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Urban Agriculture in Cuba



“Organic Agriculture within this context is a desire to consume only products that are secure, sustainable and ethical”

Suquilanda, 1996

Introduction

In February 2011 I was lucky enough to be rewarded a Winston Churchill Memorial Trust Fellowship to visit Cuba to learn more about Urban Agriculture. Since the collapse of the Soviet Union at the beginning of the 1990s, when the United States also tightened their blockade on the island, the Cubans experienced a catastrophic collapse of their economic and agricultural systems. This collapse, alongside a huge drop in the amount of oil and petrol they had access to, meant that Cuba had to re-invent the way that it fed its people. It was this necessity that sparked the development of a system of sustainable urban agriculture that is now regarded by many as being a model of best practice of food production within post peak oil communities.

The Cuban Context

Cuba is a tropical island with a population of around 11million. The majority of population live in cities (around 75%) The island has a tropical climate with annual average temperature of 24°C. There is a rainy season from May – October and dry season from November – March. There is also a hurricane season from June – November.

In the 1990s the collapse of Soviet Union and the tightening of American blockade meant that Cuba faced a massive food crisis on the island. A key contributor to this crisis was a huge loss of external inputs that Cuban had grown to rely upon. This meant:

- 50% drop in diesel and food imports,
- 75% drop in petrol, agrochemicals and animal feeds.

This impacted the Cuban food system in two main ways:

- 30% drop in domestic food production.
- 50% drop in seed production and sugar harvests.

This crisis meant that Cuba had to reinvent the way that food was cultivated on the island. It was felt that Urban Agriculture needed to be a key part of this reinvention, with a national strategy created specifically to drive its development. The main features of this strategy are:

- To make use of mechanisms that incentivise and give interest to produce food and develop skills.
- To make rational and intensive use of all available area in every place with defined programmes for each locality.
- To cultivate the maximum diversity of species and varieties in each productive unit creating a strong base that will guarantee seeds for future cultivation.

- To elevate the culture and knowledge of food and the environment through a programme of outreach education for the public and producers.
- To develop a wide basis of support and co-ordination.

Planning My Visit

I began planning my trip to Cuba nine months in advance of my departure. I knew that Cuba was a difficult place to communicate with via e-mails, and that I needed a specific visa in order to access any agricultural sites on the island. In order to secure this visa I needed an invitation from a reputable scientist or scientific organization in the country.

After much communication with various contacts in Cuba I finally managed to organize my visa with the support of INIFAT - *Instituto de Investigaciones Fundamentales en Agricultura Tropical “Alejandro de Humboldt”*. In many ways organizing this was the most complicated part of my trip – it involved a great deal of time and pursuing many contacts that ended up in a dead end. I was very pleased to finally receive a copy of my visa three days before I travelled to Havana in November 2012.

Week One

I spent the first week of my trip hosted by INIFAT in Santiago de las Vegas about 25km outside Havana. The team there developed a programme of seminars, meetings and visits that would give me as wide an introduction to Urban Agriculture as was possible.

Introduction to Urban Agriculture – Marisol Morales (Santiago de Las Vegas)

Marisol is a specialist in Urban Agriculture at INIFAT. She gave an introduction to the basic structures behind Urban Agriculture (UA) in Cuba. She introduced the key concept of UA as an urban agricultural system that aims to produce food focused upon urban and peri-urban methods of intensive food production. It is a system that makes the link between people, cultivation, animals and the environment. It also focuses upon production throughout the year and the recycling and reuse of all waste.

There are now around 1.2 million hectares of urban agriculture in Cuba, all supported by a national, provincial, municipal and local infrastructure, which has learning, sharing and excellence at its foundation. The national group has the responsibility of proposing, evaluating and controlling the national programme of UA, with everything evaluated against a national *Unit of Reference*.

The whole system has environmental conservation and biodiversity as a key factor. As well as the recognition that UA plays a key part in social process, improving community and individual wellbeing. As Marisol explained it:

“It is the perception of a person of their position in life in the context of their cultural system and the value system of their life.”



Tienda Agropecuario in Santiago de las Vegas

Visit to local Tienda Agropecuarios and UA Sites – Marisol Morales (Santiago de Las Vegas)

We visited the local *Tienda Agropecuario* which is a feature of each community in Cuba. It is a shop that offers advice on agro-ecology and growing as well as selling supplies such as seeds, plants and organic fertilizers. Each shop is also supported by a team of consultants who visit *UA* sites throughout their local area to offer advice and support.

We also visited a local patio, parcela, organopónico and tienda intensiva to get an idea of the different forms that *UA* takes.

Patio

- *Typically a garden of yard*
- *Essential base of production as it is the place where people live.*
- *Perfect place for experimentation and new ideas.*
- *Importance of integrating the ideas of individuals into wider development and placing food within the heart of the community.*

Parcela

- *Small community based growing sites.*

- *Generally for local / family food production.*
- *Situated on small plots of waste land – generally in the middle of urban communities.*
- *Sale of produce – not a key factor.*

Organopónico

- *“Gualderas” – edges to the beds as the key feature.*
- *Used and created where soil is not good enough to grow into directly.*
- *Lombriculture as key component.*
- *Beds 20-30cm in depth, 120cm wide with paths of 55cm.*
- *Punta de venta on site where possible.*

Huerta Intensiva

- *Same form of cultivation as organopónicos but without gualderas – where soil is more fertile.*
- *Much more common than organopónicos.*
- *Again, production of organic fertiliser on site is a key feature.*
- *Punta de venta on site where possible.*



Typical Street in Santiago de las Vegas

An Introduction to INIFAT – Martiza Corrales (Santiago de Las Vegas)

Maritza gave a context to INIFAT and the work that goes on there. It was founded in its current form in 1974 to provide a scientific and technical base with specific focus upon *UA*. The work there includes groups of researchers working on genetics and the improvement of vegetables, physiology of

vegetables pre and post harvest, microbiology, the production of plants, and understanding of vegetable systems. This work is reflected in a number of different ways:

- Municipal seed “fincas”.
- Research into the technology of organopónicos and huertas intensivas.
- Research into bioproducts and biofertilisers.
- Production of edible fungus (there is no tradition of eating mushrooms in Cuba)
- Fruit gardens.
- Collections of plants and microorganisms.

Development of Urban & Sub-Urban Agriculture –*Nelso Companioni*
(Santiago de Las Vegas)



Parcela in Santiago de las Vegas

Nelso is the deputy director of *UA* at INIFAT and sits on the national panel for *UA* in Cuba. He gave a wide overview to the context of *UA* explaining that there is a long tradition within primitive communities of cultivating food so the idea of growing food within communities is not a new concept. However, it is now enriched by techniques and knowledge that did not exist in years gone by. The development of a structured system of *UA* in Cuba was started by Raúl Castro in 1987.

