

Building Rooftop Gardens in NYC

Benny Wen

Israel Pina

Michael Romashov

Yosef Ali

(Group 5)

ENGL 21007 – Writing for Engineering

The City College of New York

Prof. Julia Brown

Spring 2023

Summary

New Yorkers do not consume enough fruits and vegetables on a daily basis. This is either due to financial problems, lack of groceries, or lack of time. Thus, we have created a plan for rooftop gardening. This plan will allow every New Yorker to garden plants on their rooftop with our help and supervision. This plan will take approximately 3 years, during which we will first work on the rooftop and backyard to make them suitable for gardening.

Followingly, we will help them build the foundation by providing them with seeds, materials to plant on, and a pamphlet of instruction. Throughout this 3 year timeline, it will take almost 19.3 million dollars in total for all materials and rooftop renovation. Within this budget is extra money that will be used if we are to change anything during this plan for the benefit of our customers.

Introduction

In a 2019 report, the New York State Department of Health (DOH) revealed that roughly one-third of adults (31.2%) in New York do not include fruits or vegetables in their daily diet, with some counties having figures as high as 42.4% (New York State Department of Health, 2019). A study by the New York Academy of Medicine found that nearly one in four children and 13% of seniors over 60 years old fell into this category (Libman et al., 2016). Additional research found that only about 10% of New York City residents consume five or more servings of fruits and vegetables per day, the recommended daily amount and only 50% consume two or more (Li et al., 2016).

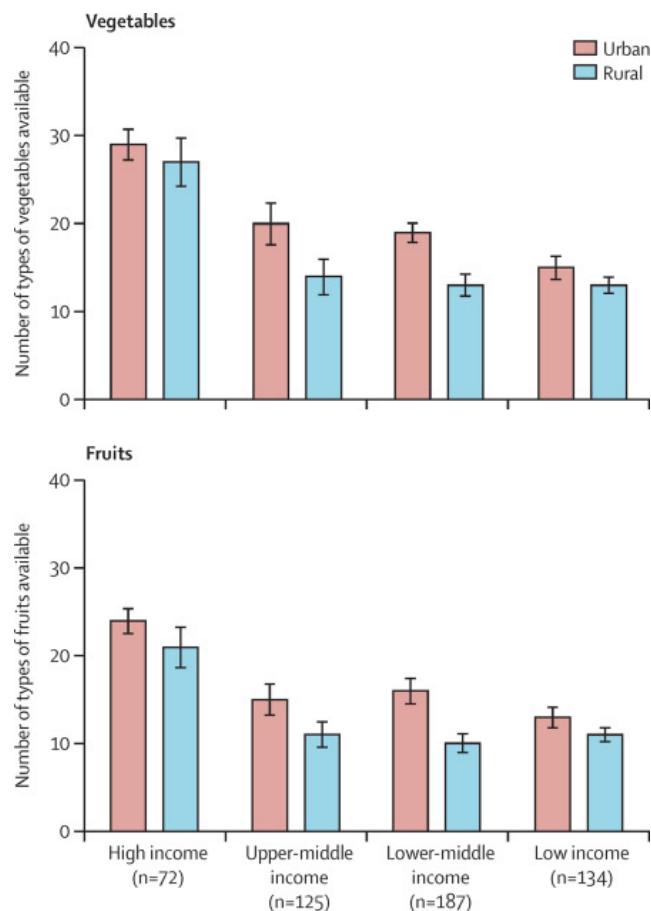


Figure 1. Mean number of types of vegetables and fruits available by socioeconomic class

These residents show a genuine desire for healthier diets but struggle to afford or locate produce that would sustain such a diet. A 2014 study on access to food in the five boroughs found that 1.4 million residents, or one in six, did not have reliable access to nutrition (Libman et al., 2016). A 2010 study by researchers from Columbia University found that low-income neighborhoods, such as Central Harlem, lack supermarkets and grocery stores that provide crucial access to fresh fruit and vegetables (Pereira, 2018). This is backed up by data from a study on the availability and affordability of fruits and vegetables, shown in Figure 1, which found that lower-income communities had fewer options when shopping for produce (Miller et al., 2016).

