

Integration of Landscape with Architecture (In Delhi's Context)

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Abstract – A human being is part of nature and so feels more relaxed, peaceful and calm when he has natural elements like water, trees, hills, sea, forest etc. around him. Natural landscapes always attract humans to spend some time there. Human body functions on oxygen and in polluted environment where there is lack of fresh air they body gets tired easily and affects work performance. This paper reflects upon importance of landscape in spaces and their role in architecture. Landscapes helps in getting more fresh air in space and make it more efficient.

Key Words: Landscape, Spaces, Natural, Human being, Functions, Work, Architecture.

1. INTRODUCTION

Open green spaces are given for good ventilation and supply of fresh air in corridors. With today's increasing pollution rate there is a lack of fresh air in the environment. People breathe air mixed with air pollutants like carbon monoxide, nitrogen dioxide, etc. The polluted air which has mixture of harmful gases can easily cause hazardous harm to civic health. The main reason for such an increased level of pollution is replacement of trees with concrete buildings. This leads to a limited area of construction where a person working also suffers with less natural ventilation and lighting arrangements. With less or, no natural elements around all the heat radiated from the sun gets absorbed by building surface causing stockpile of heat inside.

This study aims to establish the role of landscape in architecture and how it could help in creating a suitable microclimate around the building. This is due to the potential of landscape planning to improve the air quality. The study has taken Delhi as its main concern for research because of its increasing population growth due to which has a huge impact on the environment as combustion of gases increase. With a high rate of combustion and decreasing green lands around the air pollution rate increases. Delhi is trying to provide a proper infrastructure to its residents because of such rapid growth in population.

Delhi witnessed growth in the population of 3.5 million in 1970 to 25 million in 2015. It was ranked the world's second most populated city in the world after Tokyo in 2014. People from nearby villages and city migrated for new opportunities in life. But this has caused two out of nine sectors in Delhi i.e. New Delhi and Central Delhi to be 100% urbanized. With work opportunity elevated but with a limitation on horizontal growth the spaces now are growing vertically which causes the distance between man and ground. In research, it has been proved that when a man has a visual connection to nature around him the stress level decreases giving a boost to work productivity rather than

having a small cubical space with no visual connection to his surroundings.

Even the indoor landscaping is today a growing practice in landscape integration. Interior plants depend on carbon dioxide to live and grow and the human presence there eliminates them. So both plants and human get the benefit of each other on same space. The human gets fresh oxygen without having a mixture of pollutants. Even in the inside of the office, there are toxic gases present from wood treatments, halogenated flame retardants, volatile organic compounds like paints, protective coatings, etc.

With the growth of vertical spaces today we can bring up the green spaces from the ground to open spaces like on balconies, rooftop, etc. Vertical landscaping not only takes less space but also makes space look more inviting and environmentally friendly.



Fig -1: Office foyer with vertical garden



Fig -2: Office balcony with common gathering space

2. Benefits of green spaces in the office

A green space creates an impact on employee's productivity resulting benefits to the economy. It is due to its properties to reduce stress level and tiredness. View to plants or other elements around them or outside view increases job satisfaction rather than a man surrounded by man-made objects around him. With the reduced level of stress, the productivity of work quality and quantity both increase as a green space gives a sense of calmness and relaxation.

2.1 Reducing stress level

Office employee's face stress levels for their work and extreme stress can lead to negative effects on health temporary or permanent, so the natural features around them can result in a positive response within minutes.

2.2 Improved emphasis and increase in creativity

An office to function needs projects to be done with quality and persistent focus which often leads to perceptive overload giving temporary results like irritation, anger, etc. resulting in both mental and physical fatigue of the employee. With an element of nature around them improves focus, increase creativity and even reports of fewer ailments. Nearby nature can be mentally soothing and thus help in the resulting growth of creative thinking.

2.3 Enhanced of work environment

Plants help in creating a better work environment with refining the air quality of the space, as plants need carbon dioxide to live and having them in the workspace where several people work and eliminate carbon dioxide; plants eliminate oxygen which is free from the mixture of air pollutant particles which are harmful to health. Plants also absorb harmful gases eliminated from modern building materials used. Wood treatment chemicals have three common preservatives pentachlorophenol, creosote, and arsenicals. These chemicals could have intense in form of releasing toxic gases over years. As the gases can be absorbed by the skin as well as inhaled. These toxic gases also harm the nervous system resulting in nausea and other adverse health diseases. With the presence of plants inside or around the space absorb these gases resulting in a better and clean work environment.