UA is now viewed as a form of agriculture that exists without external input or the use of consumables. It also doesn't need machinery, an aspect that is

particularly resonant in Cuba where there is little access to the fuel needed to run agricultural machinery. On this basis *UA* has been developed as the result of an imposed situation within a specific economic context that created a necessity to cultivate food. It is now seen as a key form of agriculture for the future, alongside a role in public health and the health of the soil and the environment. It also focuses upon native crops as non-native plants are much more tricky to grow using organic methodologies.

The key found foundations of success and support are felt to be:

- Inclusive participation and collaboration.
- Development of outreach and community support.
- Development of a National School – transfer of knowledge.
- Commercialisation that is flexible and easy with no more than 2 or 3 stages between producer and customer.

Fundamentals of Agro-Ecology in Urban and Suburban Agriculture **Rosalía Gonzalez (Santiago de Las Vegas)**

Rosalía began by outlining the underlying Green Revolution that was a background to the development of Urban Agriculture in Cuba. In Cuba this manifested itself as a desire to change:

- systems and technologies that misuse chemicals, energy, mechanization and / or monocultures.
- systems that exist without considering their own sustainability and which have the potential to cause grave environmental disasters.

It also recognizes the crucial link between man, the environment, society, and the physical surroundings.

Rosalía then went on to explain the concept of sustainable development:

“Development that satisfies that necessities of this generation without compromising the capacity of future generations to satisfy their own needs.... And a foundation where political institutions are focused on a realistic vision that is integrated in accordance with ecological conditions, social economic conditions and appropriate exploitation of resources.”

This also takes into consideration the three main factors of sociable, ecological and economic development, and aspires to a wider system of development that achieves better levels of wellbeing in the present and future within a context of equilibrium of all three dimensions.

In Cuba great consideration has been made of what this concept means within the systems and processes of a city. Cities are typically linear systems and therefore not natural as all natural systems as circular. It is felt that the incorporation of *UA* is essential in cities in order to create a circular urban system – a factor that will be essential in the sustainable development of cities.

Within this wider context the concept of agro-ecology is seen as a key part in the development strategy in Cuba, with a focus upon people and sustainability:

- To optimize the use of locally available resources, combining to create the system.
- To reduce the use of external resources, and resources that do not contribute to the health of the producer and consumer.
- To combat causes and not symptoms.
- To ask what is available locally to use and support what you want to achieve.
- To consider the relation between the design of cultivation, its potential productivity and the local environment.
- Work to value and conserve biodiversity and make optimum use of the biological and genetic diversity of species of plants in surrounding areas.
- To value the practices and knowledge of local people even though this is rarely scientifically verified.

Agro-ecological Management of Soil – Marisol Morales (Santiago de Las Vegas)

The health of soil is a key part of any form of *UA* and Marisol introduced the basics of this within her seminar. She described soil as having its own system, being biological, living and dynamic, being complete and open, being structured and multi-faceted, being poly-functional and having fertility. It is the harmonic equilibrium that exists in the physical state of soil and the environment that permits the development of a plant ecosystem. On this basis, all sustainable agriculture needs to have a fundamental basis within the fertility of soil.

Marisol went on to outline different methods of soil management including:

- Application of organic fertilizers.
- Incorporation of green manures.
- Application of bio-fertilizers.
- Minimal labour.
- Crop rotation.

She also explained how substrates are essential in the building and maintenance of soils. This can be incorporated in a number of different ways:

- Incorporation of organic materials.
- Crop rotation.
- Turning of terrain.
- Preparation of composts.
- Control of PH and electrical conductivity.

Technology and Creation of Organic Fertilisers - Daniel Balmesdal **(Santiago de Las Vegas)**

Daniel began by explaining the idea of compost. In its simplest form this is the action of the fermentation of organic material in the presence of air to create a product of quality to return to the soil. He then went on to talk through the methods of making compost in Cuba, which are not applicable in the UK as the climate is totally different.

Another major organic fertilizer in Cuba is worm compost created as a result of *lombriculture*, or *vermiculture* as it is called in the UK. This is a technique that combines composting action alongside the action of worms and micro organisms to take advantage of and transform organic residues, derived from farming of all types, into two different products of high quality:

- Humus.
- Protein.

There are great benefits in the use of worms and it is for this reason that *lombriculture* is the foundation of *UA* in Cuba. This rich compost is produced in *canteros* that require very specific conditions in order to function:

- Need access to clean water.
- Close to the source material that will be used to feed the worms.
- Well drained.
- Shaded.
- Not in an area that is likely to flood or be affected by heavy rain.



Making Worm Compost at INIFAT

Design, Construction, Organization and Exploitation of Productive Installations – Daniel Balmaseda(Santiago de Las Vegas)



Typical Organopónico construction in Cuba

In this session Daniel went through the basics of the management and construction of organopónicos, which has been honed to a fine science in Cuba so that urban food producers can get the best out of the land that they are cultivating.

Organopónicos are the form of *UA* that is most well known outside Cuba. They are a unit of intensive horticultural production of vegetables, fresh condiments and other crops of a short cultivation cycle. They are developed around beds which are laterally protected by *gualderas* and filled with substrates. They can be used in areas without decent soil. They can also be used to make the most of sites that couldn't otherwise be cultivated, making use of intensive cultivation throughout the year. The only difference between these and huertas is that huertas cultivate the soil directly.

Alongside clear guidelines regarding site construction in order to maximize productivity, Daniel also outlined the robust infrastructure that exists to support urban food-producers. This includes:

- Regional seed farms constantly improving the range and reliability of available seed stock.
- Centres and micro-centres of organic fertilizers.
- Consultations – Tiendas de Agricultor

- Movements and units of reference and excellence.
- Regional conferences.
- Local *Circles of Interest* to share knowledge at a community level.
- Points of sale as a method of information sharing.

Week Two

Alamar – Site Visit (Alamar, Havana)



Cultivated beds at Alamar

Alamar is one of the biggest and most famous organopónicos in Cuba. On the day that we visited, we were introduced to the site by Miguel López who is the president and founder of the site. Alamar is a *UBPC* (Unidad Básica de Producción Cooperativa) – a type of co-operative that was created specifically for urban food producers. This is part of Law 142 (1992) that allows food producers to commercialise their food production and use their profits to reinvest in the development of their business. This constitution of the UBPS represented one of the biggest changes to the agricultural economy in Cuba since 1959.

