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## Revitalizing New York City Food Deserts: On Addressing, Examining, and Solving Food Insecurity in New York City

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**Revitalizing New York City Food Deserts:**  
**On Addressing, Examining, and Solving Food Insecurity in New York City**

**Eleanor Rodde**

**Abstract:**

This paper aims to expose the food deserts of New York City and present ways that the government and non-governmental organizations can combat food insecurity in the urban environment. Food deserts are the product of insufficient access, availability, utilization, and stability of food in a particular area due to environmental racism. Food insecurity in New York City will rise with the increased impacts of climate change on our agricultural system. To that end, disadvantaged neighborhoods will bear the burden of environmental costs. The first chapter of this paper considers the failing agricultural system to prove that massive reform to protect the world's food security is necessary. It considers how climate change threatens food security by putting farms at risk through rising temperatures, desertification, and land loss. This chapter will propose policy solutions on the agricultural level, including the diversification of commodity crop subsidies. Chapter 2 will define the food desert as an environmental justice issue. It will examine the disparities in food distribution, comparing different neighborhoods in New York City while highlighting race as a significant factor. Chapter 3 discusses the irony of Hunts Point in the Bronx, a food distribution center that sources the largest amount of food to a surrounding area globally. Despite this, the Hunts Point community remains in a food desert. Chapter 4 looks into the adverse health effects of food deserts and identifies the food desert as an obesogenic environment. The fourth chapter will then focus on how an obesogenic environment impacts an individual's daily well-being. To erase food deserts, Chapter 5 argues that there needs to be a reconstruction of our supermarket networks, food system reconstruction, support of community gardens and mobile food stands, and helpful zoning policies. With the increased threat of climate change disproportionately affecting communities of color, food deserts must be taken seriously as a public health crisis.

**Keywords:** Food desert, environmental justice, food insecurity, environmental racism, Green Revolution, industrialization, commodity crop, industrial farming, neoimperialism, and permaculture farming.

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**Introduction: When We Bring Food to the Table:**

Growing up, my family celebrated every holiday with our close friends, and we called ourselves “the crew.” We were a group of 4 families whose extended family lived out of state. We found each other in the “cloud room” at Wallingford child care, our local preschool in Seattle, WA. Soon after our parents met, they constructed a babysitting network to watch all of us on Saturday mornings. Taking turns caring for us relieved the other parent for that week, a child-free morning. Our families, friendships, and dependency on each other grew. Soon, each family was assigned a holiday to host the rest of us (my family took Christmas Eve and some Friday pizza nights). Together, we celebrated New Year's Eve, The Super Bowl, Independence Day, Labor Day weekend, Halloween, Thanksgiving, Gingerbread making, The Seattle Christmas Ships Parade, Christmas Eve, and, of course, all of our birthdays (this list is not exclusive of other sporadic gatherings). Each of these people, whom I now consider my family, has molded me into who I am today. The company we shared has built a community for me to depend on.

It is here that I'll mention almost every time we gathered, we gathered to eat. A feast for the family sparks joy in conversation. We have laughed and fought over the many suppers we shared. Our parents have fed us to grow from toddlers to college graduates. Over meals, we have discussed topics from the positives and negatives of the week to our differing views on politics. My memories of these people are sprinkled with cooking and cleaning. The meals we've shared have given reason for our relationships. Food has this magical quality that can take us back in time and place. It can time travel through passed-down recipes from generations back.

Our ancestors have built cultures through food. It's quite a simple fact that food brings people together. When we bring food to the table, stories are shared, and relationships flourish.

In our social systems today, food is structured as a node for relationships. Take aphrodisiacs, foods that increase romantic desire when eaten. When a couple goes out to eat, they can sip wine and drink chocolate, making them grow fonder for the other. Food is an agent of the human connection. Cultures have developed parallel to the food that is harvested and then cooked. The heart of many traditions is a meal shared. The breaking of the bread in Christianity happens during communion. Priests offer bread and wine, representing the body and blood of Jesus. In Judaism, latkes are shared during Hanukkah to celebrate the small oil flask that stayed lit with fire for eight days, keeping the Temple alight. Food as tradition creates a space where food becomes sacred. Food is sacred. We need it to survive.

Not only is food celebrated everywhere, but it also keeps us alive. Humans need food to complete all the biological processes of being a living human. These significances are why government and non-governmental bodies should take the threat of climate change to food security seriously. Because of the danger of massive change in climate and the increase in severe weather, our planet's agricultural systems are in jeopardy. Yet, the desire and necessity to gather with friends and family to eat will live on. Examining the causes and effects of food insecurity will be crucial in supporting underprivileged populations. This thesis will dissect the food system to understand what dries up the food desert and how environmental, social, economic, and political change can revitalize it.



## **Sowing Sustainability:**

This chapter will examine the failures of the urban food system on an environmental level to understand the ecosystem services that impact food deserts. The food system is a compilation of multiple subsystems, including food production, aggregation, processing, distribution, consumption, and disposal (Nyguen 2018, 3). Since the industrialization of farming, food production has drastically increased. Scholars are in debate as to whether higher food yields caused a parallel trajectory in the global population. Rapid industrialization has been successful in raising farm production levels and reducing the cost of food. However, the environmental costs of this type of farming are building. Environmental costs now reap detrimental economic and social costs for the future. It is essential to consider ecological services when discussing any part of the food system, including food deserts. In the urban environment, population density is higher, meaning that the food system functions differently than a rural environment. The demand for food is high; therefore, the flow of food into city centers must be maintained to support consumption levels. The chaotic urban environment tells where our built systems succeed and fail. A food desert occurs when a food system fails. To this point, food system actors must establish sustainable food systems to combat the food desert. A sustainable food system functions when each of the three dimensions of sustainability, economic, social, and environmental sustainability, are met. This chapter will examine these three dimensions of sustainability and dive into the ecological services that support the agricultural system in managing rising production costs worldwide.

*Unraveling agriculture's vital role in ecosystem health starting with the European History of farming:* In the 21st-century globalized world, the food system spans borders. It includes actors in local, state, and federal governments, private stakeholders, laborers, the

neighbors of farms, grocery vendors, and consumers. This kind of involvement creates a complex chain of events strung together by trades and transportation. It hasn't been long since the human population began to rely heavily on this high-yield system. It significantly differs from subsistence farming, which describes the type of farming since the first plant domestication. This type of farming describes people growing and hunting food they obtain themselves. Since the first Homosapien was discovered 300,000 years ago, the human population has used traditional farming methods such as hunting and gathering to cultivate crops for centuries. Subsistence farming was used until the start of the European feudal system. This system ruled 9th to 13th-century Europe (Hickel 2020, 42-44). The feudal system in Europe was run by feudal lords who were given property by nobles and the monarchy at the time. Large swaths of land were worked by people who were taxed to live on the lands they worked. Farms grew as the people on those lands populated. When feudalism fell, the population was then able to specialize their interests, economically speaking, because of the lessened burden of gathering food.

Lieges, Knights, merchants, artisans, and farmers used trade to facilitate the swapping of goods. The markets gathered townspeople to buy, trade, and sell to sustain a comfortable living. This economic system occurred during the Middle Ages when the Plague, also known as the Black Death, wiped out one-third of Europe's population. Between the 1350's and 1500, civilization was organized through a grassroots democracy based on a "collective management of resources," (Hickel 2020, 47). It was a violent upheaval of this type of societal management because the elite class was unhappy with disaccumulation. In his book *Less is More*, Jason Hickel writes, "Capitalism rose on the back of organized violence, mass impoverishment, and the systematic destruction of self-sufficient subsistence economies" (Hickel 2020, 48).

Subsistence economies were replaced by the elite class, which created the idea of property ownership. This ownership, also known as enclosure, for the first time, deemed Earth's land as something to own. Enclosure took advantage of cheap labor and began the system of the capitalist society that we live in today. Capitalism is the accumulation of profit by owners of property to accumulate at a faster rate. It is “an economic and social system in which the owners of capital (or capitalists) appropriate the surplus product generated by the direct producers (or workers), leading to the accumulation of capital–investment, and amassing of wealth–by the owners,” (Magdoff & Foster 2011, 38). In capitalism the environment is seen as an “externality,” or something that is external to a system. This creates the false idea that the environment is something external to the workings within the economy. When capitalism was born, ideas about nature shifted from a relationship of reciprocity to something that can be used as a means to an end.

As royalty sat in castles, the peasants were sick and starved, causing unrest in those civilizations. This feeling of unrest was what began the French Revolution. During the French Revolution - which the Historical novel, famous Broadway Musical, and Oscar-winning movie *Les Misérables* explains very well - philosophers at the time were fed up with the people's misery. This political revolution in France shook unstable grounds as a brutal war was fought between those loyal to the throne and those who demanded equality. Between 1789 and 1799, the wealth gap between the bourgeoisie and the aristocracy raised war between the classes. The wealth gap was proportionally large to the population in France. The war ended with the monarchy being overthrown and property was given to farm owners.

The Industrial Revolution took place in the 18th century with the invention of the steam engine (1712). This invention was the catalyst for incredible advancements in technology that

heavily relied on the usage of fossil fuels. With increased technology came luxuries that the human race did not experience before, such as travel by rail and increased modes of communication at high speeds. For the first time, people were obtaining their food by purchasing it from farmers who were producing at higher capacities, abandoning the trend of self-reliance when it came to growing food. The Industrial Revolution gave Western thought a new perception of the world, driven by technological advancement and, more importantly, money. Vendors could sell at a larger scale to obtain a more significant profit. Higher yields in a place with lots of demand could make the farmer rich. Not long after, the Green Revolution followed during the 1950's (Parasecoli 2019, 12). The Green Revolution is marked by its reliance on synthetic fertilizers. Since the Green Revolution, our agricultural system has become a negative feedback loop, where the damage to the environment affects the overall productivity of a farm's ecosystem (Mann 2018). These damages deteriorate the usefulness of ecosystem services.

