

## Pollution-Free City in the Shade of Architecture, with Garden Class

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### ABSTRACT

With the increase of population in megalopolises of the world we are witnessing pollution and global warming. Wide spread of cities horizontally and vertically is causing global warming too. These contaminants are due to the kind of human behavior to the nature and the misuse of it. Now after damaging human to nature human noticed recently it is not possible to live without nature. We see in architecture, activities in this field of bringing nature back to the life; bionic architectural designs, are some solutions. Vertical garden is an obvious and successful example of that. Which are centers for cleaning of air with high gardens. It solves the problem of land prices and doing well cleaning of air in three dimensions. In this paper, we describe in detail, analyzing the issue and provide a solution for resolving pollution in megalopolises.

**Key words:** Class gardens, Pollution, megalopolises.

### INTRODUCTION

living in towns and cities to one or two centuries ago be regarded as a specific phenomenon beside of rural life. Two hundred years ago proportion of urban population to the rural population were very small. Rural communities were self-sufficient communities and there were a balanced relationship between man, nature and the environment and its natural substrate was understandable and residents, were placed in direct contact with the surrounding nature easily. Now, more than half the world's population, about 3 billion people are living in cities. And Until 2030 this amount will increase to 5 billion. Conditions such as decreased production, increased demand and drastic changes in weather, has caused food crisis. Following the recent drought, the world has witnessed the decreasing 20 to 40 percent in the amount of agricultural productions. In other words, the sources of human food supply are threatened by various factors. Factors such as loss of arable land, growing dependence on fuels, processing and transportation of food on a global scale.

At the same time that the developed countries have adopted a policy of reliance on food imports, 862 million people of around the world suffer from hunger and food shortages. Even some of these people who live in the same countries that are the exporter of foods to the west. This situation became worse with the increasing dependence on oil resources and uncontrolled expansion of cities and whatever increase the distance between the point of production to the consumption, Then also Increase the consumption of fossil fuels and end of these energy sources have more increasing.

This dependence on fossil energy sources causes that the big cities like London, will stand only five days during the famine<sup>1</sup>

### Stating the problem

Designers, architects, play a major role in the stability of the city. So that, there are numerous examples of buildings that were built on the idea of stability. For example, these buildings provide for decades their energy, such as electricity, heat and

gain their water from collecting rainwater. They also use the recycling materials and are also flexible in terms of performance and their maintenance costs are low.

On the other hand, global warming, which caused by the overproduction of greenhouse gases, have caused severe weather changes and present great challenges in the supply of water and food resources in the world. In this context, the decrease in the production of these gases is necessary to protect the living conditions in the earth and food supplying for its residents, the combination of urban and agricultural areas, can reduce production of greenhouse gases and compensate the lack of production. Thus, the relationship between urban and agricultural land is converted from parasites and parasite relationship to symbiotic relationship. Agricultural production within the cities, make faster the access to sources of organic food and provide good condition in term of hygiene and health and

also has benefits such as creating job opportunities, new revenue sources and improving social welfare. It can also be used from the waste as fertilizer and from sewage water for supplying agricultural water and eliminating the problem of water shortages (Figure 1).

One of the great challenges of humanity in the 21 century, is the problem of supply and management of water resources. Impenetrable surfaces of city buildings and streets, increasing the possibility and the risk of floods and convert all the precipitation to surface water and evaporation. Creating green vegetation cover is the solution to solve this problem. These covers act as a natural drainage system and help to reduce the temperature of the urban environment by absorbing rainwater and process of photosynthesis. The combination of buildings and land can be implemented in the form of diverse ideas. Some of them are mentioned below<sup>1</sup>

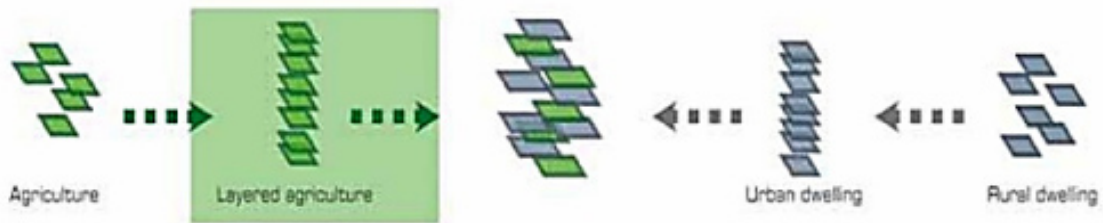


Fig. 1: Integrating agriculture (nature) with the City and Urban Development [1]

