Urban Farming in Cuba

THE DISINTEGRATION OF THE SOVIET BLOC IN 1989 CLIPPED Cuba's umbilical cord and the favorable trade relationships that had long nurtured the island. Without this trade partner, Havana's 2.2 million residents lost access to food imports almost overnight, along with many of the resources needed to sustain their regional agricultural efforts. At that time, Habaneros had not yet developed outlets for widespread food production in the city: they lacked experience, supportive infrastructure, and available land with which to experiment. According to some experts, from 1989 until 1992 Cubans were at risk of mass starvation, having lost one-third of their daily calories, which averaged "thirty pounds in the three long years following the collapse of the Soviet Union."[1] This period was accompanied by the suspension of all but the most critical development activities, such as the transformation of the agricultural sector, and the reduction or elimination of nonessential services, such as garbage collection and public transportation.[2] Cuba's acute economic crisis impacted every sector of society, including food production, education, hygiene, and city services.

Like so many other industrialized nations, Cuba's food system had effectively been outsourced. The Cuban government depended on ideologically aligned trading partners for far more than food products—Cuba relied on them for the oil, mechanical parts, fertilizer, and animal feed that had historically facilitated food production. These inputs served as agricultural gatekeepers, without which the country's single-crop, high-input farming system simply fell apart.[3]

To their credit, Cubans overcame this crisis by refocusing their attention on developing a diverse local foodshed and an ethic of self-sufficiency. Cuban agricultural ministers noted an intentional shift in the country's approach to farming at this time, from the classical model of conventional industrialized

agriculture to a more sustainable and context-driven alternative model. In an effort to deindustrialize their food and farming system, farmers followed the principles of low-input sustainable agriculture (LISA) promoted by progressive growers in the United States. In this system, farmers replace "dependence on heavy farm machinery and chemical inputs with animal traction, crop and pasture rotations, soil conservation, organic soil amendments, biological pest control, and what Cubans call *biofertilizers* or *biopesticides*—microbial formulations that are nontoxic to humans."[4]

This semiorganic approach also informed early urban agriculture efforts, and thousands of city farmers in

Havana's historic Vedado neighborhood has clear setbacks and a block structure that facilitates urban growing.

Havana began to carve out space for production. By 2002 at least "86,450 acres of urban Cuban land was dedicated to intensive farming, producing more than 3.2 million tons of food," and in Havana alone at least 12 percent of the city was under cultivation by some 22,000 urban and peri-urban producers.[5] A decade after the food crisis struck, officials estimated that more than 50 percent of the perishable produce consumed in Havana was produced within the city limits.[6]

Despite the dire circumstances that led to the food crisis in 1989, few doubted the ability of Habaneros to improvise and cope, particularly as socialism had honed the Cuban practice of *resolver* over many decades.[7] But flourishing was another matter. Cuba not only survived the aftermath of the collapse of the Soviet bloc and two-plus decades of concomitant trade isolation but also witnessed a fundamental shift in favor of a more resilient infrastructure—all while maintaining strong government and intact social services. Cuba stands apart as a leader in self-provisioning: Not only has the country relied on largely sustainable farming methods during the last twenty-five years, but the island has also innovated new agricultural infrastructures in surprising and unparalleled ways.

Although often misunderstood as an impoverished nation, Cuba possesses a rich social system with high physical quality-of-life indicators. While food access currently consists of basic government-supplied food rations and limited market products, the days of hunger and food insecurity are long gone. The literacy rate is close to 100 percent; the constitution guarantees universal health care, education, and housing; and the country officially maintains an enlightened view toward race and class by declaring racial discrimination illegal.[8] Unlike other regional disasters—notably New Orleans's devastation by Hurricane Katrina in 2005 and Haiti's 2009 earthquake—

A produce seller prepares his stall for the day.

this crisis befell a nation with an intact city infrastructure, a history of equitable governance, and strong state leadership.

Cuba is credited as the only country in Latin America to have successfully eliminated hunger—for thirty years preceding the Soviet collapse—only to enter one of the most challenging, pervasive, and inescapable periods of hunger in its history.[9] The food crisis had the effect of refocusing Cuba's food system, creating—among other things—a new model for urban agriculture that is de facto organic, minimally disruptive to the environment, and radically inclusive.

History of Urban Farming in Cuba

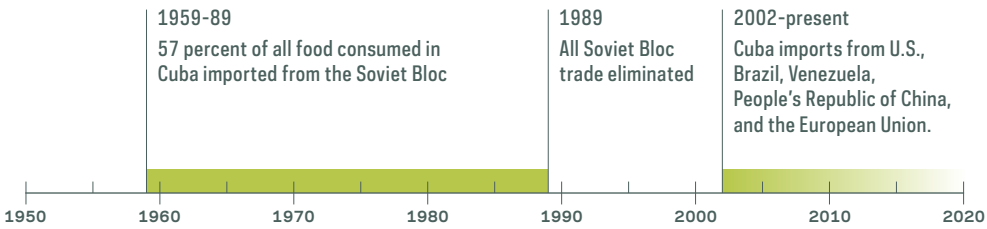
The end of the Cuban Revolution in 1959 resulted in a new national food-distribution system reliant on international imports as well as rural and peri-urban agricultural production in Cuba. The First Agrarian Reform Law, passed after the close of the revolution, transferred the ownership of large national and foreign-run *latifundios* (large landed estates) to peasant-run *campesinos* (small-scale farms). A decade later, the Second Agrarian Reform Law effectively eliminated large private farms by decreasing the maximum landholding limit to sixty-seven hectares per individual.[10] During these formative post-revolutionary years, the Cuban government incrementally overhauled every aspect of food provisioning, from restructuring state farms to implementing a ration system.

While this single-system approach adequately provided for the country's needs during this time, farming monopolies and increasingly illogical trade agreements also reinforced near-total dependence on state provisioning. From this perspective, Cuba's food instability was fixed as early as 1972, when the country joined the Council for Mutual Economic Assistance (COMECON) and signed trade agreements with countries such

as the Soviet Union (exporting citrus and sugar in exchange for cereals and other staples). This vulnerability was twofold: it both limited Cuba's agricultural products to nonessential, single-export foods and it established a dependence on trade relationships for critical goods.

