ASSESSING THE POTENTIAL OF
SMALL-SCALE URBAN AGRICULTURE IN HAVANA

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February 2012
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**ACRONYMS**

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<tr>
<td>ACPA</td>
<td>Asociación Cubana de Producción Animal (Cuban Association for Animal Production)</td>
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<tr>
<td>CCS</td>
<td>Cooperativa de Créditos y Servicios (Credit and Service Cooperative)</td>
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<tr>
<td>EGAME</td>
<td>Empresa de Ganado Menor (Small-animal husbandry public Company)</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agriculture Organization</td>
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<tr>
<td>HLS</td>
<td>Household Livelihood Security</td>
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<tr>
<td>MCS</td>
<td>Multiple Case Study</td>
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<tr>
<td>UBPC</td>
<td>Unidad Básica de Producción Cooperativa (Basic Unit of Cooperative Production)</td>
</tr>
<tr>
<td>UN</td>
<td>United Nations</td>
</tr>
<tr>
<td>UPA</td>
<td>Urban and Peri-urban Agriculture</td>
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<td>GNAUS</td>
<td>Grupo Nacional de Agricultura Urbana y Sub-urbana (National group of Urban and Sub-urban agriculture)</td>
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ABSTRACT

Urban and Peri-Urban Agriculture (UPA) emerged in Cuba in the context of an economic and food crisis known as the Special Period. During this period, households seeking self-sufficiency began to produce food in their houses. The state was no longer the sole food provider. When the crisis ended, households continued to be involved in this activity. However, two decades have passed and households keep investing up to 80 per cent of their salaries in buying food products. Why and how has this occurred?

In Cuba, the state-managed rationing system which entitles each citizen to subsized foods, provides for subsistence but not for all the nutrients required for a safe and healthy diet. Furthermore, the island is constrained by a trade embargo which limits the availability of basic foodstuffs and agricultural technology. Cuba's rural agriculture regime is still mainly based on sugar monocropping (an export-oriented cash crop) and historically characterised by output insufficiency: it is still far from warranting food sovereignty and fails to adequately supply citizens with the foods they need.

Available literature on Cuban UPA has systematically overlooked the potential of privately produced food whereas public and mixed forms of UPA (e.g. state farms and cooperatives) have been a recurrent object of attention. This research aims at elucidating the functioning of household food production in order to assess its potential in contributing to household food security and agricultural livelihood in Havana, Cuba. Using the conceptual approach of Household Livelihood Security and adapting it by introducing context-specific factors, this research has allowed an identification of the main resources, constraints and opportunities specific to Havana urban farming. To unravel this process, sixteen case studies have been selected and analysed through a combination of qualitative and participatory research methods.

Research findings demonstrate that small-scale urban farmers are partially able to decrease the share of the income they spend on food. The sustainability of self-sufficiency depends on farmers’ ability and capacity to cope with structural constraints posed by urban pollution and insufficient access to water and land. The variables impacting on this strategy are to be found at two levels. Firstly, the human capital resources available to farmers (agricultural skills, knowledge of the local environment and resourcefulness) determine their coping strategies. This results in to higher output levels (be it in fungible or real income) and lesser dependence on external inputs. Secondly, in the Cuban context, where fifty years of socialism have forged a propensity for reciprocal trust and connectedness between individuals, farmers genuinely contribute to the enhancement of neighbourliness. They tend to put their social capital not only at the service of improving their productive farms but also at the service of improving their surrounding community. This can be observed in their efforts to make their neighbourhood more ecologically friendly.

Household food production may not confer high levels of food security but it has a significant potential in securing other households needs which can be traced to the attitudes of the farmers. By implementing measures aimed at the reduction of the aforementioned structural barriers, such a form of production can be improved. Small-scale UPA is a mechanism for households to be increasingly self-reliant, thus relieving the burden on the state. Simultaneously, it contributes to the strengthening of the communitarian civic ethos and the raising of a still incipient public environmental awareness. To acknowledge this on the political agenda requires assuming a broader perspective on food production aside from public and collective forms of organization. In rural and urban areas, semi-private small plots known as parcelas have already proved their potential in securing household food needs.
1. THESIS OUTLINE

The aim of this research is to describe the factors shaping the capacity of UPA to secure basic household alimentary needs in Havana, Cuba. I shall first explain the current evolution of the global agricultural system of which UPA is a part. I shall then focus on the specificity of homegardening as a livelihood strategy in Cuba. This theoretical background will reveal helpful in understanding the research context, which will be described in chapter 3. The main features of Cuba's past and current agriculture will be briefly addressed and related to the current characteristics of access to food in the island, and in Havana in particular. The origin and development of UPA on the island and in the capital will be explained. In the following chapter I will clarify the purposes of the research and provide a conceptual framework to my research questions. The methodological chapter will aim at describing and justifying the use of a qualitative and participatory approach as well as the multiple case study methodology and the main instruments for data collection will be described. The final aim is to provide the reader with the necessary information to interpret the research findings reported in chapter 6. These findings will be presented as answers to the “5 W” questions (who, what, where, why, how). The last chapter will be dedicated to conclusions and recommendations.
2. THEORETICAL DISCUSSION AND RELEVANCE

“Who controls food supply controls the people”
Henry Kissinger, 1973

2.1 Agriculture and the uneven distribution of food

In 2007, approximately one third of the world’s waged workers were employed in agriculture. According to the World Health Organization (2009), this is the largest employment sector in non industrialized countries and is also deemed to be a key pathway out of poverty.

In spite of such a large workforce, agricultural production contributes less than 5 per cent to the Gross World Product. Moreover, the number of persons facing malnutrition and hunger is not diminishing and reaches some 850 million (United Nations Millennium Development Goals Report 2010 : 9). Out of these, 815 million live in developing countries, of which 76 per cent in rural areas (FAO, 2004). Furthermore, numerous studies indicate these figures to have been constantly increasing in the last decade, despite sufficient food production to meet the needs of the planet’s population and despite more than five decades of “developmental action”. Indeed, even as population has increased, the availability of calories per person has also increased. Producing enough food in the future is possible.

Accordingly, since hunger and malnutrition cannot be directly attributable to global food scarcity, it may be concluded with Windfuhr and Jonzen (2001) that their cause lies in the uneven distribution of food, land and other productive resources.

The urgently needed global redistribution of resources and rights (clamored for by the development and aid industry for decades) never took place. What has gone wrong? I shall first attempt to answer this question by reviewing the main theoretical lines that inspire political and economical actors when making global decisions affecting food systems. In the following sections I shall describe the type of scholarly argumentation which is subtly legitimating the current unequal distribution, then, in contrast, what theoretical responses have been put forward by Cuban and Latin-American scholars.
2.2 The Green Revolution and the Modernization Theory

The agreements and policies controlling the international trade of agricultural products are key determinant factors in any country’s development and food security (Patel, 2007). Over the past few decades, the dominant neo-liberal economic discourse advocated increased pressure on poor countries to reduce recourse to subsidies and compete “freely” on the world food market. According to this view, the role played by agriculture in development had to be based on the key pillars of increased productivity and enhanced global competitiveness (World Bank, 2007). For that purpose, throughout the 1950s and 1960s, several developing countries witnessed major changes in their agricultural systems with the introduction of advances in irrigation and of new crops. This led to the development of intensive agriculture, requiring heavy reliance on technologies such as chemical fertilizers and pesticides, as well as abundant irrigation, modern transport and distribution networks. Progressively, other sectors would become incorporated by success, stimulating a “Green Revolution”.

This type of serialized model of increase in food production was conceived and promoted (convincingly at the time) as a means to eradicate poverty and hunger in developing nations and, ultimately, as a means to feed an ever-growing world-population. The advocates of this intensive agriculture based their ideas on the postulates of the Modernization Theory which claimed that underdevelopment had to be seen as a result of factors internal to a nation (for example traditionalism), that could, with assistance, be overcome by following the same modus operandi as that of industrialized countries and attain development.

The Green Revolution and the Modernization Theory nevertheless revealed inappropriate to solve problem of food insecurity and poverty in the global South. On the contrary, over the decades, they encouraged the progressive development of a neoliberal trade model which fostered peasant hunger and accumulation of capital benefits for food processing industries. According to Windfuhr and Jonzén, “the open world market and the low prices for all major commodities, piled on enormous pressure to produce as cheaply as possible” (Windfuhr and Jonzén, 2005 : 9). In these conditions, food insecurity and vulnerability among smallholder rural farmers is likely to quickly increase “in times of drought or heavy rainfalls, pests and diseases, insecurity and other misfortune” (Pouw, 2008 : 118).

In summary, this conception of agriculture and development led to the dwindling of local small size productive units, the rise of food speculation and unsustainable food prices, as well as to the consolidation of agricultural land and assets in the hands of big landowners, agribusinesses, and other large commercial entities.

2.3 The Latin American reaction: the Dependency Theory

Although the Modernization Theory had been the dominant paradigm driving and measuring development since the 1950s (Shepherd, 1998), it was not impulsed by a true engagement to the eradication of poverty and hunger. And the Green Revolution legitimated by this theory, finally worked against the poor.

These critical observations led to the development of the Dependency Theory according to which
underdevelopment is, on the contrary, caused by the intervention of external forces such as neo-colonialism, global market pressure and the host of transnational corporations. Partly based on neo-Marxism, this theory emerged at the beginning of the 1960s as a scholar reaction to the aggravation of Latin American development (Blomström & Hettne, 1987). The basic idea was that dependency from capitalist countries impaired development whereas breaking with them should lead to self-reliance and self-controlled development. Advocates of this theory believed such was the cause of the development of underdevelopment in Chile, Brazil, Mexico and Cuba.

Proposed solutions included a socialist revolution together with a partial or complete disconnection from the capitalist economic system. This is exactly what happened in Cuba. With the socialist revolution of 1959, Cuba achieved an anti-imperialist revolution resulting in the disruption of trade relationships with the United States, and thus also became an anti-capitalist revolution. It led Cuba to embrace Marxism as an ideology and a political model (Glaser & Walker, 2007). Obviously, this major change drastically altered Cuban social forms of agricultural organization, most importantly by the elimination of latifundios (large agricultural estates) owned by foreign companies, as will be explained more in detail in the Research Background (refer to section 3.2).

In a number of Latin American countries including Cuba, this social change and novel conception of development found its main inspiration in Marx's work. In Das Kapital (The Capital, 1867), he theorized that all social changes are a consequence of the clash between forces of production (tools, workers, etc.) and relations of production (relationships between classes of people through production, trade and distribution) (Blomström & Hettne, 1987). From this point of view, development dwindles when social relations do not match the available resources; class struggles occur when the beneficiaries of the unevenness attempt to retain power while those at the lower levels of society attempt to seize it. In accordance, Cuba became greatly critical of capitalism and engaged in favor of social equality and predominance of collective rights over individual ones (Vaillancourt, 1986).

2.4 The New Man, Humanism according to Che Guevara

The 1959 revolution also brought about the transformation of existing social structures and processes. This meant a progressive transformation in the ethos of citizens, including their beliefs and aspirations, by all available means, especially education.

Ernesto 'Che' Guevara's ideas gained particular relevance as a philosophical pillars of the new Cuba by way of his ideal of the Hombre Nuevo (the New Man) which was incorporated into the official discourse. According to Guevara, a revolution could only be authentic if it achieved to create new men and women. Perfect revolutionaries would be those who worked every hour of their lives bearing in mind that their work aimed at social welfare. Thus, working would not be a sacrifice, but rather something dictated by one's humanity. This idea is clearly expressed in one of Guevara's essays: “We are simply adjusting ourselves to the predictions of the scientific Marx as we travel this

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1 It should be noted that, during the 1960s, Cuba indeed ended relationships with capitalist countries. But the aim of ending its dependency, as envisaged in the Dependency Theory, was not actually achieved. In part due to the U.S. embargo imposed on Cuba in 1960, the island established strong ties with the Soviet Bloc and became a member in the COMECON (Council for Mutual Economic Assistance).
road of rebellion, struggling against the old structure of power, supporting ourselves on the people for the destruction of this structure, and having the happiness of this people as the basis of our struggle” (Guevara, 1960 : 509).

This humanistic approach of the revolutionary movement had a strong impact on, among others, the Cubans' conception of food access and food production: “people incorporated the notion of food security as a universal right” (Premat, 2003 : 94). Agriculture was promoted by public authorities as an activity in which food producers were “good revolutionaries” who consciously “contributed to the well-being of all” (2003 : 94).

This theoretical dimension will reveal crucial to understand the idiosyncrasy of Cuban agriculture in general and Urban and Peri-Urban agriculture in particular (from now on UPA). In Cuba, food production is an exemplary behavior and a state-sanctioned activity. This represents a stimulus for rural and urban agriculture. The manner in which this stimulus enhances the many potentials of UPA as observed in the research case studies, will be analyzed in section 6.6.

2.5 Food sovereignty and food security

Che Guevara's ideas on humanism were to be partly echoed, a few decades later, by post-development scholars. According to them, a site-specific transformation is needed “within a context of universal [and defensibly humanist] principles of dignity, individual and community sovereignty, and self-determination” (Patel, 2005 : 82). The concept of 'food sovereignty' emerged as an excellent catalyst of these ideas. It called for an international and yet localized humanism around the food system (Rosset and Martínez-Torres, 2010).

For the sake of comprehension, I reproduce below the definition of Food Sovereignty as recorded by the People's Convention on Food Sovereignty in 2004:

“Food Sovereignty becomes the right of people and communities to decide and implement their agricultural and food policies and strategies for sustainable production and distribution of food. It is the right to adequate, safe nutritional and culturally appropriate food and to produce food sustainably and ecologically. It is the right to access of productive resources such as land, water, seeds and biodiversity for sustainable utilization.”
(Framework for National Program on Food Sovereignty 2004 : 35)

According to Windfuhr, this highly political concept emerged as an argument to relocate the control of food production and consumption within the local environment and on the basis of democratic processes (Windfuhr and Jonzén 2005 : 5). This concept emerged as the conclusion of broader considerations on international solidarity claiming that people thinking and acting locally could oppose global forces (Peet and Hartwick 2009 : 229). In line with this, food sovereignty represents a return to the local dimension of development. As recognized by many authors, “food is local, not global”. Food production is linked to certain seeds, modes of production and a certain culture. For millions of people, identity lies in food and the traditional management of land resources. According to Weis, food sovereignty emphasizes the importance of keeping decision-making “closer to farmers and farming systems, not farther from them” (2007 : 181).

Food sovereignty is a concept that critically underscores the shortcomings of another concept, food security. The latter addresses the problem of access to food while it does not take into
consideration the sources of food or the possibility of local control over resources. A broad definition agreed during the 1996 World Food Summit, is the following:

“Food security exists when all people, at all times, have physical and economic access to safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life” (WFS, 1996).

According to Nugent (2000), besides access to food, the definition of food security explicitly integrates the need for a healthy diet. A healthy diet should include necessary vitamins and proteins, not only sufficient calories. Indeed, “variability in food consumption is desirable from a nutritional point of view” - and higher diversity of food and beverage items consumed implies a welfare gain (Pouw, 2008: 115).

Physical and economic access to food is a central issue in all definitions of food security. According to the World Health Organization, this concept is based on three principles:

1) Food availability: sufficient quantities of food available on a consistent basis.
2) Food access: having sufficient resources to obtain appropriate foods for a nutritious diet.
3) Food use: appropriate use based on knowledge of basic nutrition and care, as well as adequate water and sanitation.” (World Health Organization website²)

According to Valdés, Cuba is constrained by two main factors that prevent it from achieving food sovereignty in the strict sense of food self-sufficiency. First and foremost, Cuba has a tropical climate where it is extremely difficult to grow certain foodstuffs such as wheat or potatoes, non-tropical varieties that require exorbitant investments for their cultivation, a scenario far removed from Cuba’s financial possibilities. On the other hand, the typical Cuban diet is based on rice, beans, and meat. This compels agriculture to maximize the production of such foods within the island. Yet, available statistics (illustrated in figure 2) show that domestic outputs in these crops are insufficient to meet internal demand³.

2 http://www.who.int/trade/glossary/story028/en/ [accessed on 29/06/2011]
3 For example, Cuba’s 11 million citizens each consume an average of 60 kg of rice yearly. Nevertheless domestic rice outputs do not meet the internal demand. As of 2011 and according to a local newspaper, Juventud Rebelde, Cuba imports approximately 400 thousand tons of rice each year i.e. 60 percent of what is consumed on the island. As Valdés points out, rice production requires significant amounts of water. Cuba has undergone a serious drought in recent years, culminating in 2011 with the island’s most severe drought in half a century. Taking this into account, it can be concluded that self-sufficiency in basic staples such as rice will only be achieved by investing in culture of “dry-rice”.

Figure 2: Cuba’s import dependence for selected foods.
Therefore, an accurate terminology when referring to the island’s efforts in food self-provisioning is closer to food security rather than food sovereignty.

2.6 Urbanization of poverty

Proponents of food sovereignty advocate a reinforcement of the diversity and responsiveness of local food systems as a means to halve world poverty and eradicate hunger (Windfuhr and Jonzén 2005 : 6). In this sense, statistics demonstrate that improving access to food needs to be achieved not only in rural areas but also in urban areas for two main reasons:

1. in 2008, for the first time in history, the global number of people living in cities matched those living in rural areas (UNFPA 2007). As illustrated in figure 3, this trend seems to be long-term. Indeed, the world’s population living in cities is expected to double from 3.3 billion in 2007 to 6.4 billion by 2050. This urbanization process is accompanied by a phenomenon known as the urbanization of poverty (Ravallion 2001): “the population growth is combined with a gradual shift in the locus of poverty from rural to urban areas” (Ravallion in De Zeeuw et al, 2011).

2. the problem of poverty and high population density in cities may be aggravated by food insecurity: when, by 2050, food demand will have increased by up to 70 per cent (Willenbockel, 2011). Urban planners and policy makers may be forced to take into account the need to improve food production in cities.

In view of these escalating challenges, UPA appears as a means to achieve food sovereignty and contribute to alleviation of poverty. Not only can UPA be a source of employment and economic profits, but it can also meet nutritional needs, thus contributing to food sovereignty. With respect to this, the Food and Agriculture Organization (FAO) concluded that it is critical to “build more resilient cities by enhancing local food production and diminishing the dependency on food imports” (FAO 2008 in De Zeeuw et al., 2011 : 156).

2.7 Urban and Peri-Urban Agriculture (UPA)

UPA is a relatively new concept, nevertheless it is an old phenomenon. Indeed, virtually all cities in the world have expanded upon fertile agricultural land. It was only in 1996, during the Habitat II Conference (convened by the United Nations), when the need for researching and supporting UPA
was recognized internationally.

Definitions of UPA tend to focus preferentially upon one or another of its many dimensions such as geographic location, types of crops and of economic activities, etc. The most comprehensive definition and the most widely used in related literature is the one given by Mougeot. He defines UPA as:

“an industry located within (intra-urban) or on the fringe (peri-urban) of a town, an urban centre, a city or metropolis, which grows or raises, processes and distributes a diversity of food and non-food products, reusing mainly human and material resources, products and services found in and around that urban area, and in turn supplying human and material resources, products and services largely to that urban area”.

(Mougeot, 1999 : 11)

In developing countries, this activity is carried out by a significant number of urban and peri-urban dwellers: approximately 800 million world-wide (Smit, Ratta and Nasr, 1996). Moreover, it encompasses a variety of production systems, “ranging from subsistence production and processing at the household level to fully commercialized agriculture” (van Veenhuizen, 2006 : 2, as illustrated in figure 4).

**Figure 4: main policy perspectives on urban agriculture**

Source: Dubbeling and de Zeeuw (2007)
2.7.1 Potentials and risks of Urban and Peri-urban Agriculture

The most specific aspect of UPA is that it is an integral part of the urban economic, social and ecological system. UPA uses urban resources such as land, labor, urban organic wastes, water and is heavily influenced by urban conditions (policies, land competition, urban markets and prices) (van Veenhuizen, 2006).

Duchemin et al (2008) investigated UPA in Montreal as a tool to tackle poverty-related problems in significantly disadvantaged districts. According to the authors, urban agriculture not only increased access to vegetables, but also led to social interactions that fostered individual and collective social developments (figure 5).

- **UPA plays an important role in enhancing urban food security** (Seeth, Chachnov, Surinov & Von Braun., 1998; Ruel, Haddad, and Garrett 1999 in Nugent, 1999). This is perhaps the strongest argument in favor of UPA if we take into account the high proportion of income that urban dwellers invest in food. A global estimate points to the fact that 15-20 per cent of global food is produced in urban areas (Armar-Klemesu in Nugent, 1999).

