Urban agriculture and sustainable urban systems: a benefits assessment of the garden movement in Havana, Cuba

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Abstract: The sustainability of urban systems is at the forefront of many national environmental agendas, both in developing and developed countries. Urban agriculture (UA) is a concept that has captured the imagination of a growing number of environmentalists, poverty activists and urban planners alike, with its capacity to deal with a number of environmental and social pressures that arise in urban areas. Despite the significant market and non-market benefits of this activity, UA is still marginalised in urban planning and considered inconsistent with the idea of a modern city. This paper argues that in order to make optimal decisions on the role of UA in urban sustainability, an extended assessment of the total economic value of UA, encompassing social, environmental and economic benefits, must be made. Results from a contingent valuation study on the value of popular gardens in Havana are presented.

Keywords: Sustainable city; urban agriculture; Cuba; contingent valuation method.

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1 Introduction

"The cities of the 21st century are where human destiny will be played out and where the future of the biosphere will be determined. It is unlikely that the planet will be able to accommodate an urbanised humanity that continues to draw upon resources from ever more distant hinterlands." [1]

The sustainability of urban systems is at the forefront of many national environmental agendas, both in developing and developed countries. Indeed, in less than five years more than half of the world's population will be urban [2]. Clearly, sustainability issues have arisen from this reality, as cities often function as open-loop systems [3], consuming large amounts of resources and producing equally large amounts of waste. Moreover, cities harbour the majority of the poor, who have often come from rural areas seeking a better life.

Urban Agriculture (UA) is a concept that has captured the imagination of a growing number of environmentalists, poverty activists and urban planners alike, with its capacity to address a number of environmental and social pressures that arise in urban areas. While it used to be marginalised and associated with poverty, UA is increasingly gaining acceptance in the world community as a response to urban problems. Since the 1980s, UA has appeared on many national agendas and is being seriously discussed by international and national organisations. This is because the benefits of UA can be observed in many parts of the developing and developed world. The benefits include increased food production, employment and income, but are not limited to these. UA also provides *non-market* benefits such as improved health and recreational opportunities, strengthening of local communities and the enhancement of the urban environment through the provision of green spaces and waste recycling [3–9].

Despite these widely known benefits, UA is still marginalised in urban planning, considered a temporary activity and inconsistent with the model of a city within a modern industrialised economy. It occupies space where, it is argued, more economically valuable development could take place. This last argument might be accepted if the market value of the output of UA were simply compared to the current market value of a commercial development, for example. But, it is less clear cut if the non-market benefits of UA are included. If it were possible to measure UA's *total economic value* [10] the comparison would be more appropriate, as all benefits would be taken into account. In principle, decisions would be more socially efficient. Nugent has advocated such an extended framework for the evaluation of UA, when policy decisions need to be made regarding the level of support for the activity and how it fits into sustainable urban planning [11]. Yet, this approach is not without its own issues.

While measuring the monetary value of market goods is relatively straightforward, valuing non market benefits is difficult, simply because no market price for them exists and the methods to estimate these values are open to challenge. In addition, some would suggest that putting prices on the environment or our health is unethical and, on principle, should not be done. On the other hand, it is important to recognise that if there is no attempt to monetise these benefits, they will likely be ignored in the process of decision making. Like it or not, it is clear that policy makers respond best to alternatives that can be valued in monetary terms. UA does have elements of a non-market good, as it is not priced in markets in a way that captures its non-market aspects. Thus, attempting to price these aspects should provide decision-makers with more information so that non-market aspects are considered and better decisions are made.

Various methods are available for the purpose of non-market valuation. One of these is the contingent valuation method (CVM). It is a popular technique that has been widely used to elicit an individual's willingness to pay (WTP) for environmental amenities and can be a useful technique to measure the value of UA. The next section describes CVM

and is followed by a report on a recent application of the method in a case study in Havana [12].

2 The Contingent Valuation Method (CVM)

CVM is a widely recognised approach for non-market valuation. It is a method that "uses survey questions and hypothetical situations to elicit people's preferences for public goods by finding out what they would be willing to pay for specified improvements in them" [13]. Thus, CVM involves the assessment of individuals' WTP for a non-market good, or for changes in the quantity of a good [14]. The method circumvents the absence of markets for certain goods by creating hypothetical markets for them and asking respondents what they would do in specific hypothetical situations.

