

**Urban Service Planning**  
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**Lecture 58**  
**Urban Forestry, Parks and Open Spaces**

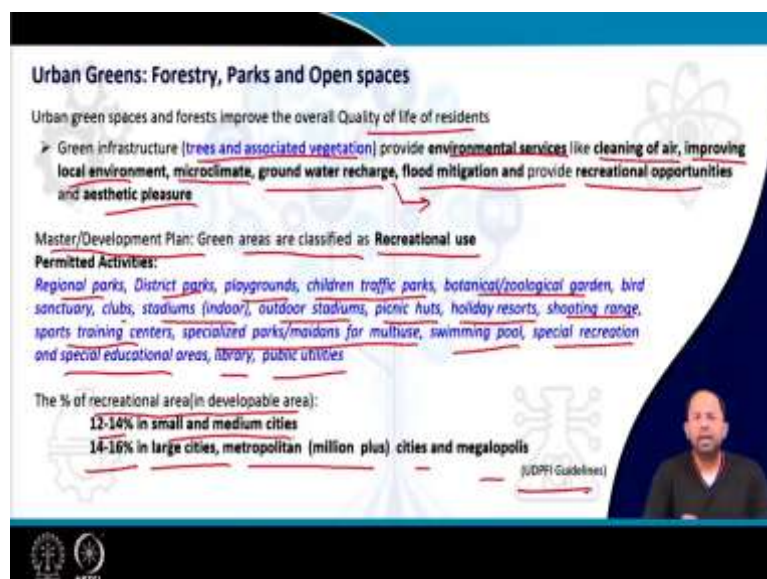
Welcome back in lecture 58, we will cover Urban Forestry, Parks and Open Spaces.

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The different concepts that we will cover are on urban greens, benefits of urban green spaces, standards for provision of green areas, type of urban greens, URDPFI guidelines, policies on improving urban green areas. Then we will look into the Nagar Van Yojana in 2021 and we will do a case study on Warje Urban Forest Pune.

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Now, as we know urban green spaces and forest improve the overall quality of life of residents. So, we are all aware that if there are green areas in the surroundings, it improves our quality of life, it improves many things for example, green infrastructures, including trees and other shrubs and other vegetation, they provide many environmental services what are those? They clean the air. So, that means they produce oxygen they absorb CO<sub>2</sub>.

So, they clean the air of course, then improves the local environment. In general terms, improves the microclimate they may reduce the green the heat island effect as well. Then groundwater recharge, because there are green areas it allows water to percolate, flood mitigation and grow and also provide recreational opportunities and aesthetic pleasure.

So green areas is a big deal in today's context considering our the flood events that are happening in urban areas. And we usually want to provide blue green infrastructure which basically is green areas where we allow water to recharge or to store water for certain times so that it does not create floods. But in master plans and development plans, green areas there is no separate classification as a green area but it is classified under areas for recreational use.

So, there are several permitted and restricted or you know other kinds of activities which are there but I will talk about the permitted activities mostly. So, these are regional parks, district parks, playgrounds for kids, children traffic parks, Botanical Gardens, zoological gardens, bird sanctuaries, clubs, stadiums, outdoor stadiums, picnic it can include picnic huts, holiday resorts, shooting ranges, sports training centers, specialized parks and maidans for multiple uses like we can held fairs, we can held certain public rallies all these things over there, then swimming pool, special recreational and special education areas libraries, public utilities and so on.

So, these are certain things which could also happen in this particular areas. Now, the percentage of recreational areas out of the overall developable area in a city it is assumed that for small and medium cities, it should be around 12 to 14 percent. Whereas for large cities, Metropolitan million plus cities and even megalopolises, this value should be a little bit higher which is 14 to 16 percent. So, this is as per UDPFI guidelines 2015.

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Now, coming to the benefits, we largely know about the different benefits of green spaces, but just to summarize, for there are physical benefits social benefits, benefits from planning view from planning, economic benefits and so on. For example, whenever we are having green spaces and all we will pay premium for plots and residences abutting these green spaces.

So, if there is a eco park then of course, if I come up with a plot beside that eco park, it will price it will cost more, then urban Shady Trees reduces building air conditioning load and improves urban air quality by reducing smog. So, overall that improves the quality of life in that area as well as people will be willing to pay more for that area. Neighbourhood parks also increases the overall transaction cost for green areas.

