

**Resilience at the margins:**

**Stories of seed practices in the city gardens of Havana City, Cuba**



**Emily DOWDING-SMITH**

**June 2011**

## **1.1. Introduction**

There is a global decline in biological diversity; specifically, genetic erosion of our of agricultural crop plants (cereals, fruits, nuts, and food legumes) (FAO 2010; Steinberg 2001). Large scale industrial agriculture, based on monocultures has pushed farmer varieties of seeds and farming practices that favour biodiversity, specifically agro-biodiversity to the side, instead favouring homogeneity (Andersen 2010; De Schutter 2010; Nazarea 2005). Of the 1.5 billion hectares of farmland in the world, 91% is now dedicated to monocultures largely comprised of corn, soybeans, rice and wheat and the result of this intensive agriculture is an associated reduction in diversity of crops per tillable land unit (Altieri 2009). Further, literature on seeds and farmers tends to focus on rural farmers rather than city gardeners (Cleveland and Murray 1997; FAO 2010; Lipper et al. 2010) and while there is a parallel set of literature on urban agriculture (UA) (ETC 2006; FAO 2001; Mougeot 2005) that omits as a key issue the very starting point from which gardens grow: seeds.

So, are seeds important in urban settings? Home gardens are being recognised for their high levels of plant genetic resources, contribution to agro-biodiversity and provision of ecosystem services, as well as being applied to broader studies of conservation practices in communities (Barthel, et al. 2010; Galluzzi, et al. 2010). In light of this, the current study is set in Havana City, Cuba to assess seed practices of city gardeners set against a framework of resilience approaches and marginality. For at least twenty years Cuban UA has been well established as part of the country's larger push to agro-ecological farming practices. Cuba's story is widely researched and cited in literature as a success story for UA (Buchmann 2009; Wright 2009), food security (Altieri, et al. 1999; Killoran-McKibbin 2006; Koont 2008) and organic gardening (Funes 2002; Nelson, et al. 2009; Rosset and Benjamin 1994) and accordingly provides a great setting to study seeds in the context of UA. The fall of the Soviet Union meant Cuba could no longer rely on the inputs of fertilisers, pesticides and farm machinery including replacement parts and the diesel to run equipment nor could it rely on its previous suppliers of food imports (Funes 2002; Nelson, et al. 2009; Rosset 1997). Accordingly, during the 1990s state wide UA programmes were initiated by the government, which played an important part in fulfilling dietary requirements of the nation amidst the difficult times of the Special Period in Time of Peace ("Special Period") (Altieri, et al. 1999; Companioni, et al. 2002; Wright 2009).

Moreover, in Cuba there is the presence of both formal and informal seed sectors. The formal sector is comprised of certified seeds produced by scientific breeding and the informal sector is farmers' varieties generally saved from farmers' harvests, circulated within families or communities through exchanges or gifts (FAO 2004; FAO 2010; Lipper, et al. 2010). Farmers' varieties are: "*geographically or ecologically distinctive populations which are conspicuously diverse in their genetic composition both between populations and within them and are the product of local selection by farmer breeders*" (Cleveland and Murray 1997). These varieties contain genetically diverse traits that are: important to feed a growing population, can adapt to marginal growing areas, pests, diseases, climatic changes such as drought or flooding; and require less chemical or fertiliser inputs (Cleveland and Murray 1997; De Schutter 2010; FAO 2010; Navdanya 2009).

Thus the current study researches seeds as an important component of resilience approaches by focusing on the seed practices of city gardeners in Havana City, Cuba. Seed practices are defined to encompass: *the practices that gardeners and farmers do associated with their seed such as cultural norms and traditions, stories, songs, growing plants specifically for seed, saving and storing the seed for another time, sharing and exchanging the seed with friends, neighbours or through seed exchange networks.*

The following questions were asked:

- How do the knowledge and memories of seed practices influence gardeners in their gardens today?
- How do different types of gardens influence the seed practices of gardeners?
- In light of the answers to the above, what, if any, seed practices are marginalised?
- How does the marginalisation of certain types of seed practices influence the resilience of a community?

The paper firstly outlines my methodology, then the theoretical framework followed by an over view of the types of gardens present in Havana City and how knowledge and memory are influencing the seed practices in those gardens. These sections summarise whether particular practices are marginalised and how that influences the resilience of community.

## **1.2. Methodology**

My research methodology on the ground in Cuba was qualitative in nature and followed Patton (2001) for triangulation, interviewing, observations and document analysis. A snowball sampling method was used. I triangulated the research design in multiple ways and interviewed actors in the three following groups:

1. Gardeners located in: Organiponicos and cooperatives; patio and parcela gardens and the permaculture community.
2. Organizations: an NGO; scientific institutes and government departments; and
3. Academics and authors on the topic of Cuban agriculture and seed systems.

