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Office Time : 3-5 P.M.(Sunday off)

Journal set by : Maheshwar Shukla,maheshwar.shukla@rediffmail.com

Printed by : mpasvo Press

Date of Publication : 1 January 2016

Maneesha Publication

(Letter No.V-34564,Reg.533/2007-2008)

B-32/16-A-2/1,Gopalkunj,Nariya,Lanka

Varanasi,U.P.,India

Anvikshiki
The Indian Journal of Research
Volume 10 Number 1 January 2016

Papers

PRINT ISSN 0973-9777,WEBSITE ISSN 0973-9777

Letter No.V-34564,Reg.533/2007-2008 INDIAN JOURNAL OF RESEARCH(2016)**10,46-54**
ANVIKSHIKI ISSN 0973-9777 Advance Access publication 15 July 2015

URBAN FORESTRY: URBANISATION AND GREENING OF VARANASI CITY

NIRAJ KUMARI*

Declaration

Abstract

Urbanisation is a logical and well anticipated consequence along the development of the cities. The role of urban forest in ameliorating urban habitats and improving quality of life is significant. Trees in urban system provide a variety of ecosystem services including biodiversity conservation, removal of atmospheric pollutants, oxygen generation, noise reduction, mitigation of urban heat island effect, microclimate regulation, stabilization of soil, groundwater recharge, prevention of soil erosion and carbon sequestration. With the participation of many different organization, local council, municipal and national planning bodies, department etc. for greening of cities is preferred. Government departments, educational institutions, municipal bodies, local residents are the key players in the greening of the urban cities. Systematic management entails regulated tree management, operations such as planting, pruning and felling needs to be conducted in an organized manner at the appropriate time. The need for urban forestry is to be planned, integrated and systematic. Approach to urban tree management should be stressed upon. Planning is important because trees are very often considered as an afterthought once development has taken place rather than being incorporated as original design phase. For effective, planned and systematic management of the tree in cities a measure of legal control is necessary. Law may be necessary for both to protect the tree from removal and to protect residents from hazardous trees.

Introduction

Urban forestry is the management of trees for their contribution to the physiological, sociological and economic wellbeing of the urban society. Urban forestry deals with woodlands, group of trees and individual trees where people live.[1]

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The need for urban forestry is to be planned & integrated and systematic approach to urban tree management should be stressed. Planning is important because trees are very often considered as an afterthought once development has taken place rather than being incorporated as original design phase. An integrated approach implies the participation of many different organization, local council, municipal and national planning bodies, department etc. Systematic management entails regulated tree management, operations such as planting, pruning and felling must be conducted in an organized manner at the appropriate time.[1] Parks and green spaces are the backbone of the sustainable and high quality urban environment.[2]

Urban forestry is concerned primarily with environmental enhancement, control of air and noise pollution and microclimatic modification.[1] High quality green spaces bring considerable benefits to the people's physical and mental health and to the environment.[2] Urban greens with their vide collection of trees and other plants have huge educational potential. Urban parks are an important recreational facility in developing as well as developed countries. People derive quantifiable benefits from the positive experience of viewing trees. The positive effect being both psychological as well as physiological.[1] People appreciate the urban green space sustainably. People appreciate that urban green space serve important social, psychological health, aesthetic, ecological and economic functions. However these functions are frequently taken for granted. Studies in cities in India suggest willingness of visitors to pay the entry fee provided these green spaces, gardens are managed sustainably[6]. In India urban parks and garden are also valued as a wildlife habitat. For example importance of cultivating Ficus spp to provide food for birds. Trees can have a significant and quantifiable effect on the local climate. Many Chinese urban foresters who claim to have altered the climate of some cities through widespread tree planting. Perhaps the most important contribution of tree to human comfort in hot countries is in shade, both directly and indirectly. They also provide protection from heavy rain and for the urban poor are a commonly used shelter both at night for sleep and during the day. Air in urban areas of many developing countries suffer from serious level of air pollution and may cause health problem. Tree planting alone is unlikely to have significant effect in cleaning the atmospheric pollutants however tree and other vegetation may contribute to this goal if used along with other measures. Trees do have the potential to make a marked improvement on air quality by absorbing carbon dioxide and other pollutants. Noise in the urban environment is often excessive and discomforting, particularly when it occurs at high frequencies. As with air pollution, the trees cannot solve the problem of noise but may help to reduce it to possibly more acceptable level if used along with other measures. Noise pollution is reduced by tree through absorption, deflection, reflection etc.[1] Foremost challenge is maintaining human wellbeing by provision for clean air and healthy living through conservation and restoration of urban green space and urban forest.[3]

