

With an emphasis on the need for restoration

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With the constant migration of people to cities has resulted them to grow in size and expand its services but due to this rapid growth many essentials have been side-lined or neglected which has made these urban hubs prone to a lot of issues but major being the limited green spaces and presence of urban heat island. Even in the Paris accords there was an emphasis on the need for restoration of natural habitats and prevent further deforestation (Davis et al. (2017)). Many new techniques and methods have been introduced and implemented with resounding success but in many cases, they have not been introduced in a large scale or are not relevant to the present context to have a major change or effect on the present conditions. This paper focus on the one such principal "The Garden city" its positive and negative aspects and opens the idea on integrating other methods with this core idea.

"The sights and sounds of everyday life affects everyone" - Victor Hugo (F. J. Osborn) (pg1) Garden City : the twentieth century marked the invention of Aeroplane and Garden city; One marked man the ability to fly and the other gave him a better dwelling space. (Howard) (pg1). It is an urban planning principal in which "green belts" surround self-contained communities, these communities contain proportionate areas of agriculture residences and industry.

Sir Ebenezer Howard wanted to combine both town and county in order to give the working class an alternative to work in the agriculture sector. His idealised garden city would house 32, 000 people on a site of 6, 000 acres (2, 400 ha), planned on a concentric pattern with open spaces, public parks and

six radial boulevards, 120 ft (37 m) wide, extending from the centre. (Goodall, 1987).

Vertical gardens: A garden that grows vertically using support systems, rather than horizontally. vertical garden can also be extended to even the plants that grown on a trellis or even a fence . This isn't a modern concept as vertical gardens existed in ancient time with example of hanging gardens of Babylon to narrow back yards of palaces covered in vines in the Mediterranean region dating 2000 years back (Kohler 2008). **Roof Gardens :** When the roof of a building is converted to a garden. While roof provide a aesthetical look they are also used for growing roof plantings which may yield food, hydrological benefits, temperature control, corridors or habitats for wildlife, recreational opportunities, architectural enhancement and in providing large scale ecological benefits (Louise 2009) **Vertical farming :** The use of vertical stacked layers for the production of medicinal and food based plants. integrated structures and/or vertically inclined surfaces (such as in a shipping container , used warehouse or skyscraper). The ideas for modern vertical farming include controlled-environment agriculture (CEA) technology and the usage of indoor farming, where there is control over all environmental factors.

These facilities utilize fertigation , environmental control (temperature , gases, humidity) and artificial control of light. 1. Study: Garden City The author (F. J. Osborn) praised Ebenezer Howard's unique combination proposal. Which included 8 points such as : Amenities : which gives the houses with

private gardens, space for schools, parks , parkways and spaces for other functional uses.

Town and country relationship : the defined town area is surrounded by a large reserved land for agriculture which enables a mutual benefit for town and farm people. Unified Landownership : The entire site was to be put under trust or quasi-public ownership. This would help secure the social element and making the planning controlled. This development was a social reform with emphasis on land management and self-government. While 'Garden city' experiment was initially started in Letchworth Garden City and Welwyn Garden City receiving both criticism and praise over the years.

For example, in a journal (Parham, S Boyfield, K R, Garden City Perspectives, 2016) praises the idea and states that Garden Cities have demonstrated very few negative connotations and associations. High profile initiatives, such as the 2014 Wolfson Economics Prize co-ordinated by Policy Exchange. But according to author (Abel, C, 2010) who states that the garden cities built with Howard's principles have faced automobile dependent, low-density suburbs of Australia's major cities. Subject to extended droughts, shrinking farmlands and raging bushfires, the continent is particularly vulnerable to the effects of climate change.

While the great many aspects of garden city were to improve the daily lives for the people in terms of environmentally and socially, But, it cannot be implemented in a modern perspective for various reasons due to the ever-expanding cities and the slow decline of agricultural fields due to rapid city expansion and climate change. The scope of the garden city is very small as

it handles only a population of approximately of thirty thousand over a large area which would be an economic burden. While the idea was to move people out of the cities it increased the dependency on automobiles which in turn negates its positive effects and the small population it handles do not have a drastic effect on the major urban cities which are affected by urban heat Island, air and sound pollution. Vertical Farming The author (Voss 2012) states that importance of vertical farming over modern day agriculture which has a lot of negative effects on the environment. He points most of his study that based on the works of Prof Dickson Despommier, who introduced the concept in 2009. He relocated the indoor farming to the urban environment.