As will be further explained in the research background section, Cuba’s urban dwellers spend up to 80 per cent of their income in purchasing foodstuffs. Moreover, as expressed in figure 6, global food prices continue rising.

Research on UPA and food security shows that UPA increases access to food...
and to a healthy diet, especially for low-income groups, in different manners:

- it may provide an important share of household food consumption;
- by growing their own food for consumption, households may reduce their expenses in food;
- by selling the produces they grow, urban households generate income which may be used, amongst others, to the purchase of food (thus contributing to the households' members dietary health, a crucial component of food security);
- cheap food produced by UPA benefits low-income urban consumers because “it is made available at a lower opportunity cost of their resources than alternative means of obtaining food” (Nugent, 1999 : 4). It will be seen in further chapters that this potential of UPA is crucial in Havana;
- another aspect revealed in literature is that “urban farmers consume greater quantities of vegetables than non-urban farmers and wealthier consumers” (Armar-Klemesu in Nugent, 1999 : 6).

- UPA contributes to local economic development. It is more than merely food-related: it provides agricultural as well as non-agricultural employment opportunities. In the latter category is the commercialization of UPA products (edible as well as non-edible). Here, urban food production has an advantage compared to rural agriculture: “it is located close to consumers with purchasing power” (FAO, 2011 : 9). Furthermore, ready-to-eat foods and beverages sold on streets represent an alternative for the marketing of urban agricultural production. Last but not least, UPA generates agricultural employment opportunities in the city such as providing waged jobs for agricultural laborers. For example, in Havana 117 thousand people are involved in urban food production (Gonzalez Novo & Murphy 2000).

- UPA can play a role in improving the urban environment. Urban food production in cities also addresses non alimentary needs of the urban population such as sustainable development and environmental protection (TUAN 1994, IFPRI 1998, FAO-COAG 1999, in de Zeeuw et al, 2011). It contributes to the greening of the city by maintaining green open spaces and enhancing vegetation cover (de Zeeuw et al, 2011), thus reducing the cities CO₂ footprint. It may also be “a source of innovation and learning about new strategies/technologies for land and water-efficient food production” (Smit & Bailkey in de Zeeuw, 2011 : 156), which often include the productive recycling of urban wastes. Moreover, UPA seldom makes use of chemical fertilizers or pesticides because of the hazard to health these products entail, especially in densely populated areas.

Nevertheless, urban farmers often work under harsh environmental conditions. Land and water resources, besides falling short, are often polluted by industrial contamination, traffic and insufficient collection and treatment of household wastes. These factors are important determinants of the types and styles of farming in urban settings, and are strong motivators of technical and organizational innovation (Prain and de Zeeuw, 2007). Indeed, such innovations “are the outcomes of a process through which people or individuals in a given locality discover or develop new and better ways of doing things, using locally available resources and their own initiative” (Critchley et al, 2007 : 4).
2.8 Homegarden Agriculture and Household Livelihoods

Home gardens, also named house gardens, kitchen gardens or house-lot gardens are defined as:

“spaces around dwellings that are used to satisfy household supplies for food, fiber, medicine, and construction materials, as well as providing places for recreation and aesthetic experiences” (Kimber 1966).

In this research I will use the term small-scale UPA because I will not only analyze gardens but also other productive agricultural spaces adjacent to or inside the dwelling such as rooftops, balconies, corridors and window sills.

Urban home gardening, as opposed to other larger modes of agricultural production in the city or to home gardening in rural areas, is a particularly undocumented phenomenon and its impacts remain understudied (Henn and Henning, 2002; Redwood, 2009). In the literature reviewed, homestead gardening understood as a strategy for community development and a means to improve food security has its advocates but also its detractors. Critical perspectives suggest that its sustainability is questionable if taken into account the rapid growth of the urban population in the world (Marsh, 1998). Furthermore, some authors conclude that frequently it is not cost-effective or viable for households not having access to key resources such as land. In this case, home gardening in poor households may turn out to be an unreliable source of food and a livelihood doomed to failure. Lastly, such an activity (and, broadly speaking, UPA) is often considered as occupying expensive urban space that should be used for more economically profitable purposes (Henn and Henning, 2002). For this reason, UPA in general tends to be sidelined in urban planning and landscape architecture.

Regarding the potential contribution of small-scale UPA to household food security, research points to two contradictory conclusions. Some claim that household urban food production aimed at self-consumption rarely confers self-sufficiency. “More often it is seen as a means to supplement the diet with safe and adequate food.” (Redwood, 2009: 230). According to Mougeot, UPA in general “is unlikely to turn any city or most households fully self-sufficient in all of the food which they may require” (Mougeot, 2000: 32).

As opposed to such arguments, promoters of small-scale UPA claim that home gardening is an inherently strong intervention to quantitatively increase and qualitatively improve urban nutrition (Berti et al., 2007: 607). Moreover, it is easy to reproduce successfully since even households with little access to income or land can grow food and raise small animals on their rooftops, in cellars, on small patches of land or idle lots (Nichols and Hilmi, 2009). Marsh adds that this mode of production is in fact accessible and viable to poor households inasmuch as “it relies on low-cost, low-risk technology and may be adapted to hostile environments” (Marsh, 1998: 5). Over the past twenty years, several studies have proved that UPA on small lots of land can significantly contribute to food security by supplying families with an important percentage of daily recommended intakes of proteins, calories, vitamins and minerals (Niñez, 1984; Marsh, 1998; Altieri et al. 1999). A case study in Havana’s small-scale private urban agriculture two investigations have been conducted. The most extensive is by Adriana Premat, in a ten-year research fieldwork to understand the extent to which small-scale productive units in Havana are spatial re-configurations of urban land that express shifts in farmer’s civic ethos.
study conducted in Mumbai, India, found that poor households who grew plants for family consumption had a higher mean energy consumption than their non-farming neighbours (Gilmore, 2010).

Families are typically motivated by this livelihood strategy because of the security and sustainability of access to food, and its potential contribution in meeting other household basic needs. Indeed, home-based agricultural production represents for many urban farmers a significant source of extra income. According to Marsh (1998), the productive space may experience seasonal variations but, in general, it yields an important proportion of total income (more than 20 per cent of the total financial resources) for many urban farmers: these have the possibility of marketing their surplus vegetable and animal products but also save in food and medical expenses.

Figures relative to the amount of money earned or saved differ according to the different cultivation methods, the environmental context and consumption patterns of the household. On the other hand, it is difficult to make a clear distinction between production for home consumption and market-oriented production, particularly in the Global South, where a significant proportion of household income is invested in food provisioning (Baumgartner & Belevi, 2001). Despite this vagueness, small-scale UPA can generate real income as well as fungible income, the latter meaning “the substitution of goods or labor for money that would have to be earned to acquire these or equivalent goods” (Baumgartner & Belevi, 2001: 10).

According to Nugent, the income, whether real and fungible generated from UPA is contingent upon:

- farming effort
- availability and cost of inputs
- crop yields
- access to markets or other buyers
- ability to store, transport, process and preserve products
- prices, as determined by supply and demand of related products

According to Nugent, the income, whether real and fungible generated from UPA is contingent upon:

5 Currently in Cuba, the law of supply and demand does not apply.
3. RESEARCH BACKGROUND

"What happened in Cuba was remarkable. The Cubans went for food security and part of that was prioritizing small farmers."
Laura Enriquez (1999)

3.1 The Setting: Havana, Cuba.

Havana was selected for this research because its urban and peri-urban agriculture (UPA) includes all the forms occurring in the country (Cruz and Medina, 2003). Moreover, “Havana has its own structure created by the Ministry of Agriculture and other government agencies and, being the capital, best displays the positive and negative effects of UPA” (2003 : 12).

The city covers 727 km², i.e. 0.67 per cent of the country’s territory. It is the most densely populated area, with approximately 2,200,000 inhabitants, or roughly 20 per cent of the population on 0.4 per cent of the arable land. It is the largest city in the island and the second largest in the Caribbean, after Santo Domingo. The city is constitutes one of the 15 Cuban provinces.

It is crossed by 12 rivers, the main being the Almendares of which 20 of its 48 km are in Havana's peri urban and urban area). The climate is tropical: with mean annual temperature 25,2ºC, relative humidity 79 per cent and annual average rainfall 1400 mm, a rainy season from June to November and a dry season from December to May. Such climatic characteristics are favorable to crops such as coffee, sugar, cocoa and a variety of fruits and vegetables (Benjamin et al, 1986). Unfortunately, three major hurricanes have hit Havana in the past five years.

The city is divided into 15 municipios (municipalities). The most central display typical urban features and the oldest constructions in the city. The others are mostly sub-urban: many roads are unpaved, water is available only for 24 hrs every 4 days, spontaneous and non-spontaneous vegetation is frequent and food prices are cheaper.
3.2 Cuba: a brief history of agriculture and food security prior the Special Period.

Why did agriculture developed inside Havana, and is that of importance? The answer lies in Cuba's history of agriculture and food security. But most important now is to understand the main steps taken in the last decades, both at governmental and individual levels, to overcome a food insecurity evidenced by dependence upon chronic food-imports and by a punctual famine in the 1990s. UPA has thus emerged as a consequence of food insecurity and of the flaws in a system rooted in the Socialist cosmovision.

Spain was initially interested in Cuba for geostrategic reasons. But in the early 1700s, a growing sugar demand in Europe led to the development of a novel intensive sugar cane production. By 1862, Cuba accounted for almost one third of the world's sugar supply (Brenner et al, 2008). Such a powerful development could only occur with the labor of millions of African slaves and with a progressive global decline of staple food production.

In 1901, after the Spanish-American War, Spain ceded Cuba to American control. The island became an independent republic, yet its domestic and foreign affairs were controlled by the US. A number of restrictive policies ensured the American privilege over Cuba’s agriculture and other economic assets as well as certain military lands (such as Guantánamo Bay).

The bulk of the island’s agricultural production, (sugar, tobacco and coffee) was exported. Cuba’s imbalanced relationship with the US “gave it little opportunity to overcome its dependence on
sugar” (Brenner, 2008 : 6). Land, resources, industry and transportation were in the hands of upper-class *Criollo* and American landowners, while small holders and landless struggled against extreme poverty, hunger and diseases. A third of the food was imported, 70 per cent of which from the US (Benjamin et al, 1986 : 9).

This situation drastically changed when the 26th of July Revolutionary Movement seized power in 1959 under Fidel Castro’s leadership (refer to figure 7). Food security became a central issue for the new government’s (Premat, 2003). Castro himself made it clear: “it is inconceivable that people should go to sleep hungry when there is still land [in Cuba] left to be cultivated” (Castro, 1993 : 65 in Premat 2003).

Based on ideals of equality, solidarity and justice, the regime sought to unravel the vicious cycle of poverty and social inequality by redistributing wealth. Land was to be returned to the people… mainly by way of the State, as claimed by the popular motto: “more state property, more socialism” (Burchardt, 2000 : 171).

As showed in figure 7, rapidly a first agrarian reform granted land to about 110 thousand small farmers and transferred 45 per cent of agricultural land to the State. In 1963 a second reform brought State-owned land to 64 per cent and finally by the 1980s, to over 80 per cent (Premat, 20033).

The government’s concern was to rationally allocate resources to meet domestic demand while producing “export crops such as sugar, which remained [over the years] Cuba’s main source of revenue” (2003 : 86). Thus, at the end of the 1960s, as much as 60 per cent of the island’s arable

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**BOX 1: HISTORY OF CUBAN AGRICULTURE**

The history of Cuban agriculture can be divided into five periods:

- 1. Pre-colonial (prior to 1492)
- 2. Spanish colonial (1492 – 1902)
- 5. Socialist, post-Socialist bloc collapse (1989 until present)

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**Figure 7: Main events in Cuba’s rural and urban agriculture**

Source: own elaboration

As showed in figure 7, rapidly a first agrarian reform granted land to about 110 thousand small farmers and transferred 45 per cent of agricultural land to the State. In 1963 a second reform brought State-owned land to 64 per cent and finally by the 1980s, to over 80 per cent (Premat, 2003).
land was still devoted to sugar cane (Valdés, 2008 in Valdés, 1997).

Favorable trade terms between Cuba and the Soviet Union led the Cuban government to prioritize sugar and citrus for exchange against edibles and cereals (Burchardt 2000 : 172). This also gave the Cubans access to other foodstuffs, encouraging a problematic reliance on monocrops for export. These were conducted on productivist principles characterized by a great dependence on external supply. According to Funes, during the 1980s, “1 300 000 tons of chemical fertilizers and 600 000 tons of feed concentrates for livestock production were used every year, together with $80 million worth of pesticides” (2002 : 5). Thus the reconversion was not operated under the best conditions resulting in untoward environmental consequences ranging from large-scale deforestation to soil degradation due to salinity, erosion and loss of fertility (Funes 2002; Funes et al. 2008).6

As a result, the effort was not so much a quest for food sovereignty as, once more, a strategy of high dependency on imports. Indeed, during the 1980s, “Cuba imported two thirds of its foodstuffs, almost all its fuel and 80 per cent of its machinery (...) from socialist countries” (Funes et al. 2002 : 6). Specifically, at food level, 55 per cent of the calories, 50 per cent of the proteins and as much as 90 per cent of the fats were imported” (Burchardt, 2000 : 173).

Since food security could not only be obtained by land reform, it had to be achieved by an equitable distribution of basic foodstuffs at affordable prices. The rationing system was thus instituted in 1962. According to Premat, “it instilled in citizens the notion of national food equity while recreating the state as its guarantor” (2003 : 87). For the purpose of this research, it is very important to underscore that, in socialist Cuba prior 1989, the State was the central actor in providing food. It managed the rationing system, distributed food to schools, hospitals and workplaces, and was the only authorized buyer of agricultural products from private farmers. In the following sections I will examine the impact of the economic and food crisis known as the Special Period in Cuba and the shifts it entailed. Furthermore, I will describe how urban farmers became actors in supplying city dwellers, and show that, currently, the State may not anymore be the sole food provider in urban and peri-urban areas.

### 3.3 Agriculture and food security in post-1989 Cuba: a major shift.

In 1989, the collapse of the European socialist countries and the disintegration of the Soviet Union led to an acute crisis in Cuba: the island’s main trading partners had disappeared virtually overnight. Between 1989 and 1993, agricultural trade indices dropped dramatically (figure 8). The COMECON countries stopped purchasing Cuban sugar at a price far above current value (Figure 9) abolishing a major source of income. By way of consequence, in that period “import capacity was reduced by 75 per cent, bearing on foodstuffs, agricultural machinery, agrochemicals and industrial appliances” (Funes, 2002 : 7).

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6 A 1997 report stated that 11 of Cuba’s 14 provinces showed symptoms of desertification and more than 1.3 million hectares were brush covered.
The resulting economic crisis was named *Special Period in Time of Peace* by the government, referring to the fact that the situation was so calamitous that restrictions and rationing resembled war-time measures (Murphy, 1999). The food crisis was worsened by a reduction in agricultural production. Malnutrition and famine became real threats. Between 1991 and 1993 the average Cuban lost nine kilos (Cruz and Medina, 2003 : 23). The daily caloric intake declined from almost 2,700 kcal in 1988 to 1,800 kcal in 1993. Cuba was far from food security.

The shortage in key materials such as fertilizers, pesticides, fuel, spare parts for machinery, high-
tech equipment, etc., posed a serious challenge to the industrialized agricultural model. It is commonly agreed that it had been flawed in many ways for decades, being environmentally unsustainable and economically unviable (Valdés, 2007; Nova, 2009). A high degree of dependence on foreign inputs meant high investment costs uncorrelated with productive results. State farms in particular obtained disappointing results, a smaller number of them each year generating profits (table 1).

Table 1: Number of state farms generating economic profits
Source: Nova, 2009 and the Cuban Ministry of Agriculture.

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<tr>
<td>Generating profits</td>
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<td>Nº of state farms per cent</td>
<td>Nº of state farms per cent</td>
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<tr>
<td>1986</td>
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<td>39</td>
<td>132</td>
<td>33</td>
<td>132</td>
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<tr>
<td>1987</td>
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<td>67</td>
<td>257</td>
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<td>1988</td>
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<td>61</td>
<td>266</td>
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<td>263</td>
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<tr>
<td>1989</td>
<td>170</td>
<td>39</td>
<td>132</td>
<td>33</td>
<td>119</td>
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<tr>
<td>1990</td>
<td>257</td>
<td>61</td>
<td>266</td>
<td>67</td>
<td>266</td>
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<tr>
<td>Not generating profits</td>
<td>Nº of state farms per cent</td>
<td>Nº of state farms per cent</td>
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The government “appeared convinced that larger territorial units and rational state management would lead to higher agricultural production” (Premat, 2003 : 86), and that production was best marketed by and through the State, it then became evident, that the government could no longer produce sufficient foodstuffs “and efficiently distribute to the cities what little food was produced” (Premat, 2003 : 87). A major change was needed and a range of measures were introduced, including:

- decentralization of the state farm sector through new organizational forms;
- opening of farmers’ markets subject to supply and demand conditions;
- distribution of idle land to encourage production of different crops in various regions;
- reduction of specialization in agricultural production;
- production of biological pest controls and biofertilizers;
- return to use of animal traction;
- greater emphasis on local production, [including promotion of UPA]” (Funes, 2002 : 7)7.

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7 Rosset (2002) perceives in this change the emergence of an alternative food system. His words deserve to be quoted: “Cuba has taken enormous strides towards self-reliance since it lost its key trade relations. We hear that a country can’t feed its people without synthetic farm chemicals, yet Cuba is virtually doing so. We hear time and again that international food aid is the answer to food shortages; yet Cuba has found an alternative in local production.” (2002 : 5).
Figure 10 summarizes the changes intended to stimulate both general and localized food production, a task no longer entrusted to solo campesinos (peasants); it became the prerogative of all citizens in a collective effort to overcome the crisis.

In 1993, another important change occurred. The government began to break up large State farms into cooperative production units known as UBPC (Unidades Basicas de Producción Cooperativas, UBPCs from now on), While they had usufruct access to the land, land title remained with the state. Their right to decision-making remained limited, because state enterprises still dictated what commodities they had to produce and provided food collection, transportation, services, and available agricultural inputs).

In addition, a distribution of parcels under usufruct status was initiated in 1992. It granted lands to individuals who could demonstrate their capacity to work them. Parceleros (usufruct right owners) have a quota that they are required to sell at low prices to Acopio, the government’s food collection agency. The most important distribution of parcels took place between 2008 and 2010, when almost 1,200,000 hectares were allocated. Currently, over 4 thousand of these are in Havana province.

The shift away from large scale production of sugar encouraged smaller scale systems relying upon more sustainable, organic practices to grow fruits, vegetables and roots. Urban areas learned to better utilize the available labor and to improve food availability for an increasingly urban population8. It is in this context that UPA developed in Cuba.

7 http://data.worldbank.org/indicator/SN.ITK.DEFC.ZS
8 Currently, urban dwellers are 75% of total population (only 44% in 1958 (Nova, 2009 : 9). rural areas are increasingly
Before describing the particularities of UPA, it is important to explain how families have access to food in Cuba and the manner in which the economy functions. These aspects are crucial in understanding the value and potential of UPA as a livelihood strategy.

### 3.4 Access to food in Cuba

Among the socio-economic changes Cuba has undergone since 1989, according to Nieto et al., the most significant “are found in the diversification of channels of food distribution, and the greater variety of income sources for the population” (2002: 48). Nowadays, estimates point that Cuban’s per capita caloric consumption has recovered to pre-Special Period level (Nova, 2009) and that undernourished people sum 5 per cent of the total population (World Bank, website).

Nevertheless, and despite the shifts in agriculture described in the previous section, Cubans’ dietary needs keep depending mainly on food imports. Moreover, according to Valdés (personal communications, 2011), Cuban agriculture is particularly vulnerable to droughts, which can decrease output by 30 or 40 per cent. According to US intelligence data, Cuba is still short of meat, milk, and other animal products (Office of Global Analysis, FAS, USDA, 2008: 16). Benjamin points that “the Cuban diet, while magnificent by third-world standards, is not as nutritionally or economically sound” (1986: 12).

#### 3.4.1 The ration system

The Cuban ration system was established by the Cuban government at the beginning of the 1960s to ensure an adequate food supply for all citizens. Under this system, families are provided with a ration book (also known as *libreta de abastecimiento*, or ‘supplies booklet’) that entitles them to buy foods at very cheap, subsidized prices. These are available once a month in purpose-specific stores known as *bodegas* and *placitas*. In the case of meat, poultry or fish, they are available at the local *carnicería* (meat store). Products provided by the ration vary depending on geographic location, age and health status. Each household is entitled to one *libreta*, which lists all household members and the products they are entitled to (refer to table 2).

