

## **GREENING FOR SURVIVAL: THE ECONOMIC CRISIS, URBAN GREENING, AND SUSTAINABILITY IN HAVANA, CUBA**

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**ABSTRACT:** *The collapse of the Soviet Union in the early 1990s eliminated important markets and subsidies for the Cuban economy, throwing the country into a crisis. The Cuban government's response to the food and fuel shortage was to implement a unique national program to increase food production. A vital part of this program was the development of the Department of Urban Agriculture, which has helped to rapidly increase numbers of farms and gardens within the city of Havana. Many governmental and nongovernmental programs have been successful in helping to increase urban food production, as well as to increase awareness about environmental sustainability and promoting community greening programs. Despite the fact that Cuba's move toward sustainability in urban neighborhoods was motivated by economic desperation, that does not discredit either its success or its leadership role in working toward environmental sustainability in the city of Havana.*

As the world approaches the year 2000, faced with rapid population growth, increasing numbers of urban dwellers, eroding farmlands and other forms of environmental crises, the issue of sustainability is discussed more often in public circles, both locally and internationally. Politically, economically, as well as geographically isolated, Cuba is responding to the challenge of sustainability (both economic and ecological) with a spirit of determination and pragmatism. With the collapse of the Soviet Union in 1991, Cuba suffered severely from loss of income and subsidies that had been consistent since the early 1960s. Gone was the annual five billion-dollar subsidy from the Soviet Union, the preferential market for sugar cane and other Cuban goods. Gone was access to machine parts, fuel, agricultural chemicals and other products that had fed the backbone of the Cuban economy since Fidel Castro came to power and United States' economic interests pulled out of Cuba in 1959. The rapid decline in availability of machines, fuel, and commercial goods was most strongly apparent at the tables of the Cuban people, who faced a dramatic food shortage, even malnutrition.

The response of the Cuban government, with help from foreign aid, non-governmental organizations (NGOs) and other politically non-aligned groups, has been to mobilize a concentrated effort to increase food production island-wide.

Included in this process has been a movement to increase food production within cities, so that they may become less dependent on rural areas for food sources, perhaps even becoming a living model for a subject talked about so often in the abstract, the idea of sustainability. This paper will review some of the changes that have taken place in Havana over the last nine years, including: (1) the creation of the new Department of Urban Agriculture, (2) different kinds of urban food production methods and their role in communities, (3) neighborhood reforestation, (4) the role of city parks and environmental education, and (5) some evaluation of programs and how they stand as an example to other communities/states/countries in the world. There is some debate about whether urban greening in Havana can be considered a "movement" since it is rising out of the ashes of the desperation of the "Special Period" (the years after the Soviet Union's collapse). This paper will also consider some of the philosophy and theory behind the systematic transformation of Havana, as well as the challenges posed by the implementation of these programs. In any case, the process of revitalizing urban communities in Havana through working towards environmental and economic sustainability is one that should be closely examined by anyone interested in humanity's future.

One of the major justifications for the Cuban revolution, along with issues of wealth inequality,

was its dependence on foreign economic interests. In particular, the United States' control of sugar production and exportation was sharply criticized by Cuban revolutionaries in the 1950s, who pointed out that Cuba still lacked economic independence more than half a century after gaining political independence from Spain (Pérez, L., 1995; Rodriguez, 1965). Pre-revolutionary Cuba had a largely agrarian-based economy supported by a system of sugar, tobacco and coffee plantations which, after the abolition of slavery, had replaced slave labor with a similar sharecropping system. In the late 1950s, approximately 75% of all arable land was owned by large companies (40% American) who leased to sharecroppers (Murphy, 1999). In addition, a majority of the large land holdings were used for cattle ranching and sugar production rather than producing food (Pérez, L., 1995). After the revolution, a radical redistribution of wealth and seizure of all foreign-controlled assets sent out waves of economic change across the island.