In total I undertook nineteen site visits to gardens in neighbourhoods in the Havana City, Cuba. Of these site visits I had eighteen interviews with gardeners. Within the permaculture community I visited six different gardens and interviewed eight gardeners, two of whom were “promoters” of permaculture and whom I considered to be key informants of information on seed practices. I undertook five interviews with representatives of organisations and the NGO Fundación de Antonio Núñez Jiménez de la naturaleza y el hombre (FANJ) in the municipality of Havana City. Scientists, project managers and directors were interviewed. Not all interviews are used directly in my data analysis but still formed an important aspect of the triangulation giving me an operational overview of the organisations and the programmes they operate regarding seeds and agriculture.<sup>1</sup>

---

<sup>1</sup> The research was undertaken as a part of the completion of a Masters in Environmental Science, Policy and Management (MESPOM). The MESPOM Programme is supported by the European Commission and taught by four European universities: Lund University, Sweden; Manchester University, United Kingdom; Central

### **1.3. Theoretical framework: Resilience approaches and marginality**

Resilience is a way of thinking that provides a context for the analysis of social-ecological systems (SES) (Cumming, et al. 2005; Thapa, et al. 2010). Resilience in this sense refers to our social-ecological resilience, namely it is the “*capacity of a system to absorb disturbance and reorganise while undergoing change so as to still retain essentially the same function, structure, identity and feedback*” (Folke 2006). Importantly, this is also the ability of systems to renew, reorganise and develop from the opportunities that arise from the disturbance (Folke 2006). Two important indicators of resilience are the knowledge and memories of people in communities (Asah 2008, Barthel *et al.* 2010). Seed-savers and gardeners are holders of this social-ecological memory (Nazarea 2005, Barthel *et al.* 2010) which in turn may indicate resilience. But, despite holding memories and knowledge of seed practices, seed-savers and gardeners are often marginalised in a community (Nazarea 2005).

So, is there a link between systems approaches to resilience of a community and the marginalisation of certain gardens and seed practices? Resilience is important in the context of gardens (Tidball and Krasny 2007): gardeners need to be able to adapt and reorganise while undergoing change, mainly because of their utility for community and household food provision. This may be in times of crisis, and in the literature, Cuba’s Special Period is cited as an example of this (Barthel, et al. 2010; Killoran-McKibbin 2006), or for everyday survival (Baumgartner and Belevi 2003; Redwood 2009). This study does not attempt to create or apply indicators of resilience to city gardens; instead the research aim is broader, namely: *to explore the seed practices in city gardens of Havana City, Cuba to highlight the importance of seed practices as a factor to be taken into account in resilience studies.*

### **1.4. Garden type**

Gardens in Havana City have been established in the past twenty years for community food provision in response to the crisis of the Special Period (Wright 2009, Funes 2002). They are often 1ha or more and sell produce at the garden gate to people in the neighbourhoods or are found around households. The city gardens present in Havana City that are relevant to this study are: Organiponicos (and semi-protected Organiponicos), intensive gardens (“Huertos Intensivos”), patio and parcel gardens (“parcelas” or “parceleros”) and permaculture gardens.

#### **1.4.1. Organiponicos and Huertos Intensivos**

Organiponicos contain raised beds, often with tiles (“*zines*”) or brick around the outside whereas in the Huertos Intensivos plants are sown directly in the ground where soil is of better quality (Figure 1). Location and soil quality will often determine which is preferred with Organiponicos providing a solution to poor quality soils and have the added benefits of

retaining water and nutrients. They make the transition from disused or abandoned waste sites to more productive ones easier through the use of raised beds (Companion, et al. 2002). Semi-Protected Organiponicos are those with shade cloths (Figure 2). Both gardens are founded on organic, agro-ecological farming practices.

*Figure 1: Huerto Intensivo, Havana City: private garden with gate sales of produce (Source: Author's photo).*



*Figure 2: Semi-Protected Organiponico, Havana City (Source: Author's photo).*



### ***Findings: Knowledge and Memory***

Larger Organiponicos (1ha or more) produce according to demands of customers (often state sectors such as hospitals or schools) and sell produce for the profit of the cooperative in kiosks at the garden gate. Some Huertos Intensivos do the same. Here, gardeners order their seed a month in advance and stick to demanded vegetable varieties such as broccoli, cabbage, cauliflower, lettuce, tomato, carrots and beetroot. I was shown original containers of vegetable seeds, which were labelled as being from Brasil, Israel, Italy, Japan and Mexico. The seeds are open pollinated, adaptive seeds from the commercial system. They are not hybrid; nor transgenic seeds. As these Organiponicos will receive larger, bulk seed supply the seed are often still in their original containers and the excess seed stored in reused plastic drink bottles. In this way, it is easy for the gardeners to tell where the seed is from and its quality. Seeds are also produced locally as well at the provincial Finca del Semillas (Seed Farm) in San Antonio de los Baños. This suggests that there is a relatively high amount of information available for the gardeners in these gardens about the origin of the seed they are using.

