha.
- Southern Ridge 6200 ha.

The area of Regional Park is 7777 hectares. Part of this has been notified as Reserve Forest.

6.3 Green and Recreational Area

The area under recreational/ green use i.e. 7145 ha is in the form of District Parks, City Parks, Community Parks etc. comprising around 15 % of the total urban land area. In addition to this, a large chunk of green area is provided in the form of Neighbourhood Parks/Tot lots in the gross residential use zones, plantations/greens in large campuses like President's Estate, JNU, IARI, Delhi University, plantations along drains and roadside plantations. In addition to above, two Bio-diversity parks are under development.

In the Urban Extension the green cover is to be provided at the rate of 15 % of the total land, excluding the Ridge Regional Park. Out of this, some area shall be developed in the form of formal parks for the community and the rest shall be developed as woodlands and incidental greens for balancing the environment. This will be in addition to the development of specialized parks like Bio-Diversity Parks, plantation along the roads, drains, riverbank, etc.

6.4 Management of Natural Resources

The major natural features and eco-systems of Delhi are the river Yamuna, together with a network of streams/drains that empty into the river, and the Aravalli Range. Both of these are in a state of considerable degradation, and it is of vital importance to conserve and rejuvenate these ecosystems. This ecological reserve area has regional carrying capacity; therefore, surrounding States also have to contribute towards their conservation and rejuvenation.

Delhi has 18,000 parks and gardens under various civic agencies, measuring more than 8,000 ha which are managed by civic agencies alone or in association with NGOs/RWAs/Private Sector. Huge road length, railway lines, drains play an important role in greenery. Beside this, Forest Department and other agencies have about 9,500 ha under forests and other green patches ranging from 3 Acres to 6,200 Acre continuous forests. Forest Department of NCT Delhi has set up twelve City Forests in Delhi.

Civil society of Delhi (RWA), committed NGOs awareness in schools (Eco-Clubs), NGOs and so on are actively participate to enhance the urban forestry in Delhi.. The total green cover is much more than the recorded forest area (Forest Survey of India, 2009)over here. An unusually large number of agencies control land in Delhi and as a result the creation and management of green cover is a task shared by official agencies in Delhi namely, Delhi Development Authority, New Delhi Municipal Council, Municipal Corporation of Delhi, Airports Authority of India, Delhi Cantonment Board, Central/State Public Works Department, Forest Department and other civil agencies, including Railways.

Various issues related to urban greenery are – protection of created greenery, involving people in colony park maintenance, development of degraded parks, creation of greenery along roads, drains, railway track etc. Furthermore, blank institutional areas, village fallow lands and scrub forests need to be planted with suitable tree species for sustainable ecology. Only then 33 % of Delhi area can have green cover on sustainable basis.

Urban green spaces play a critical role in maintaining biodiversity and augmenting quality of life of a city's residents. Rapid population influx, inadequacies in city planning and regulations result in inadequate availability of land for greenery and landscaping. Redevelopment of the city through new infrastructure projects to cater to old and new needs creates additional pressure to remove trees even where they exist to provide necessary space to new developments.

Delhi is no exception so far as these pressures are concerned but still Delhi has managed to keep its green cover growing compared to other urban regions despite faster increase in population and other infrastructure developments than anywhere else in India.

To mitigate these adverse impacts and to restore and preserve the heritage of Delhi, the Delhi Development Authority (DDA) and University of Delhi have jointly initiated a major conservation effort to create a network of Biodiversity Parks which will not only serve as heritage sites but also act as home for thousands of vanishing species living together and provide a wide range of services to the human population inhabiting the city. It is a first landmark collaborative initiative by any infrastructure agency in India which has thought real estate development with ecosystems services in real sense. The concept of Biodiversity Parks if taken together with Real Estate will open new gateways in creating Green Civil Society.