Trees in urban system provide a variety of ecosystem services including biodiversity conservation, removal of atmospheric pollutants, oxygen generation, noise reduction, mitigation of urban heat island effect, microclimate regulation, stabilization of soil, groundwater recharge, prevention of soil erosion and carbon sequestration[7]. Without urban green spaces a sustainable city cannot be designed[8].

The term urban green space is used as comprehensive term comprising trees in all urban parks, forests and along the roads, canal etc. which contribute greenery in the city. Three main component of the urban forest and green spaces are: Patch (Urban domestic gardens, public and private parks, gardens, urban forest patches etc.), corridor (roadside avenues, walkaway and urban green ways etc.) and Network structure (layout of all the patches and corridors connecting the patches)[3].

The threat to human safety is one of the major potential problems and can serve as a hazard to urban inhabitants either directly through the falling tree/ branch or indirectly when cause damage to the structure[1]

Therefore to minimize or to avoid it, proper planning at initial stage before planting is required. Instant result is wanted so large saplings are planted which require intensive after care.[1]

Government departments, educational institutions, municipal bodies, local residents are the key players in the greening of the urban cities. For effective planned and systematic management of the tree in cities a measure of legal control is necessary. Law may be necessary for both to protect the tree from removal and to protect residents from hazardous trees.[1]

Figures compiled by UN (1991) indicate that in mid-1990, 45% (2.5 billion) of the people of the world were living in town cities and this will have increased to 51% in the year 2000 and 65% in the year 2025.[1] Cities occupy less than 3% of the global terrestrial surface but accounts for 78% of the carbon emissions.[1] In 1900 just 10% of the global population was living in Urban areas which now exceeds 50% and is expected to rise to 67% in next 50 years[3].

International minimum standard suggested by WHO and adopted by the publications of Food and Agriculture Organization (FAO) is a minimum availability of 9 sqm green open space per city dweller[9]. As per the census data for the year 2011, the total population of India has shown percent decadal growth of 17. 64 % and the rural population 12.18% whereas the urban population percent decadal growth has been 31.80%. The trend is similar in respect of many of the states and other cities.[4] Before it is too late, planners for the other such Indian cities needs to take into consideration the action and the initiatives required in advance to ensure proper greening.

Objectives

The objectives of the study are as follows:

- To study the condition of green belts in the city.
- To assess the adverse effect the city is facing due to the lack of urban forestry.

Methodology

The data is collected from secondary source. The data of the plantation work and proposed plantation work is of secondary nature. It is collected from the office of forest division Varanasi, land use data collected from the office of Town and Country planning, the data of pollution from Dept. Of Environmental Science (B.H.U.), the evaluation of the result is done with the help of Statistical Cartographic method and using MapInfo (8.5) and Arc GIS (9.1) for map making.

