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Urban Agriculture in Copenhagen and Madrid
Practical applications and the effect of entrepreneurialism

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Statement of Purpose

This master's thesis aims at investigating how urban agriculture can provide solutions to sustainability issues with industrial or conventional agriculture, whether an entrepreneurial approach is necessary for proliferating the practice and what the advantages of organic urban agriculture are. The research is largely based on a background of the food system, and what the benefits of urban agriculture can provide to both those living in the city and those living in suburban or rural areas. Research was conducted in Madrid and Copenhagen and is based on practical applications of urban agricultural. Case studies sought to answer the aforementioned research questions by examining how urban agriculture can operate within various urban and procedural contexts.

I suggest that entrepreneurialism is important to proliferate urban agriculture, and that the practice of localizing food production can contribute to bolstering its sustainability on social, ecological and economic terms and that urban agriculture is an effective way to reduce the negative effects of industrialized agriculture and the centralized food system.

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Chapter 1: Introduction

Urban Agriculture (UA) can be defined as many things: urban gardens, urban farming, rooftop gardening, vertical farming, hanging gardens, allotment gardens or community gardens and can utilize different technologies such as aquaculture, horticulture, permaculture, biodynamic intensive agriculture, or animal husbandry. For the purpose of this paper I will focus on Urban Agriculture as the umbrella terminology and specify where needed – similarly, the different technologies will be examined for suitability in urban areas.

Inherent in the study of urban agriculture is the study of agriculture. Since civilization began humans have been tilling the soil to sustain populations, and until the 20th century, the practices of working the earth have not changed drastically. Today the industrial agricultural system controls what we, as citizens of cities, countries and earth, consume. Evidence suggests that the practices of conglomerate agribusinesses are not sustainability (Shiva 2000; Winne 2007; Despommier 2010; Smit, Ratta and Nasr 1996; Nelson 1996). Urban agriculture can provide solutions to many of the issues with industrial agriculture by localizing and decentralizing the food system (Smit, Ratta and Nasr 1996; Despommier 2010; Mougeot 1994). The question is: **How can urban agriculture provide solutions to sustainability issues with industrial farming and the system of distribution?**

As the case studies take place in Western Europe, markets influence the viability of urban agriculture. Due to the costs involved in urban agriculture, it is important to examine the economic drivers. Because economics can be one of the strongest barriers to the success of an urban agricultural venture (Despommier 2010; Smit, Rassa and Nasr 1996;), the question follows: **Is an entrepreneurial approach to urban agriculture necessary for proliferating the practice?**

While there are obvious advantages and disadvantages to farming organic in cities, for some people or communities, it is inseparable from the production of food. The contextual circumstances of the organic or green movement is very strongly felt in urban areas, and the sociocultural perceptions may strongly effect the success of urban farms. The question I examined is: **Is urban agriculture a worthwhile venture if it is not organic?**

The dynamics of the food systems are such that lines of inquiry do not stop at one conclusion, rather the questions continue on and on into an imbroglio of topics that range from carbon footprint to rural-urban relations or watershed quality. For the purpose of expediency and succinctness I will focus on the questions above, in the context of Copenhagen and Madrid.

1.1 *Methodology*

Research Questions:

- How can urban agriculture provide solutions to the many issues with industrial or conventional agriculture?
- Is an entrepreneurial approach to urban agriculture necessary for proliferating the practice?
- Is urban agriculture a worthwhile venture if it is not organic?

First, extensive research on the history of agriculture and urban agriculture was conducted to establish the context. Scientific data bases were researched, looking for urban agriculture and related terms and the found literature was critically analyzed. Research of literature on urban agriculture in both cities was conducted and found documents critically analyzed, providing historical backgrounds and context to each of the case studies.

Second, interviews and field visits were conducted in the cities of Madrid, Copenhagen and a single case study on the North Shore of Oahu, Hawaii in the United States. In Spain, the documentation of city farming was very much absent from planning documents. The process of determining where to research involved deductive reasoning. Peri-urban agriculture was the most apparent form of urban agriculture in Madrid and as the land surrounding Madrid is quite dry and only extensive cereal agriculture is possible, Professor Fernando Moliní and I consulted topographic and planning maps in order to determine where the Manzanares and Jarama rivers would spill into irrigable fields in the South, East and South-East of the city. The closest irrigable area was in the south of Madrid municipality, particularly the section of “public green space,” which is just behind the Merca Madrid platform, (Image 4.6). This area is extended in the contiguous municipality of Getafe. Another location for field research was found in the Rivas-Vaciamadrid municipality east of Getafe, or south-east of the municipality of Madrid, particularly the protected, non-urbanizable land in the Jarama river valley. (Image 4.10). On field trips, using cars and a great deal of walking, we intensely and extensively visited those the areas looking for existing urban agriculture.

In an excursion to the “public green space” zone along the irrigated section of the Manzanares, in Getafe of Madrid, we hiked through the areas we deemed probable to support agriculture. In the field work we located several informal urban gardens where we conducted interviews with several farmers. Following the river south to the community of Perales del Rio, we located more informal settlements

without finding farmers to interview. There is, however, a formal allotment garden, led by a neighborhood association, which is located on either side of the M-50 radial corridor running just north of the community of Parales del Rio, where we interviewed farmers working on their personal allotments. Field research concluded at the “EcoSecha,” in Rivas-Vaciamadrid where we conducted interviews and toured the property of a commercial farming venture utilizing permacultural and biodiverse polycultural techniques to bring locally sourced, fresh food to market in the form of a community supported agricultural venture (CSA).

In Copenhagen, I conducted research and interviews at two subsidized urban gardens in the neighborhoods of Amager and Nørrebro, Prags Have and Dyrk, respectively. At Prags Have I researched through participatory observation, joining the garden association and receiving a grant to build an aquaponics system; see Appendix C. I also interviewed organizers of an entrepreneurial city-bee-keeping project and a non-profit organization distributing locally sourced organic vegetables to their shareholders. Other interviews that have not been included in the paper include a formal interview conducted with Copenhagen's “Slow Food” director, Katrine Klinken and several informal interviews with people in the community surrounding Copenhagen's urban agricultural projects.

In Haleiwa, Hawaii, on the north shore of Oahu, research was conducted using participatory observation. With a goal of working on a cooperative farm in the area, I researched local farms through newspaper and municipal publications, looking for farms that were small scaled, organic and producing for the market. After ingraining myself in the community through farmers markets, I located Meleana's farm, on the Kameahmeah highway, three kilometers north of Waimea bay. The participatory study at Meleana's farm allowed me to gather information on an informal bases on the day to day operations of an up-start agribusiness while also gaining knowledge about the basics of running a farm, something that proved valuable later in the study.

Chapter 2: Sustainable Agriculture

This section of the paper is to provide contextual information about the solutions urban agriculture can provide to sustainability issues with industrial agriculture, and examples of best practice. It can be used as an argumentation for agriculture in general to be recognized as an underdeveloped and underestimated tool to fight climate change.

2.1 *Industrial Agriculture's Sustainability: Challenges to Industrial Agriculture's nutrient cycle paradigm.*

The dynamics of the food system's relationship with sustainability are such that lines of inquiry do not stop at one conclusion, rather the questions continue on and on into an imbroglio of topics that range from carbon footprint to rural-urban relations or watershed quality. For the purpose of expediency and succinctness I will focus on the problems with the current system of agriculture and distribution and offer solutions in the form of Urban Agriculture, solutions that maintain the balance of sustainability in social, economic and ecological spheres.

2.1.1 Ecological Sustainability

The future of industrial agriculture lies in the microbic content of the soil and the intensity of use of the nutrients in the soil. With the global population approaching seven-billion, there is a steady increase in the consumption of food and fiber (and fuels) produced by agriculture, while at the same time a steady decline in the quality and productivity of soil around the world (Clay 2004) . The circumstances of these converging trends may become overwhelming if there is not a revaluation and reorientation of agriculture and the direction in which we lead it. Innovative practices will likely need to focus on sustaining what soil we have and shifting production closer to urban centers. Sustainability by definition is the ability to endure, yet the current system of cultivation and distribution may not allow the human species to thrive, or even endure, without a shift in tactics. If the course is not diverted, earth's soil will no longer be able to accommodate enough food to feed the population (Despommier 2010). Much of the earth's biodiversity revolves around the adapted use of human ecosystems, for better or worse, and so enters the great sink of vitality: The City (Ibid). However, this approach has been largely ignored (Quan 1999), and farmers continue to convert natural habitat into new agricultural lands after they exhaust and abandon the lands that they previously farmed, as a result of the increased demand for agricultural products and the use of unsustainable agricultural practices. Consequentially,

farming is the single largest threat to biodiversity and ecosystem-functions, of any single human activity on the planet (Clay 2004). Indeed, intact ecosystems are precisely what allowed us to evolve into human beings (Despommier 2010), yet the destruction of ecosystems caused by industrial farming is rarely discussed. Urban agriculture enables urbanites to focus on sustaining biodiversity and the balancing of ecosystems from afar, while fostering reflection of the current food-system.