Miguel explained that the other major form of co-operative in Cuba was a *CCS* (Cooperativa de Créditos y Servicios) where a group of campesinos come together to secure contracts and technological and social developments. These small landowners own and manage their land and sell their produce to the state through contracts, then sell excess produce at free market prices.

Alamar was founded in 1997 during the Special Period. It reflected a new type of agriculture responding to the socio-political situation in Cuba and the newly renewed sense of community. At that time there was a great deal of human resources available in the country but also a high level of poverty. The development of co-operatives was a way to capitalize on and increase human capital – especially as within co-operatives everybody benefits from collective success. At Alamar, co-operative members each work 6-7 hours per day, and alongside this they have a wide range of other benefits, in particular personal development. Miguel was keen to reinforce that there is a humanistic basis in all the work that co-operatives do and that all production and cultivation of food has a basis in politics.

Work at Alamar focuses upon the importance of the relations between people within a mixed workforce that is reflective of society as a whole. For example, at Alamar both women and older people are an essential part of the workforce – reinforcing the ethical basis that a mixed workforce creates a situation that is favourable and productive. Value is also placed upon the skills that each individual brings with them whilst they do a job - skills that are viewed as being both intelligent and sensitive. Within Alamar, and other similar projects, the creation of employment is hugely important with social success being quantified in the way that the co-operative is able to support people.

Miguel explained that he felt the unique situation in Cuba had made Alamar possible and that each different country would need to find its own solutions. However, the feature of capacity building that is direct and participatory is certainly an aspiration which is transferable, with a focus upon a hands on approach to employees at all levels. Though it is essential that this is formed in the basis of the creation of a viable product. Miguel also felt that the idea of inheritance and legacy had to be a key part of all aspects of operation in any co-operative, making the most important themes those of democracy and permanence.

When Alamar was formed in 1997 it was part of a wider *UA* movement in Cuba and was based within a community with 27,000 local inhabitants and 50,000 people living in the surrounding area. The inspiration behind the way that Alamar is run is:

“Manage things – don’t control things.”

On the site they now produce over 270 different cultivars. This is done within a complete system of production that works in respect of the environment where traditional agriculture is used alongside more new / developing technologies. The whole site is organic on the basis that “chemicals are not an appropriate part of a system that is part of a community.”

Alamar is:

- A system that is intensive and cyclical.
- An organic system.

- An intensive system of soil management.
- Potentially very cheap as you don't need to buy chemicals, seeds...etc...
- A system focused upon the creation of organic fertilisers.
- A system based upon the idea of prevention because this is much easier than management and treatment.
- A system where soil and its care is the most important thing.

The site itself at Alamar is very impressive. It includes:

- A semi protected cultivation house where plug plants are brought on before being moved outside.
- A processing plant for making natural fertilisers and insecticides as well as for breeding of natural predators like ladybirds.
- Literally acres and acres of beautifully cultivated land made up of a variety of organopónicos and huertas intensivas.
- Semi-protected cultivation houses for crops like cucumbers.
- A huge area for making compost and substrates, including worm compost.
- Preservation room teaching and practicing the preservation of fresh produce.
- Large nursery and shop selling ornamentals.
- A *punto de venta* where local people can buy freshly grown produce at low prices.

Biofertilisers in Agriculture as a Contribution to an Organic Agriculture – Mariselle Ortes (Santiago de Las Vegas)

Mariselle gave an introduction to a variety of different bio-fertilisers that have been produced at INIFAT. These are a variety of treatments that are originated from natural sources and whose development is a major area of work at INIFAT.

One example, out of many that Mariselle talked about, was *Azotoryza* which was a plant food that's basis lay in *Azotobacter chroococcum* – a fungus that had been cultivated at INIFAT. This fungus was recognized as an effective fixer of nitrogen and a stimulator of growth through its own chemical and biological make up. By adding *Azotoryza* to the soil it was seen to increase growth particularly well in Bananas and Corn – both key crops in Cuba,

Another example was *Acestim*. This is a biofertilizer and biostimulant in vegetable growth. It is made from a type of fungal bacteria that occurs naturally in the soil, when added to the soil as a biofertilizer plants exhibit a significantly increased ability to absorb Nitrogen. Its use is particularly recommended for plants that contain a high amount of sugars such as fruits, some tubers and roots.

Mariselle explained that these products are researched and created for use in Cuba but also for export as they have a financial value as an export that brings much needed hard currency into the Cuban economy.

Organic Protection of Plants *Project Nim* – Jesús Estrada Ortiz **(Santiago de Las Vegas)**

Jesús began by talking through *Project Nim*, which is a major research project in Cuba. The project focuses upon the creation of bio-plaguicides that are safe for use in agriculture that is sustainable and ecological. It looks at the industrial production of bio-insecticides that artisans and campesinos have produced on a small level for many, many years. This is on the basis that many plants contain active insecticides in their natural structure that traditional food producers have always exploited within their methods of cultivation.

Project Nim makes specific use of Nim, which is originally an Asian tree that is perfect for use in re-forestation on Cuba because it grows quickly and well within the conditions on the island. It also has a very rapid cycle of life from seed to its adult state. INIFAT have developed many different bio products from Nim. The particular benefits of products developed from Nim is that:

- They are biodegradable and have no residual effect.
- They have a high level of effectiveness.
- They are not genetically resistant.
- They are not toxic to beneficial predators and parasites.
- They are not toxic to humans or animal.

The Management of Water in Different Production Models – Reinaldo **Cun Gonzalez (Santiago de Las Vegas)**

Due to very seasonal rainfall in Cuba, and low annual levels of rainfall, Cuban food producers have to be extremely careful in the way that they use water. Especially as they are not allowed to take clean water out of the domestic drinking system so can only make use of water that they have saved during the rainy season.

The humidity of soil is key to all successful cultivation. This humidity is based upon two key factors:

- The capacity that a particular piece of land has to retain water.
- The productive limit that every soil has to produce and to be productive.

Conservation of water is also crucial and Cubans use many different methods in order to maximise this, working around techniques that deduce the exact amount of water that is needed to cultivate each different crop in each different soil.

At each location water will either come from natural or artificial sources, with consideration made to a variety of factors regarding this source:

- Where is it situated?
- How will the water be applied to the land?
- What level is the water coming from? Eg, is it surface water or is it coming from below ground?
- What quality is the water that is being used?