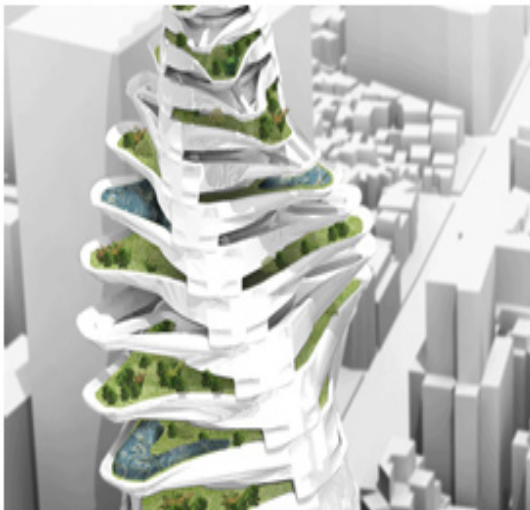


Fig. 2 & 3: Special views of urban nebulizer [6]

**Assessment of solutions**

The architect is faced with an important and difficult issues and the unskilled person is aware of the importance of architecture in his life. But the experts are to solve the problems due to the trends of society. Those persons that their funds are used to create large buildings, have personal attention to their own building. Interaction and mutual influence between professionals and people can lead to a better and more accurate architecture. But the

unskilled people must understand the fundamental problems of professionals and professionals should also have a mutual understanding<sup>2</sup>

**Designed examples**

Urban Nebulizer<sup>1</sup> is a kind of skyscraper, which is designed for the most polluted cities around the world. Geometry of this tower is consists of a continuous helical with blades that have classes with different functions. This structure has a central hollow core, where filter the smoke and dust with filtering layers of water and plant nutrients. (Figures 2, 3 and 4)

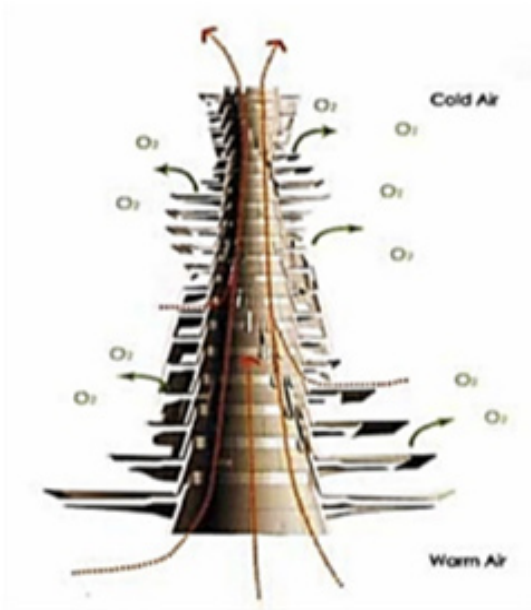
This tower can be seen as a vertical garden and can be built in the center of every megalopolises<sup>3</sup>

**Samples were carried out similar**

Vertical forest in Milan; this vertical forest is being built in Milan, Italy and designed by Stefano Boyer. (Figur5)

This is an important solution to tackle with greenhouse gases and increase air quality. This is also a response to disappearance of the nature of people's live.

Modeled after traditional Italian tower. These two towers are covered with plants. Each of these towers has 50,000 square meters infrastructure. 10,000 square meters of it covered by trees and plants.



**Fig. 4: Urban nebulizer functional diagrams in different climate [6]**



**Fig. 5: Vertical forest in Milan [8]**

Vertical forest provides a clean city and greener life, for its residents and people by absorbing dust particles,  $CO_2$  and produce oxygen. It also protect things from radiation and acoustic pollution. This project is consists of two towers of 110 and 76 meters in height that has 900 trees alongside a range of shrubs and flowers. In pictures 6 and 7, you can see the phases in the construction of project<sup>9</sup>

### Solution

#### Reasons for selection of site

Maybe At first sight, It was better that this project was designed for big cities such Tehran. But in closer look, we realize that pollution at Tehran is

not only due to the lack of green space. But it is for some reason, including the wrong expansion of the city, closing to the Pollution sources and the wrong culture in use of the car. Thus, the solving of these raised problems is priority.

Among the cities that require such this design, perhaps, Qom May be the most desert city and it is not possible to create gardens with this size. But we should not forget that, the main idea of the Persian Garden, is contrast and conflict. This means that when the garden will find its true meaning which is in the desert. This is one of the reasons that we chose this place for design.