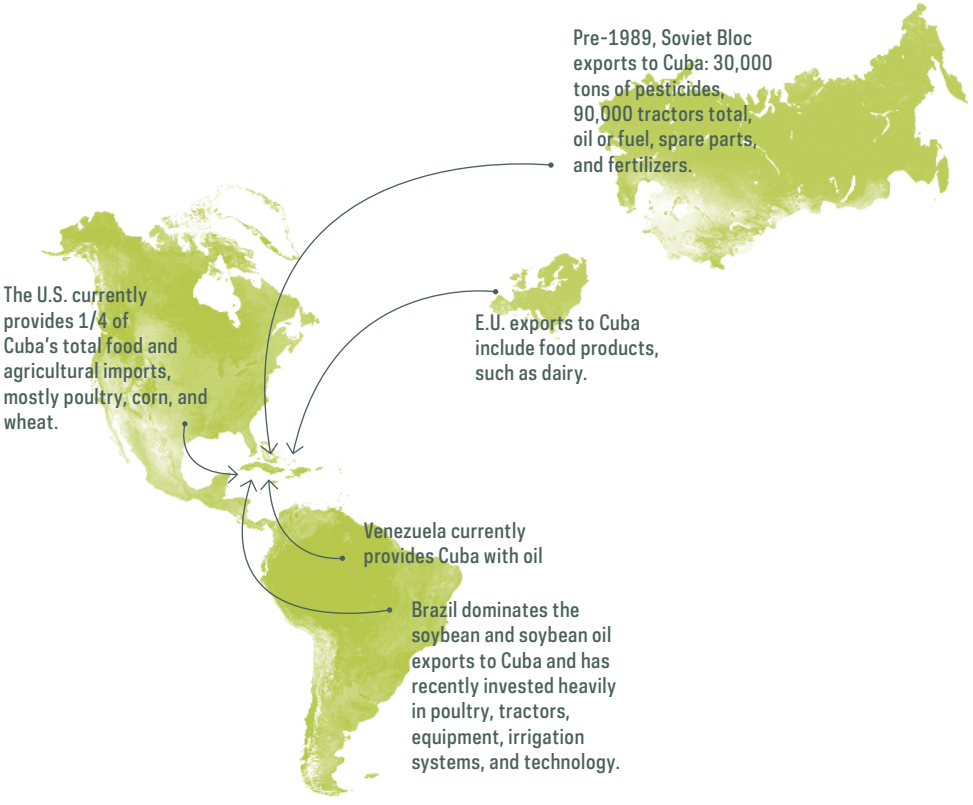
The genesis of the present-day urban farming movement in Havana dates back to 1966, when urban planners developed the Havana Belt, a swath of farmland encircling the city for concentrated fruit tree and dairy production. Over the years many thousands of city-dwellers have volunteered at this peri-urban space to prepare soil, cultivate seedlings, sow, and harvest. This early urban farm—sponsored by the government and still in place today—trained many Habaneros in the business of agriculture. This notable precedent and a vastly urban population notwithstanding, most of the agricultural production in Cuba occurred in the countryside.[11] Moreover, despite the state's widespread agricultural propaganda, urban dwellers largely experienced a social, geographic, and visual disconnect between farm and table.

When the country lost access to the products that supported food production, such as fertilizers, tractors, parts,



Cuba's global import relationships over time

and pesticides, with the collapse of the Soviet bloc, it also relinquished the refrigeration, storage, and transportation methods that had sustained Cuba's food distribution system—all of which were dependent upon oil in some way.[12] The government declared the Special Period in Time of Peace in 1991, a wartime-style economic austerity program implemented to ration food as rural farmers struggled to keep up with production demands. Approximately ninety thousand tractors were replaced by two hundred thousand oxen, and the country began "the largest conversion from conventional agriculture to organic or semi-organic farming that the world has ever known."[13]



The Special Period also contributed to the widespread popularization and prevalence of urban agriculture. For the first time since the revolution, devastating food shortages prompted the government to allow individuals to adopt self-provisioning methods. The state announced that government-owned urban lots would be available for agricultural production, officially launching an era of local and decentralized food production.

This shift also marked a change in the individual's relationship to public space: Habaneros now had an invitation—if not a responsibility—to participate openly in their own hyper-local food production. Urban farming reallocated agricultural responsibilities while simultaneously scaling food production

A team of oxen prepares the soil at an organopónico.

in new ways, turning "everyone's attention to smaller spatial scales, such as the neighborhood, in ways that signaled an important reconfiguration of prior government practices."[14] This public awareness served as a powerful reframing device, especially in cities, where residents were less likely to feel invested in food production, conceive of opportunities for participation, or imagine spatial alternatives to the traditional farm.

The Cuban government's emphasis on urban farming had two important political outcomes: This framework improved food access in urban areas and united citizens around a common productive goal, both of which reduced the likelihood of civic unrest. By 1992 the chronic food crisis had inspired thousands of Habaneros to claim urban spaces for crop and animal production. The government supplied botanical and agamic seeds, necessary tools, and watering cans, and began to invest resources and financing in the development of *organopónicos* within Havana's city limits.[15]

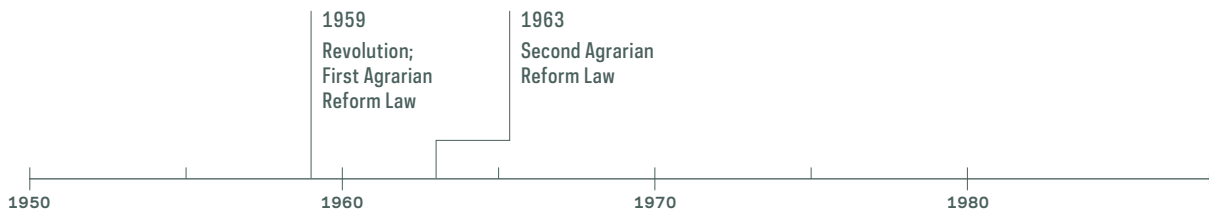
Cuba's food crisis intensified the same year, however, when the U.S. Congress passed the Torricelli Act, banning trade between Cuba and foreign subsidiaries of U.S. companies. Under this new law, boats stopping in Cuban ports would not be permitted to land in the United States for six months, which effectively eliminated trade stopovers in Cuba. This loss of trading partners deepened the island's economic crisis, forcing Cuba to turn inward to solve problems of food provisioning, agricultural training, and pest control.