- How clean is the water? For example, is there any chance that it will include any human / animal sewage? (on 60% of sites in Cuba the water is polluted)

Water Distribution

The main method of water distribution on Cuban *UA* sites is using a basic pump system that sprays water precisely on the different beds – the beds are built at a precise width as this is the distance that water can be distributed from typical pump systems in Cuba. On this basis no water is wasted and only the water that is absolutely necessary is used. A typical spray water system for an organopónico or huerta intensive is made up of:

- A pump station including the pump, motor and any other necessary accessories.
- *Conductors* that take the water from the sources to the growing site *Mothers*.
- *Mothers* are hubs where water comes onto site before being distributed to the *Laterals*.
- *Laterals* take the water to each bed and feed the sprays that distribute the water.

Drainage

Maintaining good drainage is also essential on any growing site. This is the method by which water is transported away from areas where it gathers in excess towards areas on site where it is more useful or where it can be saved. On many Cuban sites this manifests itself as drainage canals around sites which are regularly cleaned during the rainy season to prevent them from flooding.

Sustainable, Ecosystem Focused Practice within Urban Agriculture – Felix Canet Prades(Santiago de Las Vegas)

Felix began by introducing the idea of design which focuses upon the system as a whole – the concept upon which the design of *UA* sites in Cuba is based. He felt that in order to do this it was necessary to create a system that was:

- Interdisciplinary.
- Qualitative and quantitative.
- Organised.
- Creative.
- Philosophical.
- Pragmatic.
- Practical.

And in order to do this it was necessary to consider and respect a wide range of different aspects:

1. How will you manage the land, water and other resources on each site?

2. How can you create a system that is as simple as possible?
3. How can you create a system that considers the needs of each individual who is involved within it?
4. Have you recognised that there are great potential benefits from managing things within an ecological fashion within an economic and social context? If so, what are these benefits?
5. How are you going to work to conserve of the structure and function of the ecosystem on your site?
6. What are your limits and how will you manage them?
7. Are you using the appropriate methods for your site and operation?
8. What aspects of your ecosystem are potentially variable and how may you allow for this?
9. Have you recognised the inevitability of change? How does your design allow flexibility to accommodate this?
10. Where does the balance lie between the use of nature and its conservation?
11. Are you making maximum use of available information in order to conserve ecosystems on your site?
12. How does your management and design make consideration of society and of science?

He also explained the design process by which you may begin to create a coherent design in respect of these answers:

1. Agree upon the problem that you are trying to solve or the questions that you are trying to answer.
2. Identify possible responses to this answer / problem.
3. Create a design for your site that reflects these responses.
4. Analyse your results and see if anything needs to be changed.

In order to do these things it is essential to make consideration of the specific situation on each site, both physically and socially. For example:

- What is the financial context?
- What is the condition of the soil?
- Are there any specific biological conditions?
- What methods or cultivation are already being used and what methods are being considered?
- Are there any specific socioeconomic factors in the local area?
- Are there any specific cultural factors?

“Maintaining natural systems as the foundation of preserving fertility and productivity.”

The Production and Conservation of Seeds – The Importance Within Small Scale Sustainable Agriculture – Maria Benitez (Santiago de Las Vegas)

“The seed is the beginning and the end.”

What are seeds?

Seeds are concentrations of life. They are a method of reproduction, multiplication and diversification of species. They conserve genetic information and maintain species for the future.

“If you control seeds you can control the whole of the agricultural world.”

The Objectives of Producing Seed

One of the main motivations in Cuba has been to succeed in developing varieties adapted to local conditions. It has also been to increase the available varieties whilst increasing the resistance and tolerance to pests and diseases. This is on a foundation of a desire to strengthen the cycle of production and to improve food security through self-reliance.

The Characteristics of Quality Seed Stock

Good quality seed stock will have a known origin, a known date of collection, and will also have a % of germination that is at least 80%. This known origin should also act as a mark of quality.

General Requirements to Create a Seed Finca

In Cuba each region has at least one seed finca, which serves to develop excellence and good practice in seed saving. This will be a place that sells seeds but that also teaches others how to save their own seeds and focuses upon the development of new and improved seed stock.

This is generally a clean, freshly cultivated area with a good natural soil quality and where there is access to a source of water. It also needs to be well drained. In terms of local neighbours it is essential that it is not within an area of agricultural production of plants that may cross-pollinate – or if it is the capacity must exist to protect plants from cross-pollination. For further protection against cross-pollination the site also needs a barrier area around the site of un-cultivated land.

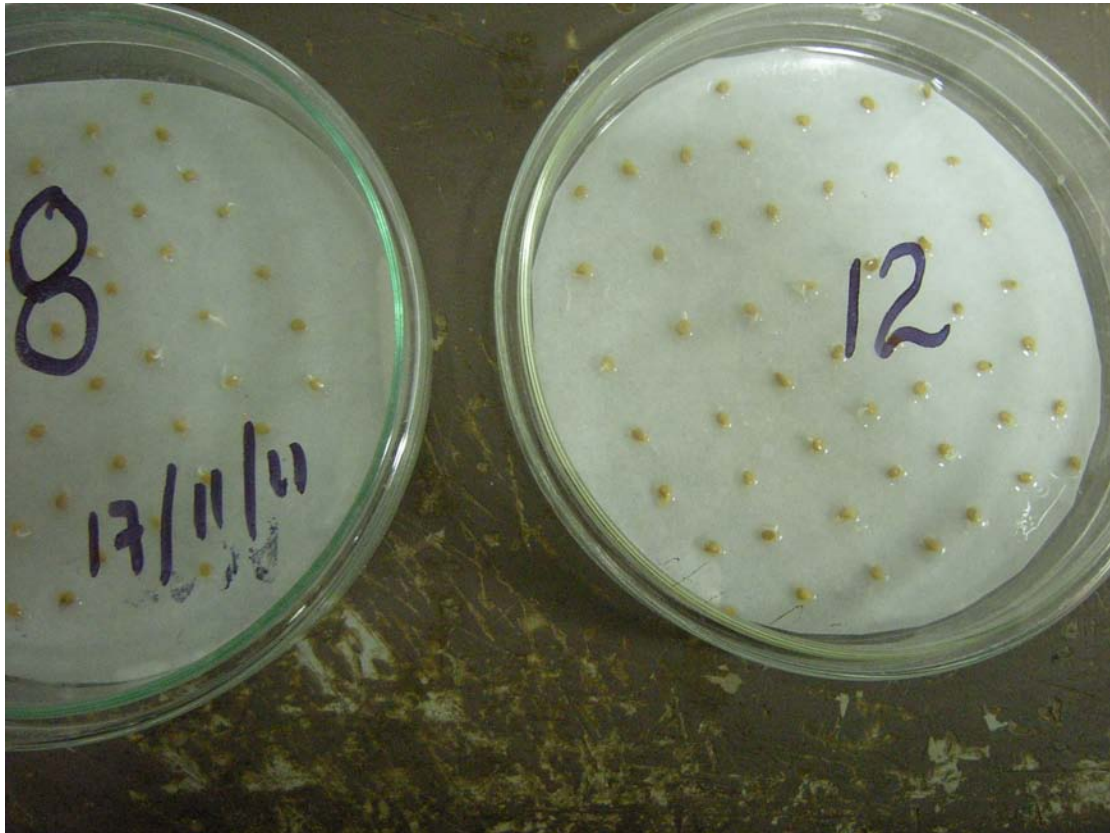
Finca construction and design recognises the different distances that different species need to between themselves and similar species if you wish to collect seeds eg lettuce need at least 200m, cauliflower needs 500m, peppers need 400m and radishes need 500m.