The Agrarian Reform Law of May, 1959, required that all land previously owned and cultivated by monopolies and foreign companies be given back to Cuban ownership. Farms were sequestered to state-owned cooperatives and small private holders (Skidmore and Smith, 1989). Although there was an initial movement to reduce Cuba's dependency on sugar and to diversify crops, the mono-cropping large state farms that replaced the plantations were, in practice, barely distinguishable from the former plantations because they mainly produced export crops. Shortly after the first agrarian reform law, Cuba implemented a plan to increase sugar production as part of the new economic partnership with the Soviet Union. The plan's ambitious goal of producing ten million tons of sugar annually reversed the brief focus on crop diversification, and continued Cuba's dependence on food imports (Pérez, L. 1995). Even by the late 1980s, Cuba had to import the majority of its dietary staples like beans (99%), cereals (79%) and oil and lard (94%) (The Ministry of Agriculture, cited by Rosset and Benjamin, 1994).

Not until the loss of Soviet subsidies threw the country into a food crisis did the Cuban government start to implement land reforms that allocated more worker control and created incentives (as well as requirements) to increase food production. In 1993, "Resolution 357" was passed, creating *Unidades Básicas de Producción Cooperativa* (UBPCs), autonomous cooperatives, which ceded

60% of previously state-operated land to worker management. Members of the UBPCs were required to sell their produce to the government, but were allowed to lease small plots of land (under one-half acre) for their own use (Pérez-López and Travieso-Díaz, 1998). The main purpose of this change was to encourage greater labor participation in order to counter declining yields due to fuel and fertilizer scarcity (Jatar-Hausman, 1999). The government promulgated the idea of self-sufficiency and greater autonomy in worker production by "applying formulas that motivate people to achieve larger levels of production with the smallest use of material resources...." (Ministry of Agriculture, cited by Murphy, 1999: 10).

In addition to changes in the structure of farm management, organic farming techniques were explored to counterbalance the sudden absence of chemical fertilizers and pesticides. In her report on urban agriculture in Havana, Catherine Murphy called it "the largest conversion from conventional agriculture to organic and semi-organic farming that the world has ever known." (Murphy, 1999: 9). The success of this process was largely due to the involvement of so many groups from different spheres of Cuban life. Military personnel followed through on the Minister of the Armed Forces' statement that "food production is our principal task" and began to produce their own food (Murphy, 1999: 9). Young people were allowed to choose between a mandatory year of military service and agricultural labor on one of the new military farms. In April 1994, the Agricultural Department for Havana City was established. In a symbolic gesture, the Ministry of Agriculture planted lettuce, bananas and beans in front of its Havana office. Acquisition of vacant land for farming rapidly became popular and easy. Incentives for greater food production included no state controls on farmers' markets and allowing farmers to sell their excess produce for profit. In addition, sales tax for produce sold in Havana and Santiago de Cuba remained half what it was on the rest of the island. In Havana, the new Department of Agriculture worked to support a growing number of urban gardeners through increased access to land, outreach, research and education, providing supplies and assisting with marketing (Murphy, 1999).

In order to understand the changes in economic policy and structure made by Cuba's local and national governments during the Special Period, one must first understand the extent to which both the

collapse of communism in Eastern Europe and the United States' blockade against Cuba affected the island economically. After the fall of the Berlin Wall, Eastern European imports to Cuba decreased dramatically, nose-diving to half in 1990 and to almost none in 1991 (Cole, 1998). Two important events further destabilized the economy: the price of sugar dropped, greatly reducing Cuba's trading power, and oil imports from the Soviet Union decreased by about 90%, leaving Cuba with a painful fuel shortage. The impact of the shortage hit sugar plantations almost immediately after the Soviet Union's break-up, since Cuba depended on Soviet sources for 90% of its energy usage. This meant that agricultural fertilizer imports were reduced by 80% and animal feed was reduced to 70% of former levels (Pérez, L., 1995). The effects of the fuel shortage on the Cuban economy between 1989 and 1993 were an annual reduction of sugar production by half and a falling gross domestic product that reached a low of almost negative 15% in 1993 (Banco Nacional de Cuba, cited by Jatar-Hausmann, 1999). The loss of capital from sugar exports shook the foundations of the fragile Cuban economy. Moreover, loss of basic food imports such as grains had an immediate impact on Cubans' daily food consumption (Pérez, L., 1995).