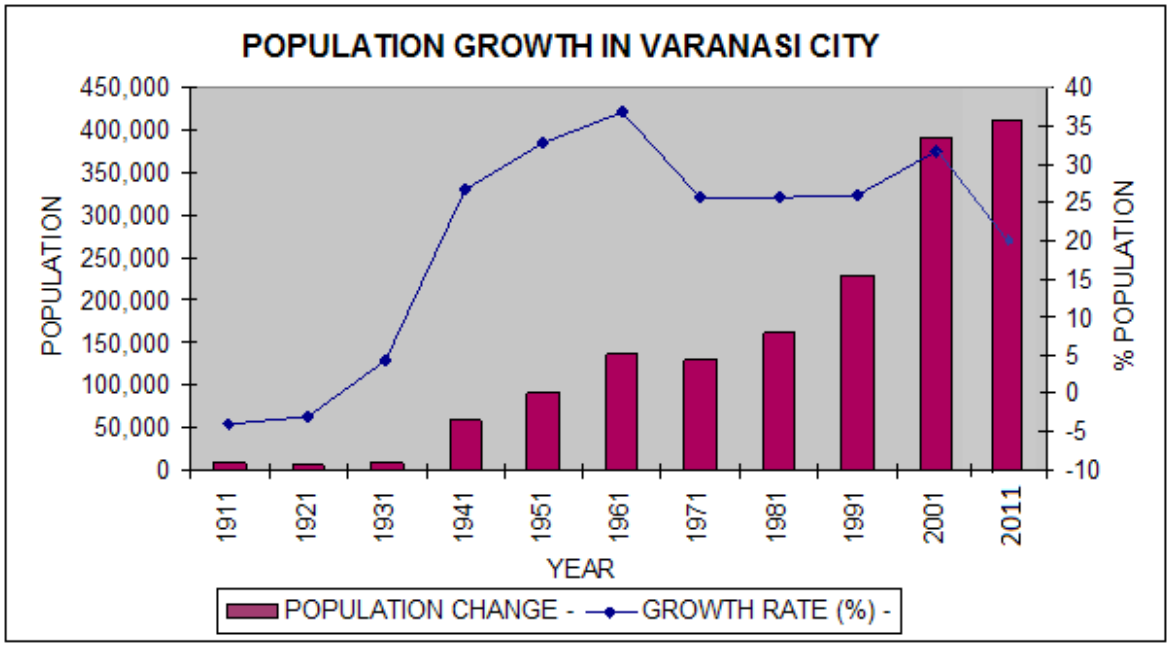
Study Area

The city of Varanasi is located in the middle Ganga valley of North India, in the Eastern part of the state of Uttar Pradesh, along the left crescent-shaped bank of the GangaRiver. The Varanasi City is the district headquarters of the Varanasi District and the major part of the urban area, delimited by the Census as 'Varanasi Urban Agglomeration' (VUA; 82º 56'E - 83º 03'E and 25º 14'N - 25º 23.5'N, covering an area of 112.26 sq. km) and consisting of 7 urban sub-units. These urban units are: (a) Varanasi), (b) Ramanagar MB, (c) Maruadih Railway Settlement), (d) Varanasi Cantt, (e) Banaras Hindu University NA, (f) Phulwaria CT, and (g) Sheodaspur CT. The average height of the city from mean sea level is 77m., i.e.: around 72m in the south along the Assi stream, and 83m at the high ground near the confluence of the Varana to the Ganga River in the north (known as Rajghat plateau). The nature and the character of the banks of the Ganga River has made the position of Varanasi so stable and enviable

