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Sky-Court and Sky-Garden

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***Abstract*: The effect of industrial capitalism has not only seen the fall of public man but also decentralization of the public realm. As population increasing, the technology becoming advance, it illustrates a migration to inner city, densities will increase, through economic progress has transformed the traditional city of spaces into the modern high rise. In our day to day life it has become necessary to have an alternative spatial space, interactive space, recreational space or communal activities. This paper considers the sky-court and sky-garden in the phrase of their social, economic, environmental, and spatial benefits to the high rise buildings. The loss of open space need to be replenish for the benefit of civil society is as foundation for the co-presence of future generation as it was in the past. This paper also considers the sky-court and sky-garden as semi-public space. This paper focus on the rapid growth of urbanization that how social spaces, economic filter, environmental filtration can help it in 21th century.**

***Keywords*: Sky-Court, Sky-Garden**

1. Introduction

The presence of greenery in sky-court and sky-garden would improve the environmental, social, economic benefits, while localized to a building scale. The sky-court and sky-garden improve the daylight penetration, rainwater collection, air-flow and its filtration taking place within or at the periphery of the building. As sky-court and sky-garden has been popular among the high rise buildings for almost all recorded time. Now a days people want to have a source of greenery near, where they live for simply to have a beautiful vicinity, enjoy the smells of nature and enjoy the sights. Therefore, the need of sky-court and sky-garden has been increased. The fundamental function of sky-court and sky-garden in high-rise building are as follow:

- The sky-court and sky-garden as environmental perspective.
- The sky-court and sky-garden as social perspective.
- The sky-court and sky-garden as economic perspective.

Environmental perspective: A micro climate, human-friendly space that provides human comfort through low energy design guidelines.

Social perspective: A responsible typology that enhances the social sustainability and occupants' experience.

Economic perspective: An element in high-rise buildings that carries iconic value to the building and increase productivity of the occupants.

The sky-court and sky-garden connects the five element of nature the earth, air, water, fire, space (void). In such a way that it create some indoor and outdoor spaces (void) that it would ample the natural light to penetrate inside the building and give a sense of natural air and light. And by giving large window, high celling, wind-scope; the sky-court provide natural light and air throughout the building or by adopting the method of rain water harvesting the sump collect the rainwater and recycle it or injected for use in gardening and flushing. We can generate the electricity by solar-wind hybrid system this would save energy.

2. Significance of sky-court and sky-garden.

The rapid increase of population growth, predicted by demographers represent the increase in densities of our city toward the inner city migration. This will develop the loss of open such amenity for secular society is needed, since it become important that loss of open spaces is reclaimed, if it is not possible on ground or, in their absence, create then in sky. In respect to planning scheme, as we configured the open spaces in two-dimension land, we should similarly calculate then in three dimension, with similar ratio of open spaces in sky.

Fig. 1. The open space creativity indoor greenery

The sky-court and sky-garden act as a semi-public spaces in the sky and act as a recreation spaces, social interaction, while they also create a hierarchy of void spaces within the greater urban environment, as well as providing convenience amenities to create a sense of community. Such spaces can be memorable, enjoyable, and benefit of civil society. The sky-court and sky-garden in addition improving the health and wellbeing of both occupant and civil society. Besides the other advantages of sky-court and sky-garden such as economic perspective, environmental filter, social networking by offering such space for seating and relaxation for users enjoying outer view, it also

improves the performance of the building and the holistic sustainable environment.

Fig. 2. A lush indoor jungle purifies air and encourages relaxation at airport Shanghai

The space as an air-purifying device and a multi-functional area where passengers can relax and spend time while waiting for their flights. As a space densely populated with vegetation, the design brings nature to the sleek, technology-dominated architecture of airports. It then allows for a closer examination of their social and spatial characteristics by considering the sky-court and sky-garden as:

- Space as movement and transition.
- Space of social interaction.
- Space that can increase density within the city.
- Space that enhance a building's environmental performance.
- Space that can be measured in terms of their urban greenery provision.

3. Alternative space for the posterity

In the modern world, the sky-court and sky-garden plays important role in high-rise building. As they are attracting widespread interest in the contemporary construction of high-rise building. Due to their unique function as public realms and transitional nodes, those spaces could introduce alternative to the vernacular courtyards, atriums in high-rise building. Sky-court and Sky-garden provide the opportunity to compensate the loss of open spaces of the civil region during the moderate shift from the figurative public voids of the 18th century square to the 21th century traditional object. As a planning policy, we should be advocating for open spaces with in the high-rise building that endeavor to readdress the loss of open spaces from the ground.

Fig. 3. Indoor and outdoor living space at top floor

By creating such spaces it improve the built environment at ground level, the sky-court and sky-garden enhance the urban environment by replenishing it with habitable, social spaces in the sky.