The loss of Soviet subsidies removed the protective barrier that had prevented the United States' embargo from effectively damaging the Cuban economy. In 1992, the United States government passed a series of measures aimed at tightening the economic sanctions on Cuba that had been in effect since President Eisenhower canceled the annual purchase of Cuban sugar in 1960. In November of 1992, the "Torricelli bill" or "Cuba Democracy Act" went into effect, outlawing ships from docking in United States ports for six months after trading with Cuba. The bill also made it illegal for subsidiaries of United States companies to trade with Cuba, and denied economic aid and free trade to countries that continued to provide economic assistance to the island. It included restrictions on humanitarian aid in the form of medicine, food and medical supplies. The enactment of these measures, in combination with the loss of Soviet assistance, caused some of the worst living conditions ever experienced in modern Cuba. Rations were small and insufficient, forcing people to buy food on the black market. Medicines were in constant demand, and basic pharmaceutical products that had previously been available, like aspirin and asthma medication, were now almost

impossible to find. In 1993 an optic neuropathy epidemic occurred due to lack of B vitamins, affecting over 50,000 Cubans. Lack of building materials affected housing quality, and the absence of fuel restricted industry and the use of vehicles, from farming equipment to public transportation (Pérez, L., 1995). The government scheduled daily blackouts to conserve electricity and encouraged the use of cisterns to supplement irregular supplies of running water. "Vast amounts of ingenuity were applied simply to meet ordinary and commonplace needs," as energy spent on transportation, obtaining food and basic necessities, cooking and inventing survival tactics became the *modus operandi* of the Cuban people (Pérez, L., 1995: 386).

Out of these times of scarcity emerged the idea that the promotion of urban greening, and most specifically urban food production, might be one of the keys to lifting Cuba out of the doldrums. In the early 1990s the Cuban government recognized the necessity of shifting the focus of farm production from export crops like sugar, coffee and tobacco to food crops. As Cuban vice-president Raul Castro stated in 1994, "Today the main political, military and ideological problem of this country is to increase the food supply." (Pérez, L., 1995: 404). In an attempt to reduce dependency on food imports the National Food Program was developed in the late 1980s, which converted 20,100 hectares of land (much of it near the city of Havana) formerly used for producing sugarcane into food crop farms. The program also promoted *autoconsumos*, areas connected with schools or workplaces that grew their own food. The movements growing out of the desperation of the early 1990s went even further to promote ideas of self-sufficiency and sustainability, with particular reference to cities which are traditionally high consumers and low food producers. These ideas caught hold in a virtual explosion of projects in the city of Havana, including the creation of thousands of urban farms and gardens, the expansion of farmers markets, community recycling and composting efforts, outreach about organic farming techniques, the creation of urban centers for ecological promotion and education, and community clean-up efforts and reforestation projects (Murphy, 1999).

Urban greening projects are appealing for more than economic reasons. They are connected to peoples' desires to be useful, to contribute to their communities, to be self-sufficient, and to promote

projects which are conducive to socializing across barriers of age, gender, race, etc. Other benefits to urban gardening include increased income from the sale of excess produce, reduced economic and ecological cost from shortening the distance of food transportation, increased environmental awareness, improved freshness and availability of produce, and improved waste disposal and recycling of organic materials through composting. The success of urban greening programs can be recognized in cities throughout the world that have adopted similar movements such as the one in Havana. The result of such programs is evidenced in the existence of over 1,000 gardens in New York City, over 30,000 gardens in Berlin, and successful urban food production programs in Kathmandu, Dar es Salaam, and Hong Kong (Murphy, 1999). Philadelphia Green has been highly successful at mobilizing community involvement in Philadelphia in projects such as tree planting, community gardening and education. By 1998, according to government sources, there were an estimated 8,000 food production sites in Havana, cultivating about 30% of all available land. Extension programs, research, community organizations, and participation as part of *Poder Popular* (the "people's power" or localized governments) have all contributed to the success of the greening of Havana (Murphy, 1999).