Now, when we look into the kinds of how it helps in urban planning, its urban parks as separators you can say or you can say that those urban parks also helps in tying up different functions. So, a hierarchy a network of this parks or green spaces, it can integrate the different land uses it can bring the different land uses and it can improve the accessibility and attractiveness of local facilities.

Of course, if there is a park people can cut through and then it can improve accessibility and also it improves the overall attractiveness of an area. It also encourages people to travel safely by foot and bicycle people can use the parks and all in order to travel through that, through if there are large parks and all we can use those pathways where they can travel by foot or bicycle and in a safe way and overall it can access a visual barrier. So, that it can be barrier between different kinds of land uses.

Different social benefits are there safe play spaces for children, cultural life improves cultural life providing venues for festivals, emphasis diversity of urban areas. So, it contributes to social interactions of a wide range of land uses and activities and also stimulate senses. So, these are standard you know, benefits of clean spaces and physical benefits, we have learned about this already.

For example, it stabilization of soil, increases water catchment in floodplain surfaces, improvement of air, water and land resources, provide habitat for wildlife reduce noise pollution, air pollution, greenhouse gas reduction, wind breaks in winter, trees and all can break the cold wind during winter temperature buffer in summer. So, it reduces the overall temperature of an area. So, all these are different benefits of provision of clean spaces.

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Now, let us look at the standards starting with initial standards developed primarily in Japan and Germany, it was around 40 square meters per capita the idea was like if I provide a lot of greenery it will reduce pollution, it will improve the air quality and so on. So, initially it was 40 square meter per capita in high green space of high quality and 140 square meters suburb forest area per capita. So, if it is in the suburb area, and then it is a little bit more if it is score urban areas, it was considered as 40 square meter per capita.

Now, currently, the general standard in developed countries is something around 20 square meter Park area per capita, whereas WHO recommends 9 square meter of undeveloped unpaved open spaces for every inhabited that is per capita. So, all this another part that is also considered is how far away is this particular green space from your actual build or your actual home.

So, here it says that residents has to live within 15 minutes of walking distance from our open space, why because people can use this open space for many functions and 15 minutes is the threshold limit beyond which people will not be willing to walk to a particular open space. So, that is why these two standards are given by WHO, in India URDPFI guidelines are created also for determining what number of urban parks and all should be given in an urban area and usually, that is based on the concept that for every person, we should have 10 to 12 square meter of open spaces are green areas in an urban area.

And NBC also has given some suggestions where it is particularly did it with within a building or within a group of buildings that comes to around 3 square meter per person as the very very minimum norm that has to be provided. This particular chart shows the open spaces in urban areas in India, blue is the existing amount of space in square meters, whereas this saffron is the proposed open space in square meters.

So, you can see that different cities like Chennai, Varanasi, Jaipur has got existing how much amount of open spaces they have got, the blue is indicated of that, whereas in other places it this yellow shows that how much there is proposed in the coming masterplans and so on. So, you can see that for Bangalore, current is very low it has to be increased, whereas for Varanasi current is shows pretty high where it is that proposed is very less, in the coming master plan the amount of new greenspace proposed is much lesser. So, in accordingly for different densities, this can as per different master plans, these are the different provisions that has been created.

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Types of Green areas		(Source: Urban Green Guidelines, 2016, TCPD)
Reserved Forest	<ul style="list-style-type: none"> <li>Notified under the provisions of Indian Forest Act, 1927 or State Forest Acts</li> <li>All activities prohibited unless specifically permitted</li> </ul>	
Protected Forest	<ul style="list-style-type: none"> <li>Found in urban and peri-urban areas, secured by fencing or wall, No construction allowed</li> </ul>	
National Park	<ul style="list-style-type: none"> <li>Set aside for protection and conservation of outstanding natural flora, fauna, geographical formations and natural scenic areas</li> </ul>	
District Park	<ul style="list-style-type: none"> <li>Highest levels in the hierarchy of green spaces in a city (40000 sq.m., 2,50,000 pop.)</li> </ul>	
Neighborhood Park	<ul style="list-style-type: none"> <li>Planned on a neighbourhood level (2,000-4,000 sq.m., 10000 pop.)</li> </ul>	
Tollots	<ul style="list-style-type: none"> <li>Lowest levels of green areas in a city, play area for children (125 sq. m., 2500 pop.)</li> </ul>	
Playgrounds	<ul style="list-style-type: none"> <li>Provided in educational institutions for students or neighbourhoods (5000 pop.)</li> </ul>	
Green belts	<ul style="list-style-type: none"> <li>Include green girdle, park belt, rural belt, rural zone, agriculture belt, country belt, agriculture green belt</li> </ul>	
Green Strip	<ul style="list-style-type: none"> <li>Developed on vacant land (land under high tension power supply lines or along arterial roads)</li> </ul>	
Tree Cover	<ul style="list-style-type: none"> <li>Trees planted along the roads within ROW, central median</li> </ul>	