Delhi has been hailed as a one of the greenest metropolitan cities of the world. Considerable work has gone into bringing tree cover to Delhi. It is estimated that the current green cover in Delhi is 20 percent, a quantum jump from that of only 3 percent in 1998. The current plans are to increase this green cover to 33 percent in 2012 and this involves several civic agencies like the Delhi Development Authority (DDA), New Delhi Municipal Council (NDMC), Public Works Department (PWD), Delhi Jal Board (DJB), Central Public Works Department (CPWD) and the Municipal Corporation of Delhi (MCD).

MCD is at the forefront of these efforts as it : a) Maintains about 14500 parks in the city, (ii) Provides greenery along MCD Roads(Road sides, Central Verges, Traffic Roundabout and traffic channelisers) (iii) Maintaining greenery in MCD establishments like schools, offices, hospitals, dispensaries, sanitary land Fill Sites spread all over Delhi and other vacant lands under its jurisdiction.

MCD has now embarked upon a new policy of involving other stakeholders to give a push to its targeted greening program names as "Public Private Partnership (PPP) in Development and Maintenance of Colony Parks". This institutional mechanism involves partnership of MCD and Registered Welfare Association/ Residents' Society, Residents' Social Welfare Association, NGO in the maintenance and development of the colony parks.

Municipal Corporation of Delhi today looks after 14500 parks in city. Some of the parks are in precarious condition. This is often due to shortage of staff at best and delinquency/absence at worst. In a city as large and complex as Delhi with the constraints in tow, public private partnership in management of city parks is not only desirable but an imperative if we are to deliver our residents the parks that they look forward to. MCD is now proposing to involve Resident Welfare Associations in maintenance of city parks. While the new policy is welcome a lot of institutional issues need to examined and resolved. Foremost, it is necessary to review the level of financial support to RWA to achieve the desired objectives as meager allocations are bound to dilute the efforts, and as a result the impact the new policy initiative.

6.5 Conservation and Development of resources

Green cover of the capital has increased the tree cover of Delhi from 36 sq km to over 300 sq. km. This could be possible because of the understanding & active participation of the citizens especially the school children: A Bhagidary System. Over the past three years the concept of City Forest has been given a new fillip. With the intent of having forest where ever it is possible to have it in Delhi. As a result in these past 3 years at least 28 forests have been setup. The idea is to set up at least 42 forest clusters to promote conservation of biodiversity, improve the quality of city's environment and create a better quality of life for Delhi's resident. In order to ensure that city's green spaces reflect the diversity and character of our rich flora Delhi Government has set up Delhi Parks and Gardens Society (DPGS) under the Department of Environment. A part of DPGS's ambitious mandate is to incorporate plant species that can adapt to Delhi's climatic conditions which seem to be going through a transition. There are already two biodiversity parks in Delhi, one in the northern part of Delhi and other in the foot hills of Aravali near Vasant Vihar. There is a third one coming up in the Vasant kunj area. These biodiversity parks are expected to play a stellar role in promoting a better understanding of the real ecological needs of Delhi and identify plants that can best flourish in the climate of Delhi. In order to enhance tree cover, the Delhi Preservation of Trees Act was enacted in 1994. The act had a provision, according to which, anybody cutting a tree for any purpose has to plant ten trees as compensatory plantation. But now an alternate arrangement has been made according to which, the person will have to pay Rs 28000 to the Department of Environment and Delhi Parks and Gardens Society so that they grow trees and also take care of them.

7   CONCLUSION

Finally as the result of implementation of BGC System will ensure wise use of the natural resources; generation of creative economy; creation of scientific and knowledge base; transforming gray land-uses into green for gaining the status of aesthetic luxury; and, reducing the budget of cities for combating environmental pollution. BGC System, therefore, calls for comprehensive multi-land-use partnerships that will enable the achievement of the goals and objectives of an Smart Government, Smart transportation, Smart economy, Smart planning, Smart innovation, Smart databank and thereby Smart NCT Delhi.

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