This document proposes the promotion of urban horticulture in New York City to ease the burden on residents who have limited access to fresh produce. Urban horticulture is the cultivation of specific fruits, vegetables, and other plants that can thrive in an urban environment such as a large city (Khan et al., 2020). The document details a plan to support NYC residents in beginning rooftop gardens by allocating resources for the preparation and construction of such gardens, as well as by providing guidance on how to ensure an urban garden's longevity and success. The document is split up into three sections: the project description, which details the mechanisms by which this plan will be carried out; the budget, which breaks down the costs involved with the implementation of this proposal; and the conclusion, which discusses long-term effects and considerations associated with the proposal.

Project Description

The end goal of the project is to establish rooftop gardens in New York City that will yield fresh, local fruits and vegetables to greatly increase access to nutritional produce that is

lacking in many New Yorkers' diets. There are two main steps in achieving this goal: preparing rooftops to support gardens and actually establishing the gardens.

planting materials



Figure 2. Planting materials used for rooftop farming

As shown in the graph, the materials that are needed for a rooftop garden are not as heavy as they may be seen, therefore, there isn't much fear in terms of whether the roof can hold the load. A similar concern goes for balcony gardening as well. We can use small items such as bags and bottles to start growing fruits and vegetables.

After earning permission from the Department of Building to work on the rooftop for a checkup and construction work if needed, we will set up a mailing system with a pamphlet and a few packets of fruit and vegetable seeds. Through the mailing system, we will first send a consensual form whether the consumers give us permission for this work to be completed, which can also be done digitally to make it faster. Following that, we will send a pamphlet in which there will be a detailed explanation of how to successfully raise plants without the need for pesticides along with how to set up soil for the seeds to be planted. With full directions given in the pamphlet, we will also send a few packets of seeds for fruits and vegetables. Instruction and

materials being provided to the civilians rather than them having to look for the right resource will encourage them more to engage in rooftop gardening.

We will also ask permission from the government office buildings and apartments to decide whether we can set up rooftop gardening at the top. Through such, we can organize a volunteer group that will participate in gardening on the roof. School students should also be encouraged to the garden to understand its value. Thus, in the future, they too can have their rooftop garden to take care of.

We understand this is not possible over a weekend considering the population of New York City, which is almost 8 million. It is not that much of a long-run project either if we were to do this digitally. Consents and forms before sending out the material will be an online form. We will also advertise and social media promotions to enhance the product more and encourage more people to find ways to do rooftop gardening. This is an ongoing plan where we are hoping to aid as much as civilians as we can during the three years.

As we get approval from the Department of Buildings of NYC, the work on the plan will be implemented. We will make two groups named “A” and “B” to perform this plan.

Group A will work on the buildings for “rooftop gardening” in a diligent way. To make sure that the rooftops of the NYC buildings are capable of gardening, in the 1st and 2nd months of the start of the plan, we will inspect the rooftops of all the buildings in all boroughs. After that, starting from the 3rd month to the 7th month we will construct gardens by extending the roofs of some buildings in the form of balconies to fulfill our purpose. We are hoping for a four-month time to complete this work to consider the number of governmental buildings there are in NYC. In the 5th and 6th months, we will construct the backyard gardens if some buildings'

rooftops are not capable of rooftop gardening. In this way, we estimated that in the next few months, we will be able to construct rooftop gardens in the buildings in all the boroughs of NYC.

After that, the next challenge is material for gardening. We need a lot of material for this purpose because we have a big plan that will cover all of NYC's buildings to make these buildings capable of rooftop gardening. In this way, group B will work on this plan in an effective way. For this purpose, after the 6th month of the plan, we will set up gardening materials like green layers, plastic bags, and lightweight potting soil with fertilizer, furniture, etc. on the rooftops of the buildings in the interest of the residents (GrowNYC, 2018). In the following two months, we will provide seeds and a guidelines book about gardening to the residents. In this way, they can try to grow fresh vegetables and fruits on their rooftops. After the distribution of the seeds and setting up the material for gardening, in the next two months we will make advertisements on social media like Facebook and YouTube that will create more interest in residents to do gardening on their rooftops. These advertisements will motivate residents to grow fresh fruits and vegetables and these advertisements will also help them to get techniques about how to start gardening. People of NYC will be able to grow their fresh vegetables and fruits on their rooftops within approximately ten months.