Benefits of Saving Your Own Seed

- Greater autonomy.
- Greater ability to guarantee genetic qualities in the plants that you want

to grow.

- Save money from not buying seed but also make money if you are able to sell seed to others.
- Independence.



Work in the seed lab at INIFAT

Ecological Management of Plagues and Infestations –María de los Angeles Zayaz Vázquez(Santiago de Las Vegas)

What are plagues?

Plagues are organisms that can cause problems for plants – either cultivated or otherwise. They can attack plants from a variety of different sources and at a variety of different times eg the soil, during harvest, during transport to market, on/as insects, on/as mites. They are generally caused when opportunity presents itself due to some kind of disturbance in the biological equilibrium of the plant.

How can you manage plagues in an ecological way?

- Though good management / design across your whole site.
- Through good management during sowing of seeds or seedlings.
- Through knowledge of prevailing winds on your site that may bring problems.
- Soil management.
- Positive methods of cultivation – good work cultures.
- Appropriate management of waste.
- Biodiversity.

- Minimal use of chemicals – and only make use in moments of absolute necessity.
- Utilise experience to learn and support new ideas.
- Remember that the food producer is at the heart of everything that you do.

Entomofagos

Organisms that one or more other insects to complete their own biological cycle either as a parasite or a predator. A good example of this is a ladybird. These can be bred and then released onto a site or conditions can be developed on a site to make it particularly attractive to these beneficial insects

Entomopatpgenos

Organisms that develop within the body of another insect with the capacity to cause sickness or death. They are generally micro-organisms and may include bacteria, fungi, viruses and nematodes.



Work in Maria's lab at INIFAT

Artisan Methods of Production

Many of the methods and preparations that are now being developed on an industrial scale originated within traditional, artisan farming techniques. For example, all over the world food producers have traditionally produced their own liquid and solid applications that act in the fight against plagues of all kinds. These same artisans also demonstrated that these treatments should only be applied at certain times of the day or when there is no rain. They also

need to be applied on their own, not with other things at the same time, leaving at least a three day gap before other treatments are applied. Much of this traditional craft has influenced the development of formal science in Cuba and beyond.

Bio-security – The Security of Life in Every Part of the World – Esmerelda Acosta Morrfi (Santiago de Las Vegas)

Coming from a veterinary back ground, Esmerelda focussed upon the idea of bio-security with a particular focus upon the production of sustainable meat, milk and eggs within small-scale *UA* settings. And also within a wider context considering how the management of animal waste is a key issue within agriculture and protection of the environment. She presented the idea that, as food producers, it was essential to protect any livestock we kept from the attack of physical, chemical, toxic or biological agents that may lessen their health, that in turn will lower the quality of meat, milk or eggs. On a practical level this means creating a logical form to apply everything that is procedurally, technically, logistically and economically viable in order to prevent any kind of contamination within the site that you are working. And to ensure that the wellbeing of people, plants, animals and the environment are all maintained within this system.

It is important to note that the promotion of health is not solely about reducing and avoiding illness in livestock. It also needs to focus on maintenance of general wellbeing of stock through management, food and living conditions. Animals in bad condition will not be able to fulfil their full potential on any level. The other important aspect in the wellbeing of livestock is the location and design of the site that they are being kept on, and ensuring that they are handled and managed in a way that reduces the risk of illness.

Pepe and Vilda Community Food Preservation Project – Site Visit (Playa, Havana)

Pepe and Vilda run a community food project in the suburbs of Havana. They are a retired couple and the project is situated in the ground floor of their house. The focus of the work that they do is looking at food preservation, in particular food drying in the sun, and thinking about how these dried foods can help improve the health of Cubans. Especially how using dried herbs, which are very uncommon in Cuba, can help improve people's food choices, health and well-being.

It was fascinating to hear about the work that the couple were doing nationally and internationally, including their own cookery show on Cuban TV for many years! They also travel all over the world talking about their work – though now prefer for people to visit them so they are not diverted from their main project in Havana by being constantly out of the country.

Pepe explained that he had originally been a mechanical engineer and that Vilda had been a chemist. Their project *Proyecto Comunitario Conservacion de Alimentos* was founded in 1996 during the special period. He went on to

explain that Cuba had a very interesting culinary history – culturally the country had many more influences than most other countries but their food culture has always remained a little weaker in comparison to other Latin American and Caribbean countries. Traditionally their diet is an unhealthy one with lots of salt and sugar, and lots of fried food. Pepe and Vilda's project was founded with an aspiration to help find a more healthy diet in Cuba. It is now a project that works in partnership with many other community food projects, in particular parcelas and patios, to change the Cuban food culture.



Pepe and Vilda talking about food preservation

The project uses traditional technologies to preserve food, with a basis in permaculture design in the structure of what they are doing. They work directly with local communities and also develop and deliver distance learning programmes on the internet. The three main methods of preservation that they are using are:

- The heat of the sun – sun dried food.
- Vinegar.
- Fermentation.

They also use some processes with sugar, but much less. None of the processes that they use include chemicals. There is no real tradition of using dried herbs in Cuba so much of the ideas that they are presenting are new to local people. However, dried herbs are an easy and cheap way to add flavour to food.

Another area of interest for Pepe and Vilda is the development of Cuban flours. There is no tradition of / climate for growing grains on the island so as a consequence most of the flour and grain that is used on the island is imported. They have done a great deal of work developing flour from Yuca, that they feel could be an alternative to the imported flour that Cubans currently rely upon.