The invention of the Haber-Bosch process at the start of the 20th century sparked what is now known as the Green Revolution. In any environment, biodiversity is essential to a healthy ecosystem. Every living thing requires the consumption of a certain amount of each of the crucial life-giving elements. An acronym for these elements is CHNOPS: Carbon, Hydrogen, Nitrogen, Oxygen, Phosphorus, and Sulfur. Every living organism must be able to obtain these elements to produce biomolecules needed to perform the functions it needs to survive. Nitrogen is known as the limiting reagent in plant growth. When plants have access to more nitrogen in the soil, they have the ability to grow at a higher rate. The Haber-Bosch process invented a way to synthesize nitrogen to make it into a fertilizer. This invention single-handedly skyrocketed crop yields. At the same time, pesticide use began to increase. The Green Revolution also included a sweeping movement towards monoculture farming. A monoculture is a farm that only produces one type

of crop. Take corn, for example; fields of corn replace acres of biodiversity to support the demand for it. The corn will be fed nitrogen fertilizers and pesticides from seed dispersal to keep pests away. The environmental services include sun energy, soil nutrients, biodiversity, pollinators, and water. In running a farm, it is essential to consider environmental services as a priority. The problem with farming after the Green Revolution is that its practices harm every one of these things.

Monoculture farming strips the soil of its naturally occurring nutrients. The first cause of this is the threat to pollinators that pesticides pose. Some pollinators are affected by pesticides, and their colonies are then harmed. Bees and other pollinators are essential for produce production. Pollination is at the base of how plants reproduce and, therefore, necessary for producing fruits and vegetables. Because of this, pollination levels decrease, and along with that goes the diversity of the soil's micro-nutrients. Pollinators also rely on biodiversity and are turned away from fields of one crop. However, those fields of the crop, like the corn example, depend on pollinators to reproduce. Without stable pollination, crops will die.

Additionally, from a public health perspective, the use of organophosphate pesticides has been connected to the development of Attention-Deficit/Hyperactivity Disorder (ADHD) in children. (Magdoff & Foster 2011, 24) The chemicals used in pesticides, including bisphenol A (BPA, a known carcinogen), pollute waterways and end up in people's drinking water or food. These chemicals are also found to lower fertility rates in women and cause neurological side effects (Magdoff & Foster 2011, 24). Pesticides should face large swaths of regulation before they can be deemed good for any environment.

Soil should be filled with micro-nutrients, which requires a healthy level of biodiversity to be sustained. As organisms die, their makeup breaks down by micro-organisms in the soil and

turns into healthy, absorbable nutrients to be recycled into plant bodies. Plants take up the life-giving elements from the soil and create glucose through the cellular respiration process. Monocultures do not support biodiversity enough to support soils in the long term; because of this, more and more fertilizers will be used to make up for the cost. The problem with fertilizers is that they are the catalyst of algae blooms. When rain carries fertilizers from farms to bodies of water, the algae will react to the nitrogen as the plants do and rapidly grow in population. This causes issues with the health of the ecosystem because the algae grow so much that it covers the top layer of the water, taking up all the sun and blocking other organisms from accessing sunlight (another essential ecosystem service).

Food security depends on working agricultural processes. For agriculture to be productive, ecosystem services must be protected. Ecosystem services are naturally occurring benefits provided by a particular functioning ecosystem. Each ecosystem organizes a plethora of inputs and outputs to develop and function. Ecosystem services can be overlooked in a world run by capitalism, a world economic system with the goal of accumulating profit at higher rates. Often, the damaging effects of treating ecosystem services as an afterthought develop over time and are more challenging to pinpoint and advocate for. Since the Green Revolution, there has been a dramatic shift in the way that farmers interact with the environment. Although the Green Revolution increased food production, practices including monoculture farming and the use of synthetic nitrogen fertilizers have begun to strip ecosystems of their organism-abundant, nutrient-rich contents.

In the context of the urban food system, this is significant because the process has decreased the price of food overall. On the other hand, if ecosystems begin to fail, food prices will rise rapidly. It is important to discuss the agricultural damages that could possibly create a

rise in the price of food. Food can be considered a provisioning service through the agricultural system. Inorganic agriculture harms the water cycle through pesticide and fertilizer runoff. Our current agricultural systems negatively affect how habitat/supporting services operate. With the promotion of monocultures, our diverse ecosystems are being replaced with fields that produce one crop. Monocultures are unsustainable because they decrease the biodiversity of an area.

Decreasing biodiversity harms production levels because a lack of microorganisms will deplete soil quality over time. The pollinators will not be able to keep up with production levels because pesticides are threatening their populations. The land that monocultures stand on has already begun to dry up, resulting in erosion (Mann 2018). In the future, monocultures should be abandoned and replaced by permaculture farming. Permaculture farming uses agricultural techniques such as crop rotation and cover cropping to nurture the soil to have sufficient nutrients.

The agricultural system depends on regulating services to function correctly. The Green Revolution messed up those regulating services. For plants to grow, a farm needs sunlight, the water cycle, stable weather, soil fertility, and pollination to function. These services are at risk because of climate change. Therefore, food security is at risk because of climate change. Specifically, the changing of the climate endangers food systems due to jurastic shifts in climate. Global warming is a product of climate change. Global warming happens because of rising rates of greenhouse gases in the atmosphere. When these greenhouse gases, including Carbon Dioxide, Methane, and Nitrous Oxide, are emitted into the atmosphere by burning fossil fuels, such as coal, petroleum, and heavy oils, heat is trapped. Heat waves from the sun head towards Earth. Some are absorbed, and some are reflected. These reflected heat waves should be released through the edge of our atmosphere. However, when greenhouse gasses accumulate, the heat

waves are reflected back towards the earth. This phenomenon creates global warming. Fossil fuel emissions are the proven cause of global warming and, therefore should be mitigated to slow the effects of climate change. The most detrimental side effect of climate change in terms of the agricultural system are the increased risk of drought and rising global temperatures. Plants are beings that have evolved to grow in certain climates. When temperatures rise in a particular area, the plants there could have difficulties germinating (seed sprouting out of dormancy). High heat increases transpiration so that water evaporates right out of plant bodies. This means that plants have a higher risk of dehydration, which can cause lower produce yields and even plant death. The other effect of climate change is drought. Drought will become more prominent because climate change affects the earth's precipitation patterns due to large shifts in atmospheric circulation patterns like the jet stream. The jet stream is what causes weather patterns. This means that agricultural lands will face drought. Already in California, farms are tackling water scarcity by pulling water from far and wide (Cody 2019).

Climate change is the biggest threat to the ecosystem services that support the base of the food system. It is important to conclude that climate change is primarily supported by the capitalist system that uses the need/greed for profit as an excuse to plunder Earth's natural ecology. When capitalism continues to function as we know it now, it will be impossible to predict the environmental damage that the system will cause. Under capitalism, the conglomerate chooses the least expensive option even though the amount paid for the use of fossil fuels now does not even come close to the amount of destruction that will happen to the environment (Magdoff & Foster 2011, 40). Capitalism collides with the Earth's ecosystem services in farming, fossil fuel, and mining industries. Therefore, these systems must be scrutinized to mitigate any damages that could occur from resource extraction. However, the sad fact is that on a graph with



the y-axis being \$/unit and the x-axis being emission levels of a capitalist company, marginal damages will always be steeper than marginal abatement costs—the cost incurred to calculate the damages per unit of emissions in price. This means that environmental damage will always result from cost-cutting strategies that see the environment as an externality. In the long term, rising temperatures and more instances of drought could cause massive devastation to agriculture as we know it. The severity of this issue calls for immediate recognition and action taken globally. These solutions will be expanded on in chapter five.

*Balancing economics and ecology in agriculture:* Economic sustainability happens when food is affordable, worker wages provide a living wage, tax on food supports the government, and the food supply can keep up with demand. This is easier said than done. The affordability of food depends on the cost it takes to produce the product. Many things go into the cost of production, including but not limited to land rights, soil upkeep, seeds, fertilizers, pesticides, farming vehicles/tools, transportation costs, and manufacturing costs. The cost of all of these things determines the price of the goods. As the availability of all these operational costs ebbs and flows with technology and raw material extraction costs, the price of goods ebbs and flows. Currently, in America, large swaths of farming production are heavily subsidized. This means that farmers can purchase certain input costs at a lower rate than what the environmental service is worth. Ecological services have inherent input costs, which are hard to determine because putting a price on something naturally occurring is unnatural. Economists calculate costs intended to benefit the market so that goods can be produced cheaply and in quantity. However, the price of subsidized goods is below the cost of the environmental service.

For farming to become economically sustainable, subsidies should be diversified across crop production to support biodiversity. Right now, mega-farms produce commodity crops on a

large scale. These crops include corn, soybeans, wheat, cotton, and rice, receiving the most funding from government-provided subsidies. Subsidies distort the actual value of these crops and under-charges at the expense of environmental damages from an extreme lack of biodiversity. Between 1995 and 2020, around \$240 billion was spent in the US on subsidizing these commodity crops (Farellio 2022). Because the government highly invests in these grains, much of farming dedicates is enclosure by solely growing commodity crops via monoculture farming. There are multiple downsides to this type of investment, starting with nutrient depletion over time due to the absence of crop rotation and, therefore, biodiversity. Because of the organic makeup of these crops, US citizens consume heavily refined sugars or meat. Why meat? Because the majority of the corn and wheat grown is then given to cows to build on the meat industry.