One of the first efforts of the Agriculture Department of Havana City was to insure land access to gardeners. Rights to land use became a division of *Consejos Populares*, local units of representative government established in 1991, which made land acquisition even easier and more decentralized. Essentially, if there was land available and people willing to cultivate it, permission was granted for land use with little bureaucratic red tape. Even if land was privately owned, once local gardeners requested to cultivate it the owners of the property were obligated to cultivate it within six months, otherwise it would be turned over to the interested parties. The result of these new laws was the creation of thousands of gardens on vacant lots throughout Havana, particularly in outlying areas with more open space such as Arroyo Naranjo, Boyeros, Cotorro, Guanabacoa, Habana del Este, La Lisa, Marianao and San Miguel del Padrón (Murphy, 1999) (see Figure 1. Relevant Projects: Regional Map of Havana). The older neighborhoods of Havana, Habana Vieja and Centro Habana, are limited by spatial issues, due to their colonial-style layout of narrow streets with little

or no sidewalk space and almost no vacant land. These neighborhoods are also challenged by the prospect of Havana's reforestation campaign, because, as one community development worker stated, "they weren't designed for trees." (Author interview, Fernandez, 1999). Also, the fragile nature of these neighborhoods' buildings, suffering from lack of repair, makes the added weight of rooftop or terrace gardens dangerous. Despite this, residents of these neighborhoods have found ways to participate in urban gardening. Walking through these neighborhoods, one can observe potted plants growing on terraces or hanging on hooks above doorways. The city government has also designated plots in other areas such as Regla and East Havana for residents of more congested neighborhoods. Some other densely populated areas like Cerro and Diez de Octubre are fortunate to have open space that has been converted into gardens (Murphy, 1999). In Miramar, the old wealthy area of the city, many farms and gardens have been created, as well as nurseries and demonstration gardens that serve as environmental education tools.

In addition to urban gardening and farming, the implementation of organic techniques has gained popularity in Cuba throughout the 1990s. Garden sites are grouped into five categories: *huertos populares* (private gardens), *organopónicos* and *huertos intensivos* (raised bed gardens with high compost content), *autoconsumos* (institution-owned and operated gardens), *campesinos particulares* (small individual farms), and *empresas estatales* (state enterprises) (Murphy, 1999). *Organopónicos* use container bed gardening methods, with compost-enriched soil to improve on the frequently poor soil of urban areas. *Huertos intensivos*, or intensive gardens, draw on the biointensive gardening techniques promoted by American farmer John Jeavons, which employ concentrated areas of production in compost-enriched raised beds without containers (Murphy, 1999). In 1997, the urban agriculture department announced an 11-point program for these types of gardens that emphasized increasing crop diversity and improving soil fertility. Many of these gardens are also implementing a timed drip-irrigation system to conserve labor and water (see Figure 2). Some of the *campesinos particulares* have combined reforestation and farming, planting guava and avocado trees between rows, thus providing shade for crops and added income for farmers (Murphy, 1999). *Hidropónicos*, in which