Social assistance programs have also been developed aimed at assisting low-income families and individuals with limited access to food. Free food is available for inpatients in hospitals and at low prices for pupils in primary and secondary schools.

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9 In his research, Nova González concludes that, in the last years, agricultural production has decreased, there are significant amounts of potentially arable idle lands and that food imports to cover the shortfalls of national production are rising (2009: 22).

10 Cuba is a long, narrow island with few large rivers and limited surface water. Supply of freshwater is is always a challenge. Furthermore, groundwater is increasingly susceptible to heavy-metal pollution and salt water intrusion in coastal areas.

11 For instance, children below 7 years old, the elderly, the ill and pregnant women are provided with 1 litre of milk per day.
Reports suggest, however, that the products provided by the ration system are insufficient to cover individual and household necessities (Mesa-Lago, 2006; Wright, 2009). The ration only provides 7 to 10 days worth of food (Mesa-Lago, 2006). Suffice it to say that for the remaining days of the month, household’s needs have to be purchased via other more expensive channels. As a result, urban dwellers end up spending up to 70 per cent of their salaries on food (Koont, 2008).

**Table 2: Price of the main staples available via the rationing system**

*Source: adapted from the rationing system's list as of October 2011.*

<table>
<thead>
<tr>
<th>Product</th>
<th>Quantity</th>
<th>Price* in Cuban Pesos</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>6 pounds (2.7kg)</td>
<td>0.70 / lb</td>
</tr>
<tr>
<td>Beans</td>
<td>20 ounces (570g)</td>
<td>0.32 / lb</td>
</tr>
<tr>
<td>Refined sugar</td>
<td>3 pounds (1.4kg)</td>
<td>0.15 / lb</td>
</tr>
<tr>
<td>Unrefined sugar</td>
<td>3 pounds (1.4kg)</td>
<td>0.10 / lb</td>
</tr>
<tr>
<td>Milk (only children under 7 years)</td>
<td>1 lt / day</td>
<td>0.25 each</td>
</tr>
<tr>
<td>Eggs (only from Sept. to December)</td>
<td>12 units</td>
<td>0.15 each</td>
</tr>
<tr>
<td>Coffee</td>
<td>1 ounce</td>
<td>5.00 / oz</td>
</tr>
<tr>
<td>Potatoes/bananas</td>
<td>15 pounds (6.8 kg)</td>
<td>0.40 / lb</td>
</tr>
</tbody>
</table>

*Cuban Pesos (CUP) are not a convertible currency (refer to section 3.5). They can be exchanged to the convertible peso (CUC) at a fixed rate of 24 CUP to 1 CUC. 1 CUC is approximately 0.87 US Dollars. In this table, prices are subject to fluctuations according to the day of the week and seasonality.

### 3.4.2 The non-rationing system

In an effort to avoid persistent food insecurity, new food distribution channels have been allowed. As forecast in section 3.2, the State is not anymore the paternalistic entity that produced and distributed virtually all the agricultural output in the island. Currently food from new sources is to be found in farmers’ markets (usually *in situ*), small cafeterias, restaurants and supermarkets. Nevertheless the population has limited access to that due to high prices. For example, in dollar stores, which charge prices literally hundreds of times higher the prices for the rationed products, one litre of milk costs CUC 1.75 (1.50 US Dollars) and 3 ounces of bread CUC 0.90 (roughly 0.80 US Dollars). Obviously milk and wheat flour are imported goods. In Cuba, the average monthly wage is 20 CUC or 17.4 US Dollars (Mesa-Lago, 2005). It is evident that these prices are not affordable for the vast majority of Cubans.

Fresh agricultural products (vegetables, fruits, eggs, honey, etc.), are available at farmers’ markets and *agromercados* (small-scale farmers’ market, often located at the entrance of cooperatives and selling fresh agricultural output coming from the cooperatives or produced in the vicinity) or via self-provisioning. Here farmers are allowed to sell surplus production (beyond state-imposed quotas) at free market prices, but in Cuban Pesos. By 2000, these farmers markets handled 25 to
30 percent of the farm products available to Cuban consumers (Office of Global Analysis, USDA, 2008). Plate 1 shows a list of product prices in an agromercado in the El Vedado neighborhood of Havana. The translation is illustrated in table 3.

**Table 3: products sold in a central market of Havana**

*Source: own elaboration*

<table>
<thead>
<tr>
<th>Item</th>
<th>Cuban Pesos</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cassava</td>
<td>2,00 / lb</td>
</tr>
<tr>
<td>Eddoe</td>
<td>3,50 / lb</td>
</tr>
<tr>
<td>Papaya</td>
<td>3,00 / lb</td>
</tr>
<tr>
<td>Avocado</td>
<td>4,30 / lb</td>
</tr>
<tr>
<td>Aji pepper</td>
<td>15,00 / lb</td>
</tr>
<tr>
<td>Beans</td>
<td>10,00 / lb</td>
</tr>
<tr>
<td>Chay</td>
<td>12,00 / lb</td>
</tr>
<tr>
<td>Banana</td>
<td>3,00 / lb</td>
</tr>
<tr>
<td>Banana “macho”</td>
<td>3,00 / lb</td>
</tr>
<tr>
<td>Guava</td>
<td>3,00 / lb</td>
</tr>
<tr>
<td>Banana “burro”</td>
<td>8,00 / lb</td>
</tr>
<tr>
<td>Garlic</td>
<td>2,50 / unit</td>
</tr>
<tr>
<td>Lemon</td>
<td>7,00 / lb</td>
</tr>
</tbody>
</table>

Despite these new sources, section 3.8 will demonstrate that an increasing proportion of Cubans make available a free (or low cost) source of food by way of their own homegardens, backyards, parcels and cooperatives.

### 3.5 The Community Economy

As previously mentioned, today Cuba circulates two currencies: the *peso Cubano* (the national currency), used for national transactions, and the *peso Cubano convertible* (convertible peso) used at international level. Since the Special Period, the Cuban government has somewhat modified its approach to the running of the economy. Reforms have led to the gradual decentralization of state services progressively transferred to non-state and private actors, with a particular importance of the tourist sector.

Some of the measures implemented during the last decade, have had an impact on the context in which Cuban UPA developed and operates. The most relevant for the purpose of this research is the authorization of *cuentapropismo* (self-employment). In 2010, more than 300 thousand persons in Cuba held licensed employments in businesses, services or activities previously in the hands of...
the state. 30 per cent of these self-employed citizens live in Havana. Moreover, 22 per cent of them are employed in the elaboration and selling of food, ranging from restaurants to small cafés and kiosks of take-away meals. This measure may be “in direct relationship to the rationalization of the labor force in a large number of government companies, to counteract the foreseeable growth of unemployment” (Cruz and Medina, 2003 : 6).12

Thus, family revenue does not come exclusively from the relationship between the population and the state by the means of waged work in state enterprises or from social security programs, as it used to be prior to 1989. Indeed, non-state work has increased as well as income-generating transactions between citizens (mainly as a result of cuentapropismo). Furthermore, incomes in convertible pesos and dollars have appeared due to remittances from Cubans living abroad, special incentives at work and the expansion of tourism and of the private service sector, and the rising black market.

According to local experts, the island is a perfect setting for a flourishing informal economy for two main reasons (Anonymous, personal communications, June 2011). One is a lengthy period of economic austerity, the other the inability of the state-controlled economy to provide adequate goods and services for the Cubans. Due to the decrease in the diversity and amount of goods available in state-run peso shops, “Cubans have turned increasingly to the black market for food, clothing, and household items” (Ritter, 2005 : 349). As a fellow Cuban student recently told me, “en Cuba no se vive, se sobrevive” (“In Cuba one does not live but survives”).

3.6 Urban Agriculture and the quest for self-sufficiency

Even when production started recovering, food supplies to cities lagged and urban dwellers resorted to growing some of their own. They were encouraged by an urban agriculture aimed at both private and commercial gardens on underutilized land. These gardens promoted an organic, sustainable production and succeeded in increasing the availability of fresh vegetables, and fruits. UPA emerged in Cuba as a response to a national food insecurity problem.

3.6.1 Historic evolution

Urban and peri-urban agriculture existed in Cuba for centuries, beginning in 1638, when the Santa Clara de Asis convent devoted a space to the self-provisioning of its nuns. In the early XXth century, a few people produced a limited variety of leafy vegetables and reared a few animals in backyards or small peri-urban plots. Prior to the Special Period, the state supplied basic necessities; and self-provisioning was not a necessity.

However, the Special Period was a time of food-shortage, difficult transportation due to fuel and scarcity of storage capacity for an increasingly urban population (Gonzales and Murphy, 1999; Murphy, 2000; Murphy, 2006; Koont, 2009). The limited access to foodstuffs in cities, enticed citizens to produce for themselves on whatever piece of land was available (Gonzales and Murphy, 2000). Thus we can conclude that UPA in Cuba was triggered by a necessity for survival, and was a subsistence-oriented type of urban agriculture.

12 Regrettably, figures on the tax of unemployment in Cuba are not available.
When the economy recovered, the government realized the potential of urban sites and began supporting UPA as a means to promote self-sufficiency in perishable foods and generate employment opportunities. The Ministry even started a garden in the front yard of its headquarters to feed the workers (Auld, 1999).

Since the 1990s, the government has facilitated the access to urban land (Valdés, personal communications, 2011). In parallel, the legislation restricting the free sale of produce has been made flexible and farmers’ markets have mushroomed in cities (Gonzales and Murphy, 1999). Government’s commitment strengthened a grass-roots movement that was already well underway (Murphy, 1999).

In 2010, annual UPA production has provided more than three million tones of fresh vegetables, and since 1996 it has provided employment for almost five hundred thousand workers, according to the Popular Power National Assembly. Unfortunately, these figures are not available for the city of Havana, nevertheless sources claim that it produces half of the citizens' needs in vegetables (Gonzalez Novo et al, 2008). According to Rodriguez Nodals (in Gonzalez Novo et al, 2008) agriculture in the city results from a combination of several favorable factors:

- high food demand. It has to be highlighted that, currently, 75 percent of the population in Cuba lives in urban areas (Oficina de Estadísticas, 2009).
- qualified working force and research centres;
- experience in community work;
- supportive administrative and social structures.

On the other hand, it is limited by a number of constrains:

- a need for optimization of management level and stimulation of citizen participation;
- legal vagueness, especially as to the length of usufruct of land allocated by the State.

### 3.7 Urban agriculture in Havana

Havana has been the pioneer for UPA in Cuba. As early as the XIX century Chinese migrants grew vegetables and fruit in peri-urban Havana and low populated areas. After their emigration in the decade of 1940s, local residents attended the crops. Peripheral municipalities such as Cerro, Arroyo Naranjo and the area of Rancho Boyero are blessed with particularly fertile soils.

However, the real take-off in 1992 was due to an important law allowing the usufruct of state-owned idle lots, free of charge, in urban and peri-urban areas (as mentioned in section 3.3). Seeds and agamic plants, agricultural implements and some 40 thousand watering cans were sold at cheap prices with the support of the Municipal Government and other public institutions. Havana's farms and gardens flourished. Over 30 thousand people are now engaged in growing food on more than eight thousand farms and gardens in the city (Cruz and Medina, 2003).
The Special Period, according to Cruz and Medina furthermore strengthened the civil society; “the NGOs that existed before this period were consolidated and new ones were created with new roles” (2003 : 24). Many of these organizations collaborated with the urban agriculture movement, encouraging synergic interactions between government and NGOs. Thus, the development of UPA in Havana has not only profited the urban population in terms of food security, employment opportunities or use of urban resources. It has also presented the population with better participatory means of action.

In 2001, foreign cooperation funds supporting UPA in Havana “amounted to approximately 2 million dollars” (2003 : 25). Moreover, new projects are being implemented introducing novel technologies such as greenhouses, for production of seedlings and fresh vegetables throughout the year. Figure 11 illustrates the main social forms of agricultural organization present in Havana.

Twenty years after its first development, Havana’s UPA now covers 12 per cent of the land in the city, involves 22 thousand urban and peri-urban producers, supplies the population “with 150 to 300 grams per capita of fresh vegetables and culinary herbs daily and has largely eliminated the use of small refuse dumps for urban garbage” (2003 : 4). According to several reports, as much as 90 per cent of the vegetables consumed in Havana are produced within its boundaries (Companioni and Hernandez, 2002; Koont, 2009). Thus, it is safe to assume that a transition of urban agriculture from cultivation for subsistence to cultivation for consumption by producers and for trading has occurred.

### 3.8 Small-scale, unwaged Urban and Peri-urban Agriculture in Havana

This thesis focused on the small-scale, unwaged production that takes place on private patios and rooftops in Havana. Such areas tend to be small though slightly larger in peri-urban areas. Yet, they may significantly contribute to food security and generate a modest income. In 2000, more than 104 thousand small-scale plots and patios generated a higher production than organoponicos and high yield gardens put together (Companioni and Hernandez, 2002). Furthermore, small-scale productive spaces tend to be agro-ecologic in keeping with a city-friendly attitude of citizens who
feel they are active elements in the urban ecosystem, growing food while preserving or improving it.

Patios and plots in Havana usually cultivate fruit trees, vegetables or medicinal plants (Altieri et al., 1999) and rear small animals for their meat, milk or eggs. Further, many farmers produce compost and organic fertilizers (González Novo et al, 2009).

As a social forms of organization in Havana, UPAs have significantly contributed to feeding the urban population, have cleaned and put under production a wide number of abandoned spaces, often trash dumps, “and have provided socially useful and productive employment opportunities” (Companioni and Hernandez, 2002 : 227).

The use of these small-scale spaces is an expression of urban dwellers who improve their self-provisioning capacity in order to attain higher levels of autonomy and resilience and comfort their self esteem in the face of a totalitarian though paternalistic form of government.
4. PROBLEM STATEMENT

In this chapter I will describe the relevance of my research and I will explain the way I linked the main theoretical discussions with the data collection process.

4.1 Justification

Since the beginning of the 1990s a noticeable urban agriculture movement has developed in Cuban cities and suburbs (Companioni and Hernández, 2002). Persons being part of this movement have the goal of sustainably producing fresh and healthy food from previously idle urban land. Indeed, the motto that one hears most frequently when interrogating food and agriculture experts in Havana is that Urban and Peri-urban Agriculture (from now on UPA) is the key to food security and urban environmental sustainability. As a confirmation of this, Cuban authors enumerate the three main principles on which UPA in the island is based:

- the use of organic and environmental friendly methods
- the rational use of local resources
- the direct marketing of produce to consumers (Companioni and Hernández, 2002: 220).

In 2002, Havana's UPA provided almost 50 per cent of the city's annual demand of fresh vegetables (Nodals, 2003). This seemingly successful movement has been echoed in Cuban and international media, and is a recurrent object of research (Cruz et al. 2003; Companioni and Hernández 2002, Koont 2008, Premat 2008, etc.), from different disciplines and viewpoints. According to most of this literature, UPA in Havana has proven to be an example of how cities can become not only more sustainable but also more self-reliant. In view of this, it is important to assess the limitations and benefits that favor UPA, bearing in mind that Havana is situated in an island which is not only geographically but also economically isolated (refer to sections 3.3 and 3.5). This means that resource availability and the different strategies to make the most of them should be at the centre of the analysis.

Furthermore, UPA in Cuba is an attractive issue for research in International Development Studies, because it is a central element in getting a glimpse of the genuinely novel pathway of development Cuba seems to be pioneering, a pathway aimed at reaching society's well-being by promoting ecologic awareness and making an optimal use of existing resources.

Nevertheless, the above mentioned literature on Cuban UPA has repeatedly overlooked agriculture taking place in private urban plots and has focused primarily on state-controlled forms of UPA such as cooperatives and popular orchards. One explanation may be that such independent productive spaces are officially unrecognized in that they represent private solutions to the problem of food insecurity, which until recently has been the exclusive responsibility of the State.

It has to be acknowledged that, since institutionalization in 1994, collective UPA forms of organization have developed in a prosperous way, and in Havana more than other Cuban cities (Cruz, 2003). But according to local experts, small-scale and officially unrecognized plots contribute quantitatively and qualitatively more to Havana’s food security than public plots depending on the
State administration. What is more, research has reasons to engage with private UPA in Cuba because urban plots worked by individuals and their families may be symptomatic of a “transformation of the civic ethos from one that is more communitarian to one that is more individualistic” (Premat, 2003).

4.2 Research question

As the theoretical framework illustrates, urban farmers working in plots which they own could be part of a broader movement of Cuban families seeking to enhance their level of self-sufficiency vis-a-vis of the state. UPA in Havana’s private plots seems to be a feasible pathway to a richer, fresher and more varied type of diet and simultaneously it seems that it is possible to receive a monetary reward from it. Nevertheless it is obvious that every livelihood outcome depends on the way in which available resources are used and combined. Indeed, optimizing their use and practicing environmentally sustainable agricultural techniques may be a shortcut to livelihood outcomes.

Urban agricultural production in post-1989 Cuba drastically increased the food supply and security in cities (Altieri et al. 1999; Koont, 2009), nevertheless its impact on food producers’ households has received little attention in literature. The few existing scientific analysis suggest that urban farmer households have experienced an increase in their access to fresh and healthy foods. Also, they have been able to save money that would otherwise be used to purchase food (Koont, 2009). Due to the fact that now producers are officially allowed to sell their yield surpluses directly to consumers, UPA is contributing to satisfying households needs also through supplementary income generation (Gonzales and Murphy, 1999).

This research aims at elucidating the way such a livelihood functions and how it uses urban resources, grows produce and brings benefits for involved families, neighbourhoods and city within the possibilities and constraints offered by the urban setting. Thanks to this analysis I should be able to assess if the theoretical framework holds together if extrapolated to current Havana’s UPA. The following research question condenses these interrogations in one question.

4.2.1 Main Research Question

In this thesis I explore the idea that UPA is an effective tool to buffer food insecurity, obtain monetary income and contribute to an ecologically aware urban development. My hypothesis is that agricultural livelihood strategies in Havana’s private plots meet the conditions to develop food systems that are socially just, environmentally sustainable and economically viable, but only if they make strategic use of available resources. Considering this and that there have been significant policy shifts and serious governmental resources supporting the UPA movement in Havana, I started from the assumption that there must be urban farmers who cultivate crops for the benefit of their families who optimize the use of resources, and others who do not or who do it to a certain extent.

Furthermore, I oriented my research question towards the concept of food security, based on the hypothesis that the most valuable outcome of home gardening as a livelihood strategy is the
enhanced access to fresh and nutritive food and to a healthy diet. According to Marsh, among the multiple potential benefits of home gardening, “the most important is increased direct access to nutritious foods by the food insecure” (1998: 4). Since I decided to research small-scale UPA from the point of view of its potential to complement household's food security, this is the research question I formulated:

**What is the potential of small-scale UPA in Havana to complement Household's Food Security?**

In this research I use the concept of livelihood strategy because urban farmers appear to be active agents capable of earning at least some monetary or fungible income as a result of their effort. Although many may have it as a part-time activity, UPA remains a livelihood strategy because it is considered by encountered part-time urban farmers as an activity that is as important as their main professional occupation. In the next section I will describe my research design by keeping this research question in mind.

### 4.2.2 Research sub-questions

The following research sub-questions will be needed to provide an answer to the research question:

1. What are the different available resources of private urban farmers and how do they combine their resources portfolio to carry out agricultural activities?

2. Are there various levels of livelihood dependency on urban agriculture in private plots?

3. What is the potential of small-scale UPA to contribute to the neighborhood's social capital?

This set of sub-questions will allow me to identify the following aspects.

1) The range and quantity of resources urban farmers have and how they combine them to achieve their self-defined goals. The research is based on a two-month long fieldwork, therefore not all financial, physical, natural, social and human resources are analyzed exhaustively. Rather, data collection focuses on understanding which out of available resources play the most meaningful role in providing particular livelihood outcomes. On the other hand, the different livelihood strategies will be understood in terms of the extent to which they optimize the use of resources. Therefore, and drawing on existing literature, the main variables are the extent to which urban farmers save, recycle, innovate with the resources they have and barter them.

2) In order to make accurate generalizations on livelihood outcomes it is first necessary to understand the extent to which individuals practicing UPA depend on this activity to meet their needs. The Havana experience shows that not all of them are full-time farmers and that they need to have other occupations to be able to make ends meet. Even retired producers are obliged to work after retirement to cover family needs. Therefore it is important to
identify and analyze the main factors defining a higher or lower livelihood dependency. This will allow a useful clustering of the different profiles of producers and at the same time it will allow comparisons with analogous research in other cities of the world.