Maintaining the Quality of Food During and After Harvest - *Felix Canet Prades (Santiago de Las Vegas)*

A big problem for many small producers is maintaining the quality of their produce during and after harvest. Especially in hot climates like Cuba where many people have little or no access to refrigeration. For any producer who wants to make their most out of the hard work involved in cultivating food they need to consider the possible risks involved in keeping their produce fresh after harvest. This is particularly relevant as badly stored food may result in risk of illness to the people who eat it.

Prevention is key throughout the process of cultivating food to ensure that contamination is prevented and reduced. It is also interesting to note that many consumers do not imagine that fruit and vegetables may be a possible source of food poisoning so many not treat them with as much respect as they may do meat, for example. The key areas to consider in order to ensure the cleanliness and safety of food as mentioned earlier is by paying careful attention to the main sources of contamination in food:

- Water – is the water clean that is being used on your site?
Contaminated water can be a huge risk if it enters the food chain through fruit and vegetables that people go on to eat.
- The Environment – are there things in the local environment that may contaminate your produce? What can you do to reduce the impacts of this potential contamination?
- People – people handling produce are a significant potential source of contamination. For this reason it is essential that all the people who are handling your produce are well trained in safe and hygienic food handling, harvest and storage.
- Composts / Manures – composts and manures that have not been produced properly may be a source of contamination. For this reason it is essential only to use composts from a reputable source and ensure that they have been treated in a way that will ensure that possible contaminants have been killed. Also ensure there is sufficient time between the application of composts and manures prior to sowing crops.

Week Three

Finca de Frutas Site Visit (*Bejucal*)

The Finca I visited was about 6km from INIFAT in a place called Bejucal. It is regarded as being one of the best fincas in Cuba because of the sensitive

way that the land has been cultivated. The finca started around 15 years ago on a site that had previously been used for industrial cultivation. During the special period it was taken over by a co-operative who now cultivate it organically and who have brought the land to cultivation entirely by hand using no machinery apart from cattle drawn ploughs.



The beautiful, productive forest garden at Bejuca

The site is mainly cultivated as a very productive forest garden with different fruit being harvested throughout the year including pineapples, coffee, bananas and papaya. By cultivating the land in this way the co-operative are able to maximize productivity and therefore stabilize income throughout the year. It is also a particularly good way of cultivation if you have limited access to water which is a significant challenge for food producers throughout Cuba.

The site is cultivated by 12 people and makes enough money to pay all of their wages. Although they all work together as a team each person also has the responsibility to maintain the fertility of a specific area of the finca:

“Feed the soil and not the plants.”

This includes producing their own worm compost to add fertility to their own area. Working in this way also means that each person learns all the different skills and processes to cultivate the land rather than just one specific skill or crop. On top of their basic wage they are paid additional money as a team depending upon how much food they manage to produce so the co-operative way of working helps to develop a systems where everybody takes responsibility and pulls their own weigh.

They also have a small amount of livestock, which is a relatively new addition to the site as part of a government project looking at the role of livestock on fincas.

After visiting the main site we were taken out to another field where they are mainly growing mamey – a highly popular but highly seasonal native fruit. To combat this seasonality they cultivate mamey under planted with tomatoes that mean the land remains productive throughout the year. At this point of the site they also grow around 7 hectares of moringa that is a native Cuban crop and is very beneficial as it is one of the only plants that is able to provide omega oils that are usually associated with fish.

One of the biggest challenges they have on site is how they can commercialize all the different crops that they are harvesting as part of their poly-cultural method of cultivation.

Fundación Antonio Núñez Jiménez de la Naturaleza y el Hombre – Michelle Perez (Miramar, Havana)

FANJ is a civil organisation based in Havana and one of the few NGOs in Cuba. It was founded to continue the legacy of the work of Dr. Antonio Núñez Jiménez through research and development of programmes that promote values towards a culture with a focus upon nature in the local, national and international. They aim to develop a social conscience that reconnects nature with the national cultural identity. They are now an organisation that is known, through the experience and capacity of their work, committed to the Cuban society and the world in solving environmental problems, with a perspective that integrates a socio-cultural dimension.



Visit to FANJ in Miramar

Michelle gave a brief introduction to the work that they did as an organisation:

- Programmes that defend universal environmental values on a national level.
- Work that promotes research related to the mission of the organisation.

- Expansion and strengthening of professional relationships with national and international institutions related to its mission
- Advocacy to ensure that environmental issues are at the heart of wider social culture in Cuba.
- Community work and social projects that promote sustainable development in Cuba.

Department of Urban Planning – Xiomara Moreno Lorenzo (Cienfuegos)

Cienfuegos is on the South coast of Cuba and is the only French colonial town on the island. Xiomara works for the urban planning department in the town and talked through how urban agriculture is reflected within urban planning in the UNESCO recognized historical centre. She explained that the original development of *UA* in the town had been disorganized, with sites popping up wherever there was space. It was felt that in order to give the appropriate force and importance to *UA* that there was a necessity for it to be formally included within urban planning processes.

In 2003 a formal programme of work was developed in partnership with the University of Cienfuegos to formally develop *UA* in the town and to observe the results that this formal development had.

Physically Cienfuegos is a coastal town that is vulnerable to flooding in many parts. It's bay is one of the main attractions for image based tourism as part of its economic base. It has a highly populated in the historical areas in the centre of town. It has strong physical boundaries for growth determined by the bay itself, the airport and industrial areas so there is a need to maximize the potential for *UA* within these boundaries. It is surrounded by agricultural land, where a lot of livestock is kept offering other potential food sources to the town.



Cienfuegos beautiful bay at sunset

In total the town has an area of 4800 hectares. Of this 1504.5 hectares are now destined for *UA*. At present 50% of this land is in *UA* use.

It is felt that *UA* will have a number of positive results for the town:

- The positive use of derelict land in town that may otherwise fall into disuse and potentially be used for illegal dumping.
- It will offer local people a fresh supply of organic fruit and vegetables.
- It will provide a use for organic waste across the town.
- It will improve local food security.
- It will afford savings in fuel and transportation as food will be produced in the communities where it will be eaten.

There are also potential negative aspects that have been noted:

- Aesthetically it can be hard to integrate *UA* sites and buildings into all neighbourhoods.
- The possibility that drinking water could be wasted if it is used to water animals or plants.
- Lack of study made into how organic farms can be favourably integrated into urban planning, in particular within historical neighbourhoods
- Allocation of green areas facilities that may have been parks or leisure facilities for agricultural uses – these decisions may be unpopular with local people.
- Location of organic farms on main roads into town may present a negative image for visitors to the town.