Now, what are the different types of green areas in an urban area, starting with we have reserved forest. This is of course notified under the provisions of the Indian Forest Act, all activities are prohibited. So, mostly all activities are prohibited we cannot use it for recreation and all, then there are protected forest these are found in urban and peri urban areas these are secured by fencing and wall not to construction is not too much a lot but it could be utilized by people for walking or just for visiting and so on.

Then there are national parks which are for protection and conservation of outstanding natural flora, fauna geographical formations and natural scenic areas people can visit but there is some limits to it. And usually these the amount of activities are much much less. Then there are district parks these are no longer considered as forest and that kind of you know intense greenery these are district blocks which are highest levels of green spaces that has to be provided in a city which comes to around 40,000 square meter and which is roughly serves around 2,50,000 people.

For every 2,50,000 40,000 square meter of space needs to be provided, neighbourhood parks if for every 10,000 persons around 2 to 4000 square meters of park should be provided, then for totlots for every 2500 people around 125 square meter of totlots will be provided and these are the lowest level of green areas in the city and usually these are play areas for children.

Whereas, neighbourhood level parks as well as district level paths could we use for sport events or for playing for you know, for games like football cricket or for larger children, then playgrounds could be also provided inside educational institutions are within neighbourhoods and usually they have around 5000 for every 5000 population we should have playgrounds, then green belts are buffer areas which are provided.

This includes either green gardens, park belts, rural belts, rural zones, agricultural belts, country belts, agricultural green belts, there are different variations to it, different names are given but primarily these are green stretches, which creates as boundaries for certain activities or like for example, you really want the urban area growth to be prevented, we will provide these green belts so that we cannot expand beyond that.

Then green strips are basically vacant lands in an urban area where we can take up certain kinds of plantations and all, probably land under high tension power supply lines or along arterial roads, we can put certain stretches of greenery and then tree cover is basically trees



planted along the roads within the ROW maybe at the edges and as well as in the central media.

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**URDPFI Guidelines**

Sl.No.	Planning Unit	Number of Organized Green Spaces
1	Housing Cluster	3-4 local parks and playgrounds
2	Neighbourhood	3-4 local parks and playgrounds
3	Community	2-3 community level park and open space
4	District/Zone	1 district level park and sports center, maidan
5	Sub city centre	1 city level park, sports complex, botanical/biological garden, maidan

**Open spaces and maidans**

- Spatially distributed
- Multiple function in time

**Hierarchy of green open spaces (Source: URDPFI)**

S.No.	Category	Population served per unit	Area Requirement (Ha)
1	Sub city level multipurpose ground	10 lakh	8
2	District level multipurpose ground	5 lakh	4
3	Community level multipurpose ground	1 lakh	2

**Population Threshold and Area Requirement for different multi-purpose ground**

(Source: URDPFI)

So, coming to the URDPFI guidelines for first of all, your URDPFI specifies hierarchy of green open spaces. For example, for housing clusters and neighbourhoods, it suggest 3 to 4 local parks and playgrounds for community area maybe a larger area 2 to 3 community level parks and open spaces.

So, these are community level spaces, where people from the entire city can come and then district means it may include multiple you know areas at district level one district level park and sports center and Maidan particularly, then sub city center which may not be a district but smaller part you know part of a very large megalopolis and so on larger area, one city level park, sports complex, botanical zoological garden, Maidan and so on.

Now, this Maidan or this district level parks these are spatially distributed, and you know as per the population or it could be spread out in different parts of the city. And these are basically open spaces and Maidans where multiple functions could be held at different points of time. Then based on the population threshold and area requirement for these different Multi-Purpose grounds, these are probably the larger parks not the community or the neighbourhood level parks.