3) Drawing on the theoretical framework, the reader can come to the conclusion that the socialist project underlying Cuba’s State policy has led to the creation of productive agricultural organizations that are highly dependent, controlled or managed by the State and its institutions. But far from that, Havana is home to both public (cooperatives, state-farms, popular orchards, etc.) and private spaces for agriculture (parcelas, backyards, rooftops, etc.), the latter being a result of the post-1989 privatization of agricultural land and activities in Cuba. An exhaustive analysis of food security and agriculture in Cuba since the triumph of the Revolution cannot overlook the spatial re-configurations that have attended changes in related policy and practice. According to Premat (2003), private plots also contribute to the neighbourhood through the sharing or bartering of produce, or the utilization of the space in ways that meet other community needs. Even if these plots may have been absorbed into the private domain both in appearance and function, “they re-emerge as community-centred – if not community managed – sites” (2003: 92). There are reciprocal linkages between the productive units and their surrounding community. Due to the prominence of the socialist values in the Cuban collective imaginary, and the likeliness of a context of trust and connectedness between neighbours, it is fair to appraise the contribution of small-scale UPA in enhancing neighborliness. The following main concepts extrapolated from the social capital framework will be included in the operationalization: cooperation, sociability, solidarity and networks.

4.3 Conceptual framework

**Figure 12:** A Household Livelihood Security conceptual scheme adapted to UPA in backgardens and rooftops in Havana.
4.3.1 Conceptual scheme

The conceptual scheme depicted in figure 12 is an adaptation of the Household Livelihood Security approach, which will be described in section 5.2, to the specificity of small-scale UPA in Havana. It represents urban farming in private plots as a livelihood strategy. In this scenario, urban farmers have access to a number of resources which they combine strategically in order to obtain certain outcomes. In this research, food security will be addressed as the most important while not excluding other possible outcomes. These tend to be oriented to the household, but they also spillover at the community and city level. This means that the initially family-oriented activity has also -voluntarily or not- an impact on neighbouring families and on the urban environment. The scheme also expresses how this livelihood is subject to the influence of structures and processes, the most significant of them being the state and NGO’s operating in this field. Also the vulnerability context needs to be taken into account, since UPA is susceptible to shocks, seasonality and trends. The most important factor may be the climatic condition and associated shocks (droughts and major hurricanes).

4.3.2 Operationalization of main concepts

From this conceptual scheme and taking into account the research sub-questions, I formulated an operationalisation scheme (refer to Appendix 1).
5. METHODOLOGY

This chapter aims at describing the research methodology. I will first explain why I chose a constructivist epistemological position vis-à-vis social reality and, subsequently, I will describe my realist theoretical perspective. Then, I will justify the appropriateness of using a qualitative approach and a multiple case study methodology. The main instruments for data collection and their purpose will also be explained. Lastly, the process of data analysis will be summarized, serving as a preamble of chapter 6 on data findings.

5.1 Methodological framework

5.1.1 Epistemological and Theoretical position

My epistemological position vis-a-vis this research is a constructivist one. Constructivism is based on the idea that “social phenomena and their meanings are continually being accomplished by social actors” (Bryman, 2009: 538). Therefore, I assume there is not a single reality or truth but a plurality of realities that are socially constructed by the persons experiencing them. It is from the interaction between social actors (in this case, individuals and the urban environment) that reality arises.

This entails a certain degree of subjectivity in my research, since knowledge has been generated via the means of my interactions with the participants. Research findings reflect two levels of interpretation: participants’ exegesis of their reality and experiences as well as my own interpretation of their reality in the light of the research questions and interview questions.

Furthermore, constructivism is a suitable epistemological position for case-study based research (Stake, 2006). With a case-study approach it is possible to understand the complex relationships between social actors and their surrounding environment while incorporating into the analysis the subjectivity of social actors, or in other words, the meanings they assign to social life (Stake, 2006).

Based on this epistemological stand, my theoretical perspective is inspired on scientific realism. This perspective is useful provided that a useable distinction is made between the world and the knower. According to Sumner and Tribe, realism assumes that “i) Reality exists independently of the researcher; ii) What the researcher thinks is a small part of reality; and iii) It is impossible to establish the truth” (2006: 63). Considering that my aim is to analyze aspects of reality that exist independently of my research (the functioning of household livelihood strategies, the causalities of poverty or the degradation of the urban ecosystem), this theoretical perspective adjusts fruitfully to my purpose. Moreover, I acknowledge the fact that my perceptions as a researcher on particular issues such as the agency of urban farmers correspond to a small part of reality and can be considered as attempted interpretations from a parvenu outsider observer.

As a starting point, I undertook this research bearing in mind the uniqueness of the fieldwork setting. Cuba and its inhabitants belong to a different culture than mine and have a very particular cosmovision, especially from an ideological point of view. Therefore, I expected participants to
have very different interpretations than a Spanish researcher may have. My methods were planned in order to elicit the meanings they attribute to urban agricultural production as individuals, as members of a household and as members of an urban community in Havana, basing my analysis on their experienced realities.

With the aim of facilitating the establishment of confidence between participants and me, I payed particular attention to the need of immersing myself in their daily life, maintaining frequent interactions in households and productive spaces, and showing myself curious of their narrations. In this way I was able to observe participants and undertake an open and respectful exchange of ideas with them. This turned to be of particular significance in terms of understanding the different degrees of importance they attributed to the themes which emerged during our exchanges.

5.1.2 Qualitative and Inductive approach

The purpose of this research is to gain an in-depth understanding of the potential of small-scale UPA as a livelihood strategy in Havana, Cuba. In order to capture UPA's multifaceted character and the different meanings associated to it by social actors, the most suitable approach is a qualitative one. Carvalho and White characterize the qualitative approach as follows:

“[it] typically uses purposive sampling and semi-structured or interactive interviews to collect the data - mainly, data relating to people's judgment, preferences, priorities, and/or perceptions about a subject - and analyzes it usually through sociological or anthropological techniques” (1997 : 1).

Also, the research praxis is more inductive rather than deductive. Such an inductive approach downplayed the role of theory at an early stage of my empirical research. Obviously a theoretical framework had been constructed previous to the fieldwork to find the key factors or variables of the study. Nevertheless, the structure of the research has repeatedly changed during fieldwork, mainly with respect to the theoretical and conceptual framework, thus having an impact even on my research questions.

I started with the assumption that UPA represents a livelihood for small-scale urban farmers. However, once in the field, I realized that UPA is actually one of many households' livelihood strategies and that full-time farmers are rare in small-scale productive units. Furthermore, during the first weeks of fieldwork, I realized that the Sustainable Livelihoods’ framework I had hitherto used was too broad to grasp the complexity of households and livelihoods dynamics. The Household Livelihood Security framework (HLS) would be more appropriate because it would allow me to add an analytical lens by incorporating basic needs (e.g. food security) and right-based approaches (e.g. food sovereignty) into my problem statement.

As described in section 4.3, the research’s conceptual framework is based on the theory of Household Livelihood Security (HLS), which has been defined as “adequate and sustainable access to income and resources to meet basic needs” (Frankenberger and McCaston, 1998 : 31). In simple words, this theory postulates that household livelihoods can be composed of a range of on-farm and off-farm activities that, in conjunction, provide a variety of livelihood strategies for food and
According to Rahman and Akter, existing HLS analysis “is skewed towards qualitative accounts and usually restricted to a geographical area or a particular resource management system” (2010 : 5). Interpretation of the findings tends to be imprecise and frequently it is not possible to generalize them (Lindenberg, 2002). Using a quantitative approach or Q-square methodology to analyze livelihood strategies has proved not to be solution. For example, Jansen et al. (2006) used a quantitative approach to analyze livelihoods and their determining factors but the application remained restrained to the hillside population in rural Honduras. As a result of using the HLS framework, I assume this research may provide interesting findings, but they will not be generalizable beyond the fieldwork’s geographical setting. This, and the fact that generalization is not the purpose of this research, will be further elucidated in the following section.

5.1.3 Multiple Case Study Methodology

Taking into consideration the interpretative nature of my research question, I find a case study methodology the most appropriate. A case study is defined as “an empirical inquiry that investigates a contemporary phenomenon within its real life context, especially when the boundaries between phenomenon and context cannot be drawn clearly or unambiguously” (Yin, 2008 : 23).

In the pursuit of such an in-depth understanding, I applied a multiple case study (MCS) methodology in conducting my research. Taking into account the importance of producing findings that have implications beyond each case, I performed a strategic case selection and sampling, drawing on the theoretical grounds of this research. I preferred to study various units because case studies allow the readership to approach the world of the research subjects. MCS methodology provides a much richer picture of the phenomena under study than other, more analytical methods (Yin, 2008), thus rendering evidence more compelling.

Yet, I acknowledge one intrinsic constraint of an MCS research design, namely that it may involve very little or no critical, atypical or revelatory cases. Furthermore, another limitation is posed by the nature of case studies in that they do not involve generalizing from a sample to population. Case studies are not adequate to determine the frequency or prevalence of a phenomenon. In contrast, case studies are useful to explain the mechanisms by which a phenomenon exists, persists or changes. If all kinds of research had to apply a sampling logic, a number of relevant issues would be excluded from empirical investigation. To sum up, according to Sumner and Tribe, studying a small number of information-rich cases may not allow generalizability but it may have significant depth in the data created (2008 : 105).

5.2 Data-gathering on Household Livelihood Security

As seen in the theoretical discussion, poor households in the Global South face the need of carefully allocating labor and available resources if they want to secure welfare and satisfy basic needs (Nugent, 1999). The research questions are addressed using a Livelihoods Security approach.
This theoretical approach developed since the food crisis in the mid 1980s and owes to Sen’s (1981) theory on entitlement referring to “the set of income and resource bundle (e.g. assets, commodities) over which households can establish control and protect livelihoods” (Sen in Rahman and Akter, 2010 : 5). The revision of the concepts and key issues associated to this theory eventually led to the formulation of the broader concept of Household Livelihood Security (HLS).

In the HLS framework, households are perceived as dynamic social units in which each member puts of its own to ensure sustenance of the group. Moreover, the framework is particularly well-suited for the task of understanding the complexity of households decisions and related livelihood strategies, which tend to be even more complex when a household is both a consumer and producer of food (Nugent, 1999).

In order to eventually make an integrated analysis of the potential of UPA as a livelihood strategy I
started with understanding the population’s context. In this way I could make sense of the macro-
level factors that determine the scope of livelihood systems and the parameters within which they
function. Therefore I first considered the social, economic, political, environmental, demographic,
historical and infrastructural background (Frankenberger et al., 1999).

Secondary data (mainly from local medias and governmental documents) has been the main
source of information to build and visualize the livelihood context in Havana. Nevertheless, during
the first weeks of the research fieldwork, I realized that official documents and news in local
medias seemed to owe more to ideological concerns than empirical facts. In the face of insufficient
reliability of such documents, I decided to be more open to informal conversations with Havana’s
dwellers in general. In this way I hoped to contrast the official version versus the popular version
and thus generate more accurate conclusions.

The aforementioned data gathering methods revealed meaningful in helping me constructing a
mental picture of how livelihood strategies associated to UPA operate and, specifically, how
households interact with their social and physical environment.

Unstructured interviews, life history interviews and focus groups were the main qualitative
instruments of this research. They were useful to identify and describe the assets to which urban
farmers have access, as well as the strategies that they put in place and the possibilities, structures
and processes that have an impact on their livelihoods (legal framework, market dynamics and
institutional structures, etc.). Interviews shed a light on the factors influencing livelihood
outcomes, as for instance access to services, household’s income, agricultural know-how, land
availability, soil quality, and other factors.

During the length of the fieldwork, after collecting data from participants and my own
observations, I generally wrote small individual case reports in my field notebook. In my
notebooks I also wrote the overall perceptions and intuitions about a given experience (meeting a
participant or a key informant, exploring a backgarden, informal conversations while having lunch
in the backgarden). It must be noted that field notes have occupied a prominent role in data-
analysis due to the fact that they were constantly used during fieldwork (for example, notes were
always taken even during recorded unstructured interviews, in case it was defectively recorded or
the recording device stopped functioning). In total, these notes amount to almost 2 small-size
notebooks, of 120 pages each.

Furthermore, I used participatory research methods because of their utility in livelihood research,
and their capacity to “draw out culture, location and social group-specific understandings of the
dimensions of livelihoods” (White and Pettit 2004 : 13). The following methods were applied:

- in every case, before conducting the unstructured interview, I first had transect walks of the
productive units with the farmer(s). This way, I could draw maps, see with my own eyes the
aspect and productivity of the unit, diagnose potential farmer innovations and assess the
extent of urban pollution. Most importantly, this method allowed me to begin positive
relationships with participant farmers and develop reciprocal trust, which would result
crucial in the subsequent interview. Furthermore, farmers tended to enthusiastically describe
their activities and were proud to show their tangible and palatable achievements.
In ten cases, farmers agreed to take photos of their productive units with my camera. I gave them the instruction of picturing the five areas of their units that were most meaningful to them. In this way I was able to elicit new meanings and confirm patterns arising in the analysis of interviews. For example, the fact that farmers repeatedly took pictures of their water tanks led me to reinforce the conclusion that farmers’ lack of access to clean water was a prominent restriction to the potential of UPA in Havana.

5.3 Unit of analysis

In defining my methodology and elaborating on my case studies, I read that “it is not so much [about] defining what constitutes a case study, but rather what constitutes the case as it is the unit of analysis that is crucial to case study” (Burgess, 2000: 44). Therefore, previous to the fieldwork, I begun reviewing literature and communicating with my contacts in Havana to find an answer to the crucial question: is UPA an individual or a collective activity? According to literature, homegardening in Havana is not so much an individual activity and it involves households or families. Cuban authors such as Altieri et al. (1999) point that UPA in Havana’s small-scale productive units tends to be organized around a household. In reviewing the available literature on Havana’s small-scale UPA and consulting my contacts, I came to the conclusion that my unit of analysis should be the household. I did not consider the family a suitable unit of analysis because of the recurrence in Cuba of households that are composed of several families. A household is defined as “a house and its occupants regarded as a unit”, whereas a family is “more than one person living together, either married or of the same bloodline” (Oxford Dictionary of English, 2010).

5.4 Case studies: sampling methods

The 16 cases were selected by combining theoretical sampling and convenience sampling. The latter is due to the fact that, during fieldwork, I particularly relied on a reduced network of strategic contacts to help me in contacting potential participants. Therefore, I selected many cases thanks to the prompt communication of my contacts (mainly friends, neighbours and employees at a Cuban UPA-related NGO). Furthermore, thanks to the fact that I am a mother-tongue Spanish speaker, my networking capacity became crucial in managing to conduct interviews, participant observations and participate in events or knocking at the door of university professors and UPA professionals.

However, before confirming that those persons would be selected to participate in my research, I first made sure that the potential case studies met the three criteria of theoretical sampling:

1) their relevance to the phenomenon of interest;
2) their provision of diversity across contexts;
3) their provision of good opportunities to learn about complexities and contexts (Stake, 2006).

After visiting the persons designated and confirming that they met these criteria I started the data gathering process.
5.5 Limitations

I encountered an important challenge during the fieldwork: the current unavailability of a census of the productive units under exam. Not having access to data on the total population was detrimental for the adoption of a sociological perspective. As a result, I conducted an anthropologic research that is not intended to make generalizable inferences.

Elaborating on this statistical vacuum and on conversations with different experts, I realized that, as a rule, small-scale UPA in Havana was not as integrated in public, political and scientific consideration as larger-scale market-oriented forms of UPA. In general, State-controlled and cooperative productive units are the spaces to which more attention is given, and the intention is always supportive. In contrast, small-scale UPA owes to the concept of private ownership, which is alien to the socialist cosmovision. According to an anonymous expert, Cuban official organs such as the Ministry of Agriculture do not pay sufficient attention to the manifold potentials of backyards, patios and other small-scale private spaces”. A FAO employee also told me that it is difficult to find a professor in Havana who has conducted research on this issue. The person asserted that, in Cuba, productive units should always be part of a publicly recognized social form of agricultural organization like the three different types of agricultural cooperative or a community garden.

Another limitation was inherent to the lack of transparency on the side of participant farmers. At the end of the fieldwork I began noticing the way in which participant farmers were not completely sincere in their testimonies. For example, in interrogating one farmer regarding the use of chemical fertilizers and pesticides, I noticed he was not being sincere. While asserting he only used natural techniques such as tabaquine as a pesticide and organic compost as a fertilizer, I noticed that the kiosk where he was selling the agricultural output was shielded with patchworked nylon-fabric bags that formerly contained Nutrigen, a Mexican chemical fertilizer. Ironically, this place was a UBPC (Basic Unit of Cooperative Production, refer to Appendix 1). Such cooperatives are affiliated to the National Group of Urban and Peri-urban Agriculture, which is the official body in charge of granting awards and

Plate 2: The front of a UBPC store certificated as a national reference of organic agriculture but shielded with chemical fertilizer nylon bags.
certificates of recognition to excelling and environmentally sustainable productive units, among other tasks. As plate 2 shows, the UBPC received the title of “National Reference of Urban Agriculture in the city of Havana” even though it was not meeting the first criteria to be a national reference: to follow the principles of organic agriculture. This and many other examples illustrate the difficulty of providing rigorous and empirically proved data findings. In all these situations, information has been taken with a grain of salt. Furthermore, I am aware that only eight weeks conducting fieldwork are not sufficient to accurately contrast with other sources every information I received. Indeed, because I underestimated the particularities of conducting fieldwork in an authoritarian regime such as Cuba, my experience in the field turned out to be too short.

Lastly, another methodological challenge I encountered as a neophyte researcher is the linearity of the research process. Since my approach was based on a case-study, an iterative research process would have been more appropriate. Often, praxis required me to reconfigure my theoretical framework and I was forced to use an inductive approach more often than a deductive one. This does not challenge the validity of my findings, but it expresses the complexity of adapting concepts, frameworks and theories to the specific context of Cuba, which is, in many senses, a unique case. Fellow PhD students point out that currently, iterative research processes are much more in use in research across the world than linear ones (Regan, Personal Communications 2011).

5.6 Data analysis

Before drawing themes and contrasts from my 16 case studies, I first undertook the “the art and science of portraiture” (Patton, 1992: 55) of each individual case. I created different electronic folders where I placed a detailed written or voice recorded case report (describing general features such as name, age, gender, nº of household/family members, size of the productive unit, purpose of the activity and level of vulnerability) with the aim of locating emerging themes related to the research questions and conceptual framework. In these folders I also recorded photos, videos, scanned maps and interview transcriptions; I also printed a A1 map of Havana and stuck it on a wall. For each case study I wrote a number on the correct place of the map, and stuck a post-it every time I found a relevant individual feature, or inspiring idea coming from that case.

Subsequently I performed a cross-case analysis, which allowed me to compare and contrast the emergent understandings (Patton, 1992; Stake, 2006). To accurately do so, I used a qualitative data analysis and management software called Dedoose, in which I loaded the transcripts of the interviews. Starting with one case at a time, the transcripts were read repeatedly in order to develop a first coding scheme based on key themes. Following Stake’s technique (2006), I identified themes within individual cases, estimated their relative importance within that case, and made assertions about their relationship to the research questions. The data were then coded and

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13 Organic agriculture is defined as “a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects.” (International Federation of Organic Agriculture Movements).
the labels and quotations were clustered into key thematic areas. I also incorporated memorandums relating the themes to each other or to issues mentioned in my field notebooks.

In the cross-case analysis, I compared and contrasted the main themes between cases. Each case study's assertion about the broader research questions and theoretical framework was analyzed searching for similarities and differences. Finally the dispositio of my data findings responds to the 5 W's, a journalistic technique used to get the full story of an event, a phenomenon or an action. In the following chapter, findings will be illustrated by attempting to answer to the following questions:

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Relation with the research objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Who</strong> is it about?</td>
<td>Characterization of the producers or farmers</td>
<td>Main research question</td>
</tr>
<tr>
<td><strong>Where</strong> does it take place?</td>
<td>Spatial characterization of the productive unit</td>
<td>Main research question, Sub-question 1</td>
</tr>
<tr>
<td><strong>How</strong> does it happen?</td>
<td>Description of the main available resources, the main strategies used in the agricultural activity and the main constrains to the potential of the productive unit.</td>
<td>Main research question, Sub-question 1</td>
</tr>
<tr>
<td><strong>What</strong> happens?</td>
<td>Characterization of the agricultural production (the composition of the productive units and the main outputs they provide)</td>
<td>Main research question, Subquestion 3</td>
</tr>
<tr>
<td><strong>Why</strong> does it happen?</td>
<td>Purpose of production and time dedicated to the productive unit</td>
<td>Main research question, Sub-question 2</td>
</tr>
</tbody>
</table>

40
6. DATA FINDINGS

In this chapter I shall describe the way small-scale UPAs in Havana operate as a livelihood strategy. This multiple case study shows the different assets used by urban farmers to maintain or improve their household's food security level and the different ways in which they combine those assets. I shall prove that there are certain strategies within the livelihood strategy that improve UPA's capacity to provide a dietary complement to households. I shall also describe other non-nutritional outcomes brought by UPA at the household, neighbourhood and city levels.