Organopónico Aeropuerto (Cienfuegos)



Semi-protected cultivation at Organopónico Aeropuerto

This was the first organopónico that I visited in Cienfuegos. We had to travel there on the *camello* bus, a uniquely Cuban travel experience, as the site is some way out of town. The site makes use of spare land on and around Cienfuegos' small airport – land that could not be used for housing or other building due to air traffic. This organopónico was made up of rows and rows of equally sized beds with waste concrete slabs being used as edging – it was not the most beautiful arrangement but it was certainly functional. Much of the site was also semi-protected which meant it was shaded in order to protect small plants from the glare of the sun – this type of protection can lessen the glare of the sun by as much as 30%.

There was a small *punta de venta* on site but as they were based some way from residential areas they tended to take much of the produce that they sold to markets in the centre of town. This produce that went to market was the produce that was left after they had filled the quotas they had to produce food for the local hospital.

The producer who showed us around explained that each of the producers on the site worked individually and rented land bed by bed directly off the government- he explained that there were currently seven producers working on the large site. They worked together to meet government quotas and to produce food to sell for market. He also showed me the area that they had for making worm compost – this was a simple trough that had been made under trees at the edge of the site so that it could be protected by their shade. However, he explained that they would have to move this as it had been attacked by a parasitic worm, which was killing their useful Californian compost worms. If they didn't move it and lost all their worms as a consequence it would be a disaster for them.

The other challenge that they were facing was the fact that the pump that they used to irrigate water around their site had broken. They were desperately searching for parts to fix it, which is a real challenge in blockaded Cuba. At the same time they were trying to irrigate as best they could by hand. I asked the producer what would happen if they could not fix their pump. He answered simply:

“We will lose all the crops that we have planted.”

As we were leaving the producer pointed out a nest of bees that had made their home at the top of the tree on the edge of the site. He spoke proudly that they had chosen to make their home there and was glad of the help that they would provide in pollinating his crops. Unlike the common reaction to bees in the UK, he had no intention of moving them from their newfound home.

Organopónico La Calzada (Cienfuegos)



A central location for Organopónico Calzada

This was a beautiful little organopónico close to the centre of Cienfuegos. As Cienfuegos is a historical centre there is no *UA* right at its heart. However, this small site was a couple of minutes walk from the centre in the middle of a residential district. The site stood on the corner of the road at a busy intersection for people and traffic – traffic being mainly buses, bikes and horse drawn vehicles. Unfortunately it was closed when I visited so I couldn't go onto the site to look around in more detail but it was possible to have a pretty good look through the low wire fencing. There was a small stall to sell produce directly to people in the local community and the beds were brimming with produce ready to be picked and eaten.

Organopónico Pastorita (Cienfuegos)

I visited this organopónico early in the morning when children in the school next door were playing outside and people from the local community were going to work or getting ready for the day ahead. The site was about ten minutes on the bus out of the centre of Cienfuegos. It was right in the heart of an entirely residential neighbourhood that had been built in the 60s and 70s – the buildings are medium level blocks of flats around 8 to 10 floors in height and are typical in Cuba. The population in this kind of neighbourhood is fairly densely packed but as all the services that people could need are provided in or close to the local community it feels like a buzzy and happy place. There are also plenty of green spaces where dogs and chickens wander and people sit out. Also, due to the lack of cars in Cuba, the roads are quiet and feel like a safe place to be where people have priority and not vehicles.

Organopónico Pastorita lay at the heart of this community. It was neighboured by flats on two sides, a school on one side and a service road to the highway on the third side. It was a medium sized site but again it was well cultivated and tidy. The producer showed us around the site pointing out the different crops they were growing and also showing us where they made compost and worm compost – explaining that to avoid cross contamination they only used waste from the site to produce their compost. He also showed us the large, old pump that they were using to irrigate the site.



Organopónico Pastorita – at the heart of its community

Due to its location this site was perfectly situated to sell food to the local community. During my visit the *Punta de Venta* had a constant stream of visitors buying the day's harvest, which included huge fresh heads of lettuce and beautiful juicy tomatoes. The rest of their produce for the day had already been delivered to the nursery and school next door for lunch. The morning is the busiest time on most *UA* sites, before the weather gets too hot. The producer explained that they typically worked a 35 to 40 hour week but that they tended to start early in the day and finish by lunch time when all the work was done and the day's crops had been sold.

Organopónico Universidad (*Cienfuegos*)

This was another beautiful organopónico that was tucked away between flats and the back of the university. From the road it was almost concealed by trees and banana plants, and behind an ingenious fence that they had made using the lids from metal cooking oil canisters. Once you went through the gate onto the site, which was alongside the *punta de venta* it was almost like entering a secret garden. You passed through the shaded area they used for composting then the site opened into a slightly sloped growing site that was protected on all sides by trees and fences. The top half of the site was cultivated in raised beds but in the lower half food was grown straight into the ground. In the area in raised beds you could see that the ground was full of rubble and would have been impossible to cultivate in any other way.

The producer proudly showed us around the site and explained that there were four of them working there and one additional person running the market

stall. As with all the food producers I met it was clear that he gained great pleasure from his work and from the part that he played in his local community as a result of his job. Another perfect example of the positive contribution that *UA* can make to community development and community cohesion.



Beautiful use of recycled materials at Organopónico Universidad

Organopónico Caminos (*Cienfuegos*)

This was another site that was close to the university on the outskirts of town. Lack of proximity to local community meant that, although there was a *punta de venta* on site, they had to transport most of their produce into town to sell it. The site was large and being worked by three people on the day that I visited. The producer who showed me around pointed out the different crops that they were growing, including okra, which is now grown on many *UA* sites in Cuba as it is very successful in their climate.

Similar the site I had visited a couple of days earlier, the producer explained that they were in a particularly dire situation with water as their water pump was broken and they had, as yet, been unable to fix it. Once again, if they couldn't irrigate the site they would lose their crops. The producer also took me to the corner of the site where they kept their worms. Water is essential to the process of making worm compost and the problem with their pump meant that they could not irrigate their vermin-culture site. As a result the site was parched and dry and sadly their worms were dying. Worm compost is an essential part of the *UA* system in Cuba so without them they would have great difficulties continuing cultivating their site.