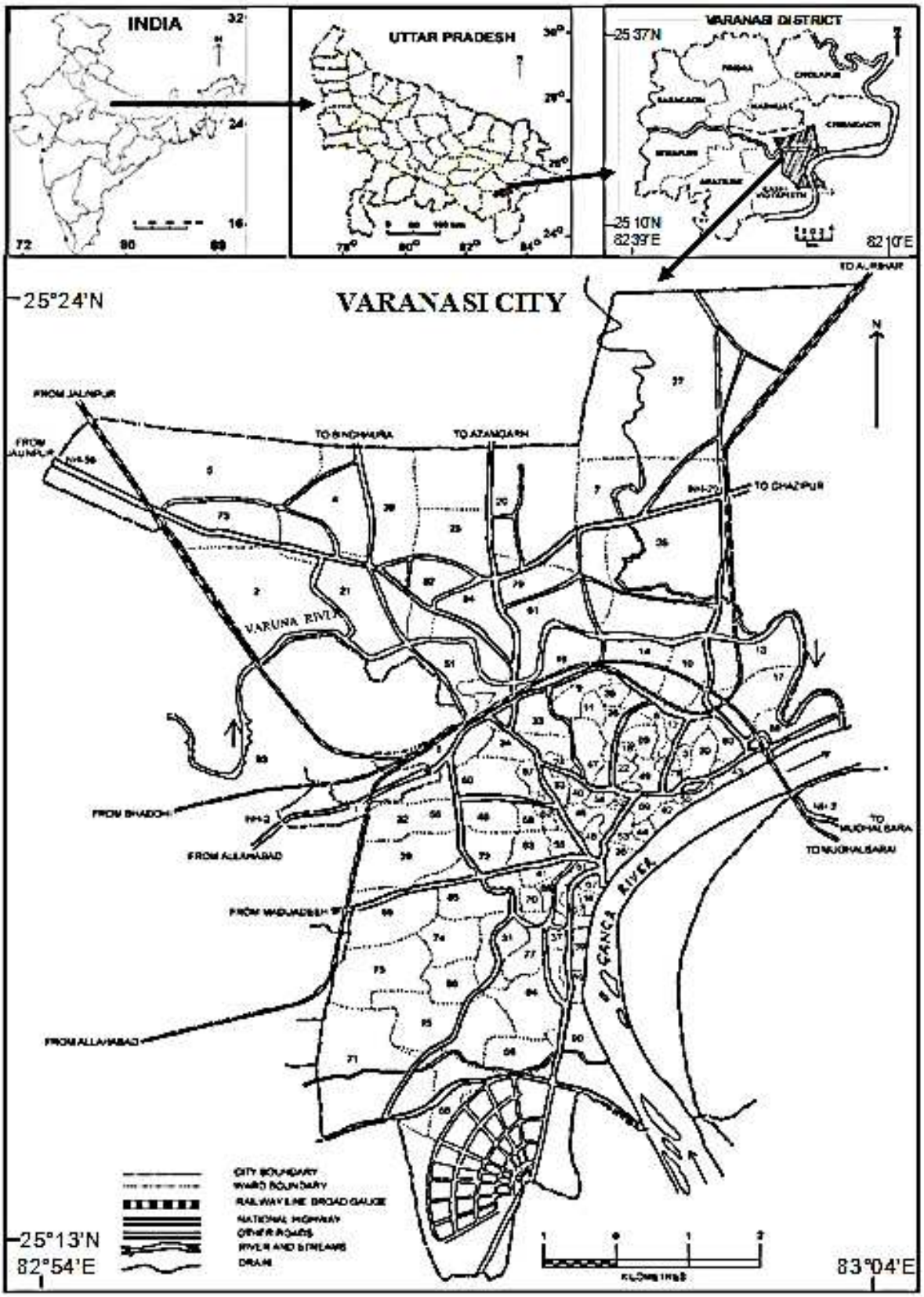
that it is among the few cities of the world which show little shifting in its site. The city proper is built on a high ridge of kankar (lime concretion) that forms the left bank of the Ganga for a distance of 5km, being quite above normal flood level. The maximum temperature of summer season is 45 and the minimum temperature is 32; while the maximum temperature in winter season is and the minimum temperature is, and the average rainfall is 600–1,000 mm. Due to floods caused every year the Quartenary Sedimentary layer is covered with two layers of soil, the new Alluvium and the Old Alluvium. Old Alluvium is formed as the mixture of Khad and Sand and is still found in the riverbeds of Ganga River and its tributaries.

Population Distribution in Varanasi City

Increasing Population. According to the Census of 2011, the population of the city was around 1.43 million. It is projected that by 2021 the population of the city will cross 2.5 million! There is, moreover, an estimated 30,000 daily floating population in the city. The riverfront and old city is densely populated (above 500 persons/ per ha), and it is here that development pressures are altering irreversibly the socio-cultural fabric of the city. The sex ratio of the city stands low at 885/000 male whereas the average Indian sex ratio stands at 933/ 000 male. The city also experiences high decadal growth of 31.6. The most important reason for the growth of the city population is its religious significance, which does not allow the population to disperse into the surrounding areas and is the city has started growing in upwards.



LOCATION OF VARANASI CITY



Why The Study Area Is Varanasi?

The area selected for the study of urban forestry is Varanasi city, the centre of Indian tradition religion, culture practices and rituals, rich in heritage and colours of India. So as to be described as mini India representing all the colours of Indian diversity, a city having a sense of its own, breathing and living in daily homage paid to the god and goddesses. The city as old as the culture of the country itself, built centuries ago is now wanting more space to breath and grow to come out of the old maze like narrow streets which has become its identity, with crumbling buildings which still hold the mark of its beauty, buried under dust of lack of maintenance it is asking for attention.