6.1 UPA's contribution to Household Food Security

As described in the research background (refer to section 3.4), Cuban citizens depend basically on the Libreta de Abastecimiento rationing system for their daily food intake. Beyond this ration provided by the State, which provides 60 percent of caloric needs, the majority of Cubans have to invest up to 80 percent of their monthly income in purchasing food. UPA emerged in the first half of the 1990s as an emergency procedure, as a possible solution to the precariousness of Cuban households' food security. This multiple case study, based on visits to the different productive units in Havana during the research fieldwork demonstrates that UPA has the potential of complementing the households' dietary needs, but that it is constrained by insufficient access to land and water resources.

Rooftop and backyard productive units, as distinct UPA niche within a broader system of city gardens, have their own specific spatial characteristics.

6.1.1 Rooftops

Table 4: Characterization of rooftop producers

<table>
<thead>
<tr>
<th>Case study no</th>
<th>Gender</th>
<th>Name</th>
<th>City location</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M</td>
<td>Noslen A.</td>
<td>Urban</td>
<td>Rabbits, guinea pigs, chicken, geese and plants</td>
</tr>
<tr>
<td>2</td>
<td>M</td>
<td>Antonio V.</td>
<td>Urban</td>
<td>Rabbits and guinea pigs</td>
</tr>
<tr>
<td>3</td>
<td>M</td>
<td>Juan L.</td>
<td>Urban</td>
<td>Rabbits and plants</td>
</tr>
<tr>
<td>4</td>
<td>F</td>
<td>Ana C.</td>
<td>Urban</td>
<td>Plants</td>
</tr>
<tr>
<td>5</td>
<td>M</td>
<td>Francisco E.</td>
<td>Urban</td>
<td>Wine grapes, rabbits</td>
</tr>
</tbody>
</table>

In the course of the fieldwork, five case studies have focused on productive units located on the homestead's rooftops. They are all located within the urban area of Havana, probably due to the scant availability of land for agricultural purposes in the densely populated and highly urbanized city center. In fact, in the Centro Habana (Central Havana) and Habana Vieja (Old Havana) municipalities, population density reaches around 40 thousand people per square kilometer. The average population density is almost three thousand people per square kilometer.
Rooftops' dimensions vary, but seldom exceed 140 square meters. In all cases the productive unit is situated immediately above the homestead, therefore access is easy. They are all fenced-off and roofed-up with recycled plastic materials and metal sheets (for example with pieces of venetian blinds), concealing them from pedestrians on the street and making them less vulnerable to pilferage than groundfloor spaces in sight of everyone. The fact that they are visible from higher or same level rooftops may be inviting for neighboring urban dwellers, who can see with their own eyes the potential multi-functionality of such typically under-utilized spaces. Indeed, as elsewhere in Cuba, rooftops are typically flat and used to hang out laundry or set up water tanks. Ana states that her neighbours in the adjacent building have started rooftop permaculture after seeing how she managed to produce all sorts of fresh vegetables and even fruit trees like guava on her own rooftop.

Ana: “Look that way, other neighbours who have also used the same technique of having big boxes on the rooftop, we gave him a book and they started with permaculture, those things are contagious, one can see the profit it is possible to get from it. It is just a rooftop but when something like this starts happening, people notice, especially because this is a rooftop and people can see with their own eyes what we have created, people get curious. This is an act of communication.”

Also, height provides a certain distance from the masses and the noise of the city as well as fresh air and escape. As experienced urban farmers have told me, rooftops act as climatic regulators of the homestead because, if populated with plants, they can lower the temperature of the house of 2 or 3°C. During the dry season, this variation may become very valuable.

### 6.1.2 Backyards

**Table 5: Characterisation of backyard producers**

<table>
<thead>
<tr>
<th>Case study n°</th>
<th>Gender</th>
<th>Name</th>
<th>City location</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>F</td>
<td>María S.</td>
<td>Peri-urban</td>
<td>Ornamental plants, fruit trees, medicinal and aromatic plants</td>
</tr>
<tr>
<td>7</td>
<td>F</td>
<td>Mayita A.</td>
<td>Peri-urban</td>
<td>fruit trees, medicinal and aromatic plants, green leafy vegetables</td>
</tr>
<tr>
<td>8</td>
<td>F</td>
<td>Niurka D.</td>
<td>Peri-urban</td>
<td>fruit trees, medicinal and aromatic plants, green leafy vegetables</td>
</tr>
<tr>
<td>9</td>
<td>M</td>
<td>Macía F.</td>
<td>Urban</td>
<td>fruit trees, medicinal and aromatic plants, green leafy vegetables</td>
</tr>
<tr>
<td>10</td>
<td>M</td>
<td>Anselmo C.</td>
<td>Peri-urban</td>
<td>fruit trees, medicinal and aromatic plants</td>
</tr>
<tr>
<td>11</td>
<td>F</td>
<td>Saray M.</td>
<td>Peri-urban</td>
<td>fruit trees, medicinal and aromatic plants, one pork</td>
</tr>
<tr>
<td>12</td>
<td>M</td>
<td>Lirardo L.</td>
<td>Peri-urban</td>
<td>fruit trees, medicinal and aromatic plants, green leafy vegetables, rabbits, chicken, goats</td>
</tr>
<tr>
<td>13</td>
<td>M</td>
<td>Alberto S.</td>
<td>Peri-urban</td>
<td>fruit trees, medicinal and aromatic plants, green leafy vegetables, porks</td>
</tr>
<tr>
<td>14</td>
<td>M</td>
<td>Lorenzo R.</td>
<td>Peri-urban</td>
<td>fruit trees, medicinal and aromatic plants</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>M</td>
<td>Alejandro P.</td>
<td>Urban</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>green leafy vegetables, cows, one bull</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>M</td>
<td>Rolando V.</td>
<td>Peri-urban</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>fruit trees, medicinal and aromatic plants, rabbits, pheasants, chicken, quails and ducks</td>
<td></td>
</tr>
</tbody>
</table>

Ten backyards or patios have been observed. Eight are located in peri-urban areas and two in intra-urban areas. In intra-urban areas, backyards are smaller in size but have better access to water, as will be further commented in section 6.2.2. Dimensions vary from 5m² (the smallest) to 700m² (the largest). As seen in the maps, shapes are variable.

Measuring patio surfaces is not a problem because they are delimited by fences. The typical fence is a live thick one made of *Caesapina sepiaria*, (a small spiny tropical shrub) popularly known as *atajanegro* (see plate 3). Dead fences are also found in the form of concrete walls or rusty metal sheets and metallic railings.

All visited patios are located within the perimeter of the household. Just like rooftops, their legal tenure is private.

### 6.2 Access to resources

This section explores the different assets or resources on which urban farmers draw to maintain or improve their livelihood. Data analysis shows that the most meaningful assets in shaping the potential of UPA to provide outcomes are land, water, knowledge and social capital. Therefore, rather than a pentagon of assets (as the HLS framework suggests), case studies are mainly dependent upon and influenced by access to a triangle of natural, human and social assets. The latter will be described in a different section because it addresses a different analytical layer (the neighbourhood) and deals a distinct research subquestion.

Other financial and physical assets are also important, data analysis nevertheless, shows that they are not as meaningful. Thus farmer’s financial solvency will be addressed in section 6.5 to describe the different levels of livelihood dependency.

#### 6.2.1 Land

As in other cities elsewhere in the world, Havana’s productive units face a primary constraint: the lack of open land on the one hand (particularly in the oldest, most densely populated areas of the city), and on the other hand the vulnerability of land tenure (given the rising prices of the urban square meter, the increasing urban population and the resulting competition of manifold actors for urban space). According to Cruz (2011), it is not the urban gardens but the larger-scale agricultural lands such as *organopónicos* (refer to appendix 1) that risk the danger of being absorbed by urbanization, because “construction companies are not interested in building hotels on the backyards of small farmers but on open extensions of land” (Cruz, personal communications, October 2011).
Yet case studies reveal that the problem of space is not only structural. Juan asserts that he was compelled to stop raising rabbits because one of his neighbour's windows opened on his rooftop and the smell was unbearable. Juan, who lives in a densely populated area, sold his rabbits and with the returns opened a small cafeteria at the gate of his house because he said it was more profitable. María also had to take a harsh decision which led her to reduce the dimensions of her homegarden:

Maria: “My daughter had twins 4 years ago, […] and we had to part with almost half of the seedlings to build a new bedroom and enlarge the kitchen, because otherwise we wouldn't fit in.”

Another problem is represented by the quality of the soil: there is not enough good topsoil and several urban soils have suffered erosion and contamination. Furthermore, confirming Murphy and Novo's (2000) observations, residues from rubbish dumps still cripple an important number of lots. The majority of productive units in the case study's (of course, excluding rooftops) are located atop former trash dumps and piles of debris, which may be rich in heavy pollutants. Before planting for the first time, farmers working in these productive units have had to remove the rubbish, sometimes with the help of caterpillars and neighbours. In many cases the poor quality of the soil required addition of layers of soil from cleaner ground. An important effort is needed to amend these soils and bring them into production. In two case studies gardeners had to plant or sow in 100 per cent compost. This represents an economic, labor and time investment that not all of the case study farmers have been able to meet. A representative case is Macia’s. Every time he wants to plant or sow, he needs to dig the ground and take out what debris he finds. In the resulting hole he puts animal manure at the bottom and soil that he fetches from the vicinities. Nevertheless, several of his plants die after a certain time. He states it is due to the presence of pollutants like asbestos in the soil.
6.2.2 Water

Water availability is a problem in general in Cuba, and in Havana in particular. By observing the city from above it is possible to see that virtually all roofs are equipped with tanks to store and heat the water. In contrast, the average cost of potable water is extremely reduced (only 0.07 $ per household per month). Urban sewage collection systems flow by gravity to creeks and streams of the Havana Metropolitan Park. In observing case study's access to water resources, three main situations have been encountered:

- productive units located in central areas of the city with uninterrupted access to water. In two cases located in Cerro centric municipality, water is pumped from the Zanja Real, or Royal Ditch, built in the XVIth century to provide Havana with potable water from the

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14 The water is not potable, before human consumption it needs to be boiled.
Almendares River. This water is only used for irrigating vegetable crops and fruit trees, because its chemical composition is not suitable for human nor livestock consumption. Other cases with uninterrupted access to water are the ones where water wells have been successfully dug.

- Productive units located in semi-centric urban areas, where the sewage system provides water every second day during 24 hours. All those units are equipped with water tanks that allow a relatively constant availability of water both for household use and agricultural activities.

- Productive units located in peri-urban areas, where the sewage system provides water every four days during 24 hours. In these cases, urban farmers show a portfolio of creative strategies to compensate. In order of recurrence, the most common are rainwater collecting, wastewater recycling and optimization of water use. The most widespread strategy (found also in intra-urban areas) is the collection of rainwater in tanks, sometimes with the help of improvised gutters. In the vast majority of cases, these tanks have been donated by a Cuban NGO involved with permaculture. These have been awarded to farmers who have successfully achieved a training module in permaculture offered by this NGO.

The recycling of wastewater has been encountered in two cases, both in peri-urban areas. Home-made special filters are used to decant waste water from the homestead.

Strategies to make an optimal use of water have been found in three backyard cases. In Macia’s and Osvaldo’s case, irrigation takes place between 3 and 6 in the morning. At 3 a.m., the public sewage system begins supplying water and at 6 a.m. the farmers turn off the water tap. Thanks to a drainage network, plants receive the water they need daily and the lower night temperatures reduce evaporation, thus increasing watering efficiency.

Anselmo: “Otherwise, during the day, up to 30 per cent of irrigating water can evaporate”

Another system optimizing the use of water is home-made automatic drip irrigation. Anselmo has placed several bottles in his backyard’s crops which are connected by a thin plastic tube to a
watertank. During the rainy season, when rain falls and the tank fills, the bottles fill. When the water level makes the bottles sufficiently heavy, the stick to which they are tied bends and water starts dripping until the bottle is again lighter than the counterweight placed on the stick opposite the bottle. In this way, water is rationally used and directed straight to the plants (plate 7).

Other strategies found in peri-urban areas consist in pumping water for crop irrigation from creeks. With a water pump and an irrigation system composed of recycled plastic tubes, Anselmo manages to irrigate his banana and avocado plantation. Nevertheless, he states that the heavily polluted water from the creek is not suitable for green leafy vegetable production. And he is considering the possibility of eliminating these crops from his productive unit:

Anselmo: “The river flowing here is not clean. [...] Lettuces, tomatoes, leek... I cannot irrigate them with that water. And I have to go every day with the waterpump, this takes me a lot of time and makes me tired. But plantains and avocado yes, because they are more resilient.”

Lorenzo also pumps water from a creek crossing his productive unit. In the past, he used to give this water to his two cows, now he only uses the water to irrigate ornamental flowers. Not being aware of the level of pollution concentrated in that creek, he did not realize the danger of using it until one of his cows died.

Therefore, case studies involved in UPA are hampered not only by insufficient access to water but also by water pollution, which makes irrigation from rivers hazardous for livestock and for the growing of vegetables. In fact, according to chemical analysis (Alonso, 1996), there are traces of sulfuric acid, detergents and titanium dioxide in the Almendares' river basin.

6.2.3 Knowledge

Another important resource is farmer's knowledge and skills in agriculture. There are three main patterns in this respect, as follows, in order of recurrence:

- peri-urban farmers who were already rural farmers before moving to the city. They are recipients of a process of intergenerational knowledge transmission. This typology of farmer is predominant amongst the approached cases, amounting to eight. Native from the oriental region of the island, all moved to Havana at some point in their life in quest of better living conditions, joining their families who had already moved there or settling as newcomers. Even if their quality of life may have improved compared to what it was in the countryside, the
majority of them show signs of vulnerability and marginalization. Four of them live in wooden shacks, without electricity nor water supply. Seven rely on agriculture for a livelihood but as farmhands in other farmer’s plots. This idea confirms Valdés theory (2011). UPA in Havana has an advantage because it is home to 20 per cent of Cuba’s population and because it constantly receives rural migrants, who represent a significant availability in skilled agricultural work force.

- Permaculturalists and other small-scale urban farmers who have learned the basics of agriculture by attending trainings and workshops offered both by state institutions (such as ACPA or GNAUS) and local NGOs. These farmers have received books and DVD’s which they treasure and show with pride.

- Neophyte urban farmers who have learned to cultivate by trial and error. This group represents the individuals who were agriculturally illiterate when they became involved with agriculture but have acquired know-how by analyzing their errors, making a change, and then trying again. These farmers have also learned from other more experienced farmers.

In the case of rabbit raisers, it is interesting to note that they meet fortnightly in Noslen’s living room with the aim of asking him questions (because he is the most experienced raiser in the group). I have attended one of these meetings, and understood the importance of such gatherings. It was not only about solving doubts and gaining expertise from Noslen, but also about sharing common expenses (to buy drinking troughs for example) and sharing important information about new trainings and new funding possibilities from agricultural state institutions. Peer-to-peer knowledge transfer is a necessity for these rabbit raisers.

Another important aspect is the constant exchanging useful information between farmers, such as how they achieved successful experiments or how they overcame a particular challenge. The

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15 Insufficient work force is a chronic challenge for Cuban rural agriculture. According to local experts, the existing rural work force is unstable, scant, demotivated and is poorly skilled in agroecologic techniques, the latter being fundamental in the face of the current scarcity of chemical agricultural products in the island. Furthermore, the countryside has witnessed a process of “de-peasantisation” or descampesinización, since rural migration to cities has led 75 per cent of the total population to reside in cities.
sharing of botany dictionaries\textsuperscript{16}, books, DVDs and extracts from magazines is also very common. Grass-root communication is simply part of the agricultural activity. Farmers act as vehicles of information, creativity and innovation that has “true merit and strong potential” (Critchley, 2007: 23), as it will be explained in the following section.

\section*{6.3 Small-scale UPA and the strategical combination of resources}

To better understand the way this livelihood strategy functions it is important to stress the idea of resourcefulness, a key concept which shows up recurrently in analyzing collected data. A person is resourceful when it has “the ability to find quick and clever ways to overcome difficulties, [...] dealing successfully with externally imposed problems or limitations” (Oxford Dictionary of English, 2010).

During the nineties, many Cubans changed their way of thinking. As seen in research background, the island's imports were reduced to a minimum level as a result of the fall of the Soviet Union. This had a direct impact on Cuba's food security. In turn, this fostered a profound reflection on survival, at all levels of society. Many Cubans understood that it was not possible to live without bringing into action their creativity to grant food-self supply. And this process was facilitated by the fact that the Cuban population is essentially literate and has ready access to printed matter and novel reasoning, thus does not rely only on intergenerational knowledge transmission.

Resourcefulness and innovation have emerged in the analysis of ten cases out of sixteen. Echoing de Zeeuw’s and colleagues, “proximity to the consumers and availability of cheap resources (e.g. organic wastes and wastewater) creates comparative advantages for urban food production” (de Zeeuw et al, 2011). Creative and site-specific solutions crystallize into the following categories:

\textbf{6.3.1 Recycling}

Turning rubbish into useful materials is a widespread activity in Cuba and involves not only urban farmers but the general population. State-owned companies known as \textit{Empresas de Materia Prima} (Company of raw materials) pay small amounts of money to individuals who bring them glass plastic, metals, paper and carton.

Mixing and matching whatever is available entails direct benefits for productive units and contributes to the improvement of urban environmental health. Back-gardens

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{image}
\caption{Plate 8. In general, urban farmers raising livestock feed their animals part of their households' wastes and in the majority of cases they receive kitchen wastes from neighbours or friends working in canteens or \textit{paladares} (restaurants privately-run in the owner's house). Remainders of bread are a complement in feeding rabbits.}
\end{figure}

\textsuperscript{16} Such as the \textit{Diccionario Botánico de Nombres Vulgares Cubanos}, by Dr. Juan Tomás Roig.
and rooftops designed in accordance with permaculture principles always include organic and non-organic recycled materials. For crop cultivation materials such as the bodywork and the tires of vehicles, glass bottles, computer hardware, TV frames and bathtubs are to be found. CDs are often hung around crops to keep flying insects and birds away. For the lighting of a rooftop, a formerly broken streetlamp is useful! As for organic wastes, recycling is a constant finding in most productive units. Permaculturists in El Pino and El Sevillano municipalities distribute buckets to their neighbours and collect them every few days filled with kitchen wastes such as fruits skins, bread etc., which they use for composting.

### 6.3.2 Innovative techniques

Innovative techniques have been encountered in seven case studies (four backgardens and three rooftops). These urban farmers appear to be very knowledgeable of their local environment and available materials, which they use to design low-external input and often organically based innovations. In this way they increase their self-reliance. Their innovations are affordable and replicable for other farmers in similar conditions. They fit with Critchley's definition of innovative farmers: they “see patterns of resource utilization in their minds. They visualize solutions” (2007: 7). The following innovative techniques have been repertoried:

- With a thick rope, Lirardo ties bricks on the edges of his seedbed's roof, to act as counterweights and prevent the roof flying away when hurricanes hit.
- Lirardo, an engineer specialised in thermal insulation, puts tinfoil inside lamp screens to maximize the bulb's lightning capacity. He says that with this technique, lamp bulbs provide 60 per cent more light (see ).
- Macía uses a metal barrel for banana ripening. He puts unripe hands of bananas at the bottom of an old iron barrel together with old textile, banana leaves and plastic sacks. He closes the barrel with a metal lid and stones on top so animals cannot open it. After ten days, his bananas are ripe. This is also a way to stock them and prevent their pilferage (see plate 11).
- Home-made dehydrators for animal fodder have been found in 6 cases. Four permaculturalists involved in livestock breeding use self-made solar dehydrators (typically to dehydrate old bread). In another case, a farmer has successfully reproduced a dehydration machine and claims to be completely self-reliant in feeding his rabbits and guinea-pigs. This is particularly important in the urban context, where grass for animal consumption is virtually inexistent. Following Critchley's terminology, this innovation is successful when considered against the criteria of the TEES-test: it is technically effective, economically viable, environmentally friendly and socially acceptable (2007: 23).