Typical transport at Organopónico Caminos

Organopónico Rio Palma (Cienfuegos)

This was the final site that I visited in Cienfuegos. It was on the road out to the airport again, just alongside a residential area with a large school on one side and a children's centre across the road. There were three people working on the site the day that I visited. Once again the producer who showed me around proudly showed me the different aspects of the site and was particularly pleased to have the opportunity to show off their composting systems that they had won excellence awards for. He also explained that they had a horse and cart to take some produce into town from time to time – the horse's waste was a great addition to their composting system that was a real luxury for a site like theirs.

This site had found a solution to the risks around water and irrigation by buying two pumps for their site so if one went out of action they could replace it with another whilst it was being fixed. It was very frustrating to see this was such an issue for so many producers – Cuba would be the perfect place to use solar technology to run simple irrigation systems but the blockade and the island's economic deprivation mean that there is no access to the technology that would make this simple improvement possible.



Learning about compost at Organopónico Rio Palma

Two other things stuck in my memory with particular clarity regarding the visit to this site. Firstly, whilst I was there, two teachers from the neighbouring school came onto the site to get some extra lettuce as they had run out and needed extra for lunch. This felt like a perfect illustration of how much these *UA* sites were essential to their local community. Secondly, whilst I was on the site the producer who showed me round spoke about the knowledge that many Cubans still have about the medicinal benefits of plants. He was proud to explain that many Cubans would know which plant to use to help minor ailments and would always try this before reaching out for less natural treatments. Whilst I was on the site he picked a small leave and explained that it was a brilliant cure for threadworms in children. Many Cubans were aware of the usefulness of this everyday weed and that would be their first point of call if their children had worms rather than more processed chemical treatments. It seemed clear that having food produced in local communities, alongside the knowledge that supported this, was a key way of maintaining and improving this knowledge in local communities.

Organopónico Patria (Santa Clara)

For anybody interested in *UA* in Cuba Santa Clara is a place of pilgrimage as this is the town where the *UA* movement originally started. This fact was something that the producer who showed me around *Organopónico Patria* was very pleased to have the opportunity. This pride reflected in the presentation of the site which was probably the most immaculate that I saw out of all the sites that I visited.

The whole site was cultivated in the typical raised beds and a proportion of the site was also semi-protected (around 50%) They have a small punta de venta at the front of the site which was busy on the day I visited and clearly very popular with people from the local community that literally surrounded the site on all sides.

The producer who showed me around explained that the site was cultivated by six people – five of who had been retired, but who had been able to come back into work thanks to the creation of this organopónico. He was also very proud to talk about the awards for excellence that their beautiful productive site had won, expressing clearly how important it was to ensure that food producers were valued for what they did and that they had the opportunity to continue and developing throughout their careers. This was a perfect example of the way that a support infrastructure is essential so that producers are able to learn how to get the best out of their land and so that they are able to keep up to date with the latest developments in agro-ecology and *UA* as they arise.



The immaculate Organopónico Patria

CTA (Centro Havana)



CTA at the heart of busy Havana Centro

Towards the end of my trip I came across this *CTA* on the corner of one of the busiest streets in central Havana. This is a neighbourhood where there is very little free space so you would not expect people to be growing their own food, but the presence of the *CTA* suggested otherwise. Although there were not many formal growing sites in this part of the city the stall served to support people who were growing food on balconies and roofs or in patios and gardens. Although these kinds of growing sites are not so prevalent, they are seen as being crucial to food security in urban areas and support is offered to people producing food in this was at every possible opportunity.

Organopónico Plaza (Havana)

On my final day in Cuba I took the opportunity to visit *Organopónico Plaza* which is one of the most famous *UA* sites in Cuba. It situated alongside the government buildings in the administrative heart of Havana, and Cuba, and alongside *Plaza de la Revolución*, which is a popular attraction for many visitors to Havana. Although the organopónico is just next door to this tourist destination most visitors would not even be aware it was there.

The reason the site is so interesting is because it was one of the first *UA* sites to be formally established in Cuba. It was established by Raul Castro during the Special Period, when his role in government was as Minister of Agriculture. It was at this point that the Cuban's realised that *UA* had to play a crucial part in the future of food on their island. It was symbolically placed at the administrative heart of the country to demonstrate a commitment to *UA* and to demonstrate the essential part that it now played within the Cuban national identity.



Organopónico Plaza in Havana

A couple of years before the site was founded Raul Castro had visited an early UA site and made the following speech inspired by what he saw which is an excellent way of encapsulating the Cuban approach to urban food production:

“We are faced with the imperative to produce more from our land, with ploughs and cattle, in the way we did before the tractor existed.

As quickly as we can, we need to reproduce the techniques of our ancestors who were food producers.

We need to create a sector, supported by the state, as if we were campesinos once more, inspiring people to undertake this hard labour despite the challenge and the heat of the sun.”

Conclusions



Harvesting Cuban coffee

I don't think I can say that anything about my visit was particularly unexpected or surprising. I had high expectations prior to my trip but trying to secure my visa involved a long and engage planning process which put me in touch which lots of local people so I feel that my expectations were fairly realistic. Maybe I could say that the biggest surprise was the fact that all of these expectations were far exceeded when I was in Cuba.

The level of knowledge and expertise in urban farming on all levels is exceptional – from the national head of urban agriculture to small food producers working directly in local communities to grow food. I was also amazed by the kindness, hospitality and openness of the Cubans that I met along my travels. I had so many fascinating conversations with people of all ages on a huge range of subjects from David Cameron and the credit crunch to the BBC World Service and it was some surprise to me that people, many of whom were strangers who came up talking in the street, were willing to be so open and articulate about their thoughts around politics.

Whilst I continue to grapple with the different things that I learnt and the many contradictions that Cuban culture and society presents I feel that there are a number of strong ideas that stay with me following my visit:

- That infrastructure and support is essential to develop any kind of successful urban food production system.

- That knowledge and the sharing of knowledge is one of the most important factors in the development of Urban Agriculture.
- That food producers are essential parts of our communities and should be valued and nurtured accordingly – it does not matter if food is organic or free range if the person that has produced it has not been treated with respect and dignity in doing so.
- That allowing people to retake a significant control of their local food chain and supply has the potential to make profound positive changes within local communities, and improvement in quality of life in a whole number of different ways.
- That people all over the world are fussy eaters – for example many Cubans love apples (which won't grow in their climate!) and would happily swap them for local grown tropical fruit any day. Any Urban Food system has to try and provide a mixture of what people have to eat due to seasonality combined with at least a bit of what they want to eat through personal taste.

I will end with the words of the inspiration Nelso Companioni as a perfect inspiration for my own experiences and to reflect how I hope to go forward and develop what I have learnt:

“Knowledge is the most important thing that we can share with each other.”

Nelso Companioni, 2011



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