2.1.2 Socio-economics

According to the Food and Agriculture Organization of the United Nations (FAO), and the United States Department of Agriculture (USDA) (FAO 2004; USDA 2002), food has never been more available. On average, a person needs about 1800 kcal per day as a minimum energy intake (FAO). Comparatively, according to the Center for Disease Control (CDC), women in the United States *consume* 1,877 calories per day, measured in 2004, which may be considered modest by most estimates. Meanwhile, the FAO estimates that 1,500 calories of food can be accounted for in most parts of the world on any given day. While 1,500 kcal is below the hunger limit, it is still significant. What this information does not take into account is the accessibility. Indeed the food may be present, or in the proximity of the subject, but through functions of the market, they are not accessible (Winne 2008). High caloric production is the goal of industrial agriculture (Winne 2008; Shiva 1998), and where maximizing caloric production typically equals maximization of profit, we see a disruption of local economies and social equilibrium. In places like the U.S., daily caloric production well exceeds 3000 kcal per day, with a great deal going to livestock feed or export (consider this number in terms of the caloric import as well). Yet because the food is inaccessible we still see a great deal of suffering around the world. According to the International Monetary Fund (IMF) and the World Health Organization (WHO), world hunger spiked sharply in 2009, significantly worsening an already disappointing trend in global food security since 1996 . The combination of food and economic crises has pushed the number of hungry people worldwide to historic levels. The FAO estimates that 1.02 billion people were undernourished in 2009, about 100 million more than 2008. Poor harvests are not to blame, with total cereal production estimates only slightly below the record high set in 2008 (Ibid.). Instead, the increase in hunger is mainly a result of poor people's inability to afford food that is produced (WHO). Hunger is a condition of poverty, not proximity. While urban agriculture is a tactic for battling hunger, and social marginalization within cities, it is also a tactic to battle the misuse of soils in the rural, industrialized agricultural system. In many ways our consumption patters, which includes an enormous amount of waste, not only destroys ecosystems, but marginalizes vulnerable groups by appropriating land and

destroying local economies. Urban agriculture can play a major role in correcting the dynamics of a system that places monetary gain, over social gain, at a premium (Prato 2009).

2.2 *Agrochemicals and Genetically Modified Organisms.*

2.2.1 Agricultural Revolution

Agricultural revolutions are inextricably tied to populations development, though a temporal and causal relationship is difficult to establish, it can be said that while every agriculture venture did not include urbanized actors, every city included an agricultural sector, indeed the first civilizations were formed in fertile areas. The need to feed a city is not exclusive to modern times, the Sumerians, Mesopotamians, Romans and Mayans alike, struggled with providing for the masses. Yet, transformative technological advancements happen rarely. From the original agro-revolution; domesticating plants and animals, to independently adapting forms of human and beast-powered tools; the practice of farming remained largely unchanged for much of the history of civilization (Rasmussen 1962). In the late nineteenth and early twentieth century, a series of unprecedented technological revolutions transformed agriculture. The grain reaper, the cotton-gin and later the tractor and thresher, pushed the mechanical revolution, increasing the amount of seeding and the amount of land that could be usefully farmed with the same amount of labor (Ibid.). At the start of the industrial-revolution distribution systems had yet to mature into the inter-regional or inter-continental trading we see today. The advent of the steam-engine and its application to the railroad created a wider distribution network and more mechanized farming techniques that enabled large amounts of surplus to provide for the explosion of market possibilities that mobility provided.

Shortly after the turn of the nineteenth century, the economic production of nitrogen fertilizer was made possible through the Haber-Bosch Process which has often been referred to as the most important invention in the 20th century as it “detonated the population explosion,” driving the worlds population from 1.6 billion in 1900 to 6 billion in 2000 (Smil 1999). The spreading application of nitrogen fertilizers in the United States and Western Europe was the introduction of the chemical revolution, further increasing the yield a farmer could produce on the same amount of seed and land, albeit with notably higher inputs as well. The dawning of the post-war food crisis, most pronounced in developing countries gave rise to a third revolution, the hybrid revolution. With increased application of chemical fertilizers and new strains of seeds, synthesized from parent species with desirable traits, yields per acre were substantially boosted. (IMF 2009). Many urban planning specialists are suggesting

that the next great agricultural revolution will be an urban one (Despommier 2010; Winne 2007; Webb 1998; Nasr and Smit 1992).

2.2.2 Industrialization of Agriculture.

The effects the industrial revolution had on farming was dually noted in urban areas; simultaneously experiencing the industrial revolution and an influx of redundant agricultural laborers from rural areas. Between 1830 and 1890 the number of hours needed to process 5 acres (about 2 hectares) of wheat dropped from 300 man hours to 50 (Morris, Kadlec 1963), mostly due to mechanized tools such as the drought iron plow and with the supplementation of beasts of burden for humans. This drastic drop in the need for human power sent a lot of people to cities and burdened the remaining farmers with the need for cash flow to utilize the technologies. Refrigeration and transportation innovations soon enabled food to travel great distances and in the middle of the nineteenth-century, this medley of circumstances pushed more and more people to cities as the agricultural employment sector receded, resulting in some of the highest levels of population many western cities have seen as of today (Ibid.). This synergistic phenomenon of migrating rural workers, and an increasing mechanization brought the food system from its piece-meal origins, to the industrialized operation we know today. The system did have flaws. New advancements led to gross over farming and the distribution networks led to an over reliance on food from great distances from land that was over farmed. Catastrophe was just around the corner – enter the Great Depression and the Dust Bowl era; see Appendix A.9, for a brief discussion. Today, with the tally of the hungry inhabitants of this planet reaching seven billion, the industrial agricultural complex has effectively geared the production system to deliver edible calories to people at an affordable “price”, but its toll on both the environment and its consumers is astonishing (Despommier x; 2010).

2.2.3 Green Revolutions

The first “green revolution,” can be traced back to the late 1950's when a range of modern varieties (MV's) of crops were engineered to be higher-yielding, and often more resilient. A number of seeds were released to South American and Asian countries, and the success of this first generation is considered the beginning of the green revolution (Evenson 2003). In many cases the green revolution was just one aspect of a much larger transformation of global agriculture during the 20th century. Driven by rapid advances in sciences and substantial public investment and policy support, including the starving developing world, the political will of developed nations focused on how to defray the

starvation of billions of the planet's residents (Hazel 2009). "A 1967 report of the US President's Science Advisory Committee concluded that "The Scale, severity and duration of the world food problem are so great that a massive, long-range innovative effort unprecedented in human history will be required to master it"" (Ibid. 1).

This circumstance of global awareness, a phenomenon newly achieved in the Vietnam War generation, with the popularization and affordability of television providing a view to the world, combined with the trend in urbanization or suburbanization, drawing folks from rural areas, created a perfect storm of public awareness of the hunger-problem and an increasingly urbanized populous. "It was the beginning of mankind's descent into industrialized food production practices that emulated the same assembly-line technology that Henry Ford applied to the automobile" (Winne 7, 2008). In many places, federal or national governments provided support through policy to standardize production systems and streamline production processes. This political fervor, coupled with burgeoning science and technological savvy combined to create the most extensive food system the world has ever seen, providing food, in many cases at lower than cost, due to subsidies (Ibid.). Still, the nutritional value of food has been compromised, through a lack of variety and a marketing machine that purveys subsidized crops as highly processed substitutions for wholesome foods. Vandana Shiva, a leading activist for biodiversity notes that, "the Green Revolution narrowed the basis of food security by displacing diverse nutritious food grains and spreading monocultures of rice, wheat, and maize" (Shiva 103, 2000).

The Genetically Modified Organisms (GMO's) or MV's are the focus of much scrutiny by watchdogs of ecological sustainability and balanced ecosystems. Those concerned with bioethics are sighting the drawbacks of placing such a high percentage of the food system on GMO's (Pfeiffer 2004; Shiva 2000; Winne 2007). Biodiversity is what allowed certain plants to thrive in organic, permacultural settings, becoming balanced with the ecosystem to survive things such as floods, pests and droughts. However, the MV's used today are of identical genetic makeup to one of five or so different seeds around the planet – seeds that need five-times as much fertilizer and more water for irrigation and in some cases 100 times the input of organic agriculture (Pfeiffer 2004).

2.2.3.1 *Agricultural run-off*

While some 70 percent of all available fresh water on the planet is used for irrigation, the side effect of this post-industrial increase of irrigation has the two-fold effect of raising the water table and flushing large amount of nitrogen fertilizer into it (Despommier 2010). Agricultural runoff (leftover irrigation-water laden with pesticides, herbicides, fertilizers and salt), is more disruptive to ecosystems than any

other form of pollutant (Ibid.). Further damage occurs when the run-off reaches the ocean. A combination of these pollutants, and massive amount of displaced top-soil moving downstream is shrinking the size of rivers or creating ever growing islands at river deltas (Ibid.; AFP 2010). The most extreme example is the island of Chongming in Shanghai, China, China's second largest island. Located at the mouth of the Yangtze River, it is completely composed of topsoil runoff and is continually growing (Despommier 2010). This is to be considered in the context of China's agricultural pollution problems – 85% of China's coastal waters are polluted by nutrient laden agricultural run-off, sometimes creating massive algae growths that damage marine life by sucking up oxygen and threatens economic activities in the region (AFP 2010).

2.2.4 Agrochemicals, pesticides and herbicides

Agrochemicals in the form of pesticides and herbicides are integral to the industrial agricultural complex and represents a substantial economic sector, thus we see a massive push by chemical companies to garner institutional support for this style of production (Shiva 2000). These multinational biotech firms control the food supply and have reshaped it to maximize their profits and their power, together (Ibid.). This is distant from the people-centered development approach (with its strong emphasis on community self-reliance, gender equity and sustainable livelihoods) that many civil society and community-based organizations struggle to promote (Prado 2010). The synergistic tendencies of these multinational corporations is quite evident when juxtaposing the list of the top-ten agrochemical companies, and the top-ten seed companies.