Dependence on the formal seed sector for seed seems to have remained constant for the city gardeners working in the Organiponicos. Juan, who has been running a UBPC for eight years, noted a lack of systemic changes to the formal seed sector during that period:

*“No, no, the system is the same: the Agricultural Supply Company of the Ministry of Agriculture imports [the seed]. These plans are made at the municipal level ... There is one thing that is real, the seed supply has remained fairly stable in the sense that few seeds are missing and every year seeds are imported”*

These comments seem to suggest there is dependence by gardeners on imported seed and the system the Ministry of Agriculture has created. Most gardeners noted that they will help out the other cooperatives or gardeners nearby through sharing seed or seedlings if others need them. But, often the origin of this shared seed is likely to be that previously purchased from the cooperative (and often therefore abroad).

In these gardens I observed that some gardeners are *Campesinos* (peasant farmers) from the countryside who have formed part of the urban drift to the city. These gardeners tend to have lay knowledge that they learnt while growing up on farms. Many have also observed changes to the Cuban seed system over the years. Carlos is a seventy nine year old gardener in a cooperative who has been gardening for 60 years and working in his Organiponico for twenty. He outlined the seed-saving techniques they used to use and then compared those to his current practices. For him, there is a distinction between that older time and the seed practices of today. When discussing any changes he has seen over his lifetime to the seed systems in Cuba, he notes when the seed production facilities began to dominate the seed sector and how traditions of seed saving were lost:

*“Laboratories start to work and inventing banana seeds... then ...here with the triumph of the revolution [when it] began to advance [from 1959] (in) the entire country. In laboratories they pull out [i.e.put them in to the market] the seeds, all kinds of seeds, with more ... bigger, a little bit bigger ...more productive ... and then this tradition [of seed saving] has been lost.”*

Reflecting on his time, Carlos compared now to then and explained that today the gardeners still help each other out and will share seeds and knowledge, but in his early days, compared to now the familiarity was stronger and he describes it was a time that was “more pure”. At seventy nine and now reliant on the formal seed sector rather than saving his own seeds, Carlos’ memories and knowledge of seed practices are being eroded. If this is not shared or even utilised today it will be lost.

For Miguel the situation is similar. He knows how to save, store and use seeds and explained this through reflecting on his family history, what it was like when he grew up and, like Carlos, has this knowledge but does not use it. When he grew up his family bought some seed, but saved others. He explains: *“In the family...put them to dry and also bought them, because there are seeds that can not be produced here in the field, you have to buy.”* Nowadays in the Organiponico, Miguel is not utilising that knowledge or his memories associated with seed-saving practices. He does however share seeds with others in the area, if they need them.



### ***Analysis: Margins and Resilience***

Despite this reliance on the formal system, gardeners often know how to save seed, but in these systems the cheap and constant supply of seed means there is a perception the alternatives are uneconomic and too risky. So, *how does the knowledge of seed practices influence gardeners in their gardens today?* It seems that they clearly *do* know how to grow produce for seed but they do not. Instead, the gardeners in these Organiponicos seem so reliant on the formal seed sector's supply of seed they therefore do not see a need to utilise the practices that they already know. But, these gardeners still *do have* extensive knowledge about seed practices even if from leaning on the gate post that is not visible.

One cannot tell what the gardener knows just by looking at the vegetable plot. Knowledge is an important indicator of resilience for this reason, for example if the formal seed sector were to collapse these gardeners would still have knowledge and information to offer about the informal sector, in conjunction with their knowledge of commercial garden operations. Therefore, an absence of informal seed sector practices in the gardens that gardeners are working in may not necessarily make those individual gardeners *less* resilient in the short term. However, while the knowledge is present at the moment and could enhance the resilience of the community, if that knowledge is not utilised or shared, it will be lost. Accordingly, in the long term failure to act on this knowledge will reduce the resilience of the community.

Regarding the marginality of seed practices, given the abundance of Organiponicos and cooperatives around Havana City I find that this system is the dominant seed system in Havana City's gardens. This is a tightly followed, well regulated and uniformly applied approach citywide.