The sky-court and sky-garden is not just a means of exaggeration urban density, but also abridge the usable ground area, and symbolize the status of power, the sky-court and sky-garden by its very presence within the sky-scraper, could become a public beacon and focal point of interaction such alternative spaces are necessary for the 21th century. The sky-court and sky-garden should employ urban design principles to embody public domain characteristics, it will improve circulatory methods that provide both legibility and choice, in doing so create a vertical transitional thoroughfare. The opportunity to provide open green spaces at ground level is abbreviating as a result in high-rise building we can provide them in sky. The skyscraper footprint is primarily focused on the object itself leaving the interstitial space between buildings as the only area for the public to share, without a formal or traditional city structure of open space.

Symbols of power and recognition for one's beneficent contribution to civil society are all well and good for the socially conscious developer, but the issue remain same that the open space afforded to the sky-court and sky-garden is potentially lost net internal area therefore a lower rate of return on the investment. However, the sky-court and sky-garden can be asset as vertical arcades. The sky-rise and sky-garden create a sense of destination to the intermediary and upper realms of the high-rise building. Thus creating a more commercially viable retail environment with greater prospects of social interaction, as well as revenue for both developer and tenant. Such an approach reinforces the importance of the sky-court and sky-garden as a viable semi-public space with public domain characteristic that could become a hub of interaction for both its occupants and the larger civil society of the city. The sky-court and sky-garden offers a remedy for our increasingly dense city, re-establish the vanishing open spaces, supporting the existing voids in the city, and effectively creating a viable alternative in the civil realm for the posterity.

4. Sky-court and sky-garden emphasize the vertical gardening.

With inner city densification and rising levels of traffic driven pollution at the ground level of the modern city, we need to look up to the upper levels of skyscrapers to contribute more as public spaces? A hybrid of public space and green roof is beginning to be introduced, but only by means of appointment and sustainability, and not as a key objective to enhance the value of the public well-being as part of the project. The environmental psychology shows that humans are aesthetically attracted to natural contents and to particular landscape configuration. These features are also found to have positively effects on human functioning and reduce stress.

Fig. 4. City Data Center in Frankfurt feature a green wall featuring plants that are irrigated with recycled water

The vertically gardening is cost effective as they reduce overall temperature, capture overall rainwater. The construction of these living walls has restrictions in terms of the climate, as they have to endure their surrounding circumstances, which may sometimes take a toll on the structure and plants of the wall. The benefit of sky-court and sky-garden in vertical style it improves the drainage with plant and shrubs they soak up rainwater and delay the time it takes water to get from the sky to garden, the damaging effects of flash flood aren't as severe. By providing more greenery one can enjoy more nature (clean air), plus a more diverse urban ecology, allowing insects and plants to flourish. Since, the presence of greenery in sky-court and sky-garden would have the similar environmental, social, economic benefit, both in reference to a building scale or as opposed to a city scale – i.e. the benefit of day light penetration, rainwater collection, air flow and its filtration taking place within or periphery of the building. The benefits of vertical gardening within a building are as follow:

- Insulates and cools the building envelope, as well as protecting.
- Creates habitats for birds and beneficial insects, increasing biodiversity.
- Soil and plants are a natural filter that can filter the water that flows through the wall.
- Filter the outside air of pollutants and dust and offsets the carbon footprint of people and fuel emissions.
- Reduces absenteeism in the workplace and boosts employee morale.
- Enhance occupant comfort and health. Heighten aesthetic qualities, minimize strain on local infrastructure and improve overall quality of life.
- Acts as a sound proofing barrier.
- Cleans interior air space by removing VOCs (volatile organic compounds) and other harmful toxins like benzene and formaldehyde.
- Gardening vertically makes fertilizing, watering, pruning and harvesting much more convenient.

The disadvantage of vertical gardening is as follow:
The construction of vertical gardens is financially and technologically challenging.

- They require high maintenance.
- Not all plants can be grown using this format.
- Limited to small plants and herbs.
- One needs to be careful while choosing plant species as the ones with deep roots can affect building structure.
- These plants would attract unwanted insects into residential premises.
- Plants will emit carbon dioxide in the night, so placement of plants needs to be planned carefully.

Fig. 5. Lush walls create a positive perception for prospective property purchasers

5. New green technique

The gardening refers to a continuously evolving group of methods and materials from technique for generating energy to non-toxic cleaning products. In present day, the expectation is increasing that this field will bring innovation and changes in daily life. In these early stage, it is impossible to predict what green technology may eventually encompass. In gardening, the tradition generally continues of dividing the area to serve various purpose; by providing walkways, and seating area for recreation; a vegetable plot; a children's area; and feature to catch eye here and there. It may be useful to review briefly the main garden types; Flower garden, Woodland garden, Rock garden, Water garden, Herb and Vegetable garden, Roof garden. I put together this list of gardening techniques to help new gardeners here at DIY Natural navigate through all the different approaches to growing gardens. The basis of our gardening involved replacing whatever nutrients our vegetables took from the soil with compost. The gardening techniques are as follow:

- Botanical Gardening.
- Mobile Gardening.
- Dry Gardening.
- Organic Gardening.
- Hydroponic Gardening.