![Plate 9. Innovative banana ripening.](image-url)
6.3.3 Agricultural practices

6.3.3.1 Pests and pesticides

In Cuba, UPA is mostly based on agro-ecological practices for a number of reasons. As mentioned in the Research Background, chemical fertilizers and pesticides are scant and expensive: they can only be found on the black market (section 3.5). Moreover, national legislation prosecutes their use within the perimeter of cities for health security reasons.

However, off-the-record conversations with three urban farmers and two local experts show a different aspect. According to them, occasional shipments from Mexico provide artificial pesticides such as dimethyl phosphoramidothioate (popularly known as Tamarón), or different types of pyrethroids such as cipermetrine to control the white fly (*Bemisia tabaci*) and granular ant-killers such as Mirex Glex, a sulfuramide-based controller of leaf-cutter ants (*Atta insularis*). Less hazardous products such as synthetically produced carbamide (urea) are used to increase foliage.

Anselmo: “I use an ant-killer, the one they sell in the agro [agricultural store]. I dissolve it in water. Sometimes there is Tamarón, that one is good for the col and all leafy plants, but many times one goes to the shop and cannot get it because there is none.”

Lorenzo: “Before being a permaculturalist, I used chemical products, for example one that we call urea, to provide foliage to the plants. Another that we used a lot was cipermetrine, which kills insects, and the white fly. Tamarón also.”

For rabbits raisers, the main plagues are acaridae parasites such as *Sarcoptes scabiei* agent of scabies and fleas (*Siphonaptera leptopsyllidae*). Against scabies, ACPA provides its members with Labiomec at subsidized prices. Fleas, however, are persistent plagues when temperatures rise in summer. At a rabbit breeder’s gathering I heard the saying “if socialism does not finish with flea, the flea will finish with socialism”.

Until the Special Period in 1993 agriculture had been centered for centuries around cattle and sugar monocrops, models of intensive agriculture intended for export and for which chemical products were lavishly used. This explains the Cuban urban and rural farmers’ propensity to use such inputs. Yet, after almost twenty years, the shift to organic occurring may be happening more in the crops than in the collective imagination. This poses an interesting question: what would happen to agriculture in Cuba if the US embargo was lifted?

6.3.3.2 Agro-ecological practices

Notwithstanding whether this behavior is the result of necessity or of individual consciousness, agro-ecological practices are recurrent in research analysis. The way basic natural resources are used in case studies demonstrate conservation and improvement of the urban ecosystem. All cases, including those in which farmers have less agricultural knowledge, are involved in at least one of the following agro-ecological activities:
- vermiculture with *Eisenia Foétida* (in 3 backyards)
- mulching (all cases)
- composting (all cases except rooftops)
- closed-loop permacultural system (1 rooftop)
- intercropping (12 cases)
- pyramidal energy (2 backyards)
- use of lunar calendar when planting seeds (11 cases)
- chromatic insect traps (in 1 backyard)
- composting toilet (in 1 backyard)
- use of plastic bottles as pots (in two rooftops)
- use of own seeds (7 cases)
- use of neem tree's grains (*Azadirachta indica*) and *tabaqueine* to control insects
- companion planting (7 cases), especially with marigold flower (*Calendula officinalis*)
- use of basil (*Ocimum basilicum*) as an insect repellent (in 4 cases)
- use of entomopathogenic fungi as biologic pest controllers (in one UBPC)
- use of *Trichoderma harzianum* to control fungi (in one UBPC)
- use of banana trees' petiole (*Musa acuminata*) to add potassium in the center of the trees

6.4 Characterization of the production

So far, case studies have described UPA's main constrains, resulting from insufficient access to land, water and the hazards of urban pollution. Yet UPA also appears as an ecologically sound practice, in which farmers are blessed with an average high level of know-how and seek self-reliance through low-cost, local specific and organic strategies. UPA appears as a sustainable activity with more potentials than constrains.

But first and foremost, how does it profit households where it is carried out? In the following analysis I will argue that UPA does contribute to households' food security. This confirms the key assumption of this research and asserts, in part, Mougeot's theory on UPA as a potential source of self-provision for urban households, which "affords a measure of self-reliance to urban markets at certain seasons and/or periods of time" (2000 : 13).

Observed urban food production does not confer full food self-sufficiency; it is a livelihood strategy mainly aimed at:
- supplementing households diet with locally produced, fresh and nutritious food;
- saving money that otherwise would be invested in food purchases;
- generating an economic revenue through the selling of self-produced foods.

Yeudall (2006) states that UPA may lead to more regular intake of more nutritious and diverse food products than those purchased in supermarkets. Nevertheless, case studies prove the opposite. Before describing the different foods produced in observed case studies, it is important to explain
that, almost in every case, household members consume foods that are extremely difficult to produce through agriculture\textsuperscript{17}. The daily diet includes at least one of these elements: bread, pizza, spaghetti, croquettes, sausages, sodas and sweets. Observed nutritional habits are characterized by a high presence of carbohydrates and sugars and seem to confirm Porrata-Maury’s research findings (2009) at the national level: Cubans prioritize the satisfaction of their needs in fats, proteins and sugars, in detriment of other healthier options such as green vegetables and fruits. In most of the case studies in which agricultural outputs are marketed, the earnings are destined to the purchase of the aforementioned products.

In the following sections, the products provided by UPA as observed in case studies will be described. Rustic varieties of fruit trees (especially plantains) are the most recurrent. Staples such as rice or beans and green leafy vegetables are less frequent in as much as they require farmers’ full-time dedication, higher amounts of (clean) water and space. Rice and beans are key elements in the typical Cuban diet. Therefore, UPA’s contribution to households’ food security has a limited impact. As for livestock, studied urban farms are home to a broad range of animals. The benefit of the activity is not, however, solely alimentary as many units tend to also provide a rich variety of aromatic and medicinal herbs for family use.

### 6.4.1 Fruits

Cuba has a patrimony of more than 200 species of fruit trees. Nevertheless, data findings point that only 5 fruits are consumed in case studies: plantain (\textit{Musa acuminata}), avocado (\textit{Persea americana}), mango (\textit{Mangifera indica}), guava (\textit{Psidium guajava}) and papaya (\textit{Carica papaya}). With these fruits, case study farmers elaborate juices (especially from guava because fieldwork coincided with its time of collection), but also lemonade, milkshakes and cakes. Other recurrent fruit trees found in case studies are: lemon (\textit{Citrus limonum}), pineapple (\textit{Ananas sativus}), coconut (\textit{Cocus nucifera}), passion fruit (\textit{Passiflora edulis}), sugar apple (\textit{Annona squamosa}), soursop (\textit{Annona muricata}), bitter orange (\textit{Citrus aurantium}), mamey apple (\textit{Mammea americana}) and canistel (\textit{Pouteria campechiana}). Raisin (\textit{Vitis vinifera}) has been found in three case studies and cherry (\textit{Malpighia glabra}) in two. In three cases, farmers produce wine not only out of raisin, but also bitter orange and canistel. The only case where wine is made out of raisin grapes is a farmer who fully depends on this activity to make a livelihood.

As a rule, urban farmers tend to sow rustic varieties, which demand less irrigation and less productive inputs.

\textsuperscript{17} This is applicable to virtually every case studied, except for permaculturalists, who tend to be vegetarian and propensive to a nutritionally healthy diet.
Despite unfavorable and insurmountable urban environmental conditions such as poor soil fertility or water pollution, avocados and plantains are widespread in available pieces of land, even on the sides of roadways. Plantain and bananas deserve special attention, in that they are the most commonly consumed fruit in Cuba. Bananas are consumed as dessert-fruit, while plantains are typically either boiled or fried as side dishes.

6.4.2 Vegetables and herbs

As opposed to fruit, vegetables are not permanent cultivations: their cycle is seasonal. For this reason and owing to the short duration of our fieldwork, I was unable to contrast all the information provided in case studies. For example, tomatoes (Solanum lycopersicum), are harvested in February while the fieldwork took place in September and October. The following listing gives an idea of the most recurrent vegetables and herbs found during that period:

**Gourd vegetables:** Pumpkin (Cucurbita maxima) and cucumber (Cucumis sativus), which are rich in vitamin C. Provided they are in the shade, pumpkins are not care-intensive.

**Green leafy vegetables:** chard (Beta vulgaris), spinach (Spinacia oleracea), cabbage (Brassica oleracea) and leek (Allium porrum, an excellent source of vitamin C). These have been found in productive units over 200 m², with uninterrupted availability of water and where farmers are fully dependent on UPA as a livelihood strategy. Other vegetables found are solanaceous: ají pepper (Capsicum baccatum) and tomato (Solanum lycopersicum), in one case used to prepare tomato puree for home consumption and bartering with neighbours. The farmer has a deal with an acquaintance who works at a beach bar and gives him used beer bottles in exchange of puree.

**Herbaceous and aromatic plants:** the most recurrent are green onion (Allium fistulosum), mint (Mentha spicata), peppermint (Mentha piperita), “white” basil (Ocimum basilicum), “purple” basil (Ocimum santum), oregano (Origanum vulgare), and coriander (Coriandrum sativum). These plants are grown all-over, even in the smallest spaces and at least one of the afore mentioned has been found in every case study. This is not surprising since Cuban gastronomy always includes such ingredients. Case studies are self-sufficient in these foods because they do not take up space, (they can be grown on window sills or vertically, as in two cases, in plastic bottles turned into pots), their seeds are cheap, easy to find and they can act as ornamental plants. Another causal link to the high presence of these plants may be their religious role and value in the Afrocuban and Catholic worshiping.

**Medicinal plants:** a wide range of medicinal herbs have been found in studied productive units. The most recurrent are aloe vera (Aloe barbadensis), camomille (Chrysanthemum americanum), tilo (Justicia pectoralis), moringa (Moringa oleifera), Moses-in-the-Cradle (Tradescantia spathacea), vervains (Verbena officinalis), mano poderosa (Neomarica caerulea, or “powerful hand”) and lemon grass (Cymbopogon citratus). In the central neighbourhood of Vedado, 27 varieties of medicinal and aromatic herbs are produced and commercialized by Falcón. Since his productive unit is not private and fulfills a public function, he could not become a case study in this research. In an informal conversation, he recalls that very often pharmacies are short in supply:
Falcón: “Moreover, the few available medicines are expensive and poor-quality. Here [in Cuba] what one has to do is sow plants on one’s own and cure oneself with that”.

6.4.3 Other crops

**Root crops:** Cassava (*Manihot esculenta*), eddoe (*Colocasia esculenta*) and sweet potato (*Ipomoea batata*) are important sources of carbohydrates. Moreover, they often grow spontaneously in the least expected places such as sand piles in public works.

**Grains:** maize (*Zea mays*), beans (*Phaseolus vulgaris*) and rice (*Oryza sativa*). With maize, a typical dish is prepared: the tamale. Like green vegetables, these grains have been found in large productive units, with a good access to water and full-time availability of farmers. Maize has been found in one case, rice and beans in two. Thus, in the cases studied the aim is not self-sufficiency in such staples, though they are key elements of the Cuban diet. Rice and beans were prominent dishes among the West Africans and remained such among their descendants subjected to slavery in the Spanish New World territories.

6.4.4 Flowers

Flowers have been found in small-scale plots or parcelas for marketing purposes. They serve as ornamental elements but also for ceremonial situations (such as funerary wreaths and bridal bouquets). Of course, ornamental flowers are also found in all other productive units approached, nevertheless they are not meaningful in explaining the potential of UPA to provide livelihood outcomes. Only Chinese hibiscus (*Hibiscus rosa-sinensis*) should be mentioned because of the recurrent use of its leaves to feed rabbits and its dried flowers to make wine and infusions to cure pulmonary diseases. They also compose live fences and are very frequent in Havana’s parks, avenues and gardens in general.

The main varieties grown are white ginger lily (*Hedychium coronarium*) and sunflower (*Helianthus annuus*). The white ginger lily is one of Cuba’s national symbols. Together with sunflower, they are the most recurrent flowers in religious offerings (refer to box 2).

**BOX 2: FLOWERS AND RELIGION**

Plants in Cuba are not only used for their therapeutic effects, but also for their religious value. In fact, worshipers of Afrocuban gods bestow plants to particular deities for particular purposes. They are believed to have supernatural properties, therefore they are used as talismans and amulets. For example, the mano poderosa is believed to prevent accidents and neutralize harm from enemies. It is more powerful if it has been given by someone. Maize is used to pay the right to enter certain sacred places such as cemeteries.

6.4.5 Livestock

Despite hygienic imperatives and the local legal framework, pigs (*Sus scrofa domestica*), rabbits (*Oryctolagus cuniculus*) and even pheasants (*Phasianus colchicus*) are raised in urban spaces. Especially regarding the rearing of pigs, certain case studies have shown that UPA may be a risk for
human health. By breeding livestock in small and confined sites very close to the dwelling unit, the risk of zoonose transmission is high, especially concerning parasitic.

In case studies, livestock is bred for commercial purposes and for other purposes (domestic animals). Besides, a share of the production is always destined to household consumption.

Rabbits have been observed in 7 cases (Four rooftops and three backyards). Only recently rabbit breeding has spread in Cuba. Rabbit meat is not a typical element in the Cuban diet, its fodder is hard to obtain in the urban context and the heath of the tropical dry season does not create the optimal setting for rabbit breeding. Nonetheless, in a peri-urban backyard almost 70 rabbits and 5 guinea-pigs (Cavia porcellus) have been observed. The key factor in explaining the choice of more and more individuals to start raising rabbits is that restaurants and the touristic sector are generating an increasing demand and that the transaction of buying and selling rabbits, unlike other livestock, is not prosecuted.

As for livestock mainly aimed at providing food for household consumption, chicken (Gallus domesticus) are the most recurrent. Two breeds are to be found: farm chicken and criollo chicken. The first is raised for eggs while the second is raised for meat. According to farmers, criollo chicken are more adaptable because they will eat almost everything and do not need a lot of space. Indeed, 15 criollo chicken have been observed on a rooftop where they were fed a mixture containing dry rabbit excreta amongst other stuffs. In turn, criollos' manure is very rich in nitrates and therefore an excellent and widely used fertilizer in Havana.

Pigs have been found in five backyards. The majority of farmers were raising them with the aim of consuming their meat for New Year’s eve dinner. In all cases, pig manure was used to fertilize crops.

Other animals providing a source of meat and eggs are pheasants, quails (Colinus virginianus), and ducks. They are more time consuming and care demanding, and have only been found in backyards where farmers are retired and spend more than 4 daily hours in the productive unit.

Animals not strictly intended for consumption are the following: homing pigeons, which are raised as a leisure activity, geese, which are mainly raised to act as guardians of productive units (in 4 backyards and one rooftop), as well as carps and goldfish (Carassius auratus).

6.5 Purpose of production and the different levels of livelihood dependency

Case studies show that UPA is, most often, one of many livelihood strategies. Confirming Niñez's postulate, “the degree and type of use this space is put to depend on the nature and success of other family economic strategies” (1984 : 2). Producers can be entered into categories according to the time they spend on the productive unit and the purpose of their production. This correlation effectively visualizes the levels of their livelihood dependency.
Only one case study does not hold to this categorization. It involves a 61 year-old permaculturalist who has established a closed-loop productive unit on his rooftop. He represents an exception in that his livelihood dependency is not correlated with the time he spends working in the unit. Even if he fully depends on his activity to make a living, Noslen states that he only spends 2 hours daily in the productive unit and one hour and a half in marketing activities. He counts on the help of a young laborer, who he pays 300 pesos monthly. The boy works 2 and a half hours every day of the week (as Noslen would say, “livestock does not go out of town on week-ends”).

Since 1991, Noslen’s economic revenue has been based on the marketing of his rabbits via two main channels: breeding rabbits for retail and rabbit meat for two Spanish restaurants of Havana. In his farm, an average 300 rabbits a year are raised. Some neighbours refer to him as the “Rockefeller with ears”. Noslen’s productive unit is a closed-loop highly self-sufficient and is characterized by the use of innovative and organic-based farming methods centered around the breeding of small livestock. In this way, not only he meets his household’s food needs but he also earns twice the average percapita income of Havaneros. Insufficient availability of animal fodder in the city was overcome by manufacturing a DIY dehydrator which allowed him to recycle kitchen waste collected from the neighbours.

### 6.5.1 Part-time UPA

In this category, UPA may be labeled as subsistent because it involves low-income households producing foods they cannot not afford to purchase. In this perspective it is important to recall that no Cuban is potentially exposed to starvation due to the existence of the food rationing system, which provides for essential nutritional requirements (although it does not provide all the elements of an ideal intake of nutrients; for more details, refer to section 3.4.1). UPA can
nevertheless give some answer to problems of malnutrition and provide a complement which contributes to a variation in the diet mainly by the addition of greens, medicinal plants, fruits, which are not included in the rationing system, and sometimes meat, which is in insufficient amount.

This type of UPA involves nine case studies. It is one of several livelihood strategies. In the household, the bulk of energy and time are devoted to other occupations, seldom related to agriculture. The household’s monthly income varies between 500 pesos (17 US Dollars) and 700 pesos (24 US Dollars). In two of the cases, individuals continued working after retirement to make ends meet. The productive unit receives less than two hours of attention daily, though this amount of time increases during week-ends and in general when individuals find time besides their necessity of making a living. Units in this category are small (no more than 140 m²) and located in backgardens (6 case studies), and rooftops (3 case studies). This type of UPA supplies condiments, medicinal plants and fruits such as plantain, avocado and mango: it is a means of saving money otherwise spent on purchasing those products.

Yet UPA’s food contribution does not appear particularly significant in terms of providing daily meal ingredients. On the one hand, none of the observed case studies produced basic foods such as rice, beans or maize. Meat is available but in small quantities and tends to be kept for special occasions. For example, pigs are typically slaughtered for the traditional new year’s eve dinner. In contrast, UPA seems to be more significant in terms of producing small surplus for sale in the neighbourhood. This is Ana’s backyard case:

Ana: “My husband takes care of the grapes. I help him when fermentation is over. I sell bottles of wine in the neighbourhood, for 15 pesos each. That is a small help for the economy of the house, [...] imagine that a pound of beans costs 18 pesos. Last month we sold 23 bottles. And my husband prepare a liquor. But that is for the house and the friends when they come to visit.”

Ana and six other case studies reveal that UPA in back-gardens and rooftops is a means of providing nutritional essentials not otherwise obtainable and at the same time generate small

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18 The age of retirement in Cuba is 60 years-old for women and 65 years-old for men. Current legislation allows retired citizens to keep working after retirement.
revenues through the sale of wine but also eggs, rabbits, domestic fish and animal manure.

Only in one case did extra-income provided by UPA seemed to be limited. Rolando is a permaculturalist and has approximately 30 ornamental fish, mainly carps and goldfish in a 3 m² pond in his backyard. The goldfish are sold and their prices vary between 20 (70 US Dollar cents) and 100 pesos (3.50 US Dollars) depending on their size. Nevertheless, he is constrained by insufficient space:

Rolando: “If I had more space, then probably I would quit my job and I would entirely devote myself to permaculture. I have all the conditions for that, look I have rabbits, fishes, plants, fruit trees, I would like to set up a closed-loop [agricultural system] but without space I cannot.”

6.5.2 Hobby UPA

Amongst farmers practicing part-time urban agriculture, three case studies stand out. They involve middle-class urban farmers who have a satisfactory source of income (more than 1000 pesos monthly or 34 US Dollars), be it thanks to their professional occupation (such as Alejandro) or remittances from relatives based in the United States. In these cases, UPA is the result of a choice. Driven by a personal attitude, mainly a passion for gardening, a propensity for self-reliance, and a yearning for physical and emotional well-being, they care for their productive unit as a hobby. The main difference with subsistence farmers is that their income allows them not to exclusively rely on their productive units to ensure households’ food security. All three cases involve retired farmers with relatively large back-gardens (from 200 to 600 m²).

6.5.3 Permaculture UPA

Cross-case analysis reveals another category of farmers who devote between 4 and 6 hours to agriculture every day. These four case studies involve homegardens and rooftops following the principles of permaculture, a multidisciplinary philosophy that encompasses gardening, horticulture, ecology, architecture and community design. Permaculturalists seek to create agricultural systems that provide their own needs and recycle their waste. Not only do they optimize the use of available resources, but they also preserve and store food products. These appear as the most sustainable and self-reliant farmers amongst all encountered cases.