#### **1.4.2. Patios and parcelas**

Parcelas (parcels) or Parceleros (small parcels) and Patio gardens are small and often found along pathways, between houses or on balconies of apartments or houses. The majority of these gardens are private and the plants grown are used for cooking and other domestic uses (dried herbs, teas, medicinal uses) and not sold for profit (Buchmann 2009; Companioni, et al. 2002; Premat 2009). Some are ornamental and grown for the pleasure of having plants around and often plants grow in containers, pots or whatever can be used (Figure 3). These gardens do not tend to have vegetables present. Instead the usual practice is that vegetables are purchased fresh, usually daily, from local markets or directly from the retail kiosks of Organiponicos.

*Figure 3: Patio Garden, Havana City. Most plants are grown in pots (Source: Author's photo).*



Parcelas and parceleros are often slightly bigger than patio gardens and may contain raised beds or directly sow plants into the ground, depending on soil quality. Land may be off-site or near to where the gardener lives (Companiononi, et al. 2002). The key feature is that they are independent from the state and often located on wasteland or sites of collapsed buildings and usually produce is for household consumption (Premat 2009).

### ***Findings: Knowledge and memory***

To buy seed many of these gardeners rely on the Agriculture supply and consultancy store (Consultorios tiendas agropecuarios hereinafter “CTA”). I visited two, which are used by both the gardeners and co-operatives to purchase gardening and agricultural supplies in the same neighbourhoods as the gardeners I interviewed. For sale at these shops are bio-fertiliser, worm farm products, seeds, hats, baskets, magazines and also ornamental plants and pots. In these stores, the majority of seeds for sale were vegetable. At the CTAs it is difficult to identify the country of origin of the seeds, because for most every day gardeners the seeds are sold in small unmarked paper packets for one peso. In these shops gardening more generally is supported for gardeners, but information is lacking specifically on seed practices, for example: how to save and store seed, how to grow plants for seed harvesting, when to harvest seed and how to become involved in local seed-saver networks.

I also found that many gardeners are self-taught about seed practices through reading books, newspapers, magazines, or from the internet (where accessible), school programmes, and discussions with friends or neighbours. At their patio garden, a notable and knowledgeable gardening couple Maria and Jorge showed me a collection of newspaper and magazine cuttings on gardening tips and health and lifestyle articles that they had kept for over 20 years. This included state newspaper articles on information of times for planting, soil care and health, how to plant vegetables at home and to build compost bins and seed sowing.

For these private gardeners many of the herbs and fruit trees are reproduced from cuttings (“esquejes”) or sourced from eyeing up a desired specimen at a friends house and asking them for some seeds or a cutting. Patio and parcela gardeners do not see a need to grow vegetables because in their neighbourhood, like most in Havana, there are markets within walking distance selling fresh vegetables and fruit, along with an Organiponico selling freshly cut produce at the gate.



When I visited Maria and Jorge's garden I identified over 20 different species of herbs, spices, medicinal plants and fruit trees, and in addition, an abundance of tropical ornamental plants. Most of these are kept in pots that line the adjacent pathway in a space of 5m x 8 m. Maria and Jorge explained they occasionally do have to purchase seed from a CTA, but this is rare. Jorge explained to me his perception of how the seed systems work in Havana City:

*"It is not the same the seed I use here, or used by people in their houses that the seed used to grow [on] large plantations, 'cause the seed to be used for large farms has other scientific work, taken to the laboratory and seed banks (those are banks of sterilized seeds to remove bacteria), and then when you are sowing them, they are sowing a product plant without any bacteria or anything to kill it. Here are terrible [i.e. big] seed banks, but they are meant for large producers. For cooperatives. They are not interested in me ... he sold the seed to me, but those seeds do not have any quality. Quality is what I seek, I go [to the] home [of] someone who has a very large basil and very good and I try to go to get the seeds from there. There are two things: the seeds used in homes and seeds that are used for large farms."*

Thus, he suggests the gardeners' perceptions that there are two distinct systems in place – one for the cooperatives and one for seed-savers, such as him. This also suggests a more general knowledge of the seed sectors that operate in the country. In addition to information, quality of seed is perceived to be lacking in the formal sector. These gardeners like to know where the seed is from; to understand its history and quality. If they just buy it from the commercial sector then these traits, these personal qualities, of the seed are lost. Juxtaposed to Carlos and Miguel in the Organiponicos, Maria's earlier memories are directly related to her current practices in her patio garden. Maria explained how she knows about gardening, drawing on memories:

*"Customs were passed from family to family, from father to son, even my mother's family was the family farm and my dad too... with animals, plants, trees, and fruit. We learn about it because we walk all around, we lived in the city and went to the fields, we saw and learned. We saw everything that the farmers did. Once a week, at least, we went to that country zone that was close." And then later: "The [seeds were] hung to dry, I remember that they were collecting the seed and played them well. That's why I pick them up and start to dry ... And since I was girl seeing that with plants, people grows their gardens or fields, giving some seeds or by taking cuttings."*