<u>Agrochemicals</u>	<u>Global Market Share</u>	<u>Seeds</u>	<u>Global Market Share</u>
		(Global <i>proprietary</i> seed market)	
1.Bayer (Germany) -	19%	1.Monsanto (US)	23%
2.Syngenta (Switzerland)	19%	2.DuPont (US)	15%
3.BASF (Germany)	11%	3.Syngenta (Switzerland)	9%
4.Dow AgroSciences (USA)	10%	4.Groupe Limagrain (France)	6%
5.Monsanto (USA)	9%	5.Land O' Lakes (US)	4%
6.DuPont (USA)	6%	6.KWS AG (Germany)	3%
7.Makhteshim Agan (Israel)	5%	7.Bayer Crop Science (Ger.)	2%
8.Nufarm (Australia)	4%	8.Sakata (Japan)	<2%
9.Sumitomo Chemical (Japan)	3%	9.DLF-Trifolium (Denmark)	<2%
10.Arysta Lifescience (Japan)	3%	10.Takii (Japan)	<2%
Total \$34,396m -	89%	Total - \$14,785m -	67%

(Source: ETC Group 2008)

There is a clear relationships between those involved in the sale and distribution of seeds and the sale and distribution of agrochemicals; pesticides, herbicides and chemical fertilizers. Industrial agriculture's GMO's and agrochemicals are inextricable to one another and may become more tightly linked as the failings of supranational regulatory agencies continue to overlook the problem of industrial agriculture's life-or-death reciprocity with chemicals and GMO's. The action group on erosion, technology and concentration (ETC Group) has been following the business model utilized by the largest agribusiness companies. In 2008, a comprehensive report by ECT, explained that the issues the companies focused on were that of a *strictly financial nature*, pushing concerns of human or nature-centric corporate policy to the forefront only if they could maximize profit from interest in such ventures (ETC 2008). ECT reports that, “instead of challenging or changing structures that generate poverty and exacerbate inequality, governments are working hand-in-hand with corporations to reinforce the very institutions and policies that are the root causes of today’s agro-industrial food crisis” (Ibid. 5).

In order to reverse these trends, a shift in the prevailing paradigm is needed. Instead of a food system that relies upon extensive mobility practices, such as air freight, shipping freight, truck freight, and rail freight, people are beginning to ask: why not localize the movements? The free-market economic model has shifted the balance of consideration to favor economics over ecological or social considerations. The problem with chemicals in industrial agricultural is that they are a remedy to a symptom of the institutionalized economic design, not to the problem as the whole. Urban agriculture approaches the remedy of the symptoms as a holistic initiative, thus negating the need for widespread application of dangerous agrochemical approaches by utilizing different techniques and functionally operating without the need for application.

Due to the singular focus of the agribusiness companies we see more of a problem in the food system today, than we did when the first green revolution began. According to many researchers, manipulating genetic codes has no effect on yield (Shiva 103, 2000), it only creates ease of operation. According to the USDA's July 2008 assessment, the number of hungry people in seventy developing countries will increase to 1.2 billion by 2017. In other words, rather than halving the number of hungry people by 2015 – the goal the governments of the member-states of the United Nations, have repeatedly pledged to meet – their ranks are projected to increase by 50%. The FAO's food import bill of 82 poor countries (designated, "Low-Income Food-Deficit Countries") was expected to reach US\$169 billion in 2008, 40 per cent more than in 2007 (Rosen 2008). Yet, because primacy of economics over of human

or ecologic concerns, when the FAO held their food summit in June of 2008, only \$12.3 billion was pledged to help developing countries in the South – and most of that has vaporized with the colossal corporate bailouts (Ibid.).

Consumers are generally unaware of the processes by which pesticides are developed, registered for use, applied to crops, and monitored for residues. As late as July 2011, major reports are being released that the world's most popular weed killer, RoundUp, causes birth defects – something the producers have known about since the 1980's (Antoniou 2011). Furthermore, most consumers have little knowledge of modern agricultural production and marketing practices. The lack of consumer awareness concerning overall food production and processing systems and specifically pesticide issues therefore emerges as a key issue (Worley 1990). Indeed most food products are dependent on pesticides during production or processing (Ibid), which represents a significant vulnerability to those controlling the food system. Transparency can alert consumers to which products are that of industrial agriculture, thus enabling people to choose another system – a localized, urban system

2.3 *Energy consumed and Emissions in agriculture.*

Globally, consumption trends have reached troubling heights and the food system perpetuates many of the unsustainable consumption practices. The USDA's National Institute of Food and Agriculture (NIFA), categorizes three main sources of emissions from the current food system as deforestation or land-use change, food production and consumption, and distribution and waste.

2.3.1 Deforestation or land-use change

Deforestation and land-use change account for 18 percent of the total global warming effect, mostly from the destruction of vital, old-growth rainforest, wetlands and peatbogs due to allocation for agricultural ventures, typically in the form of pasture for cattle, arable land for feed-crops for cattle, or palm oil plantations. This represents a massive failure of supranational organizations to stop the destruction of pristine ecosystems for corporatized agricultural missions. This is a particular problem in Indonesia where tropical rainforest is disappearing at a rate of more than 2 million hectares a year (Webster, Rimmer, Bennet 2004).

2.3.2 Food production

2.3.2.1 Energy Use

Energy used in the production of food includes manufacturing and use of agricultural machinery,

“energy-invested” irrigation, heating and cooling of feedlots and manufacturing plants.

2.3.2.2 Emissions

Food production also encompasses emissions from the production of agrochemicals and fertilizers. Half of these are used to grow animal feed crops. Nitrogen fertilizer, notoriously energy-intensive to produce, represents 72 percent of the United States' anthropogenic nitrous oxide emissions. (NIFA 2008), and accounts for about a third of energy consumption in US crop production (Gellings and Parmenter 2004). One study showed that 40% of the protein in human bodies, planet-wide, would not exist without the application of synthetic nitrogen to crops during most of the 20th century (Cox 2005).

2.3.2.3 Transport

Including emissions from mobilizing these fertilizers and agrochemicals around the world. The nature of the multinational corporations rests in exploitation of regions with strong natural resources. Thus we see a massive amount of back-end transactions just to support industrial agricultural ventures.

2.3.3 Consumption, distribution and waste

Consumption, distribution and waste is broken into two categories: Methane emissions from waste decomposing in landfills, and emissions from the distribution, transportation and storage of food (NIFA 2008). “Foodmiles,” a popular quantitative tool for examining distance between production and consumption, explains this through calculating the distances from farm to fork. Today, the typical American prepared meal contains, on average, ingredients from at least five countries outside the United States (NRDC 2007), with the average distance in the U.S. between farm and fork being 2,000 miles (3,200 km) (Winne 2007).

These three categories of emissions from the food system share a common characteristic of corporate based interventions sequestering and using large amounts of fossil fuels. Our consumption pattern is so dependent on energy use that it can be said that we are *eating* fossil fuels, a finite resource. Mechanization of agricultural methods has led to food prices being tied in a precarious relationship to oil prices. In the U.S. Alone, agriculture accounts for 25% of fossil fuel consumption while globally, two-percent of natural gas is used exclusively on rendering nitrogen fertilizers (Pfieffer 2004)

2.4 Closing the the Loop.

Large landed property reduces the agricultural population to an ever decreasing minimum "and confronts it with an ever growing industrial population crammed together in large towns; in this way it

produces conditions that provoke an irreparable rift in the interdependent process of social metabolism, a metabolism prescribed by the natural laws of life itself. The result of this is a squandering of the vitality of the soil, which is carried by trade far beyond the bounds of a single country (Marx, 1981, p. 949).

2.4.1 The urban-rural dichotomy

The separation of where food is produced and where it is consumed, and the resulting severance of the resource loop, has led to two major problems: the depletion of nutrients in soils in agricultural areas, and an excess of nutrients in waste sites in and around cities. The nutrients in agricultural soil have long been depleted from agricultural practices, thus the necessary input of agrochemicals and the subsequent gathering of nutrients in urban areas. In order to equalize the system it is necessary to reintegrate the waste stream into the production stream. There are three nutrient streams being jettisoned from urban systems: water and sewage, solid waste, and energy (Girardet 1999). Urban agriculture can play a central role in reintegrating these outputs into circulating flows by utilizing these various forms of energy to sustainably produce food. Once the nutrients, that would otherwise be called pollutants, are recycled into production, cities will be cleaner. Indeed, “pollutants,” as Esrey (2000) suggests, are just mismanaged nutrients. Wherever cities exist, they generate a steady outpouring of organic waste - from food preparation, the defecation of people and their pets, and the clearing of leaves or clippings from yards and parks. Unfortunately, the bulk of the nutrients those wastes contain is lost - either buried in landfills or dumped wherever is convenient (Nelson 1996).

2.4.1.1 Input-output

Input-output theory offers an understanding of the “throughput” of resources in an urban ecosystem where inputs (raw materials and products) brought into a city, pass through and are discharged to become an output (Smit, Ratta and Nasir 1996). Because improper management of waste breeds disease, most cities, if they can afford to, focus on simply getting rid of it as a throughput; if they fail to recognize waste as an economic asset – as most cities do (Nelson 1996.). The consequences of this linear nutrient drain from agricultural areas results in the application of petroleum based, manufactured fertilizers to make up for a lack of organic nutrients. The manufactured-fertilizers do not contain all of the constituents necessary for healthy soil (they lack organic matter and micro organisms, for example), and continued reliance on them ultimately diminished the soils fertility (Ibid.). On the other end of the spectrum, the prevailing means of “getting rid” of waste tends to concentrate them in ways that wreak

havoc on the local ecosystems. In one of the most dramatic examples, in Tokyo, the city is building islands of garbage in Tokyo Bay to dispose of the 22,000 tons of garbage produced there every day (ibid). Cities lack simple and cost effective ways to deal with waste. Urban agriculture can help to create a use for outputs or wastes in the system by reentering them as inputs.