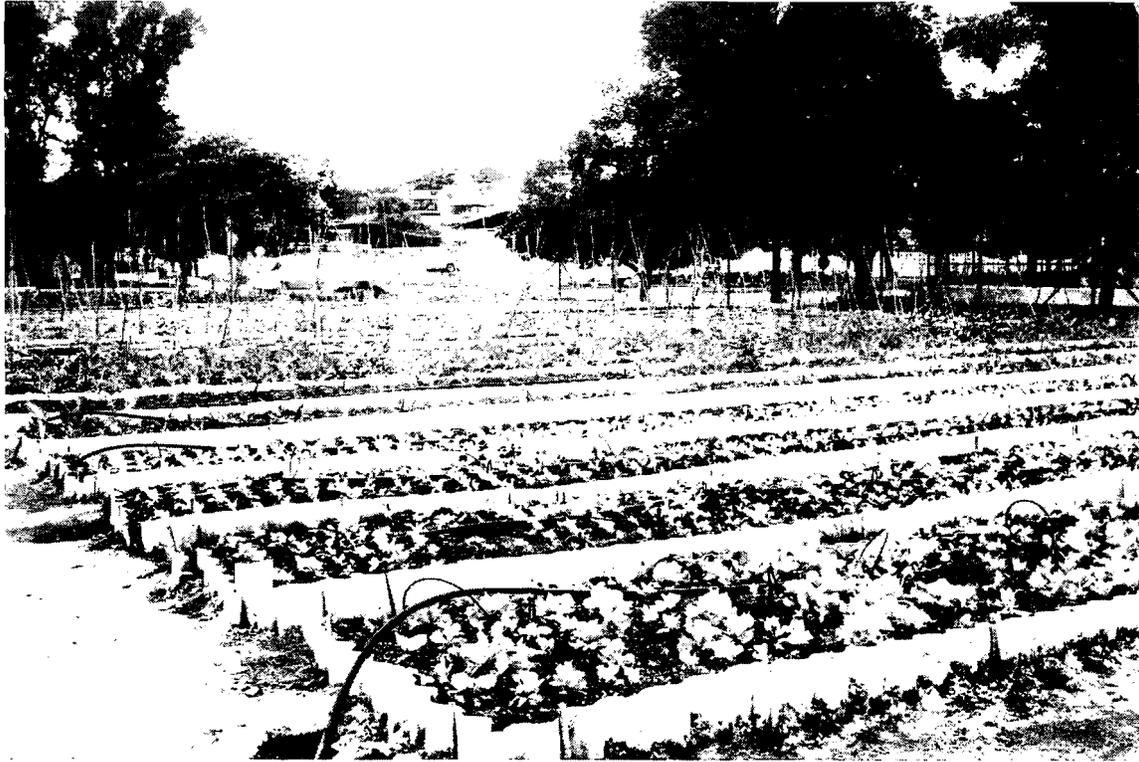


Figure 2. Many *organopónicos*, like this one in Miramar, use a timed drip-irrigation system.

crops are grown primarily in water and root in sand or small stones, are gaining popularity in Havana as well.

In recent years, the Cuban government has made allowances for some areas of private sales, such as produce sales in farmers markets. Many of the urban gardeners who produce food for themselves and their communities now sell their extra produce, usually at lower prices than are available on the black market (Pérez-López and Travieso-Díaz, 1998). All *autoconsumos* and many *organopónicos* produce food specifically for an organization like a school or daycare facility, hospital, research facility or worker's canteen. The gardeners who provide food for a community organization are paid a monthly salary from the government and are allowed to keep the profits from the sale of surplus produce. In addition to government regulated donations, as much as 80% of urban gardeners in Havana donate some percentage of their harvest regularly (Murphy, 1999).

Production on urban farms in Havana has been enhanced by research on improving methods,

material support and agricultural extension outreach. Extension agents help gardeners gain access to land, distribute vacant areas, and spread information about ecologically sound growing techniques. One of the best forms of material support has been the creation of seed houses that are designed to be responsible to the farms and gardens they service. Seed houses provide gardeners with tools, plants, seeds, biofertilizers, irrigation parts and educational materials. Research centers have been engaged in the task of determining ways to make organic urban agriculture work. Some, like the National Institute for Basic Research in Tropical Agriculture and the Plant Protection Research Institute, have been instrumental in disseminating information about holistic farming, soil enrichment and biological pest and disease controls (Murphy, 1999). Other governmental agencies assisting urban gardeners include the Institute for Research on Pastures and Forage and the Soils and Fertilizer Research Institute. Due to all of these systems of support, food production from all growing units in the city of

Havana measured 160,000 tons in 1997. Some of Havana's neighborhoods are currently producing as much as 30% of their own fresh food supply (Murphy, 1999).

