Hearst Lecture: Andrea Johnson
New York City (Steady) State
Home Grown, A Project By Terreform

On June 5, 2016, Cal Poly's CAED hosted Andrea Johnson for the Hearst Lecture Series. Andrea is Research Director at Terreform, a NYC-based urban research center founded by Michael Sorkin that makes strategic interventions in vexed and revelatory urban situations to present alternatives and stretch the parameters of debate. Terreform works closely with Michael Sorkin Studio whose members donate their time and skills to its projects. One of the projects Andrea presented was Home Grown, that investigates New York's food system and the possibilities of its expansions towards self-sufficiency.

New York City (Steady) State is a thought and design experiment that seeks to test the outer limits of urban self-sufficiency. Terreform—a non-profit urban research and advocacy center in New York City—has long been investigating how close our city can come to a completely internalized metabolic system, establishing its independence in a variety of key "respiratory" functions, including food, waste, air, water, climate, mobility, construction, manufacture, and energy. The goal is to reduce New York's ecological footprint to as closely co-terminus with its political boundaries as possible and to examine the morphologies, technologies, and behaviors that will enable this.

Our motive is compound. Recognizing that the planetary environment is in deep peril and that the competence and will of nation states—or multinational corporations—to take decisive constructive action cannot be relied upon, we believe that cities are urgently logical increments of organization, accountancy, resistance and democracy and research is predicated on the belief that systems should be as locally distributed as possible. This is not to fly in the face of logical economies of scale but to seek the greatest systemic resiliency and to devolve responsibility to people and communities with a visibly direct relationship to the forces and issues at play.

We recognize that the first approach to questions of the environment must always be on the side of demand. Our project always looks first at questions of social organization, habit, and behavior. We know, for example, if New Yorkers were to adopt a largely vegetarian diet the city "foodprint" would shrink radically. We also know that approximately one-third of our food is wasted, mainly in the consumption stage, and that more sustainable behavior in our kitchens could have a transformative impact. Likewise, we know that if the city's neighborhoods are conceived as complete—with all the necessities of daily life including work, commerce, culture, education, recreation, etc. within easy walking compass of home—transportation requirements would be greatly reduced. And, we anticipate important social knock-on effects. If everyone in a neighborhood were able to walk to work, then all the neighborhood's workers—from the banker to the barista—would find themselves living together as a community, helping redress our city's radical and growing spatial inequality.

Home Grown, the first part of the project to be completed, examines New York's food system. It demonstrates the marginal possibility of producing 2.500 nutritious calories of food for our 8.5 million people within the city. Our initial analysis shows that the New York foodprint is approximately 150 times the area of the city and Home Grown proceeds via a sequence of iterations to look at the means by which this territory can be shrunk. Simply eliminating waste would get us down to 104 NYC equivalents. Vegetarianism would have an even more radical impact, reducing our food-print to a "mere" 16 New Yorks! And, by transforming the mode of production to the most efficient methods—a change from our industrial systems of mono-cropping to more bio-intensive techniques including greenhouse, hydroponic, and aeroponic systems—yields can be multiplied by as much as 30 times! This combination of strategies gets us down to the area of a "mere" four additional

Note: *Home Grown,* the first volume of New York City (Steady) State, is a forthcoming book to be published by Terreform's imprint Urban Research (UR). For details, visit http://www.urpub.org.