2.4.1.2 Sewage

A variety of new sewage systems have been developed for the purpose of reintegrating wastes into the system. New technologies include membrane systems that separate sewage from any contaminants; "so called 'living machines' that purify sewage by biological methods and drying technologies that converts sewage into fertilizer. These technologies can be used in combination with each other making sewage facilities into efficient fertilizer factories" (Girardet 127, 1999). The taboo of utilizing human effluents may be the strongest barrier for such practices in the western world. Reusing human waste as a fertilizer is an important component of China's integrated urban agriculture system. For example, in 1991, Shanghai was collecting 90 percent - about 8,000 tons - of the city's human waste each day, treating it, and selling it to farmers in the metropolitan area (Nelson 1996). Waste-fed aquaculture, in Calcutta provides an outlet for processing human waste; sewage provides nutrients for the algae the fish eat, and the process in turn dilutes the high concentration of fecal coliform bacteria present in sewage. The resulting effluent can then be safely used to irrigate fields. Each day, 22-tons of fish - mainly carp - are produced in the course of treating 150 million gallons of Calcutta's waste-water (Ibid.). Some industrial countries recycle sewage sludge, the solid by-product of waste-water treatment, through highly technical systems. Once the sludge is put through the system it renders all outputs safe for agriculture – Singapore has even been recycled drinking water from treated sewage (Kanelos 2009). In industrialized countries it is possible to recycle nutrients of human effluent back into agricultural products, it just needs to be made economically feasible and socially acceptable, the latter of which may be the most challenging.

2.4.1.3 Solid wastes

In managing solid wastes, many cities have opted to utilize incineration, though there are issues with the environmental effects of incineration because research has shown that incineration compares badly with recycling in terms of energy conservation (Girardet 1999). So we are seeing many cities turn to integrated systems of recycling and composting. Experience in many of these cities show that market incentives can make recycling economically advantageous (Ibid.). Deliberately constructing 'chains of

use' that can mimic natural ecosystems will be an important step forward for both industrial and urban ecology and may be facilitated through urban agricultural initiatives. Furthermore, composting can provide direct energy harnessing as organic matter deteriorates and emits methane gas.

Some well documented examples include London, where much of the solid waste is dumped into clay lined pits. When the pits become filled with the compacted garbage, they are sealed with a top layer of clay, then soil and seeded with grass. Inside the pits there is a system of pipes that captures methane from the decomposing materials and directs the gas to run small power stations (Ibid.). This system leaves much to be desired however and will leave the land unusable for agriculture due to heavy-metal deposits. Better managed systems do exist that include integrating advanced, non-polluting production processes of recycling and composting. Another example is in Gothenburg, where an ambitious plan for developing 'eco-cycles', diminishes the risk of toxic leakage from solid waste (Ibid.). But the most exciting initiative takes place in Boston. The mayor, Thomas Menino, has approved a plan to construct and maintain a large indoor composting facility. By moving the composting facility indoors, Menino and a team of engineers, will harness the energy from decomposing organic matter in the form of heat and methane gas. The heat will be used to warm an adjacent greenhouse year-round, while the methane will be directed to power facilities. The remnants of the process, in the form of nutrient rich soil, will be sold regionally as fertilizer (NPR 2008). This is the first project of its kind, utilizing every stage of the decomposition process to facilitate urban agricultural initiatives, to be undertaken in the United States.

2.4.1.4 Energy

As Boston has done in utilizing the Energy from throughput of the system, so has much of Scandinavia in the form of combined heat and power (CHP) initiatives. CHP is a process that involves capturing and distributing the heat created from the combustion of fossil fuels during the energy creation process. Where most power-grids are around 35 percent efficient, CHP is around 80 percent efficient (Girardet 1999). In Helsinki, the CHP system is 80% efficient and is tunneled through underground passageways acting as a central heating. The United Kingdom is just seeing the first schemes where greenhouse cultivation is being combined with CHP, utilizing their hot water and waste-carbon-dioxide to enhance crop growth for year-round cultivation (Ibid.) Much like Boston and London, other cities are grasping onto the idea of closing the loop. The synergies of each system will assist in proliferating awareness, and can help to move urbanites into a more sustainable and healthier future.

2.4.2 Caring for the biosphere and ecosystems.

Humans invented agriculture at least six different times across the entire globe. Food production freed us from wandering and allowed for the rise of what we have come to refer to as civilization, yet in the most recent years of our growth as a civilization, we have done more damage to naturally functioning ecosystems than ever before, and agriculture is the largest contributor to ecological demise (Despommier, 2010). By shifting the paradigm back to urban cultivation, we can reduce the exacerbated effects of monocultural, industrial agriculture, and begin caring for and repairing existing ecosystems (Ibid.). The questions regarding the salvation of the biosphere and delicate ecologies remains: can a city mimic an intact ecosystem, in regard to flows of nutrients and materials, while retaining qualities that make cities liveable? The answer, according to Despommier (Ibid, 22), is yes, and in fact, very straightforward:

“Grow most of our food within specially constructed buildings located within the city limits using methods that do not require soil. This would allow for the conversion of an equivalent amount of farmland back into whatever ecosystem was there originally, usually hardwood forest. The regrowth of the forests would eventually sequester significant amounts of carbon from the atmosphere and begin the healing process. Biodiversity would be increased, and ecosystem services, such as flood control and cleaning of the air, would be strengthened. The more urban farms there are, the larger the amount of carbon that would be converted to cellulose in the form of trees. It is that simple.”

It may not be that simple, but it is indeed achievable. The integration of the myriad of ideas may provide a path of sustainable development that includes localizing food production, in places previously thought to be unfarmable. Dr. Despommier's slightly utopic vision, requires the construction or recycling of skyscrapers, filled with highly technological growing operations to realize his particular style of the future of cities. It may eventually be the path of least resistance, however getting the layman involved in the discussion of sustainability and urban agriculture by way of presenting more realistic initiatives may be the stronger route to take at this particular moment in time. That being said, farming indoors is hardly a new concept, and will certainly need to be utilized in any professional and profitable operations within most cities.

A proper framework needs to be established to capitalize on urban agricultural as means to reuse and transform the byproducts and waste of other industries. While urban agriculture increases local production, it reduces imports and decreases the amount of waste discarded into the bio-region – and by extension the biosphere (Smit, Ratta and Nasr 179, 1996). Because food and fuel are major industries in cities, urban agriculture has a large role to play in closing, open, polluting loops in the

nutrient cycle (Ibid.).

Though urban agriculture focuses on the city side of producing food, the necessity of urban agriculture and the benefits of it are much larger in geographical terms. The current model of production and consumption pollutes not only cities, but the surrounding bio-regions. The result is polluted air, water, and soil; increased temperatures; soil erosion; and sharply reduced biodiversity; all of which may increase risks of disasters such as floods. Not only is urban agriculture reducing the negative impacts, it is contributing to the improvements.

Urban agriculture cleans the air by reducing the dust and absorbing pollutants through its foliage. It regenerates the soil by returning nutrients, organic materials, and microbial life back to it. The micro climate is improved through cooling and reducing radiational heating reducing the effect of urban “heat islands,” and converting groundwater into atmospheric humidity (Ibid.).

2.4.3 Conserving resources

The relationship between urban agriculture and resources is multifaceted. Involved in the discussion are human, environmental and economic resources. Urban agriculture assists in the conservation of bioregions by reducing the pressures to convert natural environments; deserts, mountain slopes, rainforests and woodlands; into agricultural lands. Because urban agricultural methods are intensive, products are produced on a fraction of the land needed for rural production, furthermore urban agriculture is parsimonious in its use of water – thus both land and water are being conserved (Smit, Ratta and Nasr 1996).

Energy conservation through reducing the need for transportation and cooling is another contribution of urban agricultural by reducing the need to mobilize food long distances. As mentioned previously, one estimate of the foodmiles in the United States puts the distance between farm and fork at 3,200 km (Winne 2007). Producing locally cuts these distances significantly. Considering that while the food industry accounts for roughly 10% of fossil fuel use in the U.S., a typical estimate, only 20% goes towards production, where 80% is associated with processing, transport and refrigeration (Ibid.). That being said, there some research illustrating the unsustainable shortcomings of the local food movement, suggesting that the 10% use in production is significantly increased when foods are grown out of season in greenhouses in order to support local demands (Davies and McKie 2008), and that small amount of shipping do not offset massive cargo loads coming from abroad. But, this is taking into account conventional greenhouse technologies that are merely industrial agricultural practices and can not be considered, in most cases, to be urban agriculture; or distribution processes that can now only

operate in smaller scales because of the dominance of the supermarket paradigm. Urban agriculture will provide locally sourced food that has a lower carbon footprint by utilizing intensive production methods and the recycling of nutrients and resourced into the production system, and distributing produce through more efficient systems.