Permaculturalists grow crops in organically enriched beddings in every available space, including balconies and corridors inside the dwelling, where pots have wheels and can be easily moved to the sun. Typically, they sow vegetables that can be harvested at least twice a week such as aji pepper, tomato, parsley, chive (Allium schoenoprasum) and lettuce (Lactuca sativa). Biologic diversity in the productive unit is a permaculturalists' principle. Moreover, plants are sowed according to the potentially positive relations they can establish between each other. For example, Mayita sows valerian (Valeriana officinalis) next to unhealthy vegetables:

Mayita: “Here, I planted valerian, because it has a positive influence on the vegetables’ growth, especially those that are sick. […] Because I read it in the book Permacultura Criolla, valerian stimulates the properties of phosphorus in the soil.]”
These farmers conceive waste as something useful. Kitchen wastes are stored until decomposition in buckets. Discards such as eggshells and orange skin are cut in small pieces and crushed for quicker decomposition and optimization of space. Farmers are involved in a much more care-intensive agriculture than the subsistent farmers for a number of strategic reasons:

- being retired, they receive a pension (approximately 300 pesos, equal to 10.50 US Dollars). In two cases, remittances from relatives living abroad allow them to purchase goods and foods in convertible currency.
- As a rule, their mentality is more that of a producer than that of a consumer: all cases put in practice innovative techniques and recycling, leading to dwellings that are less consumptive in water and electricity. Added to food production, these households make a non-negligible economic saving. Moreover, by being self-reliant they are also more resilient to external shocks such as the impact of hurricanes or droughts.
- Every member of the family contributes with a minimum amount of time to the care and tasks required by the productive unit. Permaculturalists often teach their relatives (and their neighbours) the principles of this particular way of thinking.
- Most of permaculturalists commercialize in the neighbourhood the products they grow and process (tinned pickles (Cucuma sativa), fruit cakes, marmalades, juices) as well as non-fruit products such as compost that has undergone vermiculture fertilization.
- They benefit from the technical and infrastructural support of local NGOs. Technical support materializes in the reinforcement of small-scale farmholders' capacities, both in rural and urban areas. All neophyte permaculturalists undergo a six-day training in which they learn how to design a permacultural system. After graduation, they put in practice their designs. They also have access to publications, other trainings, workshops, conferences and visits to permaculturalist experiences in other cities. Infrastructural support consists mainly in the distribution of agricultural implements, seeds, water tanks.

**BOX 3: DRAWBACKS TO PERMACULTURE**

Permaculture in Cuba may not be seen as a panacea by all profiles of urban farmers. In this sense, it still needs to face two main challenges:

- the cultural isolation of certain profiles of low-income farmers who still stay with the principles of the green revolution. In characterizing most vulnerable farmers' profiles, data findings describe an individual who is usually native of the country side, relatively low-educated, with an agricultural know-how centered around the sugar cane monocrop. His mentality may therefore be more inclined toward the use of chemical products in agriculture.
- On the other hand, the widespread belief of the average young urban dweller that agricultural activity is hard and unrewarding. According to experts, the partial treatment of permaculture by the media has not been favorable to its spreading.

**6.5.4 Market-oriented UPA**

UPA as a full-time livelihood strategy involves small-scale family-based businesses (three cases) and UBPC cooperatives (two cases).
Francisco represents a case in which UPA generates profits that induce to fully depend on this livelihood strategy. Francisco is a 60 years-old retired cuentapropista (government-licensed self-employer, refer to 3.5) as well as a permaculturalist. His wine and rabbit business provides him with 20 to 30 thousand pesos yearly (almost 700 US Dollars), which is sevenfold the average Cuban salary. For thirteen years, Francisco has been producing different types of wines, liquors and vinegar thanks to the five grape trees he has planted in the groundfloor of his two-story house located in a central neighbourhood of Havana. The grapes develop on the rooftop thanks to a holebored in the ceiling for the trunks! In the rooftop he also has homing pigeons (as a hobby, he says he does not sell the birds), and under a backyard shed he breeds 32 rabbits. In abidance with the law, Francisco supplies the state with 120 pesos worth in wine grapes and 10 per cent of the monetary revenue he earns. Since eight years, Fran works full-time in the productive unit and receives a monthly 600 pesos salary (around 20 US Dollars). His main tasks are pruning the vines and coating vine trunks with lime. As for Francisco, his is a full-time activity of selling 1,5 litre bottles of wine for prices from 20 pesos (70 US Dollar cents) up per bottle from Monday to Saturday. This case study shows that a small-scale family-based UPA can be a source of income and employment.

A key aspect in explaining the productivity of Francisco’s unit is the optimization of available urban resources and low-cost innovation. The productive unit is a closed-loop in which no element is discarded. Furthermore, space is optimally used in that wine grape trunks do not take up space (they are planted in 1m² bedding) and the leaves provide a natural screen on the rooftop, which moderates the temperature of the dwelling unit. Last but not least, Francisco has implemented an astute low-cost technique to detect the moment when his wine has fermented enough. He places a non-lubricated prophylactic on the neck of the demijohns inside which his grapes are fermenting. When the wine is ready, the prophylactic balloons out.

Maria’s backyard is the location of another small-scale business to which she devotes an average 7 hours. Maria is a 59 years-old widow who lives in a peri-urban area with her 13 relatives. Since 20 years, she commercializes ornamental plants and recently as a cuentapropista. Her main products are endemic orchids (Encyclia...
Phoenicia) and cactuses of all sorts. Orchids are sold starting at 100 pesos (3.50 US Dollars). She also sells earthenware pots and pendant pots for 45 pesos each (1.50 US Dollars). Besides, she grows typical aromatic plants and fruit trees in her 400m² garden. Nevertheless, she faces a number of constrains, as for example plagues and adverse climatic conditions. Her productive unit is not (anymore) the main source of revenue in the household also due to new local competitors. In the same neighbourhood, a number of Tiendas-Consultorios Agropecuarios have opened their doors to the public since last year. Also, neighbours have started new businesses involving the selling of ornamental plants. Maria’s customers number has decreased and her economic losses also.

As the productive unit is not able to provide sufficient income, only her daughters in law and her younger son help her with the production in their free time. For the moment, her business only covers the expenses it requires.

Maria: “My son is not involved but he helps me a little bit. He knows that the business is not rentable, then he devotes to his job because that is what provides the money to sustain the family.”

6.5.5 Further analysis results: motivations to get involved in small-scale UPA

As a rule, small-scale food production represents both work and leisure for farmers. Notwithstanding that in all cases food production is undertaken to improve family’s well-being, UPA also generates a number of non-tangible spiritual benefits such as enjoyment, leisure and physical well-being.

Alberto: “The patio provides me with 350 pesos monthly, but spiritually I earn millions.”

UPA is often the result of farmers' vocation and a personal interest. Indeed, in asking the farmers the main motivations that led them to get involved in food production, the following answers emerged:

- to enhance the family's food sovereignty
- to provide an economic income to the household
- for pleasure and personal satisfaction
- to stay active and productive in retirement
- to work outdoors
- to relax (anti-stress therapy)
- to improve the livability of their neighbourhood

For example, Niurka asserts that, since she started homegardening medicinal plants, she does not need to go the pharmacy anymore. This case shows that UPA has the potential of directly contributing to physical well-being of producers' households:

---

19 These agricultural stores, managed and financed by the Ministry of Agriculture, are destined to the selling of seeds, seedling of fruit trees, vegetables and ornamental plants, soil improvers (such as organic matter and worm compost), technic literature, agricultural implements and veterinary medicinal products. Currently, there are 52 Tiendas-Consultorios in Havana.
Niurka: “In this house it has been years since we visited a pharmacy.”

Lirardo’s is another representative testimony regarding the spiritual benefits of his food production:

Lirardo: “Earth means health, [...] for me it is an anti-stress therapy. I go to the garden and the hours pass without me noticing, I forget the problems I have in the house.”

Furthermore, market-oriented homegardening provides a sense of autonomy which relieves burden from the state. The testimonies of these farmers express enjoyment and satisfaction, but also pride: they are self-employed and do not depend on any instance. Noslen states that, besides the economic revenue, what motivated him to start his rabbit production was the need of absolving himself from responsibilities with the state and other persons.

6.6 Links between the productive unit and the neighbourhood

Observed UPA is an activity that is carried out by weaving day-to-day relationships in a densely populated context. UPA triggers cooperative involvement and participatory processes that lead to the enhancement of neighborliness.

The concept of neighborliness arising in data findings needs to be explained in the light of Cuba’s recent history. When revolutionary forces seized the power in 1959, major shifts took place in the physical planning of urban agglomerations all over Cuba. Moreover, the legal framework affecting housing changed completely: the concept of private property was no longer accepted, meaning that individuals in socialist Cuba could not sell the houses in which they lived but only swap them through a legal subterfuge.20 A vast majority of Cubans have not moved from their native houses since 50 years, leading to the creation of connectedness (in certain cases even interdependence) between neighbours21 and interpersonal trust.

In this context, observed urban productive units are the source of four types of relationships between individuals, usually from the same neighbourhood but not exclusively:

- **Cooperation.** UPA boosts cooperative involvement of urban farmers, whom crystallize in their behaviors a certain sense of interpersonal trust. In this sense, trust is essential to the observed processes of influence and cooperation both between urban farmers as well as between farmers and neighbours. According to Mougeot, “the frequent gifting of food by home producers, strengthens reciprocity within assistance networks and reduces incidence of theft” (2000 : 32). A clear example of this idea is present in Macía’s discourse:

  Macía: “I distribute free avocados in my neighbourhood. In exchange, people protect my garden; we mutually help

20 However, the day before this research’s fieldwork concluded, Cuban president Raúl Castro announced the legalization of the right to buy and sell houses and pieces of land
21 Conflicts tend to be solved except for housing problems which, according to a local expert, are the only disputes that may never find a solution, given the lack of available housing and the aforementioned difficulties to move out of one’s house.
each other.”

Further signs of cooperation are found when observing the constant exchange of implements, seeds and foods. Often manure is traded for vegetables, especially sweet potato (which is useful as a rabbit fodder). But most recurrently, locally produced seeds are exchanged in a kind of barter system. The majority of observed urban farmers believe that solidarity is something natural and is part of daily life.

Alejandro: “We try to help each other. I bring some milk to a person, and this person gives me a pound of beans. [...] It is a mutual help, between all of us.”

However, it is important to stress that food exchange is in all cases subordinate to the provisioning of the family's food requirements and often takes place when the product's surplus risks to fall apart.

- **Sociability.** Case studies prove that UPA may reinforce preexisting relationships between urban farmers and their neighbours. First and foremost, the concept of sharing needs to be understood in its context. During the Special Period (refer to section 3.3), in which supply of foodstuffs and goods drastically dropped, Cuban media promoted sharing as an ideal behavior and depicted it “as a sign of good citizenship in a socialist society” (Premat, 2003: 93). Still nowadays this is reinforced with the presence of slogans referring to the productive units as 'of the neighbourhood, by the neighbourhood, and for the neighbourhood', in markets, pamphlets and publications of the Ministry of Agriculture. This may explain why Cubans in general and farmers in particular are prone to sharing. This attitude has been observed in farmers who assert they give their produce surpluses for free, especially to neighbours who are more in need:

María: “One likes to be thoughtful with the neighbours. Take mammee apple for example, I give them to those who have economic problems and children, I give them mammee apples and bananas.”

Macía: “Neighbours come to my house for medicinal plants. I have plants for the kidneys and for catarrh... But I don't sell that, because they are for sicknesses... One has to be a human. If one person can be saved with something that you can give him, why are you going to sell it? Those are plants that do not demand care. I just give them some water, no more. It is just about sowing, and that costs me no hardships”

Sometimes products are sold at an extremely low cost compared to that of the market. The exchange of knowledge and experience is also a recurrent pattern. As seen in previous sections, urban farmers tend to be skilled in agricultural and permacultural methods. Sociability is a determinant of knowledge transfer as well as dissemination of successful innovations. According to Saray, information flows easily between farmers:

Saray: “We often exchange varieties: I have something and I give it to him, and viceversa. [...] And the same with experience. Look at this papaya, in my backgarden papayas do not manage to grow. Then, Sánchez [a permaculturalist neighbour] had them planted in circular beddings, and he harvested enormous papayas. Now I am doing the same thing, and I'm waiting to see if they finally grow.”

This is a distinguishing aspect of UPA as observed in case studies. The potential of this livelihood
strategy to successfully provide benefits for the individuals it involves is determined in a high proportion by the easy access of farmers to information and models for action.

- **Solidarity.** This attitude, intended as mutual support within a group, manifests in those testimonies in which farmers face challenges or tensions deriving from their activity. Previous to their occupation with crops, many land lots were filled with debris and urban wastes due to their idle character. Often, neighbours took the initiative of helping farmers when these found themselves in the situation of starting with their productive units from scratch.

The only exception found in analyzing this pattern of relationships is the case of Macía, who’s backyard is constantly visited by strangers. Since few months, he asserts that persons enter his productive unit to hunt exotic birds such as colibris (*Archilochus colubris*). Besides caging the birds, they often steal fruits and break trees branches. Macía’s productive unit is large (1000 m²), has defective fences and only dogs as an alarm system.

- **Networks.** Social networks create bonds between similar people and bridges between diverse others. Indeed, Cubans in general often rely upon connections with others to obtain what they need. This attitude is popularly known as *sociolismo*, which can translate in English as "partner-ism". A term used to describe the mutual exchange of favors between friends, neighbours or relatives; it involves illegality (circumventing bureaucratic restrictions or obtaining hard-to-find goods).

Juan: “When rabbits do not have sufficient Labiomec, a friend finds me bottles of medicines that are stronger, [...] that can only be found on the black market.”

Case studies show that specialized networks linking farmers with similar activities, interests and problems are widespread. This is the case of livestock raisers, permaculturalists and urban farmers in general. As reported before, rabbit raisers in El Cerro neighbourhood meet every second Saturday of the month. Permaculturalists, meet recurrently for trainings, workshops, conferences and guided visits to other permaculturalists' operations in Havana and outside. There are 7 permaculture groups in the city (corresponding to the different neighbourhoods) and each group meets at least once a month. The El Pino group, meets to share experiences, but also seeds and inputs (such as for example the use of backpack fumigators) which are placed in a *pañol* (locked store room) and are available preferentially to newly arrived permaculturalists. These networks reinforce preexisting social interactions.

### 6.6.1 Enhanced neighborliness and spontaneous group action

In the face of observed cooperation, solidarity, sociability and networking, it is possible to conclude that the main contribution of UPA at the community level is an enhancement of neighborliness. Data findings point that productive units tend to be more community-centered than household-centered. The vast majority of approached farmers assert they put collective goals ahead of individual ones. Nevertheless, recalling the theoretical framework, it is important to interpret farmer’s testimonies taking into account that agriculture in Cuba is an officially extolled activity and that farmers are deemed as exemplary citizens.
Even those producers who derive an economic revenue from their activity, qualify their contribution to the neighbourhood as a priority. This idea echoes Premat’s argument on parcels as community-centered and community-managed (Premat, 2003 : 92). For example, Saray, who grows aji peppers and sells them in small bags in the yard of her house, says she prefers sharing with her neighbours rather than accumulating surplus for sale even though this might turn out to be counterproductive:

Saray: “My personality is not the one of a seller. I am not an entrepreneur, a business-woman, I’m not good at that. Businessmen are greedy. Charitable persons never become entrepreneurs because they give out everything they have. [...] For example I gave all my aji pepper seeds to everyone. Because they were "legendary". Eventually, I turned out to be the only one not having the aji pepper seeds.”

This attitude also confirms Kisner’s idea, who asserts that UPA “boosts cooperative involvement and dedication to the community” (Kisner : 2008). In this sense, neighbourliness may turn into a particular type of group action, which is spontaneous because it is not decided by the producers themselves. Improvement of the community through the achievement of reciprocal benefits is typical of permaculturalism. Buckets, for instance, are distributed to neighbours for them to separately deposit their organic and non-organic wastes. In this way, permaculturalists’ productive units are rewarded by using the organic wastes as fertilizers and by recycling non-organic wastes into useful materials for agriculture. Neighbours are also benefited because they do not have to carry their trash to dumping sites. The neighbourhood also benefits because such a waste treatment results in cleaner and more hygienic spaces where wild dumping is eradicated. Related to this idea is also the fact that UPA embellishes the neighbourhood and makes it more livable by creating green spaces in spite of the invasion by concrete (de Zeeuw et al., 2011 : 156).

An example of spontaneous collective action at the service of community’s needs is represented by those case studies in which farmers pooled together to build a new public park in the place of a former dumping site. With the support of different NGOs, not only did they turn it into a useful space, but they also appropriated it by personalizing benches with their own decorations allowing for the expression of individual identity.
Another interesting trend in collective action was also detected is urban farmers’ sensitization of others (especially relatives) to the benefits of UPA. Case studies show that producers are generally predisposed to transfer know-how and enthusiastically involve their family, friends, neighbours or even total strangers:

Lirardo: “I teach those who don’t know how to sow, cultivate, build. I have taught a large number of persons. Nobody was born knowing. For example, when a boy who has never seen the countryside comes here to work, I teach him how to use the hoe without cutting the roots. I teach him the necessary distance between sows.”

Ana: “It is positive that people see with their one eyes the good outcomes provided by urban agriculture. After having designed my system I called some friends to my house with the excuse of making a barbecue on the rooftop, but I wanted to hook them up, for them to also see how a rooftop could be destined to other things than only drying the laundry or making barbecues, a rooftop can be a place for permaculture. I think people should seek a more self-reliant way of life, find answers to their own problems, ways to be fed, to heal, ...”

In six cases, urban farmers became involved with community development programmes and put their productive units at the service of communitarian benefit. Again, the back-gardens fulfill a ‘public’ function by their engagement with the neighbourhood which seems to gain as much importance as their 'private' function of providing benefits for the household. For example, three permaculturalists receive groups of students, mainly from primary schools (between 6 and 12 years-old), weekly in their productive units.

Consequently, UPA’s contribution to the neighbourhood appears as the result of the farmer’s conviction that his action is socially useful. This moral incentive is similar to that observed by Premat in Havana’s parcels. I agree with her theory to explain the determinants of farmer’s involvement with the neighbourhood: “the practices of sharing and contributing to the community may be embedded in beliefs that have become hegemonic after over forty years of revolutionary government” (Premat, 2003 : 95). In the perspective of my theoretical framework, case studies do indicate that the communitarian mentality of the farmers is an expression of the collective imagination brought about by the revolutionary ideology and the guevarist ideal of the New Man (refer to section 2.4).

To conclude, the contribution of UPA to the neighbourhood is not only socially, but also economically and environmentally sustainable. Besides allowing greater possibilities for social inclusion and cohesion, they address common interests (lower prices, bartering or donation of food) and tackle common problems (dumps, pollution).

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22 Besides the sensitization induced by urban farmers, Cuban media recurrently cover UPA and its multiple impacts. During the duration of the fieldwork, three TV programmes were broadcast including testimonies of urban farmers, who showed the camera their productive unit and explained the benefits it entailed for their family, neighbourhood and more generally for the city.
7. CONCLUSIONS AND RECOMMENDATIONS

Authors conceive UPA as a tool to achieve some sort of food security in the Global South. UPA as observed in Havana owes to a very peculiar context, since the socialist government has been providing a significant portion of the necessary dietary needs. Moreover, the population is generally well educated, and therefore shows less propensity for agricultural occupations than in other cities of the Global South. It was therefore challenging to investigate the manner in which UPA was achieved in a large city such as Havana and what were the benefits to the population, if any.

Cross-case analysis of the sixteen cases in this study reveals that small-scale UPA does supplement the household diet and reduce the share of income spent in purchasing foods. Since the state-distributed rations are mainly dry staple food, the produce from UPA both increase the regularity and the variety of the diet. Indeed, they bring rustic fruits and aromatic plants, and to a lesser extent green leafy vegetables, meat and eggs, thus confirming the findings of Niñez (1984), Marsh (1998) and Redwood (2009) on the potential contribution of small-scale UPA to food security.

Nevertheless, it also confirms Mougeot’s theory (2000) that, in spite of such valuable advantages, homegardens can only but complement households dietary needs although they do contribute to food self-sufficiency. Indeed, the case studies observed prove that securing livelihood outcomes such as food owes less to the productive units than to other livelihood strategies. Only two market-oriented productive spaces achieved full household food security through UPA. Moreover, the fungible income generated by UPA is often directed to the purchase of “pleasure” foods that are not particularly nutritious and rather rich in sugars and fats. Therefore, in these cases UPA does not lead to a more regular intake of nutritious food, thus refuting de Zeeuw’s (2011) and Yeudall’s ideas (2006) but they do bring some degree of satisfaction to an otherwise rather drab diet. Which is a non negligible achievement in a city.