Figure 3. Planting materials used for rooftop farming

Within 3 years, most of the residents should be aware of this plan and already have implemented it on their rooftops. We are assuming a 3-year plan even though it may take up to 10 months due to the fact not many people will respond to our forms right away. The response and permission from the consumers might delay thus, we are assuming it will take approximately 3 years to get as many as people we can on board with this plan. We are estimating 2/3 of the population will participate in this plan. To make this plan more efficient and easier for our customers, we can make changes to the plan during the ongoing process. We will separate extra money from the budget to save it for later if we need any change. Extra time would be approximately 1 more year to carry out this plan. We understand New York City is a populated area with millions of buildings, hence, we will need many workers. Group A will have 20,000 workers and Group B will have 10,000 workers. The number of employees might increase based on how fast we need to get things done.

Compared to purchasing produce from a large grocery store, maintaining a rooftop garden has been shown to support sustainable economic growth in individual neighborhoods and provide accessible food sources for lower-income communities. Researchers from Sultan Qaboos University found that urban horticulture reduces local price volatility and stabilizes food prices, especially after the economic turmoil of the COVID-19 pandemic (Khan et al., 2020).

Perhaps the biggest challenge we may face when implementing this project is whether New York City residents will be consistent in maintaining the gardens and ensuring that they are not left without gardeners after a period of time. We hope that those willing to sign up for the project will be diligent in this task, but we concede that this outcome is not certain. Employing some sort of oversight committee for the gardens could solve this problem, but this would require more money on top of what we expect to be a costly plan.

Budget

Firstly, we must hire experts for the inspection and certification of the rooftops of NYC's buildings and the average salary of a roof inspector is almost \$ 75-800 per hour (HomeAdvisor, Inc., 2022). Then, we must hire a constructor for the construction of balconies and other attached spaces for rooftop gardening, and the average hourly rate is \$20 (PayScale, Inc., 2022). We will do inspections of all the buildings and constructions of balconies, if necessary, throughout NYC. In this way, the budget for inspection and construction will be estimated at \$3,000,000 for six months of projects.

Similarly, we will need money for planting materials on the rooftops of the buildings if we get permission from the residents. In this way, the first thing that we need for rooftop gardening is green layers, the cost for these layers is \$10 - \$50 per square foot. Next, the other

materials for rooftop gardening are less expensive than green layers, but green layers are a crucial part of rooftop gardening. Other materials like plastic bags, bottles, cans, and containers cost \$100 to \$200, seeds for planting cost almost \$500 to \$1000, lightweight soils cost \$50 to \$100. For this planting material distribution materials, if we get help from students as a volunteer then we can save money that we have to spend on workers. But if we cannot get help as volunteers then the average salary for the workers who will distribute materials to all the rooftop gardens in the city will cost \$15 per hour. So, the estimated cost for the material for rooftop gardens and the salary of the workers will be around \$15 million throughout the city for the six-month project. It is expensive, but the health of the residents is more important.

Furthermore, we must start a campaign on social media to motivate the residents and to provide them with awareness of the benefits of rooftop gardening. The cost for this purpose is estimated that \$500,000. Also, we must make and get pamphlets for the guidelines on rooftop gardening for the residents, it will cost almost \$500,000. The total estimated cost for this project will go beyond 19.3 million.

Plan	Employee Pay (Total for six months)	Extra Expenses	Total Budget
Inspection/Certification	\$3,000,000	\$500,000	\$3,500,000
Planting Material/Green Layer	\$15,000,000	\$200,000	\$15,200,000
Advertisements and Other Expenses	\$500,000	\$100,000	\$600,000

Table 1. Summary of expenses

Conclusion

The lack of access to organic, fresh and affordable produce is a serious and overlooked issue in New York. Our solution is simple: establish rooftop gardens on government buildings,

with the approval of the NYC Department of Buildings. While we expect this solution to take up to three years to kickstart into full effect and millions of dollars, the results will be well worth it. Improving the health and quality of life for the less fortunate across the city is our aim, and we also expect to meet this aim. Although we will have to place our faith in New Yorkers to maintain the integrity of these gardens, that is a bet we are more than willing to make. There are many things that define a New Yorker, but one that perhaps comes up the most is hard-working and we know that our fellow New Yorkers will work hard in providing themselves and others fresh and free produce that they are desperately lacking in.

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