2.5 *Urban Agriculture's Boundaries in the Sustainable Debate*

The trends in production and distribution have led to an increased distance from farm to consumer and an increase in the use of resources per calorie of food produced, resulting in significant ecological sustainability issues in both rural and urban areas. Though this urban-rural dichotomy is readily describable as are the causalities associated with it, the capacity of policy makers, land-use planners and academic researcher to bridge this nexus may be limited (Blodavich 2000). The urban rural dichotomy is problematic because many factors and issues span both urban and rural zones. The food system, in fact, is precisely tuned to this bipolar-geography, yet it is generally untouched in effective urban planning documents, or in classrooms in which planners are being taught (Pothukuchi and Kaufman 2000). Indeed, urban planning researchers and policy makers concern themselves with many issues that relate to sustainability such as land use, housing, transport, the environment, recreation, waste management, the economy, energy and water supply, and how all these systems interconnect – and as Pothukuchi and Kaufman (2000) point out these central topics are comprehensively reviewed, yet the food system is notable by its absence from urban planning research literature (Blodavich 2000). In most cases, when they do get involved, their role is reactive rather than proactive and piecemeal rather than comprehensive (Pothukuchi and Kaufman 2000).

2.5.1 Problems related to urban agriculture

Most concerns about urban agriculture are about potential – rather than inherent – problems, but most potential problems can be averted (Smit, Ratta and Nasr 1996) It is of utmost importance to address the problems as they also can have an effect on the sociocultural perceptions. The main problems that result from urban farming occur because of its close proximity to densely populated areas sharing the same air, water and soil resources. The effects are evident by examining the symbiosis of human developments and the environment. As food production in the city can harm the environment so too can the environment harm food being produced or those producing it. While there are many risks to humans, through consumption of contaminated food, or from the byproducts of production, the risks to the environment are no greater than the risks of conventional agriculture, and because of the human

health factor would likely be more regulated. Below is a table of the possible issues relate to urban agriculture.

Negative health and hygiene impacts

- Crop cultivation in polluted city environments.
- Use of chemicals in urban farming
- Use of domestic waste in urban farming
- Rearing livestock in the city.

Environmental Problems

- Chemical inputs effecting soil, air and water quality.
- Livestock pathogens and byproduct

Other Problems

- Inefficient use of resources
- Aesthetic impacts.

(Smit, Ratta and Nasr 1996)

While many potential problems with urban agriculture are a smaller concern for urban areas in developed countries, as there are already many regulations in place, it is still important to acknowledge the issues and design any urban agricultural venture to avoid any of these problems.

2.5.2 Urban agriculture as a planning mechanism

Using urban agriculture as a planning mechanism requires a particular fortitude because of the bevy of land-use regulations already in place, and the unavoidable conflict between customary and modern land-use tenure systems (Drescher 2001). Furthermore, the availability of land for use in urban agriculture is typically overshadowed by the access to the land (Mougeot 1994). The access and usability of land are perpetuated through the urban planning process...

“... by a lack of formal recognition of urban agriculture in planning policy; through a lack of awareness about the socioeconomic and environmental role of urban agriculture in cities, through a lack of clear government responsibility for the various aspects of urban agriculture, through resistant attitudes or cultural norms held by players in the land use planning process, and through a lack of resources, technical and financial support for urban farmers from the government (Quon 2, 1999).

Urban land management should aim to put urban resources into efficient and sustainable use (FAO), however the economics of green space within or around city limits holds a great deal of clout when considering the use of land, this is even the case when considering the recycling of spaces. This is precisely the issue that necessitates the entrepreneurial aspect of urban agriculture to be recognized as paramount in the process and will be thoroughly discussed in chapter 3.

The issue of recognizing the hazardous nature of agriculture and thus threatening the well-being of those dwelling in the city is a barrier to the process of planning for urban agriculture. Planners need to find ways to capture the benefits, and counter or prevent, the potential problems of urban agricultural activities (Quon 1999). Indeed policy also serves as a means to counter the potential negative health and environmental effects of agricultural activities; restrictions to livestock keeping in residential areas, and to where in the city farming can occur is the most common regulatory model we see in terms of urban agricultural dealings (Ibid.). Thus, urban planners have greater opportunities to “permit” rather than “support” urban agriculture, given their limitations in the role of community decision making (Ibid. 4). Utilizing more informal spaces may be the strongest way to influence change.

Considering the hazardous nature of urban agriculture, practitioners have the task of assuring community members of the sustainability of it while navigating the insecurities of residents about possible hazards. Framing agricultural production within city limits into the sustainability debate may at first seem to be straightforward, yet the issues of qualitatively and quantitatively approximating the benefits is a murky issue, one that requires significant analytical work to produce generally subjective results. While institutional organizations need to be proactively supporting analytical studies to quantify benefits, they need to maintain organizations that provide strong inroads to handling the gatekeepers that bar urban agricultural development. However, quantification of the benefits of urban agriculture's sustainability is important to maintain a strong position in the sustainability debate.

In the United Kingdom, for example, an institutional initiative requires that some foods at the supermarket have labels explaining the mode of transport used to freight the food item to the supermarket – a food-mile certification (McKie 2008). This was originally hailed as an effective initiative, yet there were issues about the externalities of labeling. Stigmatizing the ecological sustainability of a food-item does not take into account the socioeconomic sustainability of the food-item, especially considering the African origin of much of the air freighted produce in the U.K. The initiative was able to determine the actual carbon footprint of each item sold, though this proves more difficult with those items that need to be cooked at home. A bag of salt-and-vinegar crisps, for instance, costs 75g of carbon dioxide; whereas the bag of sour-cream and onion crisps costs 76g of carbon dioxide (Ibid.). It is a natural reaction to consider this to be a positive development in the transparency of the sustainability issues of the food system. However, the government has loosened requirements for labeling and dropped the exact carbon dioxide label all together. Why? The number of variables makes objectivity of measuring almost impossible, the carbon dioxide footprint analysis

leaves many other important aspects out of sight, and indeed the labeling may be counterproductive and damaging to agricultural industries in economically-sensitive geographies (McKie 2008). The significance to planning urban agriculture, is the necessity to recognize the complications involved in quantification. It may be more productive to support policy that balks the measurement process to avoid incorporating problematic initiatives based upon data that was collected to satisfy a third party.

2.6 *Urban Agriculture in the global contextualization.*

2.6.1 Industrialized countries.

It is ironic that at this point in time, there are much more highly developed urban agricultural systems in the developing world than that of developed, western countries, where food and resources are consumed and wasted at levels unheard of in developing nations. In post-industrial, developed countries, the benefits of urban agriculture are quite different from those in less developed countries. Fungible income and food security play a much smaller role in the motivations to implement urban agricultural initiatives. The strongest reason is the percent of income being spent on food costs. Food costs for lower-income groups may be one-fifth to one-third of urban family budgets, compared to one-third to four-fifths in poor countries (Smit, Ratta and Nasr 1996). Food distribution systems in cities of the developed world are generally more complete, and food is both of a higher quality and more accessible. Furthermore cities in more developed countries are generally less densely populated and have more available land for raising crops and animals -- still the amounts of waste-water and solid waste is much higher per capita, and there are several potential environmental hazards associated with those wastes (Ibid.)

The duality of urban and rural realities extends deeply into the institutional handling of support for agriculture. Historically, urban agriculture was very much a part of city life, until the end of the 19th century when a decline in urban agriculture began. The decline accelerated after the Second World War, but experienced a nominal resurgence in the 1970's and 1980's with environmental movements and "sustainability" beginning to invade the psyche of the populous. (Ibid.).

"Today, there are many new modalities for growing produce of all kinds indoors, that will make any urban food production scheme possible" (Despommier 129, 2010). In Europe, where several models for what urban good food systems look like have existed previously, we see a recognition institutionally of the importance of promoting processes to ease the development of urban agriculture, but still a lack of strong incorporation in the over all food system.

2.6.2 North America

In North America, urban agriculture was an important sub-sector of the food and agricultural system until the 1950's. Similar to Europe, there was a resurgence in the 1970's and 1980's that carried through to what can today be considered a very visible practice in many cities. About one in every three-families in the U.S. were "gardeners" in 1994, with fully 80% of these urban dwellers (Ibid).

Unfortunately, the market paradigm that mirrored the rejuvenation of city centers in the 1980's also made land prices typically more expensive than agricultural initiatives were able to afford. Thus we have seen a stagnation in the rise of urban farmers in the North America, but a strong movement in community supported agriculture (see Appendix 9 for more information on CSA's), and entrepreneur driven technology testing for different kinds of agribusiness within cities. The situation today in the major metropolises is that of a small community of people growing and exchanging food, or small distribution systems to shareholders and restaurants. Indeed the "green" movement has enabled different companies to cash in on the demand for locally sourced organic produce. In New York, there are numerous examples of restaurants growing their own foods to sell to high-end customers (Rifkin 2011). The higher-end customers share the market demand with marginalized communities. There are initiatives in cities all over the world to utilize urban agriculture to assist marginalized communities in achieving food security, and often these are institutionally supported or assisted through the application or formation of NGO's.

Chapter 3: Practical Urban Agriculture

3.1 *Why Entrepreneurial Urban Agriculture?*

In modern times the most efficient and productive example of urban agriculture have come during times when there were international conflicts. In the first, and most exemplary, the Second World War, we saw huge efforts applied to self-reliance in the food system, to ease pressures on national public food systems, and to provide food security for the general populous. Victory gardens, as the propaganda machine promoted them, were not only effective at delivering a secure source of nutrients in the form of fresh fruits, vegetables and starches, they were also effective at solidifying cohesiveness within communities and uniting communities towards a cause that had left many alienated. This was how people could help fight from the home-front.