A. Botanical gardening.

Botanical gardens, their functions and role in society have evolved over time. In botanical gardens, seeds or cuttings are collected from species in the wild and then used to build up a varieties of plants. Tissue culture can often help to produce many plants from just a few specimens. The garden encompasses all green vegetation with specific names and values that add beauty to the environment. The plant needs to be selected and considered for onward discovery, classification, naming and systematic. In the posterity, botanic gardens are challenged to address issues that extend beyond the garden walls by placing social and environmental responsibility as key

mission drivers.

B. Mobile gardening

The concept of mobile gardening is come to educate the youth and their families that how to grow their own foods and keep active outdoor environment. It makes gardening, growing food less daunting and more, accessible, while encouraging entrepreneurship skills and holistic wellness. Inspired by the idea we create; a mobile gardening that is used for education, creativity and neighborhood engagement. The mobile gardening center includes; Garden beds, Wash station, Rain barrel, Compost cart. There are two ways by which mobile gardening can be expand:

- Pop-up-workshop.
- Youth entrepreneurs program.

C. Dry gardening.

The purpose of the dry garden is to investigate a model of sustainable horticulture, suitable for use, focusing on reducing the need for irrigation through design, cultivation techniques and selection of drought-resistant plants. Where there is less rainfall or shortage of water at such places we provide the dry gardening. The gardening also called dry farming; is non-irrigated agriculture in a climate where there is 20 inches of rain or less a year. The dry vegetable garden is a gardening with limited water and making the water you have. Before doing dry gardening we have to set some goals to grow vegetable in dry climate:

- Store annual rainfall in the soil for later use.
- Choose crops suitable for growth under arid or drought conditions.
- Sow and plant crops further apart than you would where there is ample water.
- Prevent direct evaporation during the growing season.

D. Organic gardening

Organic gardening is a method of farming system which primarily aimed at cultivating the land and raising crops in such a way, so as to keep the soil alive, healthy and in good health by use of organic wastes (crop, animal and farm wastes, aquatic wastes). Organic gardening is a process that promotes and enhances biodiversity, natural biological cycles and soil biological actives that restore, maintain and enhance ecological harmony. It is basic tents and feeding the soil through decaying organic matter and utilizing natural cycles and predators for disease and pest control. The basic principles air, moisture and materials that apply to hot compost to cold composting. Despite better performance with inorganic sources for some crops, the use of organic by-products not only improves soil health but also the productivity of crop yield.

E. Hydroponic gardening

Hydroponic gardening is method of growing plants without soil instead of mineral nutrient solution in water solvent, it's a way to nurture a huge variety of edible plants (think herbs, veggies, even some fruits). In hydroponic gardens, nutrients are dissolved in the water that surrounds the roots, so plants have even easier access to the nutrition they need. Plants commonly grow hydroponically includes tomatoes, peppers, cucumber, lettuces and marijuana. Systems can be designed to make use of vertical space and increase planting density. The material used in hydroponic farming is plastic, concrete, glass, metal, vegetable solid, and wood. The benefits of hydroponic gardening are:

- Many crops can be produced twice as fast in a well-managed hydroponic system.
- Farms can exist in a places where weather and soil conditions are not favorable for traditional food production.
- No chemical weed or pest control product are needed when operating a hydroponic system.
- Production increases 3 to 10 times in the same amount of space.
- Decreasing the time of harvest and consumption increases the nutritional value of the product.

6. Conclusion

The following are the observation were drawn and ac act as a promote of thinking for the design of the sky-court and sky-garden in the posterity.

It contributes to the quality of life as they complement each other in terms of its aesthetic, environmental, social and economic quality.

- Their ability to link different forms of circulation allows them to metaphorically become vertical arcades in the sky – a high integrated, semi-public, transitional space that provides opportunities for greater local and global connectivity to other buildings.
- The sky-court is becoming increasingly integrated into the design of high-rise buildings to create more sustainable and live-able environments. Sky-courts play a promising role in reducing energy consumption for buildings.
- This provides a variety of spatial and geometric configurations of sky-court and sky-garden, and allows flexibility for the design.
- Sky-courts could allow the penetration of daylight and prevent undesirable direct solar heat gain. Therefore, future work should consider the potential of such spaces to improve daylight.

References

[1] Jason Pomeroy, "The Sky-Court and Sky-Garden: Greening the Urban Habitat."
[2] https://www.kobo.com/us/en/ebook/the-skycourt-and-skygarden.
[3] https://www.irbnet.de/daten/iconda/CIB_DC26771.pdf.
[4] https://controlyourbuilding.com/blog/entry/bringing-nature-in-how-plants-and-green-spaces-benefit-your-building.