The condition of Varanasi is at present is degrading with a rapid pace ,with the increasing population, and the pressure on the city to provide urban amenities to the growing population and also the additional pressure of floating population of tourists who visit the city in large numbers. The city is not able to take in any more , its deteriorating environmental condition is calling for attention, The city is not able to keep pace with the time which is demanding more and more from the city,

The city needs fresh and clean Air to breath, quiet and calm surroundings, the sky free of dust to see clearly the rising sun and shade to cool off in summer and more pouring water to drench itself. To put it in word the city needs lungs to breath, for this it needs urban green belts which are very much lacking.

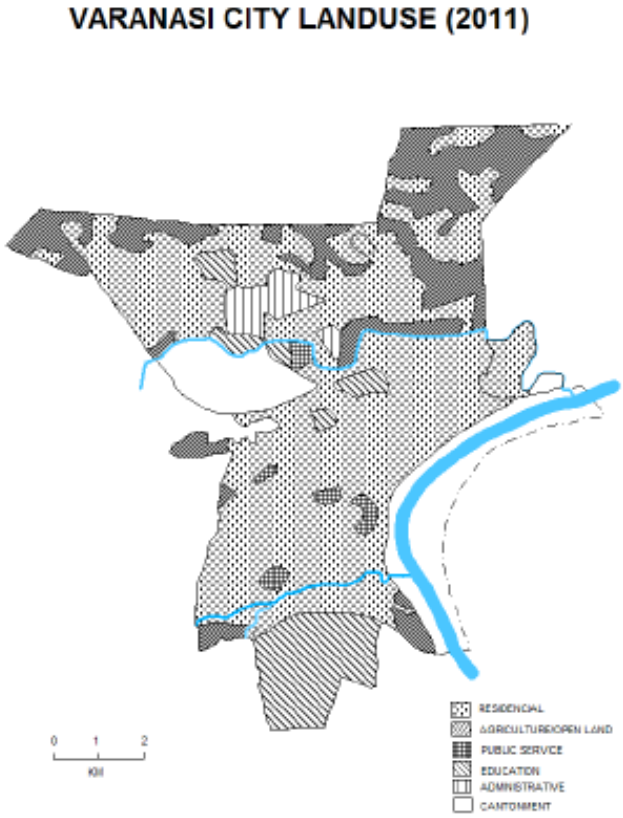
Urban green belts are considered the lungs of the cities as they act as a sink for some of the harmful gases released by vehicles and industries operating in the city area, they check the flow of dust and bring down noise pollution level. Whether sprawling over a large area or a small belt, these green belts are found in all cities and play a very important role. Plants provide innumerable environmental benefits and considering the steady increase in air pollution, it has become imperative to increase the green belts in and around the cities. And the case is similar to Varanasi, there the increase in the number of trees and urban green belt is the need of time which if not paid attention to, would cause disintegration of the city.

Open and Green Spaces in Varanasi City

National forest policy recommended that there should be 33 percent forest cover of the total geographical area of the country in all, 60 percent land in the hilly region 20 percent in the plain. The study area has only 5.49 percent green cover of its total geographical area. There is a negative change of -64.95% in green cover of the city during 1991 to 2011. In 1991 2,705.75 hectare land has green covers but in 2011 it shrieked very much and now only 948.47 hectare land has greenery in the city, which shows its poor condition in city sustainability.

Se	Land use category	Area 1988,ha	I:MP as in 1991		I:MP as in 2011		Change
1	Residential	2615.64	5,457.24	37.65	9,254.61	51.62	+69.58
2	Commercial	176.08	475.10	3.28	618.23	3.45	+30.13
3	Industrial	195.31	981.37	6.77	656.19	3.66	-33.13
4	Public and Community facility	261.05	450.42	3.11	1,309.07	7.30	+190.63
5	Recreational (Parks/Open grounds)	53.04	2705.76	18.67	984.47	5.49	-64.95
6	Services and utilities	-	-	-	103.97	0.58	-

7	Government and Semi government	56.69	292.18	2.01	1433.15	7.99	+390.50
8	Tourism	-	-	-	423.73	2.37	-
9	Transport and communication	914.30	1300.27	8.97	1460.35	8.15	+12.31
10	Others(Agriculture and Open space)	1393.79	28,32.06	19.54	1,683.45	9.39	-40.56
	Total	5,665.90	14,494.40	100.00	17,127.22	100.00	+23.68



Possible Places Where Tree Plantation Can Be Done :

Road Ways; Due to immense pressure of vehicles and lack of space on either side of the roadways, there are difficulties for plantation along road side. But few plantations may be done along NH 56 from jaunpur and NH 2 from Allahabad to mugalserai, passing through the city.