Today, we do not have megalomaniacal or fascistic dictators attempting to steer the history and the course of the planet to be more exclusionary. But we do have a critical mass of people who identify as global-citizens more than ever before and see the megalomaniacal force as liberal market mechanisms that enable stripping the world of her resources while marginalizing vast swaths of civilization. Urban agriculture can promote self-reliance outside of today's conventional market mechanisms. However, in order to achieve this self-reliance on a grander scale, not the individual, familial or organizational, but community and society wide scale, there needs to be organizational models that allow for profit accumulation. Primarily, through the production of surplus, thus enabling workers to be paid for their labors. It seems to be a simple Marxian equation, but it may require a fostering through institutional measures to reduce the barriers that the industry faces. The real questions lies in the use of various technologies, and how to produce more with less land. I will discuss the technological systems in the next section. However, it can be noted that there are currently technologies that are more than sufficient to capitalize on small portions of land -- especially considering the proximity to market, which is an negative-externality that urban agriculture negates.

3.2 *Why Urban Agriculture is not a common tool for planners.*

Urban farming is an economically viable industry whose development is constrained by a variety of negative attitudes and obstacles (Smit, Ratta and Nasr 1996). If these constraints can be removed and attitudes changed, urban farming will become more competitive and efficient and add dramatically to the hundreds of millions of residents whom it already services worldwide (Ibid.). Though there are

various types of barriers and constraints to urban agriculture, Jerry Kaufmann and Lawrence Bailkey (2000), are two leading researchers on the subject of entrepreneurial urban agriculture who have grouped them into the following categories:

3.2.1 Constraints on urban agriculture

Site related

- Site contamination
- Security or vandalism
- Lack of long-term tenure rights.

Government related

- Local government impediments
- National and regional governmental impediments

Procedure related

- Inadequate financial resources
- Access to resources and inputs
- The need to recruit and retain qualified staff
- Inadequate time
- Small-scale projects
- Coordinating projects across scattered sites.
- Conflicts among partnerships
- Lack of sound business planning.
- High start-up costs
- Losing touch with project objectives.

Perception related sociocultural biases

(Kaufman and Bailkey 2000; Smit, Ratta and Nasr 1996).

3.2.1.1 Site related

3.2.1.1.1 Site Contamination

As is common in many vacant lots in post-industrial cities, many possible locales for urban agriculture can be contaminated with various toxic elements. While soil contamination may be the most apparent consideration when choosing a site, there are various maladies of the land that can be expressed in commercial and residential lots, that need to be equally scrutinized. Lead and cadmium are common remains from "clean" residential sites, while former commercial sites which may lie in close proximity to residential sections, different uses result in different combinations of residual compounds (Kaufman and Bailkey 55, 2000). That being said, the tendency for a commercial operation, would be to utilize larger plots and thus more probably former industrial areas. Airborne particulates also need to be taken into account when considering the contamination of possible areas. Road-sides and or functioning

industrial areas pose common proximity issues.

In certain circumstances, the "clean-up" of an area, or the calculated plan and process for working around the contamination can prove to be too daunting for many groups wanting to get into the industry. Small community groups, for instance, with a lack of deep funding, simply will not have the resources to navigate the legislative system or attempt to clean up the site with their own resources, something that has proven difficult for the economies of entire countries, let alone small groups of hopeful city-farmers (Ibid.). Thus available land may be left to other uses if the economics do not allow for initiation or if the cultivation methods are not conducive to site-specific requirements. This too is cause for leaving land for other uses.

3.2.1.1.2 Security and vandalism

These can pose problems to the strategies, as any urban initiative may experience. Often times, urban agricultural ventures are in high-traffic areas, where passerby's always pose a threat to the security of the site. The pilfering of crops is the most pressing issue and thus requires some form of security to be established, typically in the form of a fence. However, litter from the streets and possible trampling of the plants, or theft of tools or signs also pose realistic problems. However, according to research by Kaufmann and Bailkey (56, 2000), "the perception or reality of vandalism is generally considered more an irritant than a deterrent." In extreme cases, violence and/or illicit activities in marginalized neighborhoods may necessitate termination of ongoing operations, thus requiring a strong consideration about the suitability of an area before implementing projects.

3.2.1.1.3 Tenure

Tenure is another ever present issue that creates a barrier for urban agricultural ventures. Tenure can come in the form of permanent use, long-term use, and short-term use (Smit, Ratta, Nasr 1996). All of these scenarios are typical and can be appropriate in various scenarios as the built environment evolves and peripherals of urban agglomerations shift. As tenure is often an issue guided by economic scenarios, it is an issue that may be solvable once an entrepreneurial urban agriculture project achieves a certain level of solvency to make an influence in the property market. In the meantime, the lack of assurance that a site is permanent requires urban agricultural initiatives to be mobile.

3.2.1.2 Government Related

Government related obstacles occur due to non-traditional use of space. This classic urban-rural dichotomy can be seen here again. Traditionally rural land is used for agriculture, so urban land being

designated for agriculture creates problems with institutional processes. The "highest and best use" principle of optimally utilizing land, in the neoliberal structuring of a city's economically stimulated tangible fabric, causes major problems for the ease of establishing and maintaining urban agricultural initiatives (Shiva 2000). While urban or local governments are typically more involved in determining highest and best use of land parcels, there are obstacles at all levels of government when implementing an urban agricultural initiative.

3.2.1.2.1 Local Governance

The interface of local governance is likely to act as an obstacle in those situations when efforts by non-profits to assume ownership of formal access to vacant, city-owned parcels for use in urban agriculture. In some cases usufruct agreements, enabling one to use land and enjoy its profits under the stipulation that they do not destroy it, can create advantageous scenarios for all involved (Smit, Ratta and Nasr 1996). However, the common role of local governments is typically expressed in the form of bureaucratic processes. The process for establishing a legally stable and just operation is considerably difficult, let alone attempting to use urban land in non-traditional formats. "Urban agricultural projects," note Kaufman and Bailkey (58, 2000), "can be stymied by conflicts among the different objectives of various municipal agencies having some control over the use and dispensation of vacant land"

3.2.1.2.2 Regional and National government

Urban agriculture within other levels of government receives similar lack of support. This is a problem of perception. Because urban agriculture is still perceived as a rural activity and the powers of multinational agribusiness usually press upon national and supranational organizations, there is a general lack of focus for funding or assisting urban agriculture. In the United States, for example in 2000, the Community Food Project, one dealing exclusively with urban issues, only received \$2.5 million of the \$120 million the USDA allocated for its Initiative for Future Agricultural and Food Systems – the rest of the money went to traditional agricultural initiatives (Ibid.).

3.2.1.3 Procedural barriers.

While urban agriculture faces many procedural barriers, some barriers exclusively apply to the for-profit initiatives. Specific procedural hurdles will differ among projects, depending on context and circumstance. This reinforces the improvisational nature of urban agriculture and serves as a warning against generalizing at too detailed a level (Ibid.).

3.2.1.3.1 Inadequate Financial Resources

Limited funding is a significant problem for market-based urban agricultural projects. Indeed, a typical urban agricultural project may be funded by various private and public organizations. The costs of operating within a city may be higher than in rural areas, while many of the grants for which urban agricultural projects are eligible for, are geared towards more generalized agricultural initiatives, or sustainability initiatives within a city making the process for winning these grants more difficult and convoluted. However, the emerging constituency of those supporting urban agriculture may encourage more financial support from national governments. Until then, the costs of operation may become prohibitive if there are low expectations of covering costs through selling produce.

3.2.1.3.2 Need to recruit and retain qualified staff

It is necessary to find qualified individuals to assist in the operations of what may be some highly technical procedures. Generally the type of employee urban farms find are uneducated and or unskilled. But it may be difficult to ensure good pay and those with the skills may not find the pay commensurate with their experience.

3.2.1.3.3 Inadequate Time

Urban agriculture initiatives may find troubles from the inability to properly train employees and “start-up” their projects in the space of time allotted by funding actors. The most common parcel of land will be a temporary one, which represents an opportunity decrease or eliminate renting or buying costs but also cramps time scales. This is exacerbated by the seasonal nature of agriculture, which could be ameliorated were it indoor urban agriculture.

3.2.1.3.4 Small-scale projects

The availability of small scale-plots means small-scale projects, and the size of the plot will have a strong impact on the economic opportunities for each piece of land. Furthermore, larger pieces of land may not be available, so processes will have to be scaled to smaller plots. Coordinating projects across scattered sites, is an issue related to the availability and access of land and mostly particular to outdoor initiatives. The lack of contiguous land to farm within the city creates a problem with coordinating the sites as one functioning farm, or managing each independently – which creates the need for more payed wages.

3.2.1.3.5 Losing touch with objectives

Conflicts among partners can cause various issues in following clearly defined objectives. The various organizations involved with urban agricultural initiatives may come from a different political, social, or economic spectrum and may not agree on every issue. This is common in any business endeavor, but urban agriculture may be particularly susceptible to this because of the valorization of property that a long-standing farm may create. There may also be conflicting objectives that can not be mutually achieved.

3.2.1.3.6 Lack of sound business planning

This involves the drafting of a carefully considered business plan addressing expected costs and revenues, including start-up costs, and finding an appropriate manager to carry out the plan.