Social sustainability within the context of the food system looks like equitable distribution of food on a level that considers the product's nutritional and economic value. Additionally, the system must be proficient at maintaining socio-cultural benefits regarding agricultural worker's rights, health and nutrition benefits, traditions upheld, and the support of animal welfare. Environmental sustainability in a food system is achieved when ecosystem services are maintained without environmental degradation. This means that agriculture, food processing, transportation and distribution, and food disposal consider all possible environmental damages (Nguyen 2018). All of these factors will be expanded on throughout this paper.

In NYC, there is an unequal distribution of food system benefits based on race. The food desert is an environmental justice issue because of its discriminatory nature against Black, Indigenous, and People of Color (BIPOC) communities. The food desert is a product of our corrupt food systems that result in leaving disenfranchised communities with lower access to produce. I will use the exploitation of ecosystem services to show where the food system has

failed and how it can be built back. The failure of ecosystem services affects the human population disproportionately. Because access issues make it hard for people to get fresh produce, many communities end up relying on unhealthy food options to fuel their day.

Cultural services are threatened because of the unfair labor practices within the agricultural system. Many immigrants are currently trapped in corrupt contracts that place them in debt to corporations. The agriculture industry sways politics with the malpractice of extreme lobbying efforts in order to restrict environmental regulation. This all falls upon the shoulders of the underprivileged who live in the food desert. Their health is at risk. More cultural benefits are needed to support the food deserts of NYC.

*The effects of a failing agricultural system:* Agriculture depends on natural forces that make up ecosystem services. Agriculture is also what the billions of humans rely on to survive. Most families expect to buy food at the grocery store. Already, malpractice in farming has starved ecosystems of their abundance in vegetation and life. Overfishing is one example of how ecosystem collapse has already begun. Without the proper diet, larger predators that would rather eat fish become scavengers. There is a focus in the food industry on taking more and more; this will not last when ecosystems cannot function as they were meant.

The inequities within the labor system lay the groundwork for a failing agricultural system, perpetuating poor conditions and insufficient pay for farm workers. Labor laws inadequately protect their rights, leading to detrimental effects on the human population, primarily manifested as food insecurity and nutrition problems. This stems from a profit-centric approach in the food industry that prioritizes accumulation over the well-being of disenfranchised communities. The consequences are further exacerbated by the aftermath of the green revolution, where the emphasis on increased production, particularly in factory farming,

has compromised the nutritional quality of available food. The cruel treatment of animals in concentrated animal feeding operations (CAFOs) contributes to declining food quality (Hickel 2020). While the call for abolishing CAFOs is clear, the challenge lies in maintaining high production at low costs, often at the expense of sustainability. The government should pivot its environmental policy towards prioritizing factors like sustainability and acknowledging the inevitable long-term damages if action is not taken now. However, there is a reluctance to invest more due to the prevailing ignorance and denial among climate skeptics. This unwillingness to act now is particularly concerning given the disproportionate impact on disenfranchised communities.

Examining the ecosystem services in the context of COVID-19 stressors on the food system reveals a map highlighting the food deserts in NYC and the associated socio-demographics. The data underscores a critical point: without safeguarding ecosystem services, food deserts will proliferate. The coming chapter will delve into a taxonomy of environmental justice terms, illustrating the unequal distribution of food across various socioeconomic strata in urban spaces. While food deserts can occur in rural and urban areas, the focus here is on neglected urban neighborhoods, emphasizing the distinctive challenges urban dwellers face. Recognizing these differences contributes to a deeper understanding of urban living and reinforces the notion that food deserts represent an environmental justice issue. By connecting the dots between labor exploitation, profit-driven food industry practices, and the broader implications on community health, this narrative underscores the urgency of addressing systemic inequalities for a more sustainable and just food system.

*What does this mean for the food system?* The food system in America creates disproportionate advantages for people who are in higher income groups. Overall, across the

globe, food insecurity has decreased over the last decade (Farellio 2022). However, as noted above, this has much to do with the ecosystem services that are being taken advantage of. Additionally, even though food insecurity overall has declined, food deserts prevail. The food desert is what can define a neighborhood's well-being. This means that they should be taken seriously and should be prioritized in political conversations. Over the next couple of chapters, this paper will discuss what creates the food desert, how food deserts are perpetuated through racist zoning codes and the possible solutions that can combat food deserts.

### **Segregated Geographies:**

New York food insecurity targets specific low-income communities and, most often, communities of color. The urban food system now is a racist structure that was built through histories of white supremacy in the US. This chapter will discuss the creation of the food desert throughout history, beginning with the Columbian exchange and colonialism. Through a historical examination of urban food systems, this chapter will reveal that racism and racist policies are the root causes of the food desert. The food desert comes from a long history of discrimination in farm ownership, redlining, and food access. These issues are an amalgamation of food injustices that deprive communities of healthy and fresh produce. A food desert is an example of the effects of environmental racism. To discover environmental racism within an urban space to unfold the layers of history that discriminate against people of color.

Understanding the history of positioning people in New York City allows for recognizing the barriers set up to restrain BIPOC communities from accessing environmental benefits. It will be essential to consider political and economic moves by the government and non-governmental actors as intentional moves for personal gain. Segregation did not happen by coincidence, but years of a specific group being denied equality.

*The Columbian Exchange and Extractive Economies:* The success of the American economy between the seventeenth and nineteenth centuries is bitterly accredited to the practice of slavery. The colonization of the Americas led to a global slave trade, which was called the Columbian Exchange (Crosby 1972). The operation was the first market exchange that happened globally that was tainted by white supremacy and the oppression of African people and indigenous cultures. The Columbian Exchange was the first time the world saw goods traded across oceans at a large scale. The environmental impacts of the Columbian Exchange, around the year 1610 are interesting to consider because of the effects of swapping native plants across the Atlantic Ocean. Plants native to the Americas made their way to Europe and vice versa. In displacing native flora, displaced species can outcompete native ones. Invasive species are increasingly threatening to the environment and impact ecosystems today. English ivy and zebra mussels, *Dreissena polymorpha*, are examples of European-based invasive species affecting the United States. English ivy has taken root from coast to coast, swallowing trees and suffocating shrubs. Zebra mussels were imported alongside the garden pond snail and have infested waters in Wisconsin and Canada, threatening native sea life (Miller, Amish, Howard, Bajno, McCartney, and Luikart 2024.).

The Columbian Exchange was also a time of mass famine for the indigenous people in the Americas. Bacteria and viruses traveled with Europeans on boats across the ocean. When coming in contact with sick Europeans, Native Americans did not have built-up immune defenses to protect against sickness. Genocide of Native Americans killed many during this time, but sickness is the culprit for the majority of lives lost (Davis & Todd 2017, 799). Between 1492 and 1650, the estimated population of Native Americans decreased from 61 million to 6 million (Lewis & Maslin 2015, 175). Again, between the years 1492 and 1650, 55 million indigenous

lives were lost. This revolting tragedy was so great that CO2 levels in the atmosphere dropped 7-10ppm, data taken from Antarctic ice core records (Lewis & Maslin 2015, 175). Scientists note this phenomenon as the “Orbis Spike,” it was the mass murder of a population that was so colossal that the earth took record of it.

The Orbis Spike proves the Columbian Exchange was the disastrous beginning of extractive global economies. The Columbian Exchange set a course toward exploitative agriculture. Our societies see the effects of colonialization today in how our food systems have grounded themselves. The global north has established an economic upper hand in the agricultural industry through the extractive dispossession of farm capital in other countries. The modern term for this system is called “neoimperialism.” Neoimperialism occurs when a country holds power over another because of its influence in that country’s private sector without occupying its territory. This takes an international political and economic perspective on the food market. Neoimperialist structures perpetuate colonial practices. Developing nations are taken advantage of and are subject to producing for the margins of monetary benefits. Large territories in developing nations have been privatized, so the country can no longer use the environmental services of that land.

Additionally, environmental injustice is occurring because of the damages of unsustainable farming that disproportionately affects the global south. Now that the Earth’s planetary boundaries (the boundaries of ecological prosperity that, if crossed, will end in environmental collapse) are strained, there needs to be a shift away from extractive economies because they inhibit the environmental sovereignty of the country being exploited. New economic systems should be “focuse[d] on restoration, reparation, regeneration, care, kinship, dignity and flourishing for all” (Sultana 2023, 6). The Columbian Exchange mobilized a

neo-imperial political and economic structure that concentrates environmental damages in the marginalized global south. Therefore, global monetary systems should be restructured.

*Field and Crop Ownership based on Colonialism:* The Columbian Exchange cannot be learned without the recognition that “15 million souls were shipped across the Atlantic from Africa during three centuries of state-sponsored human trafficking by European Powers, from 1500s to the 1800s” (Hickel 2020, 52-53). Later, when slavery became rooted in the American Colonies during the establishment of the country’s government, tobacco and cotton industries boomed as white landowners exploited African peoples for free labor. This, in turn, advanced white enslavers while also supporting the American economy at the same time. Enslaved African Americans worked on farmland without rights or freedom (Freight Farms 2020). Slaveowners built our farming system on a racist structure that future policymakers cannot ignore. White landowners controlled farms and made all of the profits from the agricultural industry as people of color were used simply as a means of production.

Robert Bullard, a pivotal figure and father (as many scholars proclaim) of the environmental justice movement, names the racial injustices in America as a product of institutionalized racism, which stems from the history of slavery in the United States. In his book “Confronting Environmental Racism: Voices from the Grassroots” Bullard says that “people of color are subjected to five principle colonizing processes: they enter the “host” society and economy involuntarily; their native culture is destroyed; white-dominated bureaucracies impose restrictions from which whites are exempt; the dominant group uses institutionalized racism to justify its actions; and a dual or “split market” emerges based on ethnicity and race” (Bullard 1993, 16). The environmental justice movement sees racism in environmental planning and calls out the injustices that cause the disproportionate burden of environmental damage on



marginalized communities. Slavery is the worst form of exploitation and deprivation of human rights. The United States estranges black and brown communities by maintaining an “internal colonial model,” as Bullard would describe, that results in racial inequalities.