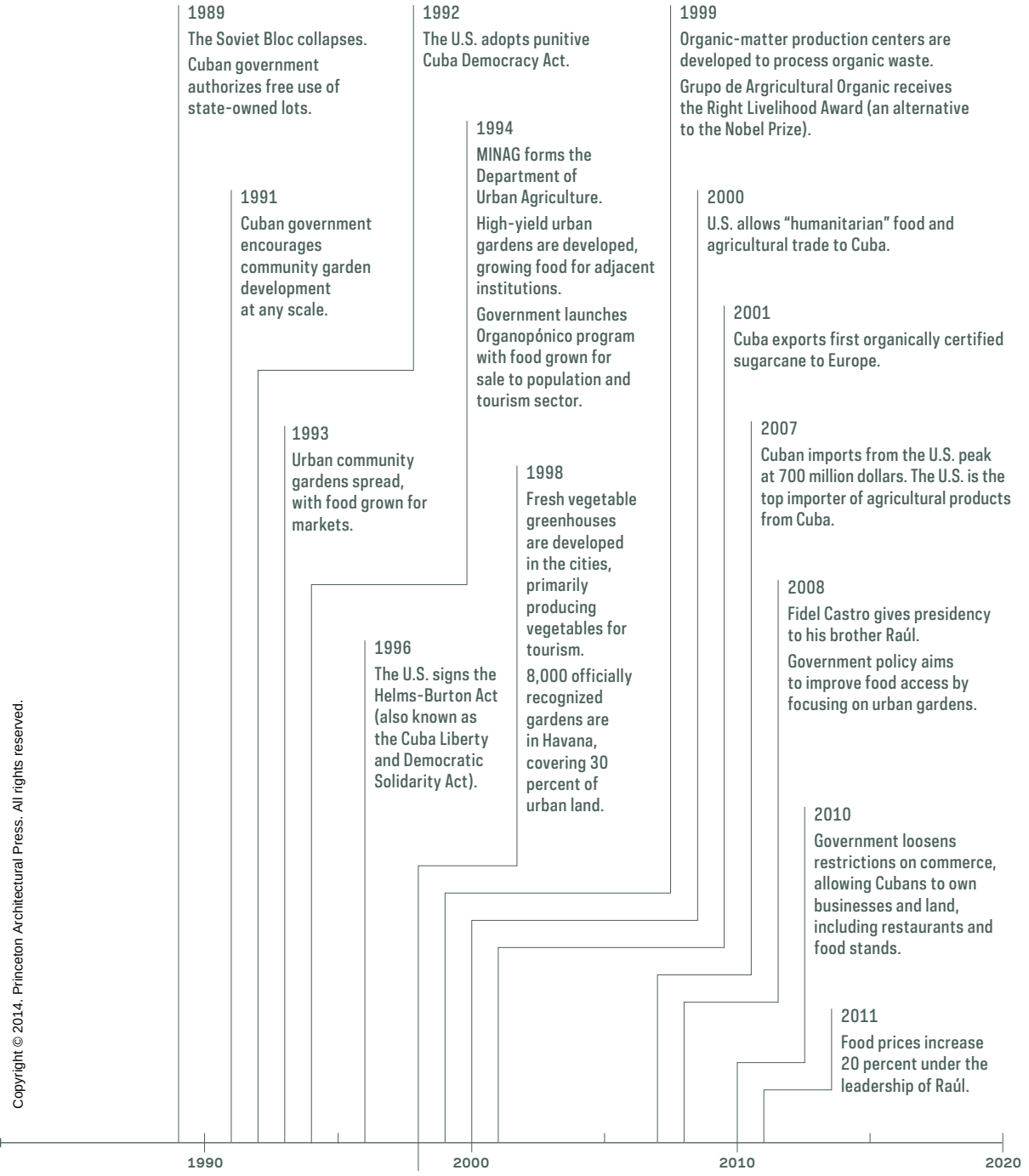
In 1993 Fidel Castro responded with the Third Agrarian Reform Law, which allowed for the transfer of 70 percent of Cuba's agricultural land—through usufruct rights—to individuals and to peasant associations and cooperatives for farming.[16] This statute had an immense impact on Havana's peri-urban ring, which became an essential production area for farming,

due to its proximity to Habaneros's tables. Within a year many new farmers were growing food, largely without information or experience but buoyed by the resources provided by the government. Independent gardens and farms could now be found in every neighborhood in Havana.

By 1995 food shortages had begun to lessen—a direct result of the urban farming initiatives in Havana, where scarcity "was largely overcome through domestic production increases that came primarily from small farms, and, in the case of eggs and pork, from booming backyard production."[17] Although Cuba's food situation had stabilized by the mid-nineties, the already strained trade relationship with the United States further declined with the Helms-Burton Act of 1996. This act tightened trade embargos and worsened the economic situation for Cubans. Ironically, while the ever-tightening U.S. trade embargos were meant to overwhelm Cuba, they may have unexpectedly strengthened the country's self-sufficiency and reinforced Castro's power.

Many physical and organizational changes impacted urban farming infrastructure during the nineties, including the authorization of more than two hundred thousand self-employment licenses (many in the farming industry); the transition of more than 2.6 million hectares of state-owned land given to Basic Units of Cooperative Production (BCUPS) for





farming; and, in 1994, the approval of a new type of agricultural market, with prices responding to supply and demand.[18] Physically, the city of Havana exhibited a host of new spatial outcomes supporting these bourgeoning initiatives, including education and dissemination centers, markets and farm stands, and many scales of urban farms.

In 1997 Fidel Castro approved a new model for profit sharing through the organopónicos, where farmworkers could augment their base salary with earnings from surplus produce. Journalist Damien Cave has since called this permissible form of entrepreneurship "handcuffed capitalism," and many Cubans acknowledge that the market remains heavily restricted by the government.[19] This allowance, however, made farming wildly popular in Cuba,where salaries fixed by the government hover around thirty American dollars a month and it is illegal to engage in most other forms of private entrepreneurship.[20] This model proved to be a tremendous success, as market forces stimulated better crop yields, which in turn bolstered the nation's foodshed.