2.4 Environmental benefits

Landscape provides a cooling effect in two methods: evapotranspiration which is a process when water evaporates in air from the soil surface by transpiration of green spaces around them and with shading. Landscaping around a building can advantage with reduced heat buildup on the ground and on a building. On ground parking, a closed car parked under full sun with no shading can reach up to 35°C to 38°C. When the same car is under natural shading due to the sun's direct radiation getting blocked the internal temperature of a car is around 28°C to 31°C. Heat gets trapped inside a car when heat radiation of sun heats the top

and it radiates inside, due to glass the heat is trapped resulting in the rise of temperature inside the car. Landscaping on the ground with epically large semi-deciduous trees can help in blocking 60% to 70% of direct sun rays, de-escalate the heat and provide natural cooling around.

3. Types of plants and trees

Every species of plants and trees have their own properties and survival conditions. For outdoor landscape we need large semi-deciduous trees which can help in reduction of noise, improving air quality, shading from the sun's glare, etc.

3.1 Outdoor landscaping

For Delhi's environment, we need trees which can improve air quality by filtering air pollutant particles in the air, but they should be native to the area to survive as well. The following trees are recommended for plantation in outdoors-

1. *Azadirachta indica*

Commonly known as neem tree it is known for its medicinal value. It is a medium-sized tree which means it can grow up to 15 meters and some similar species can grow till 23 meters. It is also an insect repellent tree and is evergreen but may lose leaves in the condition of draught. It is widely used for shading purpose as well and is said to give more quantity of oxygen in exchange for carbon gases which are toxic, more compared to other trees. This tree can survive as little as 15 centimeters of rainfall annually. The approximate lifespan of the tree is from 150 to 200 years.

2. *Ficus religiosa*

Commonly known as peepal tree is a tall deciduous tree, it is a veritable storehouse of oxygen. This tree starts to shed its leaves in January and new leaves surface from late March to late April. The tree is also said to be dust and sound absorbent. This tree plays an important role to preserve the ozone layer by reducing air pollution around. It can grow in any soil but grows best in soil having pH value slightly more than 7. It is one with the longest lifespan generally up to 500 years.

3. *Polyalthia longifolia*

Commonly known ashok tree is a tall erect evergreen tree. This tree is planted for its dense shade and elegant appearance. It can be trimmed in shapes and maintained as desired. It can grow up to 12 meters in height. It prefers a well-drained and organic soil.



Fig -3: *Azadirachta indica*, *Ficus religiosa* and *Polyalthia longifolia*

3.2 Indoor landscaping

Indoor landscaping is a technique to bring the outdoor plants in a walled location. As similar as outdoor, interior landscaping provides spaces a meaning and makes itself a focal point. But for plants to survive inside has more survival conditions like light, temperature, humidity, water, space, maintenance, etc. The following plants are recommended due to their nature to adapt surrounding conditions in indoors easily-

1. *Chlorophytum comosum*

Known as spider plant, is one of the plants which can survive on low light and low maintenance. Which means it can live in a shaded and partially shaded area both. This plant can survive for 1 to 2 days without water and are also easy to circulate. It also purifies the air by removing volatile organic chemicals and pollutants from the air. Its maximum growth is 60 centimeters in height with up to 45 centimeters long leaves.

2. *Sansevieria trifasciata*

Known as snake plant is easy to maintain, purifies air and release oxygen. This plant is said to be able to survive in nearly every environment. It grows easily in room temperature from 15°C to 25°C. It can survive in a shaded area easily and can go for days without water. It takes very little space and grows till height from 30 centimeters to 1.2 meters.

3. *Epipremnum aureum*

Known as pothos plant is one of the most common indoor plants used. The plant has a fast growth rate but is still easy to maintain and trim. The leaves have a lush green look which is pleasing to eyes. The plant requires almost no sunlight to survive and is aesthetically pleasing.



Fig -4: *Chlorophytum comosum*, *Sansevieria trifasciata* and *Epipremnum aureum*

3. CONCLUSION

Having a proper landscape around and inside the building is very important as well as beneficial due to its capability to improve the microclimate around it. With the growth of business, work opportunity is also increased, so with the use of landscape we can make space more beneficial. By creating landscape outdoors and indoors we can be able to keep the relationship between man, work and nature. With proper landscaping, an office could have better work efficiency and productivity. As we have seen the benefits of integrating landscape in space we should use it for the better work environment and as well as for the betterment of employees working.

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