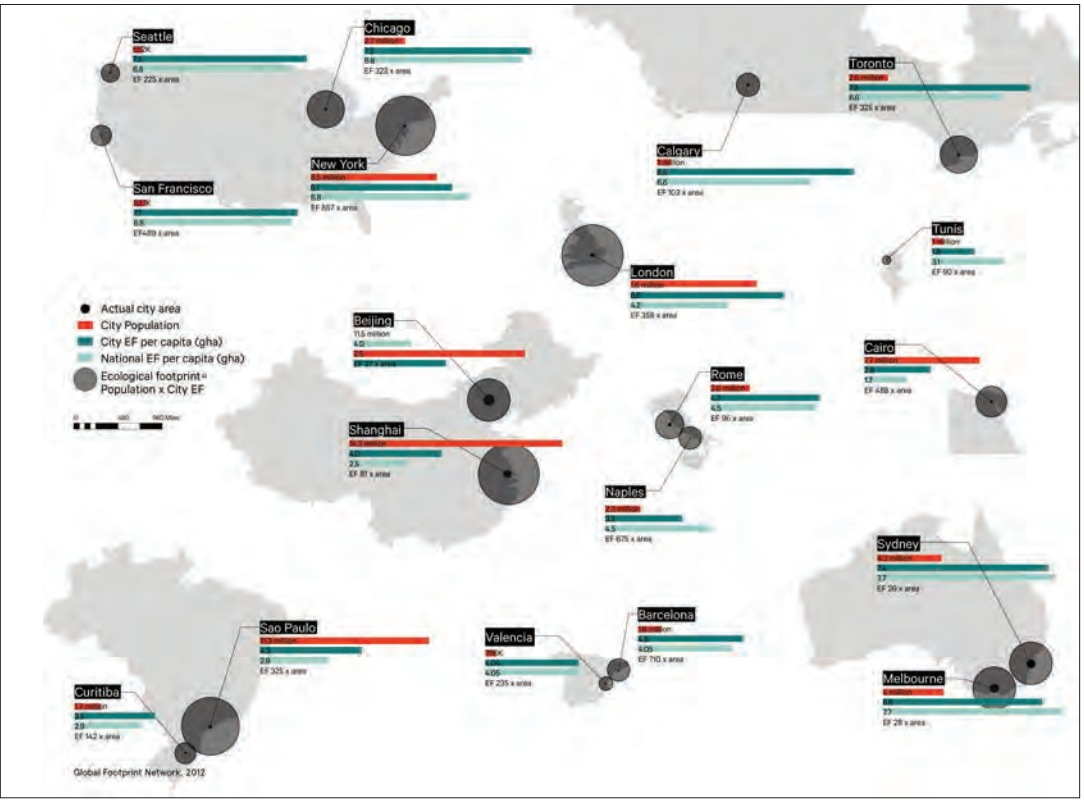


Figure 1: Comparing urban ecological footprints. By multiplying the city's population by the per capita Ecological Footprint, we discover that the true size of New York City is the equivalent of Spain.

Figure 2: NYC Foodprint: Land area required to supply NYC with 100% of its food supply according to various scenarios of food waste, diet, and production practices.

New Yorks. Where might these be found in our densely built and crowded city?

Our initial design looks first at the most readily available sites, including vacant land, parking lots, community gardens, parks, rooftops, private yards, basements, streets, utility corridors, and a variety of derelict or underused infrastructure—such as rail yards and highways that might be overbuilt. By appropriating a reasonable proportion of this resource (half of the streets, a third of rail infrastructure, all the vacant lots), we are able to reduce the supplementary requirement for 100% production to 700,000 acres. Which brings us to that beloved magic bullet: vertical farms. Research suggests that a thirty story farm the size of a typical Manhattan block might feed approximately 50,000 people and that around 250 such giant structures (or 5,000 more neighborhood-scale versions) would do the job! But such towers are insanely inefficient, requiring enormous investment, huge embodied and recurrent energy inputs (we've estimated ten nuclear plants would be necessary to power the system!), and place a demand on local water resources that would oblige the construction of 28 desalination plants with their own massive energy requirements and other deleterious environmental impacts! Not!