The abolishment of slavery in December 1865 took place with the ratification of the 13th amendment, giving freedom to black people and allowing them to own their land. The system of Sharecropping was then put in place to disguise slavery in a land rental type system (PBS 2021). Sharecropping was the practice of land owners renting out a plot to sharecroppers, who were given the right to own the crops they produced. This system is riddled with unjust laws that would prevent sharecroppers from selling produce to anyone but the landowner. Contracts between black families and white landowners kept the sharecropper's freedom to engage in the market to a minimum. Many sharecroppers were indebted to landowners if production levels were down due to a bad harvest year. One-third of sharecroppers were black families who were recently freed (PBS 2021). Another big name in the environmental justice movement is Stuart Hall, who argues that racial injustices are the product of the white dominant society using race as a means to accomplish economic gains for white capitalists. Sharecropping is an example of a racialized distribution of property. Hall says that “race is the mechanism by which this stratification of class is accomplished” (Hall 1980, 20-21). Race, as a social construct, should be disarmed by acknowledging the unjust structure that repeated racist histories have set up. The sharecroppers who were taken advantage of faced a racist economic structure that added to racist histories. The accumulation of wealth by the dominant society exacerbates economic inequality to prevent the upward societal mobility of marginalized groups. The Environmental Justice Movement recognizes race as the context for the disproportionate environmental burdens that BIPOC communities face.

Since the era of sharecropping and through the 1900s, the USDA has denied support to black families who aim to advance in the agriculture industry. During the 20th century, it was imminent that farm owners receive loans from the USDA to develop a farm. Still, often, racial discrimination prevented black families from being awarded a loan. It is essential to consider that “in the early 1900s, more than 900,000 black farmers owned over 15.6 million acres of land. By the end of the 20th century, just 18,000 farmers owned only 2 million acres” (Alkon 2015). This decline happened because of the lack of support from the government, specifically the USDA, in creating opportunities for people of color. Instead, BIPOC families were excluded from the agricultural industry. This exclusion resulted in white landowners reaping the benefits of the farming sector's profits. In a 2018 study, scholars found that between 2012 and 2014, 98% of agricultural land was owned by white people. That means that 98% of the wealth accumulated in the farming industry was managed by white people (Horst & Marion 2018). When land is made inaccessible to a particular group, it creates a severely unequal distribution of wealth. Here, it is crucial to revisit Hickel's explanation of enclosure and why the invention of “property” within the feudal system has such an effect on the power of an individual or agency. In being the owner of property, one becomes an owner of capital. The USDA prevents black farmers from gaining capital through exclusion from enclosure ownership. The behavior of the USDA is intrinsically an example of environmental racism. This governmental body did not support the BIPOC farmer's access to property. Under capitalism, those who face bureaucratic discrimination face significant losses in capital gains. Institutionalized racism has built barriers that prevent BIPOC groups from environmental benefits. When the question is about the disproportionate ratio of white groups versus non-white groups as agricultural landowners, it becomes clear that the current agriculture industry perpetuates the exclusion of BIPOC

communities from obtaining property. This inequality in farmland ownership underscores what environmental racism is about: the exclusion of environmental benefits based on the social construct of race.

*Segregated Cities.* Segregation has divided communities of color from the same social benefits as white people have been privileged to in the last several decades. It is important to note that patterns in the separation of black and white communities today are not the result of happenstance but the consequences of racist governmental policy that kept black people out of white neighborhoods. The Home Owners Loan Corporation (HOLC), established in 1933 during FDR's presidency, made it nearly impossible for families of color to receive mortgage loans, deeming ethnically and racially diverse neighborhoods as unworthy of investment (New York Law School Racial Justice Project 2012). The HOLC was created amid the Great Depression and was intended to make obtaining a loan on the house financially more feasible by extending the years to pay off a mortgage. However, when African American families wanted to buy a home, they were often turned away from the HOLC due to the discriminatory practices that enabled governmental racism. In 1939, another government agency, the Fair Housing Administration, determined that "if a neighborhood is to retain stability, properties must continue to be occupied by the same social and racial classes"(Carr & Kutty 2008). Racism in government is dangerous, and because of its tangible repercussions, it is clear that these policies had significant impacts on urban areas as we know them today.

During the 1950s, with the expansion of the interstate highway system, white families moved out of urban centers toward suburbs. This left local urban governments with a lower tax base. The Housing Acts of 1949 and 1954 established a plan to dismantle 'slums' with the promise of affordable housing (New York Law School Racial Justice Project 2012). These

affordable housing projects were giant complex buildings that were high in density. The majority of African American families dominated the available public housing, and most of the public housing units were located in industrial neighborhoods, which continued the segregation of the urban landscape. Because of urban policy, white flight, and the increased separation that stemmed from affordable housing, segregation embedded itself in the fabric of the urban environment in the 1950s. Zoning is also to blame for this type of discrimination. Zoning codes were put in place to keep “undesirable groups” from living in certain areas. The government enacted specific ordinances to restrict nuclear families (families living with extended or non-family members and primarily BIPOC groups).

Additionally, some ordinances only accepted certain career types into the neighborhood. This was a discriminatory practice because the jobs targeted low-income residents. This type of engrained discrimination has woven its way into the way that our urban environment runs today.

Racialized zoning codes have set up the city of New York in a way that makes it relatively segregated. This segregation comes from residual segregated zoning codes, such as redlining, that prevented people of color from moving into specific urban areas. In addition to that, eminent domain has worked in a racialized means to displace entire communities of color (ex, Lincoln Center) from living in a particular area. BIPOC communities have been cast to the margins of New York City so that environmental benefits are lost for those families.

*The Supermarket: Born in Segregation.* Segregated living patterns are a direct result of racist policies. These living patterns are affected by the availability of supermarkets, stores, parks, gas stations, and other entities that the public uses. It has been found that “low-income neighborhoods and minority neighborhoods are less likely to have access to large supermarkets” (Cotterill & Franklin, ). After the white flight, when white families retreated to the suburbs,

many stores went. It was during this time that the first supermarkets began to appear. Because suburbs are not as walkable and people used automobiles to navigate their neighborhoods, it became more convenient for people to buy meat, produce, dairy, and bread simultaneously. Supermarkets expanded in a big way following urban sprawl but mainly targeted the most profitable places. Minority and low-income communities were being left out of this supermarket expansion.

It is essential to point out that as stores expanded, the amount of products they carried and the amount of space they took up grew as well. The average size of the supermarket grew from 10,000 square feet to 45,000 square feet from the 1950s to 1994 (Cmty. Dev. Project Staff). This meant the cost of keeping a supermarket in inner cities, where a majority of BIPOC communities lived. Supermarkets didn't see urban centers as profitable as suburbs because the land cost was higher. Large companies such as Whole Foods Market and Trader Joes will find a place to rent with the highest purchasing power. The margins of the cities where low-income families are congregated are ignored by big businesses because of the low purchasing power in the area. This means that the wealthiest grocery stores (with the ability to buy the best fresh produce) avoid places that have higher numbers of people living near the poverty line.

Additionally, cities have more zoning regulations, making the urban center less business-friendly. The food desert is born from the abandonment of supermarkets in low-income neighborhoods in urban spaces. A failing agricultural system that raises the price of food makes produce unaffordable to low-income families. When the agricultural system fails, and that is paired with the result of years of segregation, food deserts emerge in the spaces where communities have historically been marginalized. The marginalization of low-income communities further perpetuates the food desert by keeping those families from gaining access to

fresh and healthy produce. Then, the public health issue arises. The supermarkets that do end up in low-income communities will often offer more expensive produce of lesser quality. This happens because grocery stores with a more robust financial base have the advantage of gaining access to local, better-quality produce because of the reach of their corporate influence. With more money, those supermarkets have the power to offer goods that are more nutritious and of better quality. The grocery stores that rent in low-income communities will have lesser purchasing power in the network of supermarkets and are then subject to collecting food of worse quality. This means that fresher produce ends up in wealthier urban centers, leaving low-income communities with what could be considered discarded food in the market as a whole. Food distribution from farms to grocery stores significantly impacts food insecurity because people are left with worse-quality food. This means that the food could go bad quickly, and the goods could not withstand a couple of days. Therefore, low-income communities are more likely to face problems with the quality of their produce because of the disproportionate access supermarkets have to receiving better quality food.

Because of these discriminatory trends in the location of the supermarket, due to the lack of economic incentives in urban centers, there are fewer supermarkets to support the number of people. Costs for food end up being higher in the urban supermarket to make up for the price of renting space in a city. Urban policy should incentivize supermarkets to be located in urban centers because it is necessary for the population to have access to food. It is the government's job primarily because it was governmental policy that created the lack of supermarkets in the city. Supermarkets outside of the city can work with market owners to create discounts for the food. In New York City specifically, food deserts are made when there is not enough incentive for a grocery store to pay the expensive rent in the urban center. Rent prices in New York City

are incredibly high, and without being checked, these supermarkets abandon areas without purchasing power. The food deserts in New York City are racialized because of how segregation has prevented the upward mobility of marginalized communities. Segregation and a failing agricultural system will spawn a food desert.