So, you can see community level Multi-Purpose ground or district level Multi-Purpose ground or city subsidy level Multi-Purpose ground. So, here you can see for populations have 1 lakh area requirement is 2 hectares, whereas district level Multi-Purpose ground given for

populations are 5 lakhs, there we give area for 4 hectares probably if the population is double we can give two parts then if it is a subsidy level multipurpose ground it serves around particularly for city areas, it serves a larger population of 10 lakhs and area requirement is something around 8 hectares and this chart is based on the Delhi master plan. So, this is a recent plant which has come up based on that this area has been formulated.

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**URDPFI Guidelines**

Based on MPD, 2021

Sl.No.	Category	Population served per unit	Area Requirement (Ha)
1	Housing Area Park	5000	0.50 Ha
2	Neighbourhood Park	15000	1.00 Ha
3	Community Park	1 lakh	5.00 Ha
4	District Park	5 lakh	25.00 Ha
5	Sub city Park	10 lakh	100.00 Ha

**Green spaces for plain areas (Source: URDPFI)**

S.No.	Category	Population served per unit	Area Requirement (Ha)
1	Housing Area Park	5000	0.50 to 1.00
2	Neighbourhood Park	10000	1.20 to 2.00
3	City Parks/ playgrounds/maidan/exhibition grounds/cultural gathering grounds	For entire town at one or more sites, depending upon design and space availability	
4	Botanical Garden	1 for every town	10.00 to 20.00
5	Recreational complex including zoo	1 for every settlement with tourist potential	10.00 to 12.00

**Green spaces for hilly areas (Source: URDPFI)**

Based on NBC, 2005

Now, other URDPFI guidelines for green spaces in plain areas for a housing area or an you can see that what different housing units if the its population served is around 5000 then total park area recurrent is 0.5 hectares for a neighbourhood population served is 15,000 then parking required is 1 actor. So, if it is 30,000 population is being served and we can double it as well. Then for community parks, district parks, sub city parks, these are the values which are also provided. So, district parks and substitute parks could range to even 25 hectares or even 100 hectares.

Now, the same things for green spaces or hilly areas of course the values would be a little bit different. So, housing area neighbourhood parks serve similar population and the sizes are from 0.5 to 1 hectares and for neighbourhood parks it is 1.2 to 2 hectares. So, the size area requirement is a little bit higher.

Then city parks playgrounds, Maidan, exhibitions, it for inter town maybe one can be provided depending on space availability and all which is usually limited in hilly areas. Then Botanical Gardens should be there at least one for every town and recreational complex including Zoo maybe 1 for every settlement with tourists potential. So, these are the different standards which are provided by URDPFI.



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The slide is titled "URDPFI Guidelines Variation in size of open spaces by settlements". It is divided into three sections based on settlement types, each with a blue arrow pointing downwards. The top section is for "A.Small Towns", the middle for "Medium Towns", and the bottom for "Large City, Metropolitan and Megapolis". Each section contains specific guidelines for open space provision per 1000 persons. The slide also features a logo on the right and a small video inset of a man in the bottom right corner.

Settlement Type	Guidelines
A.Small Towns	<ul style="list-style-type: none"><li>1.0 to 1.2 ha per 1000 persons for town level open spaces (excluding the open spaces in residential pockets)</li><li>Distributed uniformly in residential areas for population of 8000 to 10,000</li><li>Open spaces are to be developed with other socio cultural and commercial facilities</li><li>Serves multiple purposes</li></ul>
Medium Towns	<ul style="list-style-type: none"><li>1.4 to 1.6 ha per 1000 persons.</li><li>Lower income areas shall be provided with more open spaces</li></ul>
Large City, Metropolitan and Megapolis	<ul style="list-style-type: none"><li>1.2 to 1.4 ha per 1000 persons, depending upon the land availability</li><li>If older parts of the large cities are deficient, additional provisions in the new development</li><li>Botanical and zoological parks, picnic huts, children parks, amusement parks, etc. to be provided</li></ul>

Then in regards to open spaces or we can say some of them may should include parks or it could include other kinds of like stadiums or areas sports complexes and so on. So, overall considering open spaces for different sizes of areas or urban areas, for small towns, it is usually the standard considered is 1 to 1.2 hectares per 1000 per persons for town level open spaces and this should be in addition to the open spaces that are provided in that residential pockets.

So, these are town level open spaces, then it should be distributed uniformly in residential areas for population of 8000 to 10,000. So, this is first we determine the total area required and then we can distribute them for every 10,000 or 8000 people we can distribute these parks and you can deter the park sizes are given earlier.