The focus goes towards the water where he states the growing need for water for the growing population and nearly use of approximately 70% of fresh water of which most is either evaporated or run-off. The water used in vertical farming on the other hand can be controlled using methods such as Hydroponics and Aeroponics which can potentially conserve up to 95% of water which eliminates agricultural runoff and its negative effects on both environment and humans. He also states that due to the controlled environment the water lost through evaporation and transpiration can be claimed and reused. (Voss 2012). Another aspect of modern agriculture is the land required for production. Based on studies (Groom, Meffee & Carroll, 2005) the planet's biodiversity and ecosystem have been severely affected this includes estuaries, wetlands, grasslands, tropical and temperate forests as these lands have been altered for cultivation purpose.

These ecosystems can be gradually repaired with the help of vertical farming. As translocating the food production would relieve and give time for the mother nature to repair the land (Groom, Meffee & Carroll, 2005). This could intern help increase biodiversity and carbon sequestration. Another aspect of modern agriculture is the land required for production. Based on studies (Groom, Meffee & Carroll, 2005) the planets biodiversity and ecosystem have been severely effected this includes estuaries, wetlands, grasslands, tropical and temperate forests as these land have been altered for cultivation purpose. These ecosystems can be gradually repaired with the help of vertical farming.

As translocating the food production would relieve and give time for the mother nature to repair the land (Groom, Meffee & Carroll, 2005). This could intern help increase biodiversity and carbon sequestration. Vertical farming occupies much less area as it is stacked floors over one another instead of spreading horizontally. As Ebenezer Howard wanted to have an interaction between the town and farmlands. Vertical garden achieves the same. In the present scenario fossil fuel is consumed for transportation and storage. Transportation for agricultural foods is source for pollution and greenhouse gas emission. Vertical farming meets the needs of an increasing urbanization.

Buildings used for farming can be placed anywhere while outdoor fields are static in location. By strategically placing vertical farms inside or in the near vicinity of urban centres and cities, it would meet the need for localization of food production (Voss 2012). Green Roofs Green roofs are

considered as one of the most effective resolution for several problems both in building and urban level related to the environment.

In their research (Jaffal et al. (2012)) they state that green roofs improve storm water management, reduce air and noise pollution, increase animal and vegetal biodiversity in cities and reduce carbon footprint. They further state that the longevity of the roofing membranes is improved by green roofs as the thermal stress they are subjected to is limited. The paper further states that the building energy performance is greatly impacted by green roofs through a series of case studies and calculations as roof gardens provide solar shading, thermal resistance and evapotranspiration. The paper also identifies the green roofs into two categories: extensive (15-20 cm soil thickness) and intensive (15-20 cm thickness).

With the former being easier for retrofitting as additional strengthening is not required for the smaller load (Jaffal et al. (2012)). Vertical Gardens Vertical gardens are useful tools in urban environments for the mitigation of noise pollution. It can be stated that many places in urban environments or even inside buildings are reverberant or noisy.

Thermal mass is used as a measure to maintain comfortable and stable indoor. As a result acoustically hard materials such as masonry wall and concrete are used in which sound absorption is lacking. However, these do not drastically decrease the noise and increase urban heat island effect. The paper also states that Vertical gardens also lead in the reduction of heat transfer between surrounding environment and a building based on various other papers and studies. It further claims based on studies that Volatile

Organic Compounds in the air are filtered by the microbial activity of root systems, the leaves capture particulate matter and wellbeing and productivity increases coupled up with decrease in stress levels when in contact with plants. To support their claims the paper shows the result of experiments done with 50 modules of garden spread across an area of 10.125 m². The author further states that based on required specific acoustic designers working on vertical gardens should tune the thickness of the substrate. For example thinner substrate are more suitable if lower frequencies are not taken into consideration; thicker substrate is more suitable if lower frequencies are essential. Another research (Davis, 2015 ()) states that the vertical gardens can be used as evaporative coolers.

This is achieved through a mathematical model and later experimented with setup models. 2. Conclusion of the Study While these elements affect a building and their surrounding they do not have a large scale effect.

As they are yet to be implemented in a large scale. While Ebenezer Howard's garden city may not be suitable to the present context it still addresses many issues, we face today. With the ever-expanding cities it can be investigated that the aspect of developing a city extension with more vertical elements having a multi-functional role incorporated with emphasis on roof gardens, vertical gardens and farming integration with the 'unique combined proposals' of garden city. The modern garden city will be able to address many of the environmental issues in a city and give the city a unique aesthetic look.