It is important to note that the urban food desert differs considerably from the rural food desert. Without spending less time on it, the rural food desert is more common because it is more dependent on sprawl and lacks proper food infrastructure. This is very common in America, and it can also be blamed on the infrastructure plan during the 1950s to expand the interstate highway system. This moved industrial and manufacturing bodies out of city centers toward rural areas. Suburbs were separated by commuting distances to cities so that families could live out their American dream while maintaining a French lawn and only commuting two hours a day! As sprawl expands, grocery stores are constantly playing catch up to keep up with the sprawl. When grocery stores don't follow sprawl trends, the rural food desert appears. It makes sense because there is a lower density of all commercial infrastructure in many rural areas. Transportation is expensive, and when a grocery store is located far from a distribution center, it is less likely that a grocery store will plant itself there in the first place. There is still racism in the food deserts for the same reason that occurs in the urban food desert. Because of years of political and economic barriers preventing BIPOC populations from accumulating as much wealth as white populations, there is lower purchasing power in those BIPOC populations.

*A Justice Issue.* The location of supermarkets is caused by racist structures that have prevented the upward mobility of black people in this country. These racist structures feed off of each other such as racist zoning, agricultural ownership, segregation, and the lack of incentives for supermarkets, which is what accumulates in the food desert. That makes the food desert an

environmental justice issue. Bullard explains the definition of environmental racism when he says, “Racism influences the likelihood of exposure to environmental and health risks and the accessibility to health care. Racism provides whites of all class levels with an “edge” in gaining access to a healthy physical environment” (Bullard 1993). This type of governmental environmental racism permeates into urban fabrics and affects who receives environmental benefits.

Identifying the disparities between BIPOC and white communities is essential in understanding how the food desert is created. This history of how our urban environments have grown is laced with racism that can’t be ignored in the conversation of the food desert. The food desert is an environmental justice issue because of the history of racism in America and how it has formulated the urban atmosphere so that supermarkets are absent from the picture. Food deserts are the product of insufficient access, availability, utilization, and stability of food in a particular area due to environmental racism.

### **The Irony of Hunts Point:**

The Hunts Point food distribution center in the Bronx, NY, is the largest food distribution center in the world. The hub for food circulation is comprised of three separate markets: the Hunts Point Terminal Produce Market, the Hunts Point Cooperative Meat Market, and the New Fulton Fish Market. These markets work with public and private wholesalers that ship produce, meat, and fish in and out of Hunts Point. With this distribution center providing produce to 23 million people in the metropolitan area, the irony is that the neighborhood surrounding Hunts Point has some of the worst health statistics in the United States. 33% of residents in Hunts Point are obese, and 15% have diabetes, the highest percentage in the city. Additionally, 43% of Hunts Point residents live below the Federal Poverty Level (NYC Health 2015). The Hunts Point



distribution center poses an interesting dichotomy between the food industry and food insecurity, which will be explored in this chapter.

The food industry is comprised of multiple steps that begin with food production and end on a plate (or wrapped in plastic). It starts on the farm, where the soil is turned, and seeds are planted. After harvest, produce is transported to a distribution center, like Hunts Point. In a distribution center like Hunts Point, food from across the world is collected and taken to different vendors, restaurants, and supermarkets, where the consumer buys it. In the case of Hunts Point, the surrounding neighborhoods have deficient access to the fresh produce that neighbors their homes. This is the case because of the imbalanced ratio of people to grocery stores. Places to buy produce are limited to bodegas and fast food restaurants (NYC Food Policy Editor 2018). Much of this is due to the separation of Hunts Point from the rest of New York City.

*Hunts Point Demographics:* Hunts Point has been cut off from the rest of New York City since the construction of the Bruckner Expressway. The Bruckner Expressway was transformed from a main road to an overpass highway in 1951 as Robert Moses, an influential (and also controversial) urban investor/planner, rolled out his plans to make NYC a city for the automobile. Hunts Point can also be used as an example of when a neighborhood is physically separated from the rest of the city by the creation of large roads or industrial zones that make traveling in and out of the area very difficult. In this case, the Bruckner expressway makes it harder for the residents of Hunts Point to get to Longwood, the neighborhood that sits on the other side of the Bruckner. This separation leaves residents with less accessibility to grocery stores on the other side. Because of this, only 77% of the people living in Hunts Point eat one vegetable per day, compared to the rest of the Bronx, where 82% of the population eats one

vegetable per day (NYC Health Department). It's important to reiterate here that 77% of the population lives closest to the largest food distribution center in the world. The irony is undeniable.

The people of Hunts Point were not only physically separated from the rest of the city, but redlining also segregated the neighborhood. As mentioned in the previous chapter, redlining is the practice of excluding a particular group based on race to segregate communities. In the case of Hunts Point, the city labeled the area Hazardous (NYC.gov). During the height of redlining, white flight was taking place where white families moved out of urban spaces to suburban neighborhoods. The people who stayed were people of color, and public housing developments were built for communities of color. The 1950s and the expansive highway system's construction brought about much of this change. The highway system catered to vehicles instead of people encroaching on the flow of the urban environment. The highway system also enabled the flow of white families out of the cities. A new lifestyle was being popularized, and that was the lifestyle of the suburban white family. White families left cities to live in larger houses where land was more available for their families to grow. Because of the interstate highway system, cul de sacs were connected to downtown metropolitan areas. With this flexibility, the American family was pitched a new lifestyle through extensive white-washed marketing, where the comfort of a four-bedroom household came with a lawn, the hottest new appliances, and a garage to harbor their cars. Redlining significantly contributed to the absence of black families in these areas. "White flight" from cities brought supermarkets along with them. As land was cheaper in the suburbs, grocery stores opened franchises that sat at the town centers of suburban areas. The white flight did not only include white families but also profit-seeking businesses that abandoned inner cities.

Public housing developments were constructed parallel to suburban “garden cities,” and public housing became a mode for city planners to attempt to eliminate the presence of slums in downtown areas. This took the name of “urban renewal,” which turned out to be essentially the displacement of BIPOC communities from Manhattan using eminent domain. Eminent domain justifies moving people out of places where they reside by using the space that replaces it for public use. Lincoln Center is a product of eminent domain (NYT 2017). Robert Moses collaborated with large urban investors to convince the city that there needed to be “slum clearance on the west side of Manhattan. Seven thousand people and eight hundred businesses were displaced during this process—instead, large public housing developments were constructed to offer affordable housing to lower-income families. Hunts Point's physical separation from the rest of the city, exacerbated by the construction of the Bruckner Expressway, has hindered residents' access to fresh produce. The neighborhood's history of redlining further entrenched racial and economic disparities, pushing communities of color into areas deemed “Hazardous” and contributing to the phenomenon of “white flight” that siphoned resources and supermarkets out of urban spaces.

*Where Food Distribution Fell Through:* So why can’t the food make it to the people of Hunts Point? As mentioned in the previous chapter, supermarkets do not have an economic incentive to locate themselves in spaces that prove to be great for returns. Where property is cheap, the supermarket owners will go. Although the distribution center is so close by for Hunts Point, supermarkets do not stay because there is not enough economic incentive for them. Despite its proximity to the colossal Hunts Point food distribution center, the economics of supermarket operations have failed to provide adequate incentives for their establishment in the

area. Property values and historical neglect have discouraged supermarkets from setting up shop, leaving residents with limited fresh and healthy food options.

Hunts Point offers an interesting insight into how the local government is currently dealing with apparent health and housing issues that have long been ignored. As of 2023, there are plans to construct affordable housing, public plaza space, community involvement space, and retail. Part of these plans include the “Grow NYS Regional food hub.” This will be built on the edge of the Hunts Point food distribution center and function as a wholesale farmers market. The plans for the center include a \$38 million design plan that will offer produce to the Hunts Point community. The new market website highlights a defective food system in NYC that has left 1.8 million residents food insecure (Hunts Point Forward). To this end, they explain that there is an \$860 million unmet demand for locally grown produce. This market would allow local farmers space to set up food stands at the wholesale market. The market is intentionally located in Hunts Point to help serve the community that broadline distributors have long overlooked. Because the intentions of this project are specifically focused on reducing food insecurity, it can be determined that this will be a helpful contribution to the Hunts Point community. However, it is essential to consider the possibility of gentrification. The Grow NYS market is one of many development plans for the neighborhood.

*How Hunts Point is Proceeding:* The challenges faced by Hunts Point underscore the need for holistic and community-centered approaches. While the proposed food hub is a step in the right direction, it is crucial to ensure that development plans prioritize the existing community, preventing displacement and preserving the neighborhood's cultural fabric. As of 2023, the proposed "Grow NYS Regional Food Hub" offers a glimmer of hope (Grow NYC). Designed to address the unmet demand for locally grown produce and combat food insecurity,

this wholesale farmers market aims to serve the community intentionally. However, the success of such initiatives hinges on a delicate balance, as they risk contributing to gentrification concerns amidst broader development plans for the neighborhood.

The juxtaposition of Hunts Point as the world's largest food distribution center and its surrounding community's stark health disparities presents a paradoxical narrative that demands attention and policy solutions. As explored throughout this chapter, the intersection of urban planning, historical segregation, and economic dynamics has created a complex web of challenges contributing to food insecurity and poor health outcomes in Hunts Point. What makes the situation worse is that the food desert inhibits community strengthening because when public health is threatened, it creates a cycle in which the food desert prevails. Scholar Julie Sze writes about childhood asthma that is disproportionately prevalent in the South Bronx. She includes in her argument that breaking a cycle of poor health in a particular area is especially difficult because when a community faces environmental challenges, it is less likely to move out of low-income areas. She says that “in many ways, young people are especially vulnerable to the adverse impacts of damaged environments from physical, mental, and emotional health perspectives. They tend to lack the right of full participation in decisions about their environment that can seriously affect their lives. One consequence is a sense of alienation from an environment that young people feel no sense of control over, which can manifest in adulthood on a communitywide scale” (Sze 2006, 96). To Sze’s point, when a community faces environmental injustices that affect the health of everyone living there, such as a food desert, it is harder for a person from that community to gain a societal status that lets them advocate for themselves. Chapter five will discuss grassroots movements that counter this point. With enough of a desire for change and equity, a community can escape a detrimental environmental injustice loop.