Open spaces are to be developed with other sociocultural commercial facilities and can serve multiple purposes. For medium towns the value is a little bit higher 1.4 to 1.6 hectares per 1000 persons and lower income areas shall be provided with more open spaces compared to large you know, higher income areas and large city metropolitan and megalopolises here the standard is 1.2 to 1.4 hectare per 1000 person depending on land availability, because usually it is a very high dense areas.

And if older parts of the city are deficient that means earlier developments were very congested people have not provided parks planners, it was not possible to provide parks earlier in that case new development should compensate this deficiency, that means new development should give additional open spaces so that this these areas this deficiency could

be made up. Similarly, botanical and zoological parks, picnic huts, children park, amusement park etc can also be provided in metropolitan areas and megalopolises.

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**URDPFI Guidelines**

**Norms for recreational spaces (NBC):**

- Community open space in land measuring greater than 0.3 Ha or more in residential and commercial zones to be reserved for recreational purposes
- The minimum recreational space provided shall be 450 sqm
- The minimum average dimension of the recreational space shall not be less than 7.5 m and the length shall not exceed 2.5 times the average width

**Space acquisition for provision of green open spaces :**

- Green areas and other associated non-economic activities: Government reserved land
- Privately owned land: Compensation as per the 'The Right to Fair Compensation and Transparency in LARR Act, 2013'

S.No.	Category	Population served per unit	Land Area Requirement (Ha)
1	Residential unit play area	5000	5000 sqm
2	Neighbourhood play area	15000	1.50 ha
3	District Sports Centre	1 lakh	8.00 ha
4	Divisional Sports Centre	10 lakh	20.00 ha

**Population Threshold and Area Requirement for different sports facilities (Source: NBC)**

Now, some other norms and recreations for recreational spaces as given in NBC something like community open space in land measuring greater than 0.3 hectares or more in residential and commercial zones to be reserved for recreational purposes. And the minimum size should be around 450 square meter and more or less the shape should be something around the depth should not be less than 7.5 meter and the length should not exceed 2.5 times the average width or depth whatever you want to call it.

Now, usually how do I reserve spaces in urban areas for usually we go for government reserve land particularly for provision of green spaces or where we want we do not want to do any kind of commercial activity those kinds of spaces, but sometimes if I feel that certain areas will require green spaces or areas or we can even you know, do something with that particular area like some sort of activity economic or otherwise, in that case, we can also take in privately owned land, but in that case, we have to compensate the people from which from whom I am taking this land and they had the right to fair composition and transparency act should be followed.

Now, in addition to all these green spaces and all for that, we also have requirement for sports facilities URDPFI also specifies requirements for sports facilities such as for residential unit play area, the population served is around 5000, the land area required is around 5000 square meter. Whereas for neighbourhood play area for population served is 15,000 land area required is 1.5 hectares for district Sports Center and Division Sports Center similarly, for

subs 1 lakh and 10 lakh people respect respectively and the areas are 8 and 20 hectares also as per that particular facility.

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**Policies on improving urban green areas**

**Roads**

- Plantation scheme for roads considering safety of traffic
- Quick growing trees providing dense shade
- Trees with umbrella and semi-umbrella crowns
- For road of width greater than 30 metres, double avenue plantation scheme
- Brittle and thorny trees should be avoided for roadside planting

**Schemes of Plantation on Roads:**

**Avenue Planting**

- Consists of planting areas in single or double rows along highways
- On divided carriageway with separate footpaths, outer row of shady trees and inner row of ornamental flowering plants.

**Group Planting**

- Consists of clump of 3 to 4 trees where availability of land is not an issue
- Done to overcome the monotony of avenue plantation

**Mixed Planting**

- Consists of different varieties of trees rather than one single variety
- Breaks the monotony of a single variety of trees

**Informal Planting**

- In urban fringe settings, avenue planting may include formal landscape on an otherwise informal one
- Single trees may be featured where practicable, providing visual interest

Now, how do I improve green areas, introduce green areas in urban areas. So, usually we can do it along roads. So, like we can do different plantation schemes along roads but we should consider traffic safety of course, because trees shade the leaves and usually they can create slippery surfaces and so on.