By 2001 food security was under control in Havana, with a host of urban farming initiatives creatively appliquéd onto the old fabric of the city. Productive urban gardens played an instrumental role in this self-sufficiency, where "the shift to urban agriculture required important revisions to established ways of envisioning both urban and agricultural space, as well as food provisioning, within Socialist Cuba."[21] Urban farming was included in the city's master plan as early as 2000, a decision that served to legitimize this ecology as a fixture of Havana's foodshed.[22]

Current Practices

Havana's urban agriculture experiment can now be called a model, having flourished for more than two decades and

produced a host of sophisticated new practices and forms. These innovative urban efforts—combined with the transition to semiorganic farming in rural areas—have established Cuba as a world leader in sustainable food production. In a country where more than 75 percent of the population currently resides in cities and towns, urban agriculture provides an important outlet and service for residents who have been exposed to food insecurity.[23] Over the last decade, Habaneros have generated a number of different farm typologies, in a network of intensive and largely organic farms throughout the city, that collectively produce one hundred thousand tons of vegetables and herbs every year. Moreover, this movement

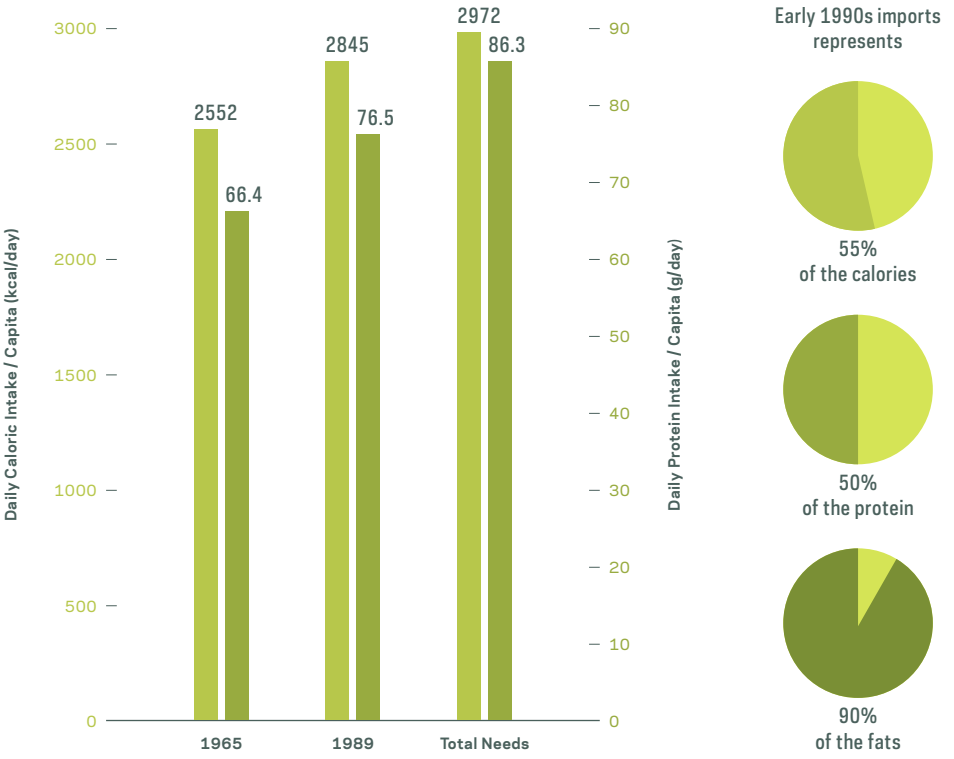
Repurposed roofing tiles form the edge condition of many raised beds.

has also begun to rebuild the economy with a direct rise in jobs: In 1989, there were no documented urban farming workers and within a decade, the number rose to 22,781 agricultural laborers in Havana alone.[24]

The adoption of self-provisioning by Habaneros has also ushered in new attitudes and habits around eating. One of the major changes that emerged from this crisis was a cultural reframing, a reorientation toward dishes that incorporate locally available foods. For instance, *viandas*—the popular roots and tubers that grow easily in the Cuban climate—have become a primary food source, substituting the more elusive wheat, rice, and animal protein that had defined the island's diet.[25] While these eating and cooking habits surfaced as a response to the food crisis, they also mark a return to the sustainable food culture that once characterized the island.

An entire monthly ration for two people, circa 2012

The benefits of urban farming have been well documented. This practice improves food security and access to fresh food, encourages productive use of vacant or underused areas of the city, and promotes a culture of healthy eating. Low-input gardens provide many environmental benefits, from the elimination of informal dumpsites and increase of green spaces to the improvement of animal habitats, water management, and air quality. City gardens reduce the urban heat-island effect, preserve soil health, and create vegetative buffers against hurricanes. The creative reuse of vacant space in the city—combined with the reappropriation of biodegradable waste streams and the



near elimination of energy-intensive transportation—helps to solidify this movement's viability in the face of diminishing resources. In Havana this effort has also spurred an open and collective participation not found in previous modes of rural agricultural practices. Called "civic agriculture" by sociologist Thomas Lyson and "everyday urban agriculture" by educators Michael Nairn and Domenic Vitiello, this brand of urban farming involves diverse participants and stakeholders, strengthens food justice, and has generated many thousands of associated jobs.[26]

Although urban farms offer a host of unique benefits, they reveal additional challenges stemming from their immediate urban context. Environmental pollution and urban toxins from salvaged materials, contaminated soils, and motorized vehicles could seriously compromise the health and viability of food products. Water scarcity remains problematic in Havana, where 38 percent of crop irrigation draws from the public water system, and more than half of the water moving through that network never reaches the spigot.[27] Farmers who do not have long-term land tenure have little incentive to invest in infrastructure, inhibiting planning efforts for a more long-term and resilient system. Critics also note that farms lack integration into the existing urban fabric "not only aesthetically, which no doubt is an important factor in any working environment, but also in relation to other components of the urban environment—be they natural, economic, or social."[28]

Today Cuba enjoys greater food security than ever before but continues to rely on foreign trading partners such as Venezuela, China, Brazil, and the United States for imported food products.[29] Cubans now have access to an appropriate number of recommended daily calories through some combination of the ration system; state, free, and black

markets; and self-provisioning. During the first decade of the twenty-first century, many Cubans lacked adequate access to protein; butter, cheese, milk, and meat were all in short supply. Because animals rely on feed—previously imported and currently still difficult to source—their populations have not yet rebounded on the island. While caloric intake meets or exceeds world standards, many Cubans today still struggle to secure a balanced diet that includes all of the relevant food groups.