According to Carson [15], there are more than 2000 papers and studies dealing with CVM and the method has been used for more than 35 years, in more than 50 countries. CVM has received considerable acceptance in the United States and in other countries as a tool for measuring values to be used in benefit-cost analysis [16].

3 Case-study: measuring the value of popular gardens in Havana

3.1 Context

Since the revolution of 1959 and until the fall of the Berlin Wall in 1989, Cuba enjoyed favourable trade agreements with the Council of Mutual Economic Assistance (CMEA), the international socialist marketplace. In the 1980s, Cuba, the most populated island in the Caribbean, ranked highest among the Latin American countries in terms of health, nutrition, education and economic strength [17]. By 1989, they ranked 11th in the world in the Overseas Development Council's Physical Quality of Life Index, while the USA ranked 15th [18].

With the collapse of the Soviet Union, Cuba was plunged into a nationwide crisis, designated by President Fidel Castro as the *Special Period in Time of Peace*. Having lost its main trading partner, Cuba saw all types of imports drop, along with their relatively high quality of life. Deere reports that at the beginning of the Special Period, from 1989 to 1992, imports decreased by 63% [19]. In 1991, domestic output decreased by 25% and by 14% the following year. One of the most important sectors to be affected was agriculture and food. Indeed, food imports were reduced by 50% in the early 1990s, along with a 54% reduction in oil, a 60% drop in pesticides imports and a 77% drop in fertilisers [17]. All this combined to yield significant food shortages and food insecurity, which even resulted in an average daily per capita calorie consumption reduction of approximately 20% and an average daily per capita protein consumption reduction of 27% [20].

In this crisis situation, Cuba faced the challenge of increasing domestic food production while reducing dependence on synthetic agricultural inputs. This gave way to major and previously unthinkable, agricultural reforms by the Ministry of Agriculture (MINAGRI), including the dismantling of the state farms, their reorganisation into production cooperatives in 1993 and the opening of free agricultural markets in 1994 [19]. But most importantly, MINAGRI developed a vast program in organic and semi-

organic agriculture, characterised by alternative techniques of polycropping, relay cropping, use of natural fertilisers, biopesticides and minimum tillage [21].

Furthermore, oil shortages affected refrigeration and transportation of food from rural to urban areas. This led to a widespread popular and institutional movement of UA in Cuba [8]. The state instituted a usufruct system that granted free use-rights of state-owned land to individuals to produce for subsistence or commercialisation. By the end of 1999, approximately 190,000 individuals had received small plots in a number of areas of Cuba [22]. A large part of this usufruct land has been used for popular gardens (parcelas), ranging in size from a few hundred square meters to a hectare.

With a population of 2 million, 20% of the island's population, the capital Havana was hardest hit by the food shortages. Popular gardens now occupy 2,438 hectares of land in the capital city, representing 8% of its agricultural land, or 3.4% of the total urban land base. Approximately 18,000 individuals are involved in small scale UA in this city and produced 25,000 tonnes of food in 1999 [23]. These gardens now account for about 50% of the vegetables consumed in the city [22] and all of this is being produced with essentially organic methods.

After roughly ten years in the making, the gardens of Havana have generated many benefits: local food security, diet diversification, health and recreation benefits, as well as providing environmental benefits, such as waste recycling and green spaces. However, UA in Havana is still considered a temporary activity, which may have to compete with other types of urban development, as Cuba moves beyond the crisis mentality that spawned this development. Thus, UA is becoming a policy issue where Cuban authorities need to make decisions about land allocation and the role of small scale production. Beyond this, the 'Cuban experiment' has been the most ambitious attempt by any government to find a sustainable balance between a socialist model of how to organise agriculture and that of open market industrialised economies. To contribute to this issue, a CVM study was conducted to determine the value of the popular gardens of Havana, Cuba.