Fig. 6 & 7: The construction and operation of buildings in vertical forest Milan [8]



Fig. 8: Project location [9]

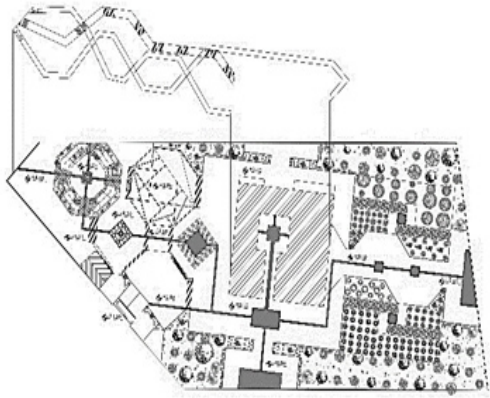


Fig. 9: Project site plan [author]



Fig. 10: Special view of project [author]



Fig. 11: Special view of entrance [author]



Fig. 12: Element of water [author]



Fig. 13: Element of class garden [author]



Fig. 14: Ramps [author]

In the following, we briefly explain the reasons:

1. Climate;
2. The need of Qom;
3. The direction of development of the city;
4. Responsibility of soil and water;
5. Policies of region 4 of Qom municipalities;
6. The needs and wishes of the Region people;
7. Lack of garden, landscape and or environment for recreation in the city.

#### Site features

This site, has 4 meters level difference in term of Inequality, and has the gentle slope of 2% from south to north. Current use of its land, it is a concrete supplier factory. Of course, in the development plan for this area, using issue is green space. [7]

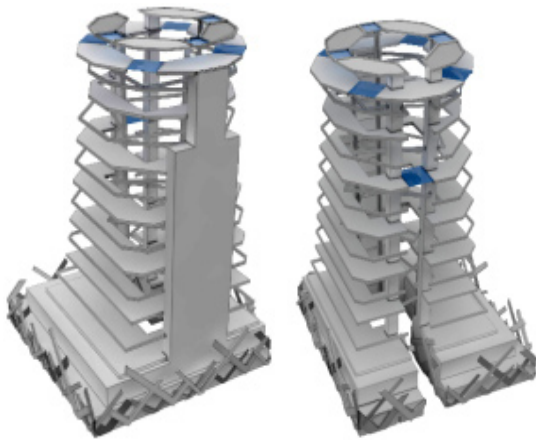


Fig. 15 & 16: The Main Building [author]

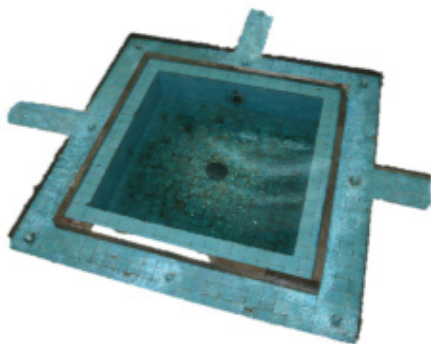


Fig. 17: Persian garden Archetype [4]

#### Project Design

At all stages of the design, it is use the idea of Persian gardens [according to reference No.5] and tried in all parts that it would be the new event for the user. In the following, we describe the different parts of the project. (Figure 9 and 10)

#### Entrance

At the entrance, it is used from what was in the historic gardens of Iran: Using the three-door and five-door. The entrance way to the building is the only central arch (especial attention to the central ax). Make a difference in the level of the entrance door is reminiscent of the porch element. Attention to the indirect entrance way, which is run by the break down at the entrance part.

Entrance in the Persian gardens was created to emphasize the contrast of the outside and inside with create a very dark atmosphere inside and the sudden influx of light and green color and freshness and vitality. This contrast is done by using a water screen that is located inside the entrance. The sound of water, freshness and succulence of water, light and various colors reflection in the water all focus in create the conflict of inside space and the crowded and polluted outside. (Figure 11)

#### Plan Site

The plan Site in this complex, include seven total sections:

1. The entrance vestibule: in this project is a quiet space for a moment hesitation and share access.



Fig. 18: Recreation one of the Persian garden Archetype [author]

2. Element of water: next to the element that shows the sacredness and beauty of water, it is created a pleasant and beautiful atmosphere to sit. (Figure 12)
3. Restaurant: Consist of closed restaurant, semi-open and open to the use of surrounding environment.
4. Element of class garden: this element shows