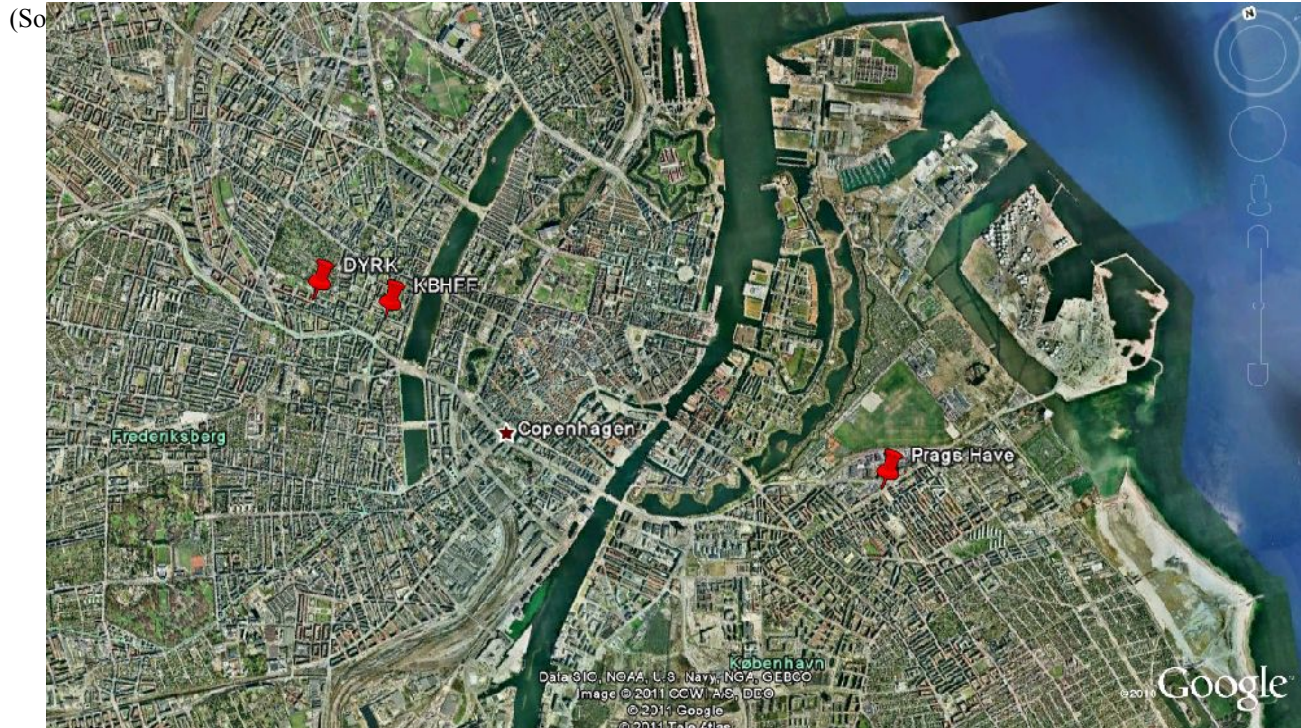
3.2.1.4 *Perception-related sociocultural biases.*

Smit, Ratta and Nasr (1996), and Kaufman and Bailkey(2000), consider stigmatization of urban agriculture in similar but different ways. The first, considers countries with colonial histories to be majorly affected by the stigmatization because the city fabric in these countries typically grew up in or after the industrial revolution, meaning that agriculture was never a part of the city plan, and that it does not fit into any predetermined designs. Kaufmann and Bailkey consider the stigma of working with dirt to be the strongest indicator of perceptions. Individuals in many communities may resist agricultural work due to historical inequities in the system, other see agriculture as something that has been left behind, something in rural areas that does not belong in cities. Smit, Ratta and Nasr (p. 212, 1996) note that there is a particular socio-cultural bias as well, one that limits the growth prospects of the industry because of its stigmatization as an “outcast” industry, speaking of the practice of work and those working in it.

Chapter 4: Case Studies

4.1 Case Studies: Copenhagen

(Image 4.1)



*From East to West, Dyrk Nørrebro, KBHFF, Prags Have

Throughout the region of Copenhagen urban allotment gardening has been in wide practice since the end of the 19th century, when very many large, dense 5-story buildings were constructed. The flats were often small, some with only a view of the back yard (Jensen 1996). At this point in time much land on the city had not been built on and the agrarian class that had relocated to the city had the skills and the necessity in many cases to practice agriculture. As the city developed, pushing allotments further out, people organized to protect these urban allotments. After providing activity and leisure for the working class of Copenhagen and essential produce during the first and second world war when there were 100,000 registered allotments in Denmark, by the 1970's the vehicular infrastructure had destroyed many of these peripheral allotments, and speculative building within the dense urban fabric. The result of the protection that these organizations received can still be seen today (Ibid.). Since the 1970's, however, the Danish government has recognized the need to protect the existence of allotment gardens and in 2001 every allotment garden that owners indicated as permanent became protected by law as a

permanent allotment location. The law must ensure that the allotment areas continue to be an essential part of the urban population to create opportunities for recreation and employment in leisure time (Municipal Act No. 1571, 2007). There is no place in the law that denotes the generation of monies. However, in interviews with the heads of those Allotment Garden Organizations – of which there are several in Copenhagen, but two of these are the most prominent in terms membership and allotments – the main focus of the gardens is much more socially and personally motivated with the fungibility of the crops produced as the strongest motivating economic factor. These allotment gardens are the most recognized form of urban agriculture in Copenhagen, and represent a considerable portion of the built environment in certain areas. But may typically be referred to as urban gardens, as the agricultural notion of food production is often times completely absent.

The other, and more recently popularized phenomenon, are community gardens being cultivated on recycled land or on rooftops. Here there are more possibilities to undertake entrepreneurial initiatives, with the exception of one initiative, the ByBi (city bee) initiative, the projects were all social entrepreneur ventures.

4.1.1 Prags Have – Social Entrepreneurialism

Prags Have, (Prague's Garden) is the product of the effort of a group three of students, working under the moniker “Klondike,” interested in social equality. The Klondike collective recognized an opportunity to implement an urban agricultural initiative in the marginalized neighborhood of Amager West. In December, 2010, the group decided to begin searching for funding and a location to place the initiative. The group tendered applications to the local municipal organization to receive a starting grant. The group received 100,000 DKK (13,300 euros) from the municipality and another 30,000 DKK (4,000 euros), unsolicited, from a local non-profit, the “local green partnership,” that recognized Prags Have's initiatives. Once they received the money they began searching for a location. Giv Rum (give room), a non-governmental organization, focused on making available empty buildings in urban areas to be utilized in creative ventures, provided the outdoor site of the Prags Boulevarden former industrial area, free of charge. In May of 2011, Prags Have opened its gates to the community in an opening ceremony that involved food and entertainment, and a lot of work. The opening ceremony was utilized as a means to gain visibility in the community and to get a large group of hands to help with construction of raised-bed-boxes and moving of the large mound of soil deposited in the middle of the site.

(Image 4.2)



(Source: Google Earth)

The group sees the initiative as a social movement and hopes to bring education to the local marginalized community made up from a large portion of Turkish immigrants. Nina Woelnick, one of the project leaders explains the view of the initiative: “We are a social movement. We try to see the garden as a tool for making a space that is more open than other places in the community. It is about what you can accomplish when you have given these citizens the possibility to be part of a public space, to create a community identity” (Woelnick, Nina. Personal interview, June 2011). Woelnick goes on to explain that the goal of educating people about the process of food production revealed itself as an important aspect of the garden as community members began using the grounds.

“There is a general lack of knowledge about the food system, we want to educate people about where their food comes from and what they are eating. We had two girls from the community who came to the garden to plant carrots. Several hours later they came back fully expecting to find mature carrots ready to eat, asking 'where are the carrots.' It goes to show the lack of knowledge and we like to see the garden as an opportunity to gather and share their knowledge and learn about new things as well” (Ibid.).

Prags Have is a conventionally operated community garden. The garden provides anyone who wants to take part with soil, seeds, and water and educates them about simple gardening practices. There are no private sections of the garden where people have ownership of the soil or what is in it.

As Prags Have is a non-profit operating from municipal and private subsidies, it is required to operate within the rules set out by the various organizations that are funding it. “It is against union (Prags Boulevarden) rules to make money, but we could sell our produce to other members of the union” (Ibid.). The generous subsidy the organization received from the municipality is subject to a year end audit that accounts for where money was spent and what, if any, money was coming in. The municipal subsidy does allow for profit to be made, but it must be reinvested in the project. Furthermore, the money allotted is not allowed to be used to pay salaries as it is required that all of the man-hours are on a strictly volunteer basis. Woelnick also notes that even if the organization were interested in profit, even for reinvestment, the organizers would be ideologically opposed to use the labor of the volunteers to create and sell surplus. “Currently, we just send people home with small bags of whatever was harvested that day” (Ibid.). The organizers do see a need to make the initiative economically sustainable however. The tenure for the land is only two-years, and thus far the project has received confirmation of their first year of funding from the municipality, of which they have only received half, as the other half is presented at the end of the year.

At this stage, in its first year of operation, Prags Boulevarden is focusing on providing for a twice-weekly people's kitchen. On Sundays, and Wednesdays, weather permitting, the organizers host a peoples kitchen where produce from the garden goes to feed those attending. As it is an open invitation, there is usually between thirty and fifty people who are eating at Prag's Have's people's kitchen.

(Image 4.3)



(Source: TV2 – Copenhagen, Denmark)

The space is mostly being used for conventional raised bed farming, however the operators are not

opposed to providing a space to test out various agricultural technologies. Woelnick explains, “there are many experiments we want to do, but as we are on a volunteer basis and this type of work could be very time consuming, we haven't personally been able to initiate any (technical) projects. That being said, we were hoping the citizens would initiate something, use our materials and land, but it is not so easy, because people need to be guided when they start and need to maintain the interest and focus so the project doesn't just sit there.”