This food stress stems from a lack of opportunity in a city where, as author Jennifer Cockrall-King reminds us, "between food and clothing expenses, there's little left over for even everyday luxuries."[30] The basic state ration provides only some of the staples that might be required to construct a balanced meal. Additional food, as well as medicine, transportation, entertainment, and material goods must be purchased using the nominal monthly allowance provided by the government. But this resource scarcity and the corresponding economy with which many Cubans organize their lives is one of the reasons that this country appears to have such a strong environmental ethic—in 2006 the World Wildlife Foundation identified Cuba as the only country in the world with sustainable development.[31]

However, conspicuous consumption has soared during the last decade as U.S. embargoes and blockades have loosened, increasing Cuba's connection to the outside world. Despite this rising buying power, many good reasons remain for supporting the urban farming movement in Havana, not the least of which has been the increased control that growers have gained over their own food access. Because the state's highest quality agricultural goods are reserved for the tourist industry and only second-tier produce is available at markets, self-provisioning remains one way for Cubans to transcend limited market options. The number of urban farms—of all types—

in Havana has actually increased since 1996, and agricultural yields and popular interest also continue to rise.[32]

During the last two decades, Cuban growers have had the freedom to explore urban farming directly, without typical barriers to entry, such as permitting, fees, or land acquisition. Although the physical form of these urban farms was limited by available building materials, tools, and technologies, these constraints have also encouraged and resulted in responsive designs that adapt according to community needs

A *parcelero* waters the many potted plants on his lot, using water brought to the site and stored in barrels.

and government directives. This organic development has led to flexibility in farm typology and aesthetics, with designs that respond to production, context, and market forces. For better or worse, the development of urban agriculture in Cuba has been characterized by a lack of formal or professional design guidance.

Regardless, Havana's innovative urban agriculture movement has helped to inspire new thinking around planning and design, especially now that the food crisis has been resolved. This is an unusual and unexpected outcome in the context of an architecture and urban planning process that political scientist James Scott attributes to "authoritarian, high-modernist states," which tend to be more interested in prioritizing technology, efficiency, and state control.[33] In adopting urban agriculture initiatives, the Cuban government implicitly condoned small-scale alternatives, both by allowing for the reappropriation of civic landscapes that had previously served other functions and by acknowledging the failure of industrial-scale agriculture. Anthropologist Adriana Premat considers this shift to be fundamental in the evolution of the Cuban state identity, as "the country was 'forced' to move away from previously hegemonic conceptualizations of space, and from forms of food production and distribution that advocated rational, large-scale planning and full integration into the formal state apparatus."[34]

Context and Conditions

While in large part the result of production demands, Havana's urban farming movement has also been shaped by the city's climate, urban form, and socialist ethic. Cuba's tropical climate, with its balmy temperatures and reliable rainfall, allows for year-round cultivation and a wide diversity of crop types.[35] Urban farms host varied and diverse produce, ranging from hardy

regional crops well suited to the climate (viandas, plantains, coffee) to nonnative foods acquired through international trade (rice, wheat), which have long been assimilated into the Cuban diet.

More than 75 percent of the Cuban population lives in urban areas, of which Havana is the largest and most populous, with 2,156,650 inhabitants.[36] The formal layout of the city is a dense radial configuration of neighborhoods that developed incrementally over the last five hundred years. Historically, Habaneros relied on harvests from rural areas for food; today, the vast tracts of peri-urban lands that border the city closely resemble rural landscapes and, because they are officially part of Havana, significantly boost the city's productive yields.

Plots of land in the heart of the city also contribute to Havana's production numbers. But unlike the peri-urban landscapes, agricultural sites within Havana's urban core necessarily responded to the primarily extensive development that had already taken place there—most of these plots are entirely made up of leftover waste spaces. With the exception of greenbelt farms and several food parks, Havana's urban farming spaces have not been designed into the urban fabric—so much as seized—according to opportunity and convenience.

Each of Havana's unique neighborhoods conforms to its own specific block and lot structure. Given this strict standard, it is easy to identify correlations between farm type and city form: Smaller garden plots correspond to the dense, central, and oldest parts of the city; medium-sized tracts tend to be located in residential areas just outside of the central core; and the largest growing spaces occur in peri-urban zones. There is also a connection between the type of space and the grower: Smaller farms tend to be single-family ventures,

while the government owns larger landholdings (many of which are subsequently borrowed by workers' collectives and farming clubs). In this socialist state, the resources that are available to small-scale growers are limited, as only cooperatives and other large-scale initiatives receive financial support from the government. As a result, much of the physical infrastructure

Map showing the density of gardens in the Vedado.

that supports urban growing—from storage spaces and market stands to fencing and irrigation—occurs at the scale of the larger farm.

Despite widespread support and engagement, Havana's robust farming movement still faces many challenges. The city's crumbling physical infrastructure, frequent electricity brownouts, and vulnerability toward hurricanes and cold fronts impact agricultural yields and the projected continuation of many urban farms. Access to clean and plentiful water for crop irrigation is one of the most persistent obstacles for farmers, and, if not addressed, could effectively cap the number of farms found in Havana. In the case of temporary growing spaces, soil health has not been prioritized over yields, which could lead to the gradual degradation of soil quality.[37] Additionally, concerns about the safety of the soil in urban lots have required growers to use raised beds with imported soils.

Land Use

In the absence of a progressive planning agenda through which agricultural space might be strategically allocated, urban farming initiatives tend to rely on the opportunistic reappropriation of abandoned or underused lands. In densely populated cities across the globe it is often difficult to secure space for cultivation, especially in places where land values have already effectively priced out farming. Environmental activists and urban survivalists consider this land-use disparity to be a particularly fraught issue, as urban gardens that could be used to infuse vitality are routinely displaced by more profitable ventures. In *Resilient Cities*, authors Peter Newman, Timothy Beatley, and Heather Boyer champion the more equitable integration of development and productive spaces from a

planning perspective, which they envision as producing food as well as "potential sources of renewable energy, especially the production of biocrops and biofuels."[38]

In the wake of Cuba's food crisis, the government immediately adjusted land-tenure laws to support urban farming endeavors. Socialist theory allows for multiple forms of land tenure, and—according to agricultural ecologist Richard Levins—the Cuban government's "transfer of land management from state farms to cooperatives was no abandonment of socialism but a reorganization within socialism to meet socialist goals better."[39] Naturally, private property presents an obstacle to space appropriation for urban agriculture; in Havana the new regulations only released public (government-owned) spaces for open-access food production. This strategy worked in part because the government still held many acres of public lands in the city, and this land formed Havana's new productive commons: a network of urban farms in parks and public open spaces.