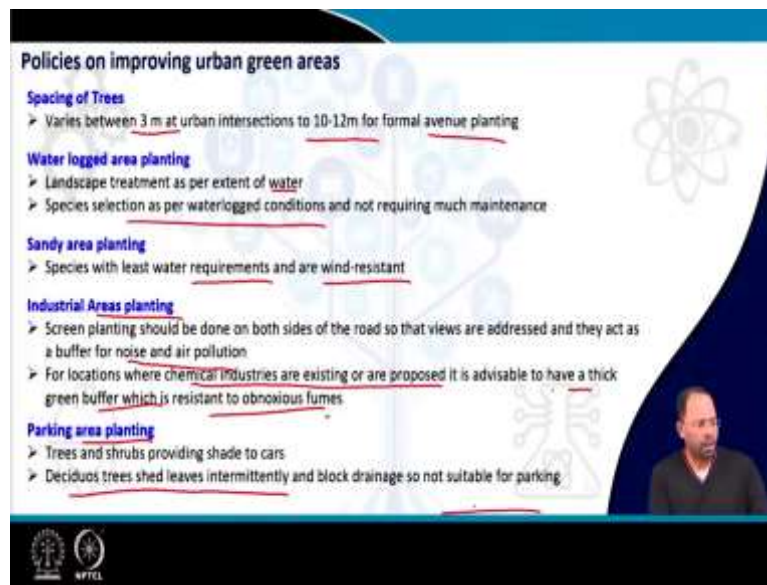
Then usually we use quick growing trees which can provide shade during the summer particularly this is important for the Indian context. Trees with umbrella and semi umbrella crowns are preferred. And for road with greater than 30 meters we can go for double avenue plantation that means to plant trees on both sides of the street and brittle and thorny trees should be avoided. Otherwise people may get scratched or they may have certain other problems.

Now, how is this different plantations provided on the road, we can go for avenue planting that is to provide plantation on both sides of the road, it could be single or double rows along highways on divided carriageway with separate footpaths outer row of shady trees and inner row of ornamental flowering plants could be also there. So, that means we can have two layers as well.

And then we can go for group planting that is to break down the monotony of avenue plantation we can have certain areas where groups are a cluster of trees could be planted 3 to 4 trees could be planted, but of course land has to be available, if land is available, we can go

for that, then mix planting consists of different varieties of trees and this also breaks down the monotony of single trees and informal planting could be done in urban fringes, revenue planting may include formal landscape and sometimes informal one and single tree is where we featured where practical and providing certain kinds of visual interest. So, overall, we can have different kinds of plantation schemes in urban areas.

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Now, the spacing of trees in urban areas are particularly along streets varies from 10 to 12 meter for normal avenue planting, but at intersections we can bring them to 3 meter. So, then for different areas such as waterlogged areas and all we should have proper landscape treatment as per that particular how much water is there and what sort of you know water levels are there or is it permanently inundated and depending on many conditions, and species selection is as per water logged conditions so that it does not requires too much maintenance.

Then similarly, for sandy areas we can have species which are water requirements, which does not require so much water and our wind resistant, then for industrial areas, we should plant trees so that the it acts as a visual barrier and also a barrier for noise and air pollution in those areas. And for in case of chemical industries and all we can advise thick green buffer, so that it can take care of some amount of the noxious fumes that comes out from this kind of industries.

And for planting areas, parking areas and all we have to be careful that the leaves that a shade does not block the drains or does not create other problems and or does not creates (())(22:21)

in that particular areas. And for that deciduous trees, which shade leaves at certain intervals are not probably should not be given for parking areas.

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**Nagar Van Yojana (NVY), 2021**

- Ministry of Environment Forest and Climate Change implemented by National Afforestation and Eco-Development Board
- Nagar Van Udyan Scheme (2015) drawback: Difficult to find forest land (10 ha) within Municipality limit

**Aim:**

- To develop **400 Nagar Van** and **200 Nagar Vatika**
- Enhance forests and green cover, biodiversity, ecological benefits and QOL in urban and peri-urban areas

**Nagar Van >10 ha to 50 ha**  
**Nagar Vatika (Congested areas): >1 ha to 10 ha**

- Site within 5 km from the city limit and area other than forest land is allowed
- Proposals by ULBs through State Forest Department for financial assistance (based on work, max.Rs. 2.00 crores per Nagar Van/ Vatika and @Rs.4.00 lakhs per ha)
- PPP mode, Active participation of people, students and other stakeholders
- Nagar Van should have minimum of 2/3rd area under woodland/ tree cover