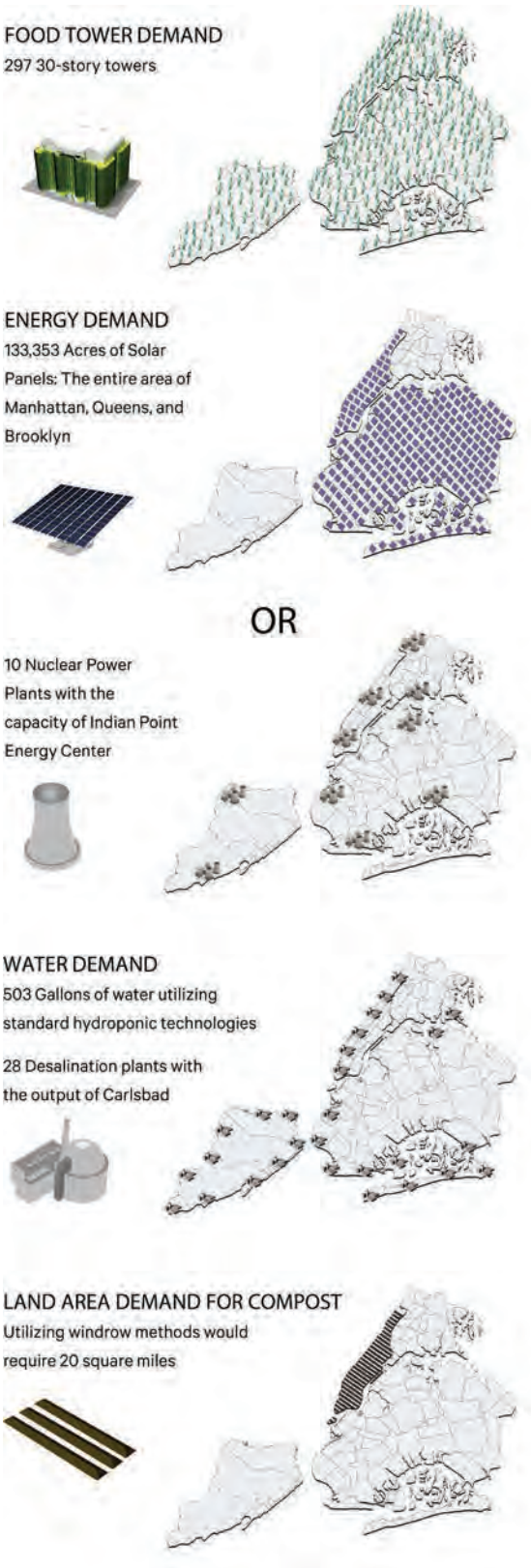
Figure 3: Visualizing the extreme 100% food self-sufficiency scenario in Queens.

Our study does show two scenarios that demonstrate how such a 100% system might be installed but doesn't persuasively argue the ultimate benefit, short of siege conditions. Which leads us to the more important elements of the work: looking for and designing "sweet spots" to materially upgrade self-reliance, community participation, and nutrition and we've offered a complex scenario for producing around 30% of our food within our borders with the remainder provided either within a 100-mile hinterland or from a state-wide system focused on the old Erie Canal as a low-energy transport armature.

The core aim of the study is to compile an encyclopedia of possibilities for radically enlarging local autonomy that can be applied at every conceivable scale, from the kitchen to the apartment to the building to the block to the neighborhood to

Figure 4: Visualizing the self-sufficiency in Queens includes blocks reconfigured to the "figure-ground switch" morphology and food towers built on the former Long Island Expressway.

Figure 5: Achieving 100% self-sufficiency with food towers demands exorbitant resources and points out the limits of a purely technological fix for NYC's food woes.



the borough to the city to the region. Each of these can have widespread application not simply in New York but in cities around the world striving to take responsibility both for the welfare of their citizens and for their planetary impacts. Looking at medium density urban blocks, for example, we investigate the very large amount of space devoted to individual kitchens (at a time when New Yorkers consume the majority of their meals away from home and when traditional nuclear families are an increasingly shrinking minority of our population) and propose various strategies for aggregating and using this space for food cultivation, preparation, and consumption. Blocks that opt into the highest intensity version of such cooperation could raise 100% of their vegetables at home.

Terreform hopes that this work—and the volumes to come—can be of value to cities around the world striving to take real responsibility for their planetary impacts and to deepen their collective polity.

Figure 6: The co-optation of half of the city's street space to non-vehicular uses, such as urban agriculture, is foundational for many aspects of New York City (Steady) State.

