POLITECNICO DI TORINO
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Master of Science in Architecture
Honors theses

BEAN_TOWER

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According to recent estimates, it is estimated that in 2050 the world population will exceed 9 billion people, of which 70% live in urban areas.
In Europe, the phenomenon of population growth affects mainly the big cities like London: for these reasons, the International group 'AWR Competitions' has proposed a design competition which involved designing a new skyscraper on the waterfront of the Thames.
Starting from this premise, through this thesis we wanted to move towards a first approach in the design of a Vertical Farm: a building partially or wholly used for growing food.
Taking advantage of the opportunity of participating in the competition have been developed, studied and deepened many concepts related to the development of this new form of agriculture in the vertical, the benefits of which are summarized in this list:

1. Agricultural production throughout the year
2. No damage to crops due to climatic conditions
3. No discharge agriculture
4. Ecosystem restoration
5. No use of fertilizers, pesticides or herbicides
6. Using the 70-95 percent less water
7. Distances traveled by the food greatly reduced
8. More control of health and food safety
9. New job opportunities
10. Purification of waste water for drinking water
11. Creation of animal feed from plant material after harvest

Render

The first step in the design of this Vertical Farm, in addition to the analysis of the site which is located near the Tower Bridge and City Hall by architect N. Foster, has seen the study of plant forms and their different stages of growth.

Masterplan

Since the creation of architecture "organic", in fact, we tried an approach that already contains the essence of its original concept of nature. The choice fell on the development of the bean plant, which is growing with a cylindrical shaft rises and expands through its leaves, from which then generate the seeds of the bean.
The intent was to crystallize the plant in one of its stages of development, retaining only the stem and one of leaves at the base, in order to create two buildings that contain, one, the short one, the farm and the other, the tall, residences and other functions to be allocated in the intervention.
Unlike the real plant, it was decided to separate the leaf from the stem, as for the establishment of a Vertical Farm's decision provides for the most appropriate division of functions in two buildings in order to grow the best crops chosen, separating the area used as a crop from the potentially damaging research laboratories and disease analysis.
Inside the farm will cultivate a wide variety of fruits and vegetables.
Downstairs is the market place where are sold all the crops cultivated to the upper floors.
The first floor consists mainly of a large green area where are located several dwarf fruit trees, placed in pots with ground. From the second floor to the seventh floor were placed the hydroponics, which are fed through various dissolved nutrients in the water that runs inside the PVC sections that can accommodate the different vegetables. They are partly illuminated by sunlight and partly through the use of proper lamps, which use a specific spectrum of light and suitable for a better and faster plant growth.

Section

The residential part is instead located at the top of the tower to the north, while the offices and laboratories are in close-ups of the same building, which also sees the ground floor lobby with reception, a repository for objects of the residents, a travel agency and a bar / restaurant.

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