**Monitoring authorities :**

- State Forest Departments (SFDs)
- Project Management Units (PMUs)
- National Afforestation and Eco-Development Board

Now, coming to a program from the government, which is Nagar Van Yojana, this is to introduce green spaces in urban areas and particularly in areas where there is lack of it. So, Ministry of Environment forests and climate change has come up with this particular program. And it is the implementation is done by the National afforestation and eco development board. And earlier this scheme is actually replacing the earlier scheme of Nagar Van Udyan scheme, which actually stated that we have to come out with forest areas inside we have to develop you know areas which are forest land of 10 hectares and or enlarger within municipality limit, we can develop that, but as you understand that such large lands are not available everywhere, so there was some issues. So that is why now it is modified to this new Nagar Van Yojana.

Now, what we can do under that? So, the aim is to develop around 400 Nagar Vans and 200 Nagar Vatikas. Now, Nagar Vans are the larger ones, which size should be greater than 10 hectares up to around 50 hectares, whereas Nagar Vatikas could not provide it in congested areas which overcomes this problem and it is greater than 1 hectare but up to a limit of 10 hectares.

Now, this kind of sites could be developed 5 kilometre within the city limit from the city limit and areas other than forest land is actually allowed. And proposals from ULBs have to go to the state forest department for financial assistance and usually it is based on the amount of money that they will be invested that is based on the project report, what is their estimate



based on their funding would be done, maximum value is around 2 crore per Nagar Van or Vatika and the rate of calculation is around 4 lakh rupees per hector that is how you estimate the overall cost of this particular project.

Now, PPP mode could be utilized for doing your collaboration with private companies to develop this kind of Nagar Vans and Vatikas and of course, we require active participation of people, students and other stakeholders for that particular area. And Nagar Van should have a minimum of two third areas under woodland or tree cover. The rest of the areas could be entertainment areas, some buildings, some other facilities and so on. But two thirds of the area should be under woodland or tree cover. The state forest department, project management units, and national afforestation and eco development boards are the ones who are the monitoring authorities for this kind of projects.

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**Nagar Van Yojana (NVY), 2021**

- Fencing of the area
- Emphasis on locally appropriate tree/shrub species
- Theme based plantations, like Smriti Van, Rashi (Nakshatra) Van, etc.
- Plants to include variety to represent floral biodiversity
- Irrigation/ rain water harvesting facility
- Establishment and maintenance of public conveniences, drinking water facilities, benches, walkways/ footpath, jogging and cycle track etc.
- Establishment and maintenance of information and extension center including I&E kiosk, display boards, signage, information brochures etc.
- Revenue generation through economic activities (sale of seedlings/saplings, value added/processed forest products, sale kiosks, recreation facilities, organizing fairs and festivals etc.)

**Benefits:**

- Carbon sequestration, reduction in temperature and urban heat island
- Space having aesthetic value with cooling and calming effect on minds of people
- Development of green spaces may also make cities climate resilient besides providing ecosystem services
- Indirect effects could be promotion of tourism and expansion of business and trade thus improving local economy
- Urban forests could offer several positive community physical and mental health benefits

The slide features a blue header, a white background with a faint floral pattern, and a small inset photo of a man in a dark shirt in the bottom right corner. Logos for the Ministry of Environment, Forest and Climate Change and NPFL are visible at the bottom left.

So, what is done inside this project? So, of course the area is fenced off to protect it from encroaches, emphasis on locally appropriate trees and shrubs. Theme based plantations like Smriti Van, then Rashi Nakshatra Van, then plans to include variety to represent floral biodiversity, irrigation rainwater harvesting, facility, establishment and maintenance of public conveniences such as drinking water facilities, benches, walkways, footpaths, jogging track cycle track, so on, so that people can enjoy this kind of spaces, and establishment and maintenance of information and extension center including information kiosk, display boards, signage, information brochures and so on. So overall, it is a nice urban park or a green space where people can come and enjoy and of course, it has got some environmental functions as well.



Now, revenue generation also could be done through some economic activities in these particular parks either from sale of seedlings, or saplings or value-added process forest products or some kiosk could be set up for selling, some recreational facilities, some fairs and festival could be also organized but obviously, two thirds should be fully covered by plants or trees.