Usufruct rights, which allow individuals to use government lands for their own initiatives, became the legal framework under which Cubans reappropriated land for farming.[40] From the scale of a family garden to the large public food park, usufruct was used to free up land for food production. Vacant lots, public parks, and even median strips—all underproductive landscapes from the government's perspective—became surfaces for informal gardening. Along with an implicit authorization for agricultural transformation, this legal structure also came with a set of rules—from preserving trees to keeping the land in agricultural production—that has kept, and continues to keep, these spaces viable over time to a variety of users.[41]

Although urban farms in Havana rarely change hands or transition to non-agricultural uses, this shift can legally occur when a lot has remained fallow for six months. This ensures

that farmers continually produce crops on state-owned lands, permitting other farmers to step in if a space has been abandoned. There is also a precedent for farmers to change product types over time; many farms have transitioned from planting annuals to investing in lower-maintenance crops and outputs, such as biofuels, composting sites, or orchards, over time.[42] Because this informal agricultural land use lacks permanent protection, in the future these productive spaces may be developed or converted into more permanent green space in the form of forests or parks.

In 2012, President Raúl Castro announced another major change in land ownership: Cubans would be allowed to sell their houses for the first time since the revolution. While the idea of a housing market remains a somewhat foreign concept to Cubans—for six decades citizens had legally owned their houses but could not sell them—it promises to have a profound impact on the economic and physical makeup of the country. To date, most of this activity appears to have affected buildings rather than landscapes, although gardens, farms, and empty lots may begin to change hands in the future. One of the most likely reasons that this new market has not impacted urban farming initiatives in Havana is that the majority of farmed land is government owned and therefore not for sale.[43]

NOTES

1. Jennifer Cockrall-King, *Food and the City: Urban Agriculture and the New Food Revolution* (Prometheus Books, 2012), 286.
2. Maria Caridad Cruz and Roberto Sanchez Medina, *Agriculture in the City: A Key to Sustainability in Havana, Cuba* (Kingston, Jamaica: Ian Randle Publishers, 2003), 4.
3. Peter Rosset and Medea Benjamin, eds., *The Greening of the Revolution: Cuba's Experiment with Organic Agriculture* (Melbourne, Australia: Ocean Press, 2002), 3.
4. Ibid., 5.
5. Peters, "Creating A Sustainable Urban Agricultural Revolution," 233; Cruz and Medina, *Agriculture in the City*, 4.
6. Fifty percent is a conservative number. This figure varies widely between sources and has been often quoted at up to 90 percent.
7. *Resolver* is a verb used frequently in Havana, meaning to resolve or fix a problematic situation.
8. See Appendix A for the 2013 ration. According to the 2002 census, literacy rates in Cuba are 99.8 percent. There are more doctors in Cuba per capita than any other country: 70,000 for a population of 11 million. Christopher Beam, "What's With All the Cuban Doctors?" *Slate*, February 1, 2007, http://www.slate.com/articles/news_and_politics/explainer/2007/02/whats_with_all_the_cuban_doctors.html.
9. Rosset and Benjamin, *The Greening of the Revolution*, 24.
10. Ibid.
11. By the late 1980s at least 69 percent of the Cuban population lived in an urban area, and some 2.2 million people resided in the capital city. Ibid., 15.
12. In the late 1980s, Cuba imported 48 percent of its fertilizers and 84 percent of their pesticides. Ibid., 18; In 1988, 57 percent of total food was imported. Catherine Murphy, "Cultivating Havana: Urban Agriculture and Food Security in the Years of Crisis" (Oakland, CA: Food First Institute for Food and Development Policy, 1999), 1. http://library.unitedddiversity.coop/Food/CultivatingHavana-UrbanAgricultureAndFoodSecurity.pdf
13. Adriana Premat, *Sowing Change: The Making of Havana's Urban Agriculture* (Nashville: Vanderbilt University Press, 2012), 17; Rosset and Benjamin, *The Greening of the Revolution*, 5.
14. Premat, *Sowing Change*, 19.
15. Cruz and Medina, *Agriculture in the City*, 24.
16. Hans-Jürgen Burchardt, *La última reforma agrarian del siglo: la agricultural cubana entre el cambio y el estancamiento* (Caracas, Venezuela: Editorial Nueva Sociedad, 2000), 174; See also Rainer Schultz, "Food Sovereignty and Cooperatives in Cuba's Socialism," in *Socialism and Democracy* 26, no. 3 (2012), 128.
17. Bourque and Rosset, "Lessons of Cuban Resistance," xviii.
18. Cruz and Medina, *Agriculture in the City*, 6.
19. Damien Cave, "How Capitalist Are the Cubans?," *New York Times*, December 1, 2012, Sunday Review, SR6, http://www.nytimes.com/2012/12/02/sunday-review/how-capitalist-are-the-cubans.html.
20. In 2011 President Raúl Castro authorized the private ownership of small independent hotels (*casa particulares*) and restaurants, which, along with farming, are the few opportunities Cubans have to make money independently.
21. Premat, *Sowing Change*, 29.
22. The 1984 master plan did not allocate space for farming except for several large farms at the city's perimeter.
23. Mario González Novo et al., *Testimonios: Agricultura Urbana en Ciudad de La Habana* (Havana, Cuba: Asociación Cubana de Técnicos Agrícolas y Forestales, 2008), 21.
24. Ibid., 11.
25. Rosset and Benjamin, *The Greening of the Revolution*, 25.
26. Thomas A. Lyson, *Civic Agriculture: Reconnecting Farm, Food, and Community* (Medford, MA: Tufts University Press, 2004); Dominic Vitiello and Michael Nairn, "Everyday Urban Agriculture: From Community Gardening to Community Food Security," *Harvard Design Magazine* 30, no. 2 (Fall/Winter 2009); Cruz and Medina, *Agriculture in the City*, 24.
27. Cruz and Medina, *Agriculture in the City*, 52, 60.
28. Ibid., 49.
29. Cuba's major agricultural trading partners are Venezuela, Brazil, China, Canada, Spain, and the United States. Common imports include meat and grain, as well as the mechanical parts, oil, fertilizers, and pesticides used for farming.
30. Cockrall-King, *Food and the City*, 289.
31. This study was based on two indexes: human welfare and ecological footprint. Many Cubans associate this environmental ethic with necessity rather than choice. Julia Wright, *Sustainable Agriculture and Food Security in an Era of Oil Scarcity: Lessons from Cuba* (London: Routledge, 2008), 233.
32. Cruz and Medina, *Agriculture in the City*, 27.
33. James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1998), 89–90.
34. Premat, *Sowing Change*, 13.
35. Average temperatures in Havana are 25 degrees celsius (77 degrees fahrenheit), with a relative humidity of 79 percent and an average annual rainfall of 1.4 meters (55 inches). González Novo et al., *Testimonios*, 16.
36. Ibid., 15.
37. Cruz and Medina, *Agriculture in the City*, 29.
38. Peter Newman, Timothy Beatley, and Heather Boyer, *Resilient Cities: Responding to Peak Oil and Climate Change* (Washington, DC: Island Press, 2009), 75.
39. Richard Levins, "The Unique Pathway of Cuban Development," in *Sustainable Agriculture and Resistance*, 278.
40. In Cuba the usufruct typically allows individuals to use government land for a ten-year renewable term and cooperatives for a twenty-five-year renewable term. Schultz, "Food Sovereignty and Cooperatives in Cuba's Socialism," 117–38.
41. On these government lands, no trees are to be cut down, and no structures, other than those strictly necessary for workers and production, are to be built. Those structures, when built, must be "rustic and blend with the landscape." Cruz and Medina, *Agriculture in the City*, 26.
42. One of the most interesting precedents for this type of transitioning model is the Parque Nacional in Havana, where some recreational spaces have been transitioned into agricultural space.
43. However, an estimated 85 percent of Habaneros own their houses, which often have associated gardens. These patios could be impacted by a change in ownership.