Today she puts in place these practices from times past noting that in her neighbourhood:

*"We share with people. They give me and I give them. They give me some seeds and I give them others, it depends, or plant cuttings that get reproduced by a branch. I have friends who have other plants, you go and exchange with people."*

This illustrates the importance of memory and knowledge in city gardeners' current seed practices. Memories of seed-savers and their practices are an integral part of agrobiodiversity and in many ways are inseparable from the seed itself (Cleveland and Soleri 2007; Nazarea 1998; Nazarea 2005).

### ***Analysis: Margins and Resilience***

What these examples from Havana City suggest is that there is also a diverse array of memories attached to seed in an urban context, as well as the more widely researched rural farming sector. In light of these observations I suggest that there is actually also memory associated with seed held by these city gardeners. Given the demographic trends of urban migration and that seventy five percent of Cuba's population now live in urban centres (Funes 2002), many of whom have migrated as Campesinos from the countryside. Therefore, this highlights the importance of the urban setting when addressing issues associated with seed, and specifically, the role of memory and knowledge of city gardeners pertaining to those seed practices.

#### **1.4.3. Permaculture**

Havana City contains a number of gardeners practicing permaculture in their gardens. Permaculture is based on a set of ethical principles and design guidelines for creating “permanent culture and agriculture” (i.e. permaculture) modelling these designs on patterns observed in nature and emphasising an interconnection between human creations (e.g. agro-ecosystems, buildings and communities), humans and the natural world (Holmgren 2007). David Holmgren who, along with Bill Mollison, coined the word permaculture and its founding principles, now extends the definition to “*consciously designed landscapes which mimic the patterns and relationships found in nature, while yielding an abundance of food, fibre and energy for provision of local needs*” (Holmgren 2007). In 1993-94 permaculture principles were introduced in Cuba, partly in response to the problems of the Special Period. Permaculture has since been promoted nationwide by FANJ.

*Figure 4: Permaculture garden, Havana City, The gardener uses a combination of pots, raised beds and direct sowing in her garden, which was once a waste site (Source: Author's photo).*



Here permaculture gardens combine both huerto populares and huerto intensivos styles with the agro-ecological techniques common to both systems (Figure 4). However, permaculture gardens extend these concepts further to engage community wide involvement. Specifically, the permaculture principle to “*use edges and value the marginal*” is relevant to the present study (Holmgren 2007). This draws on processes occurring in ecosystems where edges and margins are important for interfaces between communities, value of soil as an edge and the importance of expanding pre-existing edges to increase productivity (Holmgren 2007).

### ***Findings: Knowledge and memory***

In contrast to many of the observations I made regarding gardeners that are reliant on the CTAs and formal seed sector, for those involved in the permaculture community access to information and sharing knowledge is approached differently in two main ways. Firstly, there is capacity building for new gardeners through a network of local knowledge promoters in the communities. Secondly, there is a nationwide network of seed-savers with extensive information available to gardeners about the origin and type of seed.

Knowledge is transferred initially through local “promoters” in the community who teach other aspiring gardeners permaculture practices and principles. The initial project stems from the work of FANJ. This sharing of knowledge and creation of a support system for new gardeners is the strength of the project.<sup>2</sup> The importance of seed in the system is explained from the beginning and it is common practice to have solar seed driers installed in their gardens and to save seed. Some gardeners had up to twenty different types stored. For many gardeners saving their own seed, in the long run it is considered cheaper to harvest seed from a crop even when it is initially purchased from a CTA. José a permaculture promoter explained: “*Well, once you buy one, a package worth a peso, and when you collect the harvest, you also collect the seeds. You no longer have to buy more, so it would cost a peso.*”

A core aspect of this system is empowerment of local people and there is lay knowledge present here with local experts sharing their knowledge and skills. I consider that this lay knowledge is a fundamental component of the information that is retained and transmitted by these gardeners. These social networks extend from the community level out to a nationwide network of communities actively involved in seed-saving and sharing. The process was outlined by a representative from FANJ, who explained that there are periodic exchanges of seed at community, provincial or national levels. At a regional exchange there can be up to 200 people:

*“The result of this exchange is that people come back [to their province] with seeds that then they can use and reproduce in the system in the locality... The people don’t [just] have the varieties, fruit, vegetables, etc they have an exchange of knowledge also the “know-how.””*

Thus at these intercambio de semillas (seed exchanges) more than seeds are transferred. There is also an exchange of knowledge and experience. José also noted: “*the seed exchanges are about the opinions of each individual, with each group comes their experience.*” He pointed out that gardeners from another province had come to visit his site and made practical suggestions to

---

<sup>2</sup> In a similar vein but in rural Cuba, is the extensive Campesino-to-Campesino learning and knowledge sharing methodology that promotes farmer innovation and knowledge sharing in a horizontal way, from farmer to farmer (Rosset *et al.* 2011).

help his garden. This suggests lay knowledge being created and shared in a contemporary setting. At the intercambio de semillas local experts convene and share this knowledge with one another. These external support networks and information sharing systems go further than this; in the permaculture community knowledge is shared amongst friends nationwide and is in accordance with the permaculture principles emphasising people and communities in systems.