Now, benefits are some benefits are obvious, like carbon sequestration, reduction in temperature and urban heat island space having aesthetic value cooling and calming effect on the people development in it makes the city's climate resilient and provides ecosystem services, indirect efforts on promotion of tourism, and then it helps the overall urban economy of that area or improves the urban economy, economic development of that area increases land prices and so on. And urban forests could offer several positive community physical and mental health benefits as well.

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**Case Study: Warje Urban Forest Pune**

- 16 hectares of barren hill area of Forest Department converted to forest
- Stopped encroachments by slums and builders

**Features of the sites :**

- Rich in fertile soil
- Abundant water

**Carbon-oxygen balance:**

- Absorbs approximately 129000 Kgs of CO<sub>2</sub> per year
- produce approximately 5,62,000 Kgs of Oxygen per year

**Flora :**

- 9500 plants
- 23 indigenous plants species

**Fauna :**

- 29 local bird species
- 15 butterfly species
- 10 reptile species
- 3 mammal species

➤ Provides good walk way and a place to be in for the morning and evening walks

➤ Nearly 1000- 1500 people visit Smriti Van every day.

Source: <https://theindianexpress.com/story/india/2018/08/01/warje-urban-forest-pune/>

APTEL

So, finally, we come down to a case study of what Warje Urban Forest in Pune which is where 16 hectares of barren hill areas were converted into forests by the forest department. And this stopped encroachment by slumps and builders. And obviously, this area has got rich fertile soil and abundant water that was introduced and then this now this area absorbs around a lot of CO<sub>2</sub> per year we estimate is around 1,29,000 kilograms of CO<sub>2</sub> per year and produces around 5,62,000 kg kilograms of oxygen per year.

So, of course, these are the basic benefits of providing green spaces. And in addition, around 9,500 plants are introduced 23 species indigenous species are introduced, 29 local bird species, 15 butterfly species, 10 reptile species and 3 mammals species are found in this

particular forest. And it also provides good walkway and place for morning and evening walks for the people and usually around 1000 to 1500 people visit this Smriti Van every day, which is a place for remembrance of other people and so on. So, this is how urban forests can play a major role in improving the quality of life as well as the environment in urban areas.

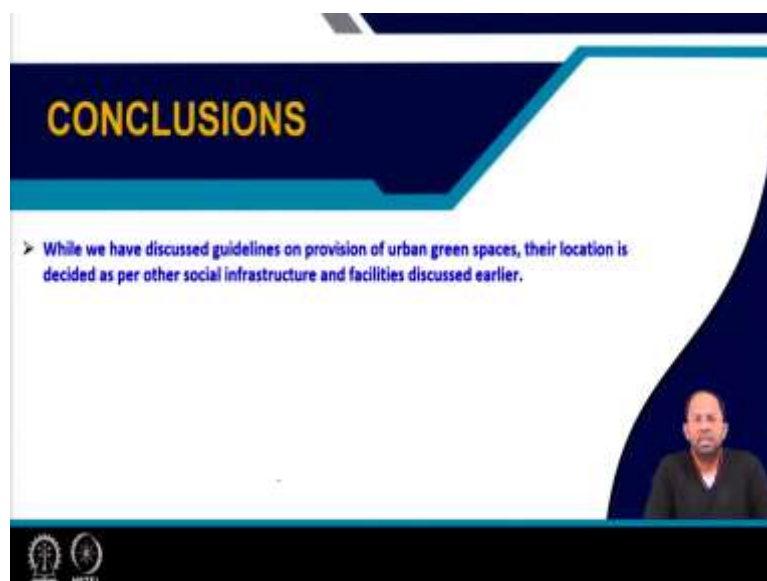
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## REFERENCES

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2. TERRE Policy Centre (2018), Warje Urban Forestry. Retrieved from TERRE Policy Centre: <https://terrepolicycentre.com/pdf/Warje-Urban-Forestry.pdf>
3. Town and Country Planning Organisation, Ministry of Urban Development. (2014). Urban Greening Guidelines. New Delhi.
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Small video inset of a man in the bottom right corner.



## CONCLUSIONS

- While we have discussed guidelines on provision of urban green spaces, their location is decided as per other social infrastructure and facilities discussed earlier.

Small video inset of a man in the bottom right corner.

So, these are some of the references that you can study. To conclude while we have discussed guidelines and provision of urban green spaces, the location is discussed as per other, decided as per other social infrastructure and facilities as we have discussed earlier. Thank you.