Urban Emergency: Community Resilience in Cuba and New Orleans

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Emergencies modify existing architecture through the adoption of new regulations and technologies in response to cultural norms about risk, but crises produce whole new architectures.

—Mark Wigley, "Space in Crisis"

In recent years increasingly frequent hurricanes and tropical storms have caused ever-greater damage as they touched down on the coastlines of the United States. As scholars and policy makers look for guidance on how to avoid catastrophic losses, like those that followed Hurricane Katrina, they frequently look to Cuba's emergency-preparedness programs as an example.[1] While these lessons in emergency preparedness will certainly be useful in preserving lives during and after disasters, the recent revolution in Cuba's food system may hold even more valuable insights for how New Orleans and other cities can respond to crises in ways that address their vulnerabilities and increase long-term resilience.

The primary lesson to be learned from Cuba's food revolution is that crises can invite opportunities to build greater resilience through increased self-reliance, development of local solutions, and investment in human capital. In seeking to improve resilience in cities, planners and designers would do well to consider the Cuban agricultural revolution as an

inspiration for how communities can develop informal and community-driven mechanisms of resilience.

The Cuban government has been much praised for the capabilities of the nation's emergency-preparedness and -response systems. Through a highly disciplined and regimented program led by the civil defense forces, the government has proven remarkably effective in preparing the population for disasters, minimizing loss of life, and mobilizing resources in the immediate aftermath of highly disruptive events, such as

A house in post-Hurricane Katrina New Orleans

hurricanes.[2] In 2001, Hurricane Michelle barreled into the island nation as a fierce Category 4 storm, even more powerful than Katrina, which was a Category 3 storm when it made landfall near New Orleans. While the flooding that followed Katrina caused thirteen hundred deaths in New Orleans alone, Michelle caused only five deaths in all of Cuba.[3]

While there are clearly valuable lessons to be learned from the Cuban emergency-response system's ability to equitably and efficiently prepare for and respond to extreme events, some components of the system rely on a degree of social solidarity and government control that is likely unrealistic in an American context.[4] Even setting aside the differences in culture and government structure, emergency preparation and response is only a small component of building lasting, community-level resilience.

The innovative response to Cuba's food crises of the 1990s presents an especially useful example of community resilience because it arose not out of systematic state planning efforts but from local necessity and investments in human capital. Whereas the country's civil defense and allied institutions have developed a masterful ability to cope with finite natural disasters, the shock to the nation's food system that followed the collapse of the Soviet Union was a true crisis in that it was "a threat to the whole system."[5] The sudden loss of heavily subsidized fuel and food commodities from socialist trading partners led to major food shortages in Cuba. During this period the calorie consumption of the average Cuban declined by more than a third.[6]

This so-called Special Period and the revolution in food production and distribution that followed created a radically new form of resilience that grew out of a crisis response. With the collapse of the existing trade-dependent system,

Cuban society had to reinvent how it fed itself. In the new energy-constrained reality, local production displaced international trade networks, and low-input organic farming methods replaced chemical- and energy-intensive practices. While the national government supported the development of these new food systems through investments in agricultural research, relaxed regulation on agricultural markets, and support for community growing institutions, the movement was largely driven from the community level. The literal hunger of a deprived but highly educated population drove the development of a distributed system of communal urban gardens, or *organopónicos*, that is now the envy of many highly industrialized countries.

The revolution in Cuba's food system, with its locally generated resilience developed out of necessity, human-capital investment, and newfound isolation, stands in stark contrast to the post-Katrina recovery and redevelopment of New Orleans. The Katrina recovery, on the other hand, has seen the expenditure of tremendous resources without substantial improvement in local resilience or decrease in the risk of future disasters. The combination of inadequate infrastructure, generations of risk-blind development patterns, and radical resource inequality among its population made New Orleans uniquely vulnerable and ill prepared for Katrina. The storm itself, the failure of the city's flood-protection infrastructure, and the inadequate emergency response left 80 percent of the city flooded, 70 percent of structures seriously damaged, more than 100,000 people dislocated for extended periods, and 1,300 people dead.[7] In spite of these dire outcomes, the long-term rebuilding process has not yielded a substantial reduction in the city's vulnerability to future disasters.

Though the flooding that followed Katrina was undeniably devastating for New Orleans, massive waves of outside recovery subsidies and an absence of large-scale political leadership have ensured that the storm remained a finite emergency rather than a transformative crisis like that experienced in Cuba during the 1990s. After Katrina, the devastation wrought by the failure of the engineered pump and levee infrastructure and by unwise development patterns provided a unique opportunity to explore ways to realign the development of the city to reduce its future vulnerability.