In conclusion, the ironic coexistence of abundant food resources and rampant food insecurity in Hunts Point reveals broader systemic issues. Addressing this paradox requires immediate solutions like the food hub and a sustained commitment to equitable urban planning, economic revitalization, and community engagement. The narrative of Hunts Point serves as a call to action for policymakers, urban planners, and communities to collaborate in creating a future where access to fresh, healthy food is a right, not a privilege, regardless of one's zip code. Supporting community partners and gardens does benefit the Hunts Point community; however, there should be more financial support and recognition of the environmental injustices faced by this community.

### **Obesogenic Environments:**

Now that the presence of food deserts in New York City has been established, it is necessary to take a closer look at the health risks that result from a lack of access to affordable, healthy produce. This chapter will discuss understanding the food desert through the public health lens. To that end, I will introduce the issue by examining a case study

*Revealing NYC Food Deserts:* In a study done in 2011 called “Measuring Food Deserts in Low-Income Neighborhoods,” the researchers identified food deserts in NYC using Geographical Information Systems to measure population density, racial proportions to a defined area, and economic status. They also identified the average number of supermarkets, the proportion of healthy bodegas, and the proportion of fast food restaurants, all within a quarter mile of the chosen area. For this study, the researchers decided to measure in “block groups,” three city black groups together, in the Upper East Side, East and Central Harlem, and North and Central Brooklyn. After gathering data on the scope of available food stores, they found that the highest amount of supermarkets were located in the block groups of the Upper East Side, with an

average of 1.56 supermarkets within the quarter mile. In this area, the average income was \$90,472, and the population was 88% white. At the same time, the number of supermarkets in East/central Harlem and North/central Brooklyn was .85 and .46 supermarkets, respectively. In East and Central Harlem, the population was 61% Black residents, 34% Latino, and 15% white. This area had .15 fast food restaurants per quarter mile,, the highest in the regions studied, and the lowest median household income was \$22,005 (Gordon 2011). This study reveals the disproportionate amount of supermarkets in majority-white communities compared to majority BIPOC communities. The spaces where low-income residents reside are less likely to have an available supermarket within a quarter mile. For New Yorkers, people with incredibly busy lives who are always on the go, not having a supermarket within walking distance could put a massive strain on their schedule. Supermarkets have avoided residing in areas with high rent but low purchasing power. To this end, the supermarkets that do reside in those areas are less likely to have top-tier produce. In this study, it is clear that the racial dynamics of NYC are aligned with the availability of supermarkets. In places of higher diversity, the group is less likely to have a grocery store available.

These statistics support the cause of an “obesogenic environment.” Environmental obesogenicity happens when an environment does not help the healthy habits of a specific individual. In the case of East/Central Harlem and North/Central Brooklyn, the environment is considered obesogenic because of the lack of access to healthy produce. The researchers determined that these areas had high levels of obesogenicity. In a separate study called “Obesogenic Environments and Cardiovascular Disease: A Path Analysis using US nationally representative data,” it was determined that there is a link between obesogenic environments and cardiovascular diseases (Guo, Bostean, Berardi, Velasquez, & Robinette 2022). Similar to the

previous study, they gathered data on places with the best and worst access to healthful food outlets. In urban centers, they measured by the half-mile, and in rural areas, they measured within a ten-mile range. To measure the obesogenicity of an area, they created an environmental obesogenicity index that accounted for grocery stores, farmer's markets, superstores, and recreation centers as salutary indicators. They also identified the amount of fast food restaurants, convenience stores, and, interestingly, crime rates to determine the pernicious indicators of environmental obesogenicity. They found that the places with higher obesogenicity had higher self-reported cardiovascular disease levels.

*Deserts as Obesogenic Environments:* The studies conducted in 2011, titled "Measuring Food Deserts in Low-Income Neighborhoods" and a separate survey of "Obesogenic Environments and Cardiovascular Disease," shed light on the profound implications of food deserts on public health, particularly in the context of New York City. Utilizing Geographical Information Systems (GIS), the first study meticulously identified and compared food deserts based on population density, racial proportions, economic status, and the availability of supermarkets and fast-food restaurants within a quarter-mile radius. The stark disparities revealed in this analysis underscored the unequal distribution of essential resources, with the Upper East Side boasting the highest average number of supermarkets (1.56) and the highest income (\$90,472), predominantly inhabited by an 88% white population. In stark contrast, East/Central Harlem and North/Central Brooklyn exhibited fewer supermarkets (.85 and .46, respectively) and a higher density of fast-food restaurants, emphasizing economic and racial disparities (Gordon 2011). The lower-income areas, notably East/Central Harlem, with its predominantly Black and Latino population, faced the highest obesogenicity, marked by limited access to healthy produce and an environment conducive to unhealthy habits. The harmful habits



are created because consumers, especially in the urban environment, will choose convenient options to purchase their produce. When a bodega is more convenient and offers a cheaper option to obtain food, the consumer will most likely get their produce from these shops. Bodegas are also called “convenient stores,” which they very well are. There are bodegas at almost every corner in New York City. A Bodega is similar to a mini grocery store because it offers cereals, snacks, dairy products, some produce, and lots of sugary drinks. Bodegas also often feature a deli where consumers can purchase breakfast, lunch, and dinner options such as bacon egg and cheese sandwiches, hamburgers, and deli sandwiches. Sometimes they offer halal food. Gyros are also available. The difficulty with the bodega is that most of the food options are high in saturated fats and refined sugars.

Refined sugars are an example of simple carbohydrates that break down quickly in the digestive system. They are a quick source of energy but do not maintain healthy sugar levels in a diet. People who rely on bodegas as their primary food source end up consuming much of their calories through these saturated fats and refined sugars. Individuals who over-consume saturated fats and refined carbohydrates—such as individuals living in obesogenic environments—are subject to higher malnutrition rates (Farellio 2022). Malnutrition happens when someone faces undernutrition or overnutrition. The three types of malnutrition are stunting, wasting, and overweight. Stunting is the result of undernutrition, leading to the inability of a child to grow at a normal rate because of a lack of nutrients required for the body to function. Stunting happens within the first 1000 days of a child's life and will prevent that person from reaching a normal “height-for-age.”

Wasting is also a result of undernutrition that takes the form of unhealthy “weight-for-height” in individuals. This type of malnutrition indicates itself in severe weight

loss. For the purposes of this thesis, this chapter will focus on the third type of malnutrition: obesity. Obesity is the overabundance of fat that impairs a person's health (Farellio 2022). Obesity results from overnutrition, which can be paired with micronutrient deficiencies. Micronutrients include vital vitamins, minerals, and omega-3 fatty acids. All of these are necessary for the body to function correctly and to obtain them requires the individual to retain a balanced diet. Bodegas do not offer the right food tools to get a balanced diet because it is restricted to high-calorie, low-nutrient options.

People with obesity are more likely to be overweight, which causes issues for the cardiovascular system. When high amounts of saturated fats and sugars are consumed, the body has a more challenging time regulating the filtration of those foods. 2 out of 3 Americans are overweight or obese (Farellio 2022). Again, for every three people in America, two of them will be overweight or obese. On top of that, \$190.2 billion is spent on obesity-related health issues every year (Farellio 2022). This is imperative to consider for any study of the American food system. This statistic proves a failed nutrition system that limits the country by impairing the public health of the entire nation. Not only does obesity create a health epidemic, but the cost of healthcare for these issues is incredibly high. Again, it is important to return to the fact that the term "obesogenic environment" encapsulates the conditions prevalent in areas with restricted access to nutritious food, as evidenced by the research conducted in East/Central Harlem and North/Central Brooklyn. The high density of fast-food establishments and the scarcity of supermarkets create an environment discouraging healthy dietary practices, contributing to an increased risk of obesity. Cardiovascular diseases often stem from decreased blood flow to the heart. Over time, when an individual intakes a diet full of high-calorie, low-quality food their arteries may become clogged, which can lead to heart attack. The correlation between food

deserts and obesogenic environments is critical to understanding the broader implications of limited access to healthy food options.

Food culture needs to be discussed when considering obesogenic environments. Since the birth of fast food, American food culture has shifted towards an on-the-go eating style. Fast food is high in calories and low in nutritional value, such as micronutrients. Capitalist ideologies are to blame for the increase in fast food consumption. In the capitalist system, the American worker is expected to work from 9 am to 5 pm and contribute high economic inputs. Therefore, The working class is strained by the high societal expectations of production levels and is more likely to rush through meals to get to work. Food on the go is convenient for the American worker because fast food is cheap and readily available. However, high consumption levels of fast food are to blame for two-thirds of the American population being overweight. Food culture should be shifted away from convenience and mobilized towards food essence. Food consumption should be considered more intentionally, and the quality of food consumed should be held to a higher standard. There are multiple faults to blame for the negative food culture that consumes America, and it is not any fault of the individual. The trend of highly processed foods needs to end. Highly processed foods are cheaper to make, and therefore, big companies are able to gain high profits from selling low-quality items for multiples of the true cost. The actual cost is low because of the low standards that large corporations hold. Difficulties arise because while the quality of food must be held to a higher standard, requiring higher production costs, the low cost of food needs to be maintained so that people of every socioeconomic status are able to purchase high-quality goods. The cost of food needs to decrease. It may seem challenging to lower the cost of already cheap food while also holding farming to a higher standard. However, this can be done through the redistribution of governmental food subsidies, which will be discussed further in Chapter Five.