Railway Lines; There is possibility of tree plantation along railway line from cant station-Kashistation; in the same manner Varanasi-Allahabad railway line passing through the town has possibility for plantation.

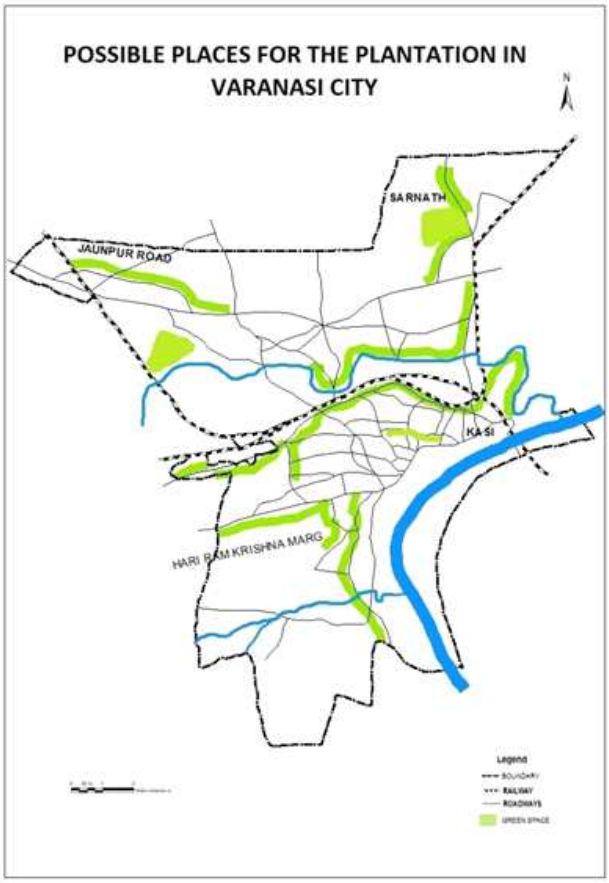
Ponds; Tree plantation can be done along the important ponds like the chakka, Ganeshpur, Sarnath, Son etc. and also along other smaller ponds.

Park; There are many parks in the city but the possibility of tree plantation is only possible in very few parks.

Education Institution; Plantation can be done in the campus of University, Colleges, and schools through various urban social forestry programs.

Government And Non-government Institutions; Plantation can be done in the campus of these institutions

Residencial Colonies; Plantation can be done in various residential colonies, or on lands available along the roadway through community forestry. In order to protect the planted trees, and keeping in mind the availability of land, protection could be done by fencing, Brick guard, Tree guard or Iron guard.



Solution; Varanasi city has only 5.49% vegetation cover of the total geographical area. To maintain the standard level (33%) of vegetation cover, the people of the city as well as the city dwellers will have to save and increase the green cover by the following ways:

I. Create new places as per new master plan.
II. Social forestry programmes should be launched at priority basis in the densely populated areas.
III. Roof top floriculture may be preferred.
IV. Convert community lands and unused private lands into green zones.
V. Increase the level of awareness among the people of the city.
VI. Start some award schemes for plantation more trees on own private lands.
VII. In order to protect the plants that have been planted adequate measure of its protection has to be taken.

Conclusion

Urbanisation at a rapid pace is a reality at present. Urban Forestry is an important contributory factor in the cities for environmental enhancement, control of air and noise pollution, microclimatic modification and recreational purposes of the urban population. Before the city expands further a proper plan for greening in the city especially with respect to land availability in the form of parks and gardens, forest patches and road side plantation should be in place. In addition to avoid illegal diversion of green cover of the city for taking up developmental works or otherwise a legal framework should be in place. And therefore plan for urban forestry should be integrated into overall planning of the urban areas in advance otherwise greening of the urbanised area becomes more difficult once the settlement takes place especially in identifying the land for the same and in greening the same.

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