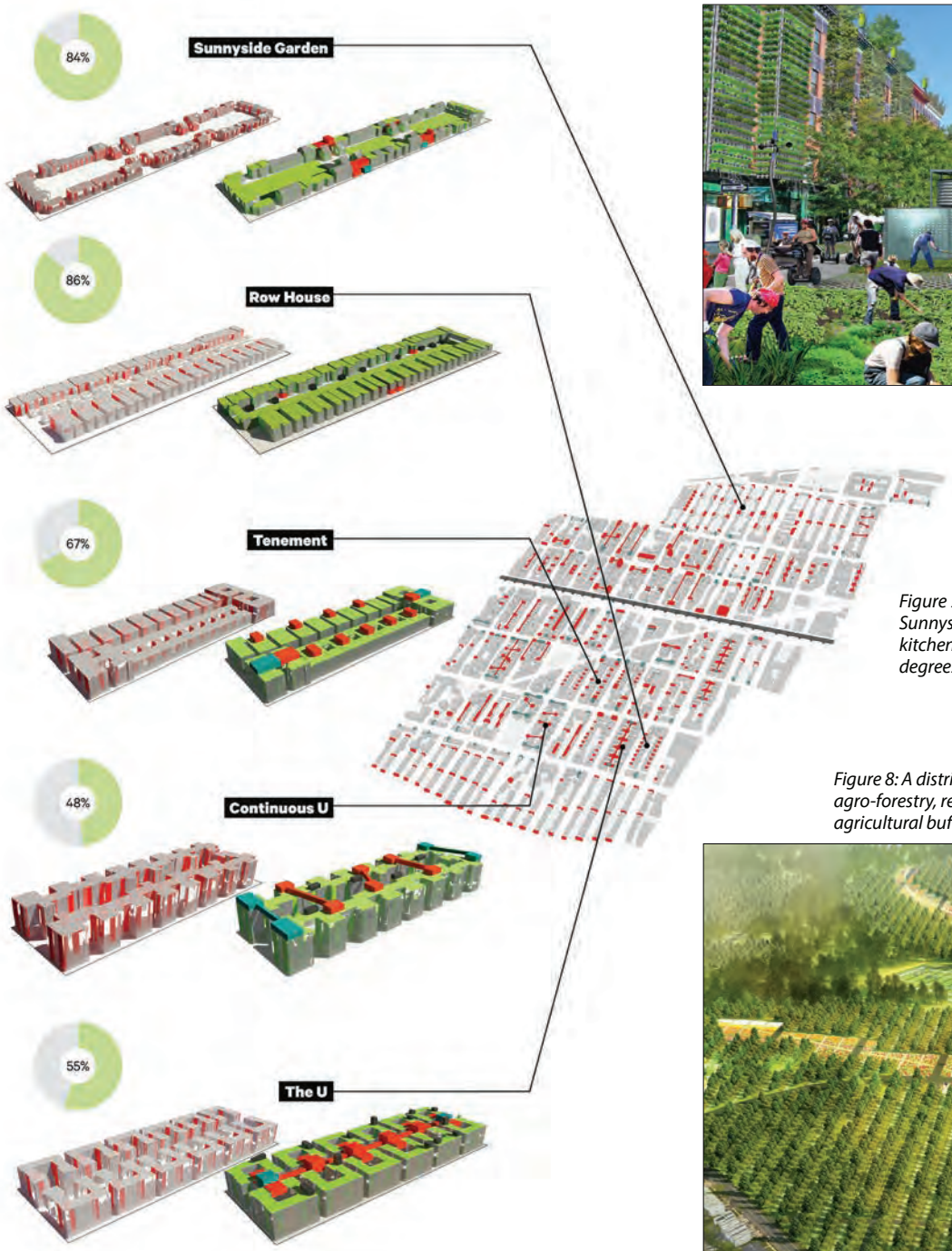


Figure 7: Retrofitting typical blocks in Sunnyside, Queens with collective farms, kitchens, and restaurants achieves various degrees of autonomy in vegetable production.

Figure 8: A district of farms in parks would include agro-forestry, recreational loops with bio-intensive agricultural buffers, and foraging nature trails.