Fig. 19 & 20: First Garden [author]



Fig. 21 & 22: Second Garden [author]

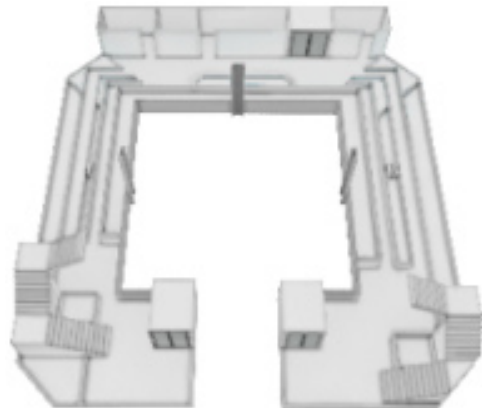


Fig. 23 & 24: Third Garden [author]

- the class garden of Qom. Glass cube, is the symbol of class garden. Other Islamic geometric shapes, are symbols of the Islamic city and its sky line. Water routes between them, shows the life in the city. (Figure 13)
5. Ramps: it is flowed motion and dynamism in this part of class garden, in a class above the ground. At this level, we can see the steep path or steps which connects the adjacent garden to the main building. There is space in a long way of these ramps, to stop and use of the surrounding and scape. (Figure 14)
  6. Cozy atmosphere: top floor garden has created relaxed, cozy and fun atmosphere. The general shape of this part of octagonal is implemented as the sunken garden.
  7. Fruit orchards: fruit orchards are at the bottom of the garden. This means that, a garden was created in the main garden in order

to plant fruits, which is compatible with the climate of Qom. Such as figs, pomegranates, Sea-buckthorn, olives, and grapes and strawberries.

#### The main building

The main building is consists of a square shape, with referring to the Persian garden's form. An earth with square or rectangular form then it becomes a square with 8sids to remind the Iranian Pavilion. In the final stages, the 8-sided becomes 12 sides to remember the historic water front and perform tasks of irrigation a collection with height of 55 meters. Thus, recalling the archetypal Iranian four gardens and water front.

#### Classes

Design of categories include seven gardens. Each shows a feature of Iranian garden:



Fig. 25 & 26: Forth Garden [author]

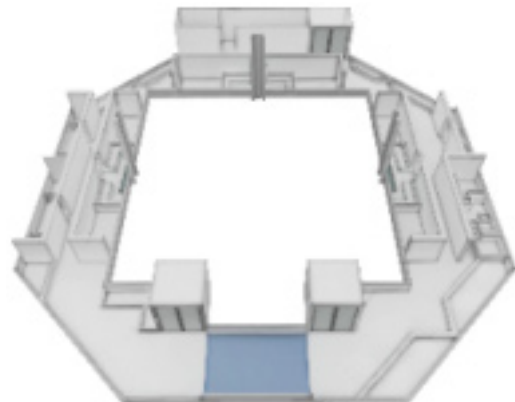


Fig. 27 & 28: Fifth Garden [author]



First and second floor, dedicated to arts and culture and social spaces to solve the region's cultural needs.

The first floor of the garden, representing the symbolic meanings of Persian gardens. (Figures 19 and 20)

The second garden is symbol of variety while it is simple. (Figures 21 and 22)

The third garden was given a three-axis geometry and the geometry of the Persian garden. (Figures 23 and 24)

In the fourth garden for number 4, we symbolized four garden. (Figures 25 and 26)

Fifth Garden, to recall the Iranian historic of lane gardens they are created complete course in this class that are separated by seven different garden with alleys. (Figures 27 and 28)

Sixth garden, due to the size limitation, refers to the symmetry and simplicity.

Café is considered between the sixth and seventh garden.

And the seventh garden is an unattainable or heaven garden.

## CONCLUSION

It was tried in the design process, created a new creative space. In addition to the duties listed for buildings, added another users, as applicable to citizens. Unlike other class gardens, impressive human presence. Side views of the collection must be considered, because of the direct relationship with the urban space. Also designed the interior spaces, paths and walks, with the idea of a strong, beautiful and creative.

Today, we are faced with the challenge of pollution and environmental degradation. Should be slightly hesitant. Perhaps it is time to move away from a western perspective, one-sided and self-seeking to nature. Now it's our future generations, we must compensate for the damages to nature and also to improve it and learn how to use the nature correctly. This mutual interaction. We respect nature and we maintain it and it also helps us to survive and live healthy. Should be leading in this direction as well as in other areas.

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