In the months following the storm, the Urban Land Institute, along with legions of academic and avant-garde designers and

The batture was barely affected by Hurricane Katrina.

planners, presented plans for urban recovery. Many of these early plans suggested shrinking the footprint of the city and realigning urban development patterns to reduce flood risks and to adapt to changing demographics (the city's pre-Katrina population had substantially shrunk from its 1960s peak). The proposals generated by these early radical reenvisioning processes, like the now infamous Green Dot plan, which proposed to "greenspace" several flood-prone neighborhoods, were immediately and vociferously rejected.[8] Though their economic and ecological rationale was clear, such proposals were doomed by opposition from an unlikely coalition of pro-development interests, political leadership blinded by triumphalist reconstruction narratives, and a deeply distrustful population.[9]

Centuries of urban development that disproportionately victimized low-income African American communities in the cause of urban advancement ensured that any conversation about substantially reforming the size or shape of the city would be immediately poisoned with distrust. In their article, "Three Years after Katrina: Lessons for Community Resilience" geographers Craig Colten and Robert Kates and sociologist Shirley Laska argue that "essential to post-disaster resilience is building an ongoing community-wide commitment to respect all segments of the community and be inclusive in decision-making processes and resource allocation. These measures build trust in advance of the next disaster."[10]

Because New Orleans lacked that essential groundwork of trust between government and broad sections of the population, it was all but impossible to conduct the difficult but essential discussions about reducing the city's vulnerability. This distrust, aligned with the profit motives of construction and real estate interests, led the city to focus on increasing the size and strength of its flood-control infrastructure (pumps, levees, and

flood walls), making use of federal funds to redevelop even the most vulnerable, far-flung, and depopulated areas. Rather than reducing vulnerability, this reinvestment in existing infrastructure and risky urbanization patterns reduce the frequency of disruptions from floods, but dramatically increase their severe effects on new developments when they inevitably occur, thus resulting in what has become known as the "levee effect."[11]

Just as the vulnerability of Cuba's food and agricultural policies were laid bare by the collapse of the Soviet system, the catastrophic failure of New Orleans's flood-control systems exposed the inherent risks of relying on highly engineered systems to safeguard the city. While isolation and poverty drove Cuba to develop a more resilient and self-reliant food system in the wake of their crisis, New Orleans's economic and political connections to the larger federal government have allowed the city to resist such a radical adjustment. Thus, in looking for solutions to increased vulnerability caused by the levee effect, it may be most instructive to look outside the levees themselves.

On the outskirts of New Orleans, there is a linear settlement of largely self-built structures tucked incongruously into the willows between the "wrong side" of the levee and the roiling brown water of the Mississippi. This enclave of a dozen dwellings—the last vestige of what was once a settlement of hundreds—is called the *batture*. The buildings and the community of the batture exist largely in spite of the efforts of planning and design professionals, and dominant regulatory and economic structures. Nonetheless, just as Cuba's relocalized food revolution has much to teach about developing resilient local-food systems, there is a tremendous amount to be learned from the batture—and other informal settlements like it—about how cities, buildings, and communities respond to environmental and political vulnerability.

Like Cuba's food-production and -distribution system, the batture can be seen as an example of what urban anthropologist James Holston calls "insurgent citizenship," in which subcommunities carve out new civic spaces for themselves in opposition to, or apart from, dominant, state-defined modes of citizenship.[12] The batture stands in stark contrast to the relatively conventional urban form and culture on the other side of the levee by inverting the bedrock assumptions of risk, infrastructure, and state-dependence that make life at the mouth of the great river possible.

The riverside community's unique forms of adaptation and resilience were on dramatic display in the weeks following

Hurricane Katrina raised many questions of infrastructural stability and resilience.

Katrina. When New Orleans's flood-control systems failed, the batture was largely unaffected. Batture dwellers—living as they do outside of the city's physical and institutional fortifications—do not have the luxury of forgetting their vulnerability and thus have built a community that is armed to respond to environmental threats. Just as Cuba's agricultural revolution emerged in response to newly revealed vulnerability after the fall of the Soviet Union, the batture represents a kind of delta urbanism "without a net," in which residents live without the guarantees of government rebuilding assistance or subsidized flood insurance.

While planner Larry Vale and urbanist Thomas Campanella argue that "resilience is underwritten by outsiders," the post-Katrina recovery of New Orleans and the case of Cuba's food-system revolution present important counterexamples to this "axiom of resilience."[13] In the case of the Katrina recovery, short-term recovery processes underwritten by the federal taxpayers may, in fact, undermine the long-term resilience of the housing and urban development of the city by allocating resources into increasingly hardened infrastructure rather than the reforming of unsound development practices. In contrast, the revolution in Cuba's food system toward greater self-sufficiency and resilience points toward a different model in which relocalization and community solidarity are driven by isolation rather than interdependence.[14]

In the case of post-Katrina New Orleans, the emergency facing the city was severe, but, relative to the geographic expanse and economic resources of the nation as a whole, it was never truly a "threat to the whole system."[15] As such, though the recovery has generated advances in social innovation and increased the capacity of many community institutions, it has not yielded the wholly transformative pivot toward a more resilient

and less vulnerable city that many had hoped for. While New Orleans, and the United States, could learn significant lessons from Cuba's emergency-preparation and -response programs, the examples of Cuba's food revolution and the development and evolution of informal communities such as the batture could provide insights into more lasting impact in developing greater urban resilience.

These types of processes create unique mechanisms of resilience because they develop outside of the institutional and infrastructural risk-management regimes of globalized modern life. As such, they may approximate a post-crisis future in which the complex systems underlying the global economy and conventional urban development can no longer be relied upon. In the coming years, the development of more nuanced understanding of how such systems change in response to crisis and vulnerability may allow for innovations that will help to make cities and institutions that are more resilient and better adapted to their environments.

NOTES

1. Martha Thompson and Izaskun Gaviria, *Cuba. Weathering the Storm: Lessons in Risk Reduction from Cuba* (Boston: Oxfam America, 2004).
2. Ibid., 4.
3. Ibid., 9.
4. Ibid., 7.
5. Mark Wigley, "Space in Crisis," *Volume: Bootleg Edition Urban China* (2009): http://c-lab.columbia.edu/0158.html
6. McKibben, "The Cuba Diet," 62.
7. Craig E. Colten, Robert W. Kates, and Shirley B. Laska, "Three Years after Katrina: Lessons for Community Resilience," *Environment: Science and Policy for Sustainable Development* 50 (2008): 36.
8. Yates McKee, "Haunted Housing: Eco-Vanguardism, Eviction, and the Biopolitics of Sustainability in New Orleans," *Grey Room* 30 (2008): 97.
9. Vale and Campanella, "Conclusions: Axioms of Resilience," 339.
10. Colten et al., "Three Years after Katrina," 39.
11. Robert W. Kates, Craig E. Colten, Shirley B. Laska, and S. P. Leatherman, "Reconstruction of New Orleans after Hurricane Katrina: A Research Perspective," *Proceedings of the National Academy of Sciences* 103 (2006): 14653.
12. James Holston, "Spaces of Insurgent Citizenship," in *Cities and Citizenship*, ed. James Holston (Durham and London: Duke University Press, 1999), 157.
13. Vale and Campanella, "Conclusions: Axioms of Resilience," 342.
14. Ibid.
15. Wigley, "Space in Crisis."