Also instrumental in assisting urban greening projects have been the many NGOs in the city of Havana, whose focus on community development was extended during the special period to emphasize community greening and food production. Among those NGOs who have provided the greatest support to urban greening issues are: *Asociación Cubana Para la Agricultura Urbana* (The Cuban Association for Urban Agriculture), *Fundación de la Naturaleza y El Hombre* (Foundation for Nature and Man), *ProNaturaleza* (ProNature), *Consejo Ecu­ménico* (Cuban Council of Churches), *Grupo Para el Desarrollo Integral de la Capital* (Group for the Integral Development of the Capital), *Cuba Solar*, *Proyecto Comunitario de Conservación de Alimentos* (Community Food Preservation Project), Martin Luther King Center, and *Asociación Cubana de Producción Animal* (Cuban Association of Animal Production) (Murphy, 1999). Grupo Para el Desarrollo Integral de la Capital is a multifaceted organization that deals with economic, environmental, health and spatial issues in Havana through community-based projects and education (Fernandez, 1999). *Fundación de la Naturaleza y El Hombre* has developed an extensive environmental education program, including workshops on permaculture (an organic farming technique that utilizes specific plants and animals to create a small scale ecosystem) and creating "nature-grounds" in schools, to educate the public about the benefits of urban greening and other national environmental concerns. *Fundación* also publishes a magazine focused on the urban environment called "Se Puede Vivir en Ecopolis" (We can live in Ecopolis) (Author interview, Cartaya, 1999).

In addition to concentrating energy on food production, Havana has implemented a program called *Mi Programa Verde* (My Green Program), which encourages individuals to take responsibility for urban reforestation. The program, according to Cuban government sources, is responsible for planting as many as five million fruit and wood-producing trees in the city of Havana and aspires to plant 17 million more by January 2000. Although it is difficult to verify the exact numbers of trees planted, and government estimates can be exaggerated, the abundance of tree nurseries (in

particular, in connection with community education programs) throughout the city of Havana reflects a commitment to urban reforestation. The planting of trees that have a practical, consumer use is a continuation of Cuba's plan to work toward a sustainable society. The philosophy behind *Mi Programa Verde* encourages individual communities to take initiative for the improvement of their physical environment. Close to 90 nurseries in Havana provide trees for the program, including cashew trees, which are being reintroduced to the island after near-extinction (Murphy, 1999). Another program currently in progress is the creation of *Parque Metropolitano* (Metropolitan Park), a 700 hectare reforested area the majority of which is being transformed from a former industrial area (see Figure 1. Regional Map of Havana: Relevant Projects). Other area features, such as the Almendares River and a number of historically significant buildings, will be preserved and incorporated in the park. The project is time-consuming and costly, but in these hard times the group managing the park is drawing resources from a partnership with the Canadian Urban Institute. It is worth noting the mission statement of the creators of *Parque Metropolitano*: "To create, together with the inhabitants of the capital, a sustainable urban park, ecologically, economically and socially, for everyone's enjoyment." (Metropolitan Park Group, 1999).

It must be clarified here that Cuban idealism, though sometimes poetically optimistic, has a way of translating somewhat differently into reality. Despite the inspired idea of working toward sustainability, there is still a tangible atmosphere of need among Cuban communities where basic goods like soap, clothes, and staple food items are hard to come by. Recycling programs, though an integral part of most communities, have yet to be organized in a consistent and thoroughly successful manner. Shortage of water, poor soils, plant pests, theft, limited seed diversity and a shortage of labor and youth involvement are some of the obstacles urban farmers face, though many are finding solutions to these problems (Murphy, 1999). The success of such programs as *Mi Programa Verde* depends on committed members of communities for care and maintenance of the trees. The reforestation process in Havana is also challenged by dense old neighborhoods and narrow streets. One of the biggest obstacles to overcome, as noted by many sources, is public opinion. The association of green areas (in