3.2 Methodology

A survey, including a section with WTP questions, was administered in 2000 to a sample of users of popular gardens. Respondents were actively engaged in agriculture on lots of land provided free of charge by the State. Using the bidding game technique [13], they were questioned on how much they would be willing to pay to keep access to their lots, through a monthly fee. Respondents were asked to value a standard sized garden of $1000m^2$. Another objective of the survey was to assess the importance of water shortages and the loss of production to theft. Thus, in a second WTP question, respondents were asked to restate how much they would be willing to pay with guaranteed access to water and better security from theft. They were also asked a series of qualitative and quantitative questions about their gardens and households, with the objective of relating these characteristics to their level of willingness to pay.

3.3 Results

3.3.1 Willingness To Pay for UA land

The sample consisted of 127 respondents, divided between two areas of Havana (Camilo Cienfuegos and Pogoloti-Finlay). Their mean WTP was 23.5 MN/month/1000m^2 [24] for the 'without improvements' scenario (WTP1), while this increased to 34.4 MN/month/1000m^2 'with improvements' (WTP2), access to water and security from theft (Table 1). To put this into context, these values represent 11% and 14% of total household monthly income, respectively. Other results and the survey instrument are reported in Henn (2000) [12].

Table 1 Users' mean willingness to pay and percentage of household income

	Camilo Cienfuegos	*Pogoloti-Finlay*	*Total*
MeanWTP1 (MN/month/1000m^2)	19.0	29.8	23.5
% of household income			11%
Mean WTP2 (MN/month/1000m^2)	25.0	45.8	34.4
% of household income			14%

These WTP results provide an indication of the value that users put on their gardening activity and there was evidence that this was related to various types of benefits. Indeed, although most respondents stated that the most important benefit of the garden was the increase in household food security, other benefits such as providing a recreational activity, improving personal health and contributing to the environment were also identified as important by respondents. These benefits would have been at least partly reflected in the WTP measure.

3.3.2 Aggregate WTP for popular gardens in Havana

According to estimates by the Urban Agriculture Department of Havana, 2,438.7 hectares of land were in cultivation [23]. It is possible to extrapolate from this information and the results of this study to estimate the value for all UA land in the city. On this basis, the total user value of land in UA in Havana would be 6.88 million pesos a year ($US 344,000). The user value of the proposed improvements in water and anti-theft services adds another 3.19 million pesos a year, to bring the aggregate WTP to 10.07 million pesos ($US 503,500) (Table 2). These aggregate user values could be interpreted as the potential rent that the State could extract for the use of the land. Yet these are most likely an under-estimate of the total value of UA, since non-user values are not considered.

Table 2 Aggregate WTP for popular gardens in Havana

	User Value of Land (in millions of Cuban pesos)	*User Value of Land ($US)*
Value for land in current conditions	6.88	344,000
Value for land with improvements	10.07	503,500
Difference	3.19	159,500

4 Conclusion

> "It seems that urban agriculture makes sense on ecological, social and economic grounds virtually everywhere on Earth. Governments should see it as an idea whose time has come." [25]

In many cities, UA has become a policy issue that has attracted much attention in the last decade. This is perhaps because of its important contribution to urban centres, in terms of social, environmental and economic benefit. Through environmental cost-benefit analysis, sustainable urban planning and land allocation strategies can take into account all these benefits and costs in order to arrive at optimal sustainable decisions that generate the most benefits for society as a whole.

This paper introduced CVM as one methodology that can provide information on the market and non-market value of urban agriculture, through carefully designed surveys and hypothetical scenarios. The Havana case-study showed that there is substantial social, economic and environmental value in popular gardens.

It is important to mention however, that non-market valuation comes with a certain degree of uncertainty. It is difficult for individuals to fully assess the importance of non-market goods such as urban agriculture in terms of monetary measures. Nevertheless, it is important to recognise that foregoing the attempt to value these goods may leave them out of cost-benefit frameworks that do use monetary measures to provide information for decision making. In this sense, CVM has a useful role in the evaluation of urban agriculture's contribution sustainable urban systems. Yet, there is more work to be done to develop this method and in particular to clarify the lessons that the Cuban experiment has for conventional agricultural policy elsewhere, including the developed world where a pernicious 'agricultural crisis' has managed to persist throughout most of the post World War II era.

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