### *Analysis: Margins and Resilience*

There are numerous elements present in the permaculture communities in these urban settings that themselves suggest a resilient community: networks that are established for seed practices (such as the exchanges locally, regionally and nationally); the sense of pride and community felt by the gardeners involved in these practices; the diverse selection of plants and seeds that they have saved and stored in each house, and the knowledge of the practices associated with those plants and seed along with a minimal reliance on the dominant formal seed sector. These are all factors that suggest diversity (ecologically and socially) within a system which is being enhanced and maintained through tightly established social networks and knowledge sharing.

In this regard these permaculture gardeners have seed practices at their core and are creating new knowledge and in turn, community memories regarding those practices. This in turn shows not only the presence and importance of the informal seed sector in an urban setting, but also the value and role of knowledge creation that exists within this. I also found that the permaculture community and those that save their own seed and participate in the informal sector are on the margins of the Cuban agro-ecological farming system, within the UA spectrum. Like the ecological examples offered by both permaculture and resilience principles, in these permaculture communities at the margins, I find there is a diversity of approaches serving both the strength of community and also the strength of conservation of PGR. Therefore, here at the margins, there are seed practices containing elements that are: capable of dealing with change and uncertainty; nurturing diversity for reorganisation and renewal; combining different types of knowledge for learning; and creating opportunities for self-organisation (Asah 2008). This suggests the important role of seed practices in making a community more resilient and strengthens the case for seed practices specifically, to be taken into account as a factor when assessing the resilience of a system.

## **1.5. Conclusion**

Increasingly, resilience approaches are gaining popularity and being applied to systems throughout our communities particularly in addressing the social exclusion of marginalised groups and social justice issues (Thapa, et al. 2010). In this study, rather than attempt to use indicators of resilience to address how seed practices may indicate resilience, I have instead shared the stories and experiences of knowledgeable and highly skilled key informants in Havana City, Cuba to draw attention to seed practices in an urban setting. The knowledge, memories and practices that these people have regarding seed is impressive and on its own suggests the power and importance of taking into account such seed practices when assessing resilience either in communities or in agricultural systems.

Through sharing these stories I have identified the following pertinent points:

- Knowledge about gardening in general, and seed practices specifically, is being created through extensive support networks available to city gardeners and many gardeners are also self-taught via various mixed media methods;
- New knowledge, which specifically encompasses seed practices in the informal sector is being facilitated by initiatives such as permaculture promoters teaching at a local level in communities;
- Regionally, knowledge pertaining to seed practices in the informal seed sector, including information on the origins and production of seeds is being facilitated and shared by seed exchanges and capacity building amongst seed-saver networks, specifically by those in city gardeners;
- Gardeners in commercial operations are more likely to be tied into the formal seed sector, and importantly, will often still have knowledge of seed practices associated with the informal sector, but do not utilise this in their daily practices;
- Memories associated with seed practices suggest a long-standing knowledge base exists in city gardens, which often stems from Campesinos migrating to the city from the countryside;
- Given many of the gardeners are aging, the memories and knowledge that they have regarding seed practices may be lost if those gardeners do not share it;
- Despite the existence of the formal and informal seed sectors in Cuba, seemingly co-existing, the informal sector is still marginalised with the majority of commercial operations are reliant on the formal sector for their seed supply; and
- This marginalised informal seed sector contains diversity (both genetic in terms of seed and also cultural in terms of numerous communities); knowledge and seed sharing across multiple regions, cities and communities throughout Cuba; capacity building and local ownership of permaculture and agro-ecological principles; and a strong sense of community.

Accordingly, when assessing how the marginalisation of certain types of seed practices influences the resilience of a community I suggest there is a link between studies of marginality and resilience through the new knowledge that is being shared by networks in the permaculture community. This knowledge is coming from the margins and yet contains lay (promoters as ‘experts’) and tacit knowledge (social norms associated with permaculture), along with being an example of combining different types of knowledge and learning by the networks and seed exchanges that are created (Asah 2008; Fonte 2008). As noted above, in assessments of the resilience of a particular system, such knowledge is an important indicator. Therefore, these findings support the importance of looking to the margins of a community, in this case those actively involved in the informal seed sector in city gardens (Nazarea 2005), when assessing resilience of a community, to see what knowledge sharing networks are being utilised in those spaces.