particular vegetable gardens) with rural (and urban) poverty is one perception that is changing. In the 1960s and 1970s, growing food crops in public view in the city was considered a public nuisance. Now it is a common sight to see block-long *fincas* (farms) growing produce, as well as individual plots on front lawns or window boxes. The absence of significant youth involvement is being countered by education and public broadcasting, which airs two environmental programs in addition to numerous public service announcements about littering and recycling (Murphy, 1999). The current struggles that the Cuban people face indicate the continued need for education and community-based projects related to community greening and food production. It is important to be aware that the Cuban struggle for economic and environmental sustainability is not unique, but a reflection of similar struggles happening all over the world.

Internationally, environmental and community groups have begun to notice Cuba as it takes steps toward sustainability in urban neighborhoods. The 1999 Alternative Nobel Prize was awarded to a Cuban organization, *Grupo de Agricultura Organica* (GAO), which has been influential in Cuba's transition to organic agriculture. Yet there are those--including many Cubans--who insist that the move toward environmental sustainability has been motivated primarily by economic need. What qualifies these steps as a movement? Would Cuba have taken steps toward sustainability if it had been included in the world economy? And is the United States' blockade against Cuba, devastating though it has been on individual lives, indeed a blessing in disguise? These questions can only be answered by Cubans themselves, since they are best qualified to determine what their country needs. One urban farmer, a retired professor of agriculture, reflected that although he believes there is no movement toward sustainability, only a response to extreme need, most Cubans have a learned sense of stewardship toward the environment because "ecological awareness is taught in schools." (Author interview, Yzquierdo, 1999). Whether the changes in environmental policy and practice in Cuba can be classified as a movement or not, the fact remains that the Cubans have some strong points on their side. One such factor is their excellent system of education that has taught literacy and awareness of community responsibility to Cubans everywhere, from remote villages to Centro Havana. Urban greening in

Havana also speaks to the dissolution of the boundaries between city and country that have so often divided the island. It is renewing the connection between urban residence and an awareness of nature as a necessary part of daily life. When examining urban greening issues in Havana, overall, it is important to remember that Cuba is an island in more than one sense of the word. Adrift in the world economy, but slowly building alliances, Cuba is drawing upon its own resources, labor, and creative spirit in order to build communities that are approaching new levels of self-sufficiency and sustainability.

## REFERENCES

### Written Sources:

- Aguila, J. M. del. 1994. *Cuba: Dilemmas of a Revolution*, third edition. Boulder: Westview Press.
- Cole, K. 1998. *Cuba: From Revolution to Development*. London: Pinter.
- Jatar-Hausmann, A. J. 1999. *The Cuban Way: Capitalism, Communism and Confrontation*. West Hartford: Kumarian Press.
- Moskow, A. 1997. Havana's Self-Provision Gardens. *Community Greening Review* 7: 17-19.
- Murphy, C. 1999. *Cultivating Havana: Urban Agriculture and Food Security in the Years of Crisis*. Development Report No. 12, Oakland: Food First, Institute for Food and Development Policy.
- Pérez, L. A. Jr. 1995. *Cuba: Between Reform & Revolution*. New York: Oxford University Press.

Pérez, M. 1999. *Local Policy Approach with Community Participation for Environmental Improvement*. Havana: Report from Group for the Integral Development of the Capital.

Pérez-López, J. F. and Travieso-Díaz, M. F. eds. 1998. *Perspectives on Cuban Economic Reforms*. Special Studies No. 30, Tempe: Center for Latin American Studies Press, Arizona State University.

Rodríguez, C. R. 1965. *Four Years of Agrarian Reform*. Republic of Cuba: Ministry of Foreign Relations.

Rosset, P. and Benjamin, M. 1994. *The Greening of the Revolution: Cuba's Experiment with Organic Agriculture*. Melbourne: Ocean Press.

Skidmore, T. E. and Smith P. H. 1989. *Modern Latin America*. London: Oxford University Press.

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