This means that the system, starting with soil health, needs to be reviewed and highly regulated to underscore the importance of producing nutritious food options. Another fault of the poor food culture is that city planners don't allow supermarkets to touch down in lower-income communities, reserving those communities solely for bodega and fast food options. Once better food options and more produce are available in the obesogenic environment, food equity will appear.

*The Public Health Dimension:* Building on this understanding, the second study that explored the connection between obesogenic environments and cardiovascular diseases provides a more comprehensive perspective on the health impact of living in such areas. Residents need more food access and retreat to bodegas and fast food restaurants. There, they are served processed foods with fewer nutritional benefits. Using an environmental obesogenicity index that considered factors like grocery stores, farmer's markets, superstores, recreation centers, fast-food restaurants, convenience stores, and even crime rates, the study found a direct association between higher obesogenicity and elevated levels of self-reported cardiovascular diseases. This underscores the systemic nature of health disparities, emphasizing that the impact of food deserts extends beyond obesity to encompass broader cardiovascular health issues. Along with cardiovascular diseases, diabetes is another public health crisis that plagues America. In 2015, one in eleven adults were reported to have diabetes, and it is predicted that one in ten Americans are likely to have diabetes by 2040 (Farellio 2022). Diabetes is the result of glucose levels being too high in the bloodstream. Glucose in the blood can also be referred to as blood sugar. The disease diabetes happens when the pancreas cannot produce insulin. Insulin signals the body that blood sugar is low and stimulates the breakdown of sugars in the blood. If blood sugar levels are too high in the bloodstream, the pancreas will not be able to keep up insulin production and

maintain a healthy balance of sugar in the body. Diabetes type 1 is genetic, and Diabetes type 2 results from a poor diet. According to the National Kidney Foundation, every year in America, \$327 billion is spent on Diabetes (Farellio 2022).

With obesity expenses combined with the cost of Diabetes, America spends almost a half trillion or \$500 billion on malnutrition every year. According to the USDA, the Congressional Budget Office (CBO) estimates that over a five-year period from 2018 to 2023, the Farm Act spent \$428 billion. Therefore, America spends the same amount on food-related public health issues as it does on the Farm Bill. Already, the majority of the Farm Act goes towards nutrition. Farm Bill spending on nutrition includes child nutrition, Supplemental Food Assistance Programs (SNAP), Special Supplemental Nutrition Program for Women, Infants, and Children, and other food assistance, including expenditures on food insecure households during the pandemic (USDA, 2023). Much of the Farm Bill is already going towards nutrition. Still, as the cost of food public health is equivalent, there needs to be a reconstruction of the food system, starting with what food is made available to the population. In re-evaluation of the Farm Bill, none of the spending towards nutrition programs should be cut; however, there is a portion of the bill that funds the subsidies given to commodity crops. The expenditure in farming practices should be redistributed towards environmentally sustainable solutions that help in the diversification of crops grown on farms.

In essence, the evidence of disparities between food access and the high spending on food nutrition and public health collectively emphasize the need for targeted interventions to address the failures within the food system. The findings highlight the intricate interplay between socioeconomic factors, food access, and health outcomes. Policymakers and urban planners must consider not only the availability of healthy food options but also the broader environmental

factors shaping public health. By comprehensively addressing these issues, communities, particularly those in lower-income neighborhoods, can be empowered to break the cycle of health disparities associated with food deserts. There needs to be a call for a better food system for healthy food habits across all income levels. The research provides a compelling call to action, urging policymakers to design and implement strategies that holistically improve food access, promote health education, and address the complex web of factors contributing to the development of obesogenic environments in urban settings like New York City.

### **Rain in the Desert:**

This chapter aims to understand the possible policy solutions that can help combat the food desert. It has been established that the food desert is an environmental justice issue that stems from a history of redlining, segregation, and unfair zoning codes that separate many people of color in New York City from a healthy level of access to nutritious food outlets. Racism in urban planning has been a prevalent force in creating spaces of environmental obesogenicity. This has left BIPOC communities in New York City at higher risk of cardiovascular disease and Diabetes. Because the food desert contributes to health risks in marginalized individuals, the city of New York must invest time and energy in solutions that create healthier spaces for the residents of NYC. Because food is a basic necessity, everyone should have equitable access to nutritious food options. To revitalize food deserts, it is necessary to consider the four facets of the food system: access, availability, utilization, and stability. The policy solutions proposed in this chapter will touch on each of these facets. They will include dedicating space and uplifting community gardens and farmers markets, increasing economic incentives for food retailers in low-income communities, supporting mobile produce stands, expanding government-based food assistance programs, creating helpful transportation options, combating food insecurity by

supporting climate change solutions, improving waste management and pushing for waste reduction, restructuring ownership within the food system, making the produce more affordable, and creating necessary changes within food cultures. Through this solution, the potential of the food desert can be mitigated. This chapter will give an overview of the different tactics that could be used to combat the food desert.

*Community Gardens:* Under the umbrella of increasing access within food deserts, the first proposed policy solution is the community garden. Community gardens are public spaces that often produce food and foster community engagement. Community gardens are a type of civic agriculture that supports the availability of food for local residents. New York City has the largest community gardening network in the country. Through the NYC Parks Department, the organization GreenThumb oversees the management of community gardens in NYC. GreenThumb provides these gardens with supplies and oversees the operation of the management staff. From there, it is up to the community to grow a garden. Greenthumb has been in operation since its establishment in 1978. Since its inauguration GreenThumb has turned 550 abandoned lots in New York City into flourishing gardens (GreenThumb 2024). The organization works as a partially grassroots effort that relies on elected managers of the gardens to organize their communities to maintain the green spaces. Community gardens are known not just for their food production but also for the community involvement and empowerment that growing things together fosters.

Community gardens as food-producing spaces support the community by providing alternatives to purchasing produce at a store. The issue with community gardens is that sometimes production can be low. Additionally, the amount of food that can be harvested is not enough to serve an entire population. Additionally, the success of the production is entirely

dependent on the involvement of the community. Therefore, the garden will only have high yields if there are enough caring volunteers. The benefits of community gardens however are primarily social in the sense that they invite opportunities for organized engagement of the people who live nearby. Social and cultural gatherings often include parties, educational activities, and religious gatherings. To this end, the community garden also supports the self-determination of a community. It is up to the public to set goals and work towards creating a space where food can be grown and flourish.

Although community gardens do not yield high enough production to offset food insecurity's effects, the fostered community supports their significant importance. When food is grown within a collective group, that group has the opportunity to grow together and learn from each other. It is in these spaces that culture thrives and smiles are shared. I had the opportunity to work in a community garden while writing this thesis, and every Friday, I would look forward to getting my hands dirty to turn soil, harvest produce, and plant seeds. The community garden also offers a space for youth communities to become familiar with environmental practices. Many work parties at the community gardens involve local schools and other youth networks. In getting kids involved, community gardens give the opportunity for environmental education, which is important in mitigating climate change.

Community gardens, fostered by the extensive network managed by GreenThumb, not only contribute to local food production but also serve as vital hubs for community engagement. Community gardens should continue replacing abandoned lots in New York City to increase the green spaces available to city dwellers. While they may face challenges in meeting the broader population's food needs, their social and cultural impact, coupled with the promotion of self-determination, makes them invaluable contributors to community well-being.



*Rezoning to Support Healthy Food Spaces:* Zoning codes establish a city's use of space.

For the urban planner, zoning is a way to organize buildings and infrastructure in the urban environment. NYC zoning is a complicated system that requires community and political cooperation to make the best use of space possible. Rezoning will support residents access to food. Regarding the food desert, rezoning certain areas to be available for grocery stores would help the population living nearby, thereby introducing new food outlet infrastructure. This would mean creating affordable rent for higher-quality grocery stores.

A process called the Whole Foods effect reveals the rezoning issues and introduces new supermarkets into areas. When upscale grocery stores move into a neighborhood, property values often rise. One study found that even the introduction of a grocery store can cause property values to increase by 5.8% (NYT 2020). This results in gentrification. Gentrification, as discussed in past chapters, has led to the displacement of marginalized groups. Whole Foods is one of many upscale grocery stores that affect housing prices when introduced to a community. In New York City, the Food Retail Expansion to Support Health (FRESH) project has operated since 2009 (Edc.nyc 2023). The program offers tax incentives to food retailers and has generated over 100 million dollars in NYC's economy since its establishment. However, it should be noted again that introducing a grocery store will negatively affect community living, thereby raising housing costs. Gentrification contributes to the displacement of BIPOC communities from a particular area because many residents can not keep up with the rising costs of rent and, therefore, have to move. This means that alternative solutions to the food desert should be considered before introducing attractive grocery stores to homebuyers. Smaller business owners should be supported. In rezoning, this could look like the support of multi-use buildings with residences built on top of commercial spaces. This building type allows the small business owner

to set up shop. Not only does this promote more available commercial produce in an area, but it also uplifts the local economy without contributing to gentrification. In its establishment, FRESH was intended to fill the need for more grocery stores in New York. Raised health concerns initiated this program.

In addition, the tensions between the city and country should be eliminated to reallocate land from the largest of companies closer to the direct producers of agriculture. At the same time, the sprawl of suburban areas must be significantly reduced. “The ownership of vast agricultural lands must be transcended through equitable land reform and redistribution, allowing for a more rational agriculture and settlement of people” (Magdoff & Foster 2011, 129).