The elements present in the marginalised informal seed sector accord with many aspects of resilience approaches (Asah 2008; Folke 2006; Thapa, et al. 2010) as well as permaculture (Holmgren 2007). Increasingly, resilience approaches are being applied to new systems and therefore the potential to assess systems that have marginal elements should be taken into account. These systems are not to be perceived with negative connotations, instead

embraced and actively sought out. Through using the example of seed practices, which are often marginalised as well as their associated seed-savers (Nazarea 2005), and specifically the knowledge and memories of those practices, I have drawn the gaze from the central space dominated by commercial seed varieties to those of the farmers' varieties and the associated seed practices. This example has illustrated the potential for those working with and only accustomed to the formal seed sector to learn of the diversity of varieties, strength of knowledge and unison of community that can be found on those margins. While this is just one example and the global applicability of a system studied in a vacuum must be approached with caution, I consider that there is the potential for analogies to be drawn between this study and other formal/informal seed sector dichotomies.

Moreover, this example builds on work associated with city gardens as spaces of agrobiodiversity and providers of ecosystem services (Barthel, et al. 2010; Galluzzi, et al. 2010; Tidball and Krasny 2007) and suggests the potential for including seed practices specifically in assessments of those city spaces. The stories and experiences of the city gardeners in Havana City, Cuba draws attention to the importance of such seed practices for practitioners and policy makers addressing *both* UA and seed policies. The example suggests that instead of marginalising urban seed practices through solely addressing rural seed practices and markets, the inter-connections between both systems, particularly in the informal system, should be further explored.

The role of the Special Period as a disturbance factor that influences resilience is not expressly studied here as a goal of research but it cannot be ignored. The intensive city gardens of Havana were born out of the need to feed people in time of crisis. What I have explored in this study, set against that historical backdrop, is how *now* these gardens, some twenty years on, have well established seed practices in city gardens. Cuban society may have indeed developed a particular knowledge base through the experiences of the Special Period. Therefore, this study suggests the importance of learning from communities that have been through disturbances. For those studying the resilience of community or agricultural systems, there is the potential to learn even more from such communities and this study is an element of that learning process.

Cuba itself seems to be enabling resilience at the margins. While many urban planners sit and contemplate the role of UA in their cities, Cuba has now had a well established and productive system in place for twenty years, while it has been arguably marginalised itself from the global seed and agricultural sectors. The result of which is a network of communities that are knowledgeable and skilled in gardening and seed saving. The harsh times of the Special Period have meant that the system in Cuba itself has had to overcome disturbances and it has done so through creating knowledge networks and local level facilitation through gardeners and farmers, thus enhancing capacity building and resilience within its own system. A result of that is a seed system that combines both formal and informal aspects that are both enabled to function concurrently and to the benefit of the gardeners and those consuming their produce.



## References

- Altieri, Miguel  
2009 Green deserts: Monocultures and their impact on biodiversity. *In* Red sugar, green deserts - Latin American report on monocultures and violations of the human rights to adequate food and housing, to water, to land and to territory
- Altieri, Miguel A., et al.  
1999 The greening of the ``barrios": Urban agriculture for food security in Cuba. *Agriculture and Human Values* 16(2):131-140.
- Andersen, U. R.  
2010 An issue of survival. *D&C* 51(3).
- Asah, Stanley  
2008 Empirical Social-Ecological System Analysis: From Theoretical Framework to Latent Variable Structural Equation Model. *Environmental Management* 42(6):1077-1090.
- Barthel, S, C Folke, and J Colding  
2010 Social-ecological memory in urban gardens- Retaining the capacity for management of ecosystem services. *Global Environmental Change* 20(2):255-265.
- Baumgartner, Bettina, and Hasan Belevi  
2003 A systematic overview of Urban Agriculture in developing countries *International Journal of Environmental Technology and Management* 3(2):18.
- Buchmann, C.  
2009 Cuban Home Gardens and Their Role in Social-Ecological Resilience. *Human Ecology* 37(6):705-721.
- Cleveland, D. A., and S. C. Murray  
1997 The world's crop genetic resources and the rights of indigenous farmers *Current Anthropology* 38(4):40.
- Cleveland, D. A., and D. Soleri  
2007 Farmer knowledge and scientist knowledge in sustainable agricultural development: Ontology, epistemology and praxis. *In* Local science vs. global science: approaches to indigenous knowledge in international development P. Sillitoe, ed. New York: Berghahn Books.
- Companioni, Nelso, et al.  
2002 The growth of urban agriculture. *In* Sustainable agriculture and resistance : transforming food production in Cuba F. Funes, ed. Oakland, CA: Food First Books.
- Cumming, G. S., et al.  
2005 An Exploratory Framework for the Empirical Measurement of Resilience. *Ecosystems* 8(8):975-987.
- De Schutter, O  
2010 Agroecology and the right to food: Report submitted by the Special Rapporteur on the right to food, Olivier de Schutter. Human Rights Council, United Nations General Assembly.