The potential contribution of productive units to household food security is greatly hindered by insufficient access to the *sine qua non* requirements for agriculture: that are adequate space and water. In the highly populated and fast-developing urban landscape, where the interests of different stakeholders compete for the use of space, productive units are often too small to produce enough to cover household needs. This is the reason why farmers often resort to other livelihood strategies. Furthermore, in peri-urban areas, the access to clean water is greatly reduced (one day of supply every fourth day). In line with this, soil and water pollution further discourage urban farming. When starting their production, farmers often need to fetch better quality soil from outside the city because the one they have is polluted and eroded. Furthermore, creeks and rivers in peri-urban areas are polluted and inappropriate sources of water for vegetable crops and livestock.

Nevertheless, small-scale UPA is a fundamental livelihood strategy for the majority of case studies. As seen from the point of view of household livelihood security, this research has identified human and social achievements as the most significant assets in favor of small-scale UPA. These largely compensate the unfavorable access to natural resources and urban pollution and justify the efforts and physical exertion.
Human assets are expressed in the rapid acquisition by urban farmers of appropriate agricultural knowledge and in their high degree of resourcefulness. Since they are particularly knowledgeable of agriculture, they are able to evaluate the local environment and available materials, and often compensate by designing low-external input and organically based innovations. This attitude expresses farmers’ proactivity in their search for self-reliance. The innovations are affordable and are often replicated by other small-scale farmers. The reward is an appreciable degree of self-satisfaction and the prestige of shared knowledge and achievements.

Indeed, peer-to-peer knowledge transfer is a recurrent theme in cross-case analysis. Farmers, especially permaculturalists, act as vehicles of information and creativity. They exchange useful information, share printed matter on agriculture and acquire new skills in the frequent workshops and trainings provided by the state and local NGOs. Thus, largely compensating for the lack of intergenerational transmission which is the rule in rural areas.

The personal “control” over a plot and production of edibles whether for family consumption or for sale is another source of satisfaction in an urban environment where most activities are controlled and collective. It gives a chance for sharing.

Indeed, farmers demonstrate a propensity for cooperation, solidarity, sociability and networking with other farmers and with neighbours. This is perhaps partly explained by the particular context of the Cuban society after over 50 years of Cuban socialist ethics promoting reciprocity and connectedness between neighbours.

The cooperative involvement and participatory processes show that one of UPA’s significant outcomes is the enhancement of neighbourliness. One of the lessons that can be drawn from Havana’s small-scale UPA is that much can be obtained by weaving day-to-day relationships that are mutually beneficial and result in spontaneously cooperative group actions. Small-scale agriculture has the potential of making a social, economic and environmental sustainable contribution to a neighbourhood.

The interplay of human and social assets in securing livelihood outcomes is a key feature of small-scale urban agriculture in Havana, the benefits of which are not solely alimentary.

UPA comes in as a means of self-assertion, exchange and social contact. The importance of being one own’s master and of acquiring sufficient experience to be able to provide advice and council to others, acts as a driver of empowerment and self-management (Bailkey et al. 2007) in the face of a totalitarian regime and its paternalistic treatment of individuals.

Moreover farmers insist on the importance of non food-related benefits provided by their agricultural livelihood. They express independence, satisfaction and pleasure as main benefits of devoting to UPA. These non-tangible outcomes prove that small-scale UPA is less perceived as work and more as leisure. Indeed, four case studies involve UPA as a hobby, not as a result of necessity. This highlights that Cuban households may not be as urged to secure food as it may be for low-income households in countries where no rationing system exists (Parker, 2010).

The HLS framework, which stresses survival over quality of life, does not seem applicable to
Havana's reality where UPA is not a survival strategy. It is often a complementary livelihood strategy providing a wide array of intangible outcomes. These rewards are not significantly recognized in the model whereas, in the light of our observations, they appear to contribute to an improvement of the producers' quality of life.

This research shows that Havana is home to small-scale agricultural systems that meet all the requirements to be socially, environmentally and economically sustainable. Productive units tend to be configured to optimize the use of available resource, and farmers thus reduce their dependence on external inputs. These spaces have the potential of providing food, income and other not less important outcomes such as emotional and physical well-being. But this potential can only be fully expressed if structural limitations are tackled by local authorities. Urban farmers can only counteract pollution and the scarcity of space and water with coping strategies. Resourcefulness and neighbourliness are not sufficient or not appropriate to rehabilitate the Almendares river basin or to tackle uncontrolled urbanization. Public authorities could positively contribute to the conservation of natural based resources and to the spreading of sustainable small-scale UPA by:

- finding ways to allow coexistence of traditional urban functions with the social, economic and ecologic benefits demonstrated by UPA in general and small-scale UPA in particular. Urban planning and landscape architecture could prioritize UPA as a win-win strategy to make cities more sustainable and resilient in coping with swift urbanization and urbanization of poverty. A physical planning of the urban agglomeration that only takes into account the economic profit of allocating land for hotels, commercial centers or parkings will further constrain the potential of UPA and its beneficial functions.

- Taking more measures in order to tackle Cuban agriculture's most chronic constrain: the lack of water. Palliative measures are imperative to cope with insufficient availability of water, especially because 2011 has witnessed the worst drought in 50 years. Moreover, the recycling of residual water, especially for horticulture should be planned. According to FAO (2010), a promising option for developing cities is the creation of shallow stabilization ponds that can use algae and bacteria to suppress external pathogens and restore the properties of water. A reform of the drainage and water treatment of the Almendares river basin is long overdue and should urgently be tackled.

- Numerous idle land lots are to be found in the city and. In this sense, it would be commendable to both diversify the different forms of land exploitation and provide more favorable means for the commercialization of urban agricultural products. The Cuban government has recently promoted legislation in favor of UPA: by legalization of cuentapropismo and distributing idle urban lands (parcelas) to individuals susceptible of putting them to production. Nevertheless, more measures need to be taken, especially with respect to the paternalistic hold of the government over the food supply system. A popular saying claims, “What are the three failures of the Cuban revolution? Breakfast, lunch and dinner.”
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**CONFERENCES**


### APPENDIX 1: OPERATIONALIZATION OF MAIN CONCEPTS

<table>
<thead>
<tr>
<th>Concept</th>
<th>Dimension</th>
<th>Variables</th>
<th>Indicative questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>URBAN AND PERI-URBAN AGRICULTURE</td>
<td>Livelihood resources</td>
<td>Time</td>
<td>- What is farmer's availability to work in the productive space in nº of hours per week? &lt;br&gt;- Has the farmer also other occupations?</td>
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<tr>
<td></td>
<td></td>
<td>Space</td>
<td>- What is the dimension of the productive space in m²? &lt;br&gt;- What is the tenure of land?</td>
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<td></td>
<td></td>
<td>Knowledge</td>
<td>- What is the technical preparation of the farmer? &lt;br&gt;- Has the farmer attended specialized trainings or workshops? Which and for how long?</td>
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<tr>
<td></td>
<td>Livelihood outcomes</td>
<td>Food security</td>
<td>- What plants are cultivated and what animals are being raised? &lt;br&gt;- In what quantities? &lt;br&gt;- All the members of the family eat the products from the plot?</td>
</tr>
<tr>
<td></td>
<td>Monetary income</td>
<td></td>
<td>- Are the products commercialized? &lt;br&gt;- At what price? &lt;br&gt;- How many are sold (monthly)? &lt;br&gt;- Is it the household's main source of income?</td>
</tr>
<tr>
<td></td>
<td>Sociability</td>
<td></td>
<td>- Has the farmer more friends than before starting with UPA? &lt;br&gt;- Does the farmer receive help from other farmers of the neighbourhood when he/she needs it? &lt;br&gt;- Does the farmer regularly give some of his/her products to the neighbours for free?</td>
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<tr>
<td></td>
<td>Cooperation</td>
<td></td>
<td>- Does the farmer cooperate with his/her neighbours to pursue mutual benefits? &lt;br&gt;- Does the farmer has had conflicts with surrounding community since started with UPA? &lt;br&gt;- Was the conflict solved? If yes, how?</td>
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<tr>
<td></td>
<td>Improved Natural Resource base</td>
<td></td>
<td>- Is the productive space designed and works in a way that makes it sustainable for the urban environment?</td>
</tr>
<tr>
<td>AGENCY</td>
<td>Livelihood strategies</td>
<td>Use of organic farming methods</td>
<td>- Does the productive unit representent a hazard for the urban environment? &lt;br&gt;- Is there any source of pollution in the vicinities? &lt;br&gt;- What plants are cultivated and what animals are being raised? &lt;br&gt;- What is the type of soil? &lt;br&gt;- Does the farmer incorporate compost? &lt;br&gt;- Does the farmer incorporate an irrigation system? &lt;br&gt;- Does the farmer use the mulching technique? &lt;br&gt;- What is the water source and availability? &lt;br&gt;- Does the farmer perform chemical weed control (quantity and...</td>
</tr>
<tr>
<td>Vulnerability Context</td>
<td>Seasonality</td>
<td>Prices</td>
<td>Agricultural Cycle</td>
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<tr>
<td>Frequency?</td>
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<tr>
<td>- Does the farmer perform chemical pest control (quantity and frequency)?</td>
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<tr>
<td>- Does the farmer use chemical fertilisers (quantity and frequency)?</td>
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<tr>
<td>Recycling</td>
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<tr>
<td>- Does the farmer re-use organic waste (of its own household or of neighbours?)?</td>
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<tr>
<td>- Does the farmer re-use inorganic waste (of its own household?)?</td>
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<tr>
<td>- For what purposes is recycling carried out?</td>
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<tr>
<td>Innovating</td>
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<tr>
<td>- Has the farmer accomplished changes by introducing new methods, ideas, or products in the productive space?</td>
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<td></td>
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<tr>
<td>- Have these changes been positive in terms of productivity?</td>
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<td></td>
<td></td>
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<tr>
<td>- Have these changes been positive in terms of contributing to the sustainability of the urban environment?</td>
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<tr>
<td>Bartering</td>
<td></td>
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<tr>
<td>- Does the farmer exchange edible products?</td>
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<tr>
<td>- Does the farmer exchange edibles for non-edible products that are useful for the productive unit?</td>
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<tr>
<td>- Does the bartering take place between neighbours? Between farmers? Between family-members?</td>
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</table>

**Context**

- **Seasonality**
  - Prices - What is the price of the main foodstuffs usually consumed in the household?
  - Agricultural cycle - Which products are grown in the different seasons of the year?

- **Shocks**
  - Climatic adversities - What main adverse climatic phenomena have had an impact on Havana in the last years and how?
  - What is the average rainfall over the last year?

- **Security**
  - Has the productive unit suffered robbery or has it been damaged?
  - Have strangers intruded into the productive unit? What has happened?

- **Trends**
  - Demographic - What are the current trends in terms of urbanization and ageing?
  - Governance - What is the relationship between the farmer and State institutions?
APPENDIX 2: SOCIAL FORMS OF PRODUCTION, PARTNERSHIPS AND INSTITUTIONAL SUPPORT TO HAVANA’S URBAN AND PERI-URBAN AGRICULTURE

- SOCIAL FORMS OF PRODUCTION:

State Farms for Producers' Consumption
These formerly vacant plots, usually smaller than one hectare, were handed over by the government in 1989 to labour centers. The aim was to involve these centers in farming activities so as to enhance their self-provisioning capacity in green leafy vegetables, fruits, tubers and livestock meat. These plots are state-owned and they are exploited by workers on a volunteer basis during a specific lapse of time.

In this research, one unstructured interview has been conducted with Macho, the principal fieldworker of a Film Festival Headquarters’ plot. Thanks to this production he manages to complement the workers’ daily diets (40 meals per day), nevertheless he states that it contributes with less than 20% of the total needs. Macho states that *auto-consumos* (as these plots are popularly known) are important to ensure a certain level of food self-reliance by producing in previously idle urban land. But its most important contribution needs to be measured in terms of generating employment opportunities and eliminating trash dumps. He states that, in the city center, there is not enough space to improve the plots’ output levels.

Community Gardens
In the face of the Special Period, these productive spaces were granted by the local government in 1991 to encourage citizens to produce in all available spaces in the city. According to Cruz and Medina, “during the first years of the economic crisis, more than 27,000 people were linked to approximately 1,800 ha of community gardens” (2001: 30). These spaces were usually smaller than 1,500 m² and their tenure was either private or state-owned. The latter were distributed free of charge to one or more families, neighbours, schools, day-care centers, military facilities and hospitals. Furthermore, in 1993, Havana’s government allocated larger plots mainly located in peri-urban areas to groups of farmers. These previously vacant plots are between 2000 and 5000 m² in size. These community gardens are technically supported by specialized agricultural institutions (pertaining to the Ministry of Agriculture), for example to prepare the land for cultivation and to bring quality soil from other places. Commercialization of the output takes place in retail outlets or kiosks situated within the perimeter of the garden.

High-yield Urban Gardens
These are also known as *Organoponicos de Alto Rendimiento* or OAR. These productive spaces have been introduced in Havana in 1994. They are over one hectare in size and often consist of low-level concrete walls filled with organic matter and irrigated with a drip system. According to Companioni and Hernández (2002), they are an example of how scientists and gardeners can work together in seeking new production methods. On the one hand they supply foods directly to the cities and on the other hand they seek to develop effective, low-input, organic methods of production. Their origin is interesting. Prior the Special Period, hydroponics existed and where heavily dependent on industrial fertilizers. Nevertheless, when such products dropped, hydroponics became no longer usable. Thus, they were converted for organic agricultural
production by filling the planting troughs with composted sugar cane waste instead of water.

**Fresh Vegetable Greenhouses**
This form of production was launched in 1998 to produce off-season crops in an intensive manner. The productive units are covered by protective shields to moderate the adverse effects of the sun, wind and rain, but also insects. Nevertheless, greenhouses face a major challenge in tropical climates in general: the spreading of antagonistic fungi. The cultivation of eggplants, pumpkins or cabbage becomes difficult, because these varieties are highly vulnerable to fungi. In 2001 there were approximately 70 green houses in Havana’s province (Cruz and Medina, 2001). The majority of the production is destined to the tourism sector and is sold in Convertible Pesos.

- **PARTNERSHIP MODES:**

**Farmer Groups**
These producers clubs appeared in the 1990s as a spontaneous farmer’s need to share experiences and find better self-managing capabilities (Cruz and Medina, 2001). The Urban Agriculture Directorate (see further below) acknowledged the positive outcomes of this partnership mode and institutionalized it to the whole city, with the added aim of establishing communicative links throughout the urban system. Nowadays, some interviewed farmers assert that the most valuable aspect of this partnership is the access to training activities and access to agricultural development projects financed by the government or by international cooperation agencies. Normally, these support programmes are aimed at providing more and better agricultural implements and water tanks. In 2001, the number of farmer groups registered in Havana amounted to 850 (Cruz and Medina, 2001).

**Credit and Service Cooperatives**
This partnership mode emerged in Cuba during the 1960s. It is a voluntary association of rural or urban smallholder producers who own the productive space or hold usufruct rights over the land, the means of production and the output they achieve. These cooperatives have their own legal personality, which allows them to extend credits and provide extension services to their farmers. Furthermore, farmers pertaining to CCS maintain their plots separated and have to abide to internal by-laws drafted and approved democratically. For example, parceleros (farmers warranted by the government with usufruct rights over small-scale land lots) are typically reunited under such a partnership mode. In this way farmers obtain mutual benefits, and at the same time the State is able to keep a certain control of these ‘semi-private’ spaces. A critique often heard during fieldwork is that ‘the State does not want to distribute land to farmers because it is afraid that they will become rich’. Here emerges a highly interesting debate on the relationship between tenure, responsibility and productivity of the agricultural space in Cuba. Although non-state urban producers have to face less barriers to access private or semi-private land than 20 years ago, they are not completely free to accumulate extra cash from their production. On the one hand because they have to hand over to the state a significant percentage of their production and their economic revenue from the marketing of the production. And on the other hand, because the state still holds a major paternalistic role in controlling the Cuban food market (for example by fixing the prices of foodstuffs and thus rendering illegal every transaction conducted according to the law of supply and demand).
Basic Units for Cooperative Production
In 1993, the Basic Units for Cooperative Production (UBPC) emerged as a part of the major shifts accomplished by the government to decentralize the agriculture-livestock production system. UBPCs formed when the state allocated plots to individuals free of charge on a permanent basis (typically to fieldworkers intending to form a partnership mode such as a CCS). The difference with CCS is that “the members control the property, which is their heritage and also their livelihood” (Cruz and Medina, 2001: 47). The members democratically elect a President and a Board of Directors. The monthly wages received by each worker are displayed on an accessible blackboard. Fieldworkers and managers of UBPC that I succeeded in interviewing asserted that they earn 250 pesos monthly and 350 pesos monthly respectively. Furthermore, the output is marketed in retail stores located within the cooperative and the surplus is equally distributed to the members of the cooperative. The line of production of the UBPC is imposed by the government according to the priorities of the surrounding community. Therefore, the members of the cooperative are certainly free to run the productive unit as they wish, but they are constrained by the state in that they need to produce what they are told and market the products in place.

• INSTITUTIONAL SUPPORT:

The National Program of Urban and Peri Urban Agriculture
UPA exists throughout the country taking into account the number of inhabitants in each town. This ever growing enterprise, is controlled by the Grupo Nacional de la Agricultura Urbana (the National Group for Urban Agriculture), established in 1998, and also known to urban farmers as la Agricultura (the Agriculture). It has two main objectives. On the one hand it has the mission of putting all of the urban and peri-urban idle land into cultivation. On the other hand it provides a broad range of extension services and resources such as agricultural specialists, short trainings, seed banks, biological controls, compost, and tools. Inter-disciplinary, it comprises representatives of the Ministries of Agriculture (MINAG), Education (MINED), Sugar (MINAZ), Superior Education (MINEDS) and of the Revolutionary Armed Force (MINFAR), as well as 15 scientific institutions led by the Institute for Fundamental Research on Tropical Agriculture (INIFAT).

The Cuban Association of Small Livestock Production
The ACPA (Asociación Cubana de Pequeños productores animales) was founded in 1974 to service individuals involved in animal science and husbandry. The Association promotes sustainable development programs aimed at improving animal production while strengthening food security and protecting the environment. ACPA is composed by a wide number of grassroot organizations (in Havana, one organization for each municipio or neighbourhood), that act as disseminators of technological research and are home to meetings between producers (often these meetings turn into workshops). ACPA also encourages families to become small livestock producers for household consumption by providing them with start-up materials at a subsidized cost. Lastly, the Association diffuses information to potentially concerned farmers when new internationally or nationally funded support programs begin.
APPENDIX 3: UNSTRUCTURED INTERVIEW QUESTIONS

Date:
Place:
Name:
Age:
Gender:
Education:

1. Where were you born?
2. How many persons live in this household and what are their ages?
3. What is/are your main job/s at the moment?
4. Which job provides more income or sustainance?
5. What is the average monthly total income in this household?
6. Is there any member sending remittances from abroad?

7. What is the dimension of the productive unit?
8. How many hours per week do you devote to the productive unit?
9. When did you start with the productive unit?
10. How was the space before being productive?
11. What are the main constrains to the productivity?
12. What plant varieties do you produce and what animals do you raise?
13. Do you process and/or conserve the foods that you obtain in the productive unit? (Jams, etc.)
14. Are the rest of the household members actively involved with the productive unit?
15. What do you do with the production? (Selling, bartering, donating, etc.)
16. What type of tools do you use for the production?
17. Does somebody from outside the household come to help you? Do you pay him/her?
18. Did you solve any problem with your own creativity? Do you think there are innovations in your productive unit?

19. How did you learn about agriculture?
20. Are you a member of any agricultural group? (ACPA, etc.)
21. Are you being supported by any national or international institution or organization?
22. Do you collect the wastes from your neighbours sometimes? Are you involved in any activity that is positive for the block or neighbourhood?
23. Do you exchange seeds or foods with your neighbours? How often?
24. Have you ever had any conflict with any neighbour? Has it been solved? How?
25. Do you donate foods to your neighbours? Which and how often? Do you receive foods from them?

26. How do you fertilize the soil?
27. How do you perform pest and weeds control?
28. What are the sources of water in the productive unit?
29. How often is public water supplied and for how long?
30. What are the main constrains to production for being in an urban setting?
31. What are the main advantages to production for being in an urban setting?

32. What have been your main challenges since you started with the productive unit?
33. Is the effort worthwhile compared to achievements?
34. What is the main reward of urban agriculture for you and your household?
35. What do you think is the main reward of urban agriculture to your neighbourhood?