The complex issue of rezoning to support healthy food spaces introduces a nuanced challenge. While the Food Retail Expansion to Support Health (FRESH) project has offered economic incentives to food retailers, it brings forth the Whole Foods effect – the potential for gentrification and increased housing costs. The balancing act between introducing attractive grocery stores and preserving community affordability underscores the need for alternative solutions before implementing such rezoning strategies. In navigating the intricate landscape of food insecurity, these policy proposals emphasize the importance of community involvement, economic considerations, and a nuanced understanding of urban development. Achieving sustainable and equitable solutions requires a collaborative effort, considering the unique characteristics of each neighborhood and actively engaging with the communities affected.

*Mobile Produce Stands:* Mobile markets are trucks that bring fresh produce to communities with low access to fresh food. These mobile farm stands can stand in and make up for the absence of a supermarket. The first mobile markets were introduced in Oakland, California in 2005 (Li, Cromley, Fox, & Horowitz 2014). These farm stands ventured to places

where fresh produce was low in availability to support the community's fresh produce needs. Some Mobile markets provide dairy products such as eggs, milk, and cheese, while most produce fresh produce. These mobile markets often operate out of parking lots and near assisted living facilities so that they help disadvantaged people. The stands also offer availability to low-income families by accepting nutrition assistance programs. The mobile produce stand has the potential in New York to bring support to an area that has low access to food by providing an alternate solution to the grocery store. There needs to be a collaboration between the public policies and the market vendors so that they are able to set up shop near the communities that need them the most (Li, Cromley, Fox, & Horowitz 2014).

Additionally, these stands must be able to accept government food assistance programs like SNAP (Supplemental Nutrition Assistance Program) and EBT. The stands should aim to be located near high-traffic areas in marginalized communities. From there, they should provide economic incentives to the residents so that they are correctly filling the needs of these people. Farm stands pose a simple and more affordable solution to solving food insecurity. Because of the nature of NYC's hustle and bustle, the mobility of the markets has the potential to keep up with the fast-paced energy of New York. The other benefit to these markets being mobile is that if one location doesn't end up working, they have the flexibility to move the next day and find another spot to set up shop. Operating in high-traffic areas within marginalized communities, these stands bridge the gap in fresh produce availability, ensuring accessibility to low-income families. Their mobility allows for strategic placement and adaptability, addressing the dynamic needs of diverse neighborhoods.

*Expanding government-based food assistance programs:* Many American families already rely on Food assistance programs to purchase produce. According to the USDA: "In

fiscal year 2022, the Supplemental Nutrition Assistance Program (SNAP) served an average of 41.1 million people per month, or 12.3 percent of U.S. residents” (USDA, 2023). The United States government should continue to provide financial aid to food assistance programs such as SNAP, WIC, and child nutrition so that food-insecure households are supported in accessing food needed to survive. In supporting social safety nets, the population, as a whole, will be uplifted through food prosperity.

*Creating helpful transportation options:* In a city center like NYC, there is an emphasis on communicating via public transportation. Many people use public transit to access the grocery stores where they purchase produce for the week. Without helpful public transportation infrastructure communities are left to walk to get their groceries. When feeding a family, it is challenging to carry groceries far distances. Bus and rail transportation systems should be supported and made safe for residents in every borough.

*Combating food insecurity by supporting climate change solutions:* With the increasing effects of global warming on climate change, it is essential that the food system prevails. As mentioned in Chapter One, the risk of agricultural system failure is ever-increasing because of the exploitative monoculture systems that do not support environmental services. The availability of food will decrease at dangerous rates if climate change continues. It is necessary to consider the implications of the collapse of the food system to understand the importance of this issue. So, environmental services should be accounted for in food pricing, and more regulations should be put in place towards sustainable practices in farming such as crop rotation, permaculture farming, and more. Authors of “What Every Environmentalist Needs To Know About Capitalism” Magdoff and Foster put it nicely when they point out that “the environment is not something “external” to the human economy, as our present ideology tells us, it constitutes the

essential life support systems for all living creatures,” (Magdoff & Foster 2011, 140). To this end, the environment should be protected at all costs, especially in the face of climate change.

In addition, ecologically destructive industries must be stopped (Hickel 2020, 219). Deforestation is destroying carbon sinks, areas that sequester massive amounts of carbon. These areas include extensive forests, such as the Amazon rainforest and the ocean. When the sea is polluted and deforestation cuts into the world's forests, the Earth loses some of its ability to maintain a balance of carbon in the atmosphere. Climate change results from a carbon imbalance, so ecologically destructive industries must be limited. It is interesting that the beef industry, which takes up 60% of global agricultural land (Hickel 2020, 219), is the cause of much of deforestation. Forests are turned to grazing lands for the cattle, and carbon sequestration centers are lost. Meat production has a worse effect because of the high levels of greenhouse gas (methane) that is emitted from cows. Humans are not naturally carnivorous, so it wouldn't be outlandish to suggest that meat production should be reduced.

There are never-ending solutions to the threat of climate change. The first and most important is the eradication of greenhouse gasses released into the atmosphere by fossil fuel-based energy sources. This means that renewable energy sources, such as solar power, wind power, hydropower, nuclear energy, and more, should be heavily invested. Solutions to make this transition to renewable energy can happen by instituting a carbon tax on private companies so there is a financial incentive to minimize emission levels. This needs to happen at the global level. By decreasing the detrimental effects of climate change, future food deserts can be prevented.

*Improve waste management and push for waste reduction:* “Up to 50% of all the food that's produced in the world - equivalent to 2 billion tonnes - ends up wasted each year” (Hickel

2020, 218). Across supply chains, food waste causes massive losses to the utilization of available produce. Commonly, more developed nations are to discard produce based on looks alone.

Families will take advantage of aggressive marketing in supermarkets, succumbing to buy-one-get-one deals, but then end up wasting it. Food in low-income countries could go bad before making it to markets because of poor infrastructure within their transportation systems

(Hickel 2020, 218). One way to reduce food waste is for supermarkets to donate unsold food to charities. Donating food rather than being sent to landfills also supports the food desert.

Non-profits within food deserts can accept second-hand food and utilize it for the surrounding community. Waste reduction would patch leaks in the food system that contribute to food insecurity.

*Restructure ownership within the food system:* Currently, the global north owns and manages much of the global food system. Because of colonial histories and the presence of neoimperialism in society today, the global south is exploited for raw materials and cheap labor. It is essential to consider this dynamic when discussing food security because of the ethical requirement to uplift all actors within the food system. In developing nations, ownership of production systems is vital to supporting economic growth. Privatization by powerful corporations should be replaced with ownership of producing structures within a developing country. Right now, the highly capitalistic society favors monopolies and the owners of the means of production, in this case, the global north. To solve the disparities among international economies, monopolies should be dissolved to distribute economic gains further. When production structures are owned by one rather than many, profit is accumulated by only the elite class, contributing to income inequality on a global scale. Sultana calls for the radical decolonization of the global supply chain to promote economic equity and the ethical distribution

of resources. In the face of encroaching on planetary boundaries, she argues that it is ever more important to uphold socioecological justice in production systems (Sultana 2023, 6). In addressing the injustices in resource ownership that the current food system supports, individuals in food deserts will then be backed up by other marginalized groups.

*Make produce more affordable:* Making food more affordable is a complicated matter due to the fact that sustainable food solutions often come at higher costs. Take the implementation of cover crops, for example. It would cost a farmer more to buy and maintain cover crops during the winter, even though in the long term, using cover crops would support nutrients available in the soil and prevent erosion. Upfront costs, however, drive farmers to make certain financial decisions when it comes to the use of their land. The solution here is in the farm bill. The farm bill provides farming subsidies to farmers, mostly decreasing the price of commodity crops, as discussed in Chapter One. Currently, big names in the agricultural industry, such as Monsanto, Cargill, Archer Daniels Midland(ADM), Bunge Limited, and Tyson Foods, heavily lobby politicians so that they can continue to receive subsidized options. First of all, lobbying in the government and donating to political campaigns to push specific agendas can lead to corrupt governments that don't prioritize the needs of citizens. In the case of the agricultural industry, when subsidies are distributed solely to commodity crops, these big name companies continue to make a profit from environmentally damaging monoculture farming. On top of that, the subsidies given will allow for the continuation of high meat production levels despite the unethical practices and environmentally damaging effects that much of the meat industry contributes to.

Subsidies should be distributed to the seeds of many crops so that diversity in the agricultural industry can prevail. Cows are fed corn at a higher rate than any other crop despite

them not evolving to eat corn. If other types of produce are subsidized more, such as beets, radishes, broccoli, and leafy greens, then crop diversity within the agricultural industry prevails. Diversifying production in the United States will help support biodiversity as an ecosystem service.

Subsidies can also be given to environmentally sustainable farming options. Cover crops provide a good example here. If the government chooses to subsidize cover crops, they will be given financial incentives so that they are more likely to choose this sustainable option. Food can be made more affordable if the efficiency and the sustainability of food systems is elevated. Food deserts will be revitalized when food is made more affordable.

*Create necessary changes within food cultures, starting with environmental justice:* In the book “The Intersectional Environmentalist” by Leah Thomas, she discusses how to “dismantle systems of oppression to protect people and the planet.” She argues that to achieve environmental justice, the environmentalist must look at both social and environmental injustices. She notes that “intersectional environmentalism argues that the same systems of oppression that oppress people also oppress and degrade the planet” (Thomas 2022, 32). In realizing that the food desert is an intersectional problem between social prosperity and food system prosperity, proper consideration of equitable solutions can be achieved. The environmental justice movement provides the space needed to address harmful neoliberal structures.

It is imperative to uplift the voices of historically marginalized groups in order to foster resilience in every food desert. Empowering communities to challenge systemic inequities supports the cause for environmental justice. Through education, restructuring urban fabrics, environmental policy, waste management, redistribution of ownership, and the mitigation of



climate change, food deserts will be combated. In conclusion, with the implementation of intersectional environmental solutions, New York City's food deserts can be revitalized.

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