ETC

2006 Cities Farming for the Future - Urban Agriculture for Green and Productive Cities. Phillipines: RUAF Foundation, IDRC and IIRR.

FAO

2001 Urban and Peri-Urban Agriculture. U.N.F.a.A.O.F. Special Programme for Food Security, ed. Pp. 84. Handbook Series Volume III. Rome.

FAO

2004 Seed multiplication by resource limited farmers - proceedings of the Latin American workshop, Brazil 2003. Rome: FAO.

FAO

2010 Second report on the state of the world's plant genetic resources for food and agriculture. United Nations Food and Agriculture Organisation (FAO).

Folke, C.

2006 Resilience: The emergence of a perspective for social-ecological systems analyses. *Global Environmental Change* 16(3):253-267.

Fonte, Maria

2008 Knowledge, Food and Place. A Way of Producing, a Way of Knowing. *Sociologia Ruralis* 48:200-222.

Funes, F, ed.

2002 Sustainable agriculture and resistance : transforming food production in Cuba. Oakland, CA: Food First Books.

Galluzzi, Gea, Pablo Eyzaguirre, and Valeria Negri

2010 Home gardens: neglected hotspots of agro-biodiversity and cultural diversity. *Biodiversity and Conservation* 19(13):3635-3654.

Holmgren, D

2007 Essence of Permaculture. D. Holmgren, ed. Hepburn, Victoria: Holmgren Design Services.

Killoran-McKibbin, Sonja

2006 Cuba's Urban Agriculture: Food Security and Urban Sustainability. *Women & Environments International Magazine* (70-71):56-58.

Koont, Sinan

2008 A Cuban Success Story: Urban Agriculture. *Review of Radical Political Economics* 40(3):285-291.

Lipper, L, C.L. Anderson, and T. J Dalton, eds.

2010 Seed trade in rural markets : implications for crop diversity and agricultural development. Rome: FAO.

Mougeot, L.J.A., ed.

2005 Agropolis: The social, political and environmental dimensions of urban agriculture. London: Earthscan.

Navdanya

2009 Biopiracy of climate resilient crops: gene giants steal farmers' innovation of drought resistant flood resistant and salt resistant varieties. New Dehli: Navdanya/Research foundation for science, technology and ecology.

Nazarea, Virginia D

1998 Cultural memory and biodiversity. Tucson, Arizona: University of Arizona Press.

- Nazarea, Virginia D  
2005 Heirloom seeds and their keepers: marginality and memory in the conservation of biological diversity. Tuscon: The University of Arizona Press.
- Nelson, Erin, et al.  
2009 Institutionalizing agroecology: successes and challenges in Cuba. *Agriculture and Human Values* 26(3):233-243.
- Patton, M. Q  
2001 *Qualitative research and evaluation methods* Thousand Oaks: Sage Publications, Inc.
- Premat, Adriana  
2009 State Power, Private Plots and the Greening of Havana's Urban Agriculture Movement. *City & Society* 21(1):28-57.
- Redwood, Mark, ed.  
2009 *Agriculture in Urban Planning Generating Livelihoods and Food Security*. London: Earthscan.
- Rosset, P, and M Benjamin  
1994 *Two steps back, one step forward : Cubas national policy for alternative agriculture* London: IIED.
- Rosset, Peter M.  
1997 Cuba: Ethics, biological control, and crisis. *Agriculture and Human Values* 14(3):291-302.
- Steinberg, M.K.  
2001 Valuing diversity: The role of "seed-savers" in *in situ* crop plant conservation. *Culture and Agriculture* 23(3):5.
- Thapa, S., F. Marshall, and S Stagi  
2010 *Understanding peri-urban sustainability: the role of the resilience approach*. STEPS Centre.
- Tidball, K.G, and M.E Krasny  
2007 From risk to resilience: What role for community greening and civic ecology in cities? *In Social learning towards a more sustainable world* A. Wals, ed. Wageningen: Wageningen Academic Publishers
- Wright, J  
2009 *Sustainable agriculture and food security in an era of oil scarcity*. London: Earthscan.