Community members are collectively working the raised-beds so there is no ownership by any one person of any parts of the garden. People can have their own projects, but everything is public. When the project dismantles, all of the equipment and soil will be distributed around the community of Amager West.

* Appendix C, has a description and photographs of an “Aquaponics” project I received funding to build through Prags Have.

4.1.2 Dyrk Nørrebro, Blågård Skolen – Ecological Entrepreneurialism

(Image 4.4)



(Source: Google Earth)

Dyrk (pronounced “durk”) Nørrebro's rooftop garden at the Blågård Skolen, is a conventionally functioning community garden, that has formed an urban farming initiative to expand vegetable cultivation in the Nørrebro district of Copenhagen. Dyrk Nørrebro, is an NGO that existed before the Blågård initiative, with a strong focus on climate change, and educating urban dwellers about what

they can do to reduce their impact on the environment. The goal of the Blågårds Skolen initiative is to act as an education platform to inform people about the issues with the current food system, while producing food that will be consumed locally. The three main organizers, Anders, Birgitte and Jens, met at a local council meeting for the neighborhood of Nørrebro, where they aligned their interests and decided to begin looking for a place to start an urban garden. In January they received notification that they were awarded a subsidy of 75,000 DKK from the municipality but had yet to find a piece of land to place the initiative. In April they received permission to use the 250 square meter roof of the Blågårds Skolen on Blågårds gade in Nørrebro.

The situation at Blågårds Skolen worked out nicely for both parties, as Anders explains. “Blågårds Skolen is a stigmatized school in the neighborhood where much of the marginalized, immigrant community are sending their children and we are presenting the school in a positive way to the public, and we have received quite a lot of attention in the media” (Anders. Personal Interview, July 2011). The good publicity is welcome at the school, but Anders explains that there are issues with the administration and maintenance of the school. “The janitor hates us. He is frequently drunk, and he hates that there is a third party up here on the roof. But as long as we keep him happy, and keep the administrators happy, we have an indefinite amount of time up here, there is no end date at this point” (Ibid.). Indeed any serious urban agriculturalist needs to be prepared to deal with the unique difficulties a location may present, in this case drunken caretakers.

Dyrk is using raised beds and sacks to grow their produce. The materials used are often recycled, as it is a goal of the initiative to recycle as much as possible. As I interviewed Anders, he was filling plastic drinking cups, recycled from a local people's kitchen, with soil and running a string through them vertically to hang them as a wall garden (Appendix); inside the cups were little lettuce seeds and each cup would grown a fully mature head of lettuce.

The rooftop garden is collectively worked and those who would like to personally cultivate something are allowed to, but there is no private cultivation insofar as utilizing the soil and taking the produce home. Most of what is grown never leaves the roof. Dyrk Nørrebro holds a people kitchen twice a week, weather permitting, and other various and spontaneous events where the produce is used. At the time of interview, there were some leafy greens, tomatoes and zucchini available, but the harvest season is yet to arrive. “In September and October, I imagine we will be sending many of those community members who have helped us, home with a great deal of food” (Ibid.).

The organizers found that the roof garden is a good place to bring people to teach them about

growing their own food, and to talk about sustainability; and that it could also be a point of departure for spreading gardening into the community at large. Dyrk initiated the rooftop garden alongside the “satellite gardens.” The satellite garden initiative is the means of spreading materials and knowledge around the neighborhood. “People come to us and we provide them with a box and soil and whatever seeds they want, and they bring the box back to their yard, or wherever they want to put it, and they grow from there... We do send out someone to help set it up, and to teach them about basic gardening techniques” (Ibid.).

Dyrk has also began hosting honey bees on the roof. Two families of bees will be housed on the roof and produce anywhere between 75 and 100 kilograms of honey annually (Tommy Flood, Personal Interview, June 2011). It is yet to be determined what will be done with the surplus honey from the beehives. Anders explains, “I suppose (Dyrk) could sell it, but we haven't made any economic plans, we haven't thought about money at all”(Ibid.). At the beginning of the project there was discussion of making some money to reinvest into the program to ensure that the initiative stays alive, but it soon became an afterthought. Anders explains, “ Without us realizing it, we started to focus on how money could be made and we all agreed that that was not what this was about”(Ibid.). Dyrk, at this moment has no financial plan, and no way of generating money other than through subsidies. This effects Dyrk's ability to promote more technically advanced methods of cultivation... *(in discussion section)

4.1.3 ByBi (City Bee) economically minded social entrepreneurship

Bybi is a shareholder firm and a non-profit union. Their goal is to create the honey industry in Copenhagen. The profits they make are reinvested in their social and environmental activities. Tommy Flood, one of the directors, explains how the company started: “When the founder and director, Oliver Maxwell, attended the Cope10 environment conference he was frustrated with the discussions, feeling that they did not focus enough on what people could do individually” (Tommy Flood, Personal Interview, July 2011). After a chance run-in with a local beekeeper, Maxwell decided to focus on bee keeping as the means of making a difference.

ByBi's goals as an organization are three-fold, staying focused on the triple-bottom-line. They plan to be economically sustainable, while providing work and outreach to marginalized sectors of society, particularly those with substance abuse problems, and tackling climate issues through providing habitats for the honey bee, a species that has lately been subject to a massive die-off, referred to as “colony collapse disorder.” Tommy flood explains their environmental goals:

“Environmentally we're sort of saving the bee, I assume you've heard of colony collapse

disorder, so in a way it is bringing a new agenda to mostly the younger people, letting them know that there are bees and that bees need humans and human beings need the bee as well, because of pollination. We have a lot of old bee keepers today, and the bees don't have the best living conditions outside of the city. It seems that the city is the best place for the bee right now because it seems there are not as many chemicals, or pesticides in the city, so environmentally we're trying to bring alertness and tell people that they can become a bee keeper. So in a way it is just preserving the bee" (Ibid.).

While ByBi focuses their general business plan around these ecological considerations, he admits there are still issues with the sustainability of the daily operations. "We still drive around in an old diesel van, and the packaging we're using, it is mostly recycled but there are certainly issues with it chemically and as another source of waste, but we're competing in the market and it would be very difficult to be entirely sustainable as a young company" (Ibid.). Socially, ByBi is focusing on providing work and education for marginalized sectors of society.

"We try to reach socially marginalized people. Right now we are at Sundholm, which is the last stop for people who have been through the system, they have both substance abuse problems and mental disorders. They are hard to incorporate into a business or a social network, but we are getting some of them, now we have two that are really beginning to become more stable, they are beginning to think more of themselves" (Ibid.).

Flood explains that their achievement have not calmed their desire to effect more change. "What I would like is to go out and get the immigrants who don't have very good conditions in Denmark due to the right wing government. Get them out of their apartments and make a social community around beekeeping" (Ibid.). Flood explains that there are many problems that the Danish welfare system perpetuates. "There are a lot of people in Denmark who are just isolated, that is the back side of the welfare state. Everything is taken care of and you have your own money to buy your food but you can also get isolated because everything is taken care of, so you aren't really dependent on anyone. We see beekeeping as way to get people out and involved in the community" (Ibid.).

The company started with funding from the Danish Ministry of Environment's Nature agency and by selling sponsorships to corporations based in Copenhagen. "There is no government or bank involved, for example, we got our money from selling sponsorships. Corporations give us money and we put honey bees on their roofs and our people take care of the honey bees" (Ibid.). The companies receive a Corporate Social Responsibility (CSR) credit. "By supporting ByBi, corporations brand themselves as sustainable and ethical companies; they are able point out their environmentally positive

impact, and possibly get tax-breaks (Ibid.). The start-up costs were reduced by the private and public sponsorships and enabled ByBi to grow to 30 be hives, with 90,000 bees in each hive, in their first year. ByBi expects to harvest 1,500 kilograms of honey in their first year, and sell them in 250 mL glass jars. Their distribution at this stage will be limited to bicycles and one van, and they expect to target farmers markets, green grocers, and organic stores around Copenhagen. The byproducts of liquid honey can yield many products, cosmetics and household items included, and they plan on marketing and selling these as well.

Flood explains that the main point of the organization is to make it economically feasible. Honey by itself does not have the highest profit margin, however they plan on exploiting the small scale beekeepers once they create the industry. They will promote bee keeping, and sell the necessary products to get started, including bees, and they will help to harvest and process once the honey is ready, which will provide them with a percentage of all of the honey production they are involved with.

Right now there are 140 beekeepers in Copenhagen. “We recognized an opportunity in the market because most of these beekeepers are getting old,” Flood explains. “the old bee keepers consider it a hobby and they made some money outside of the tax system and they didn't feel the need to become professional, and now there is the new thing with social entrepreneurship, and the time is ripe right now” (Ibid.). Once the older bee keepers retire there will be a lack of beekeepers, particularly because there is a lack of young people getting into the market. ByBi recognizes this and plans to market beekeeping and interest younger people to get involved.

ByBi looks at bee-keeping as one of the branches of urban agriculture. “The honey bee is a very good symbol of urban agriculture. It helps people realize that it is people that make cities, and that balance nature and concrete, and we see honey bees at the front of this new movement” (Ibid.).

4.1.4 Københavns Fødevarefællesskab – Alternative distribution.

Københavns Fødevarefællesskab (KBHFF) is cooperative, alternative-distribution system, sourcing their produce from local agricultural markets. KBHFF operates as a conventional non-profit and reinvest all of its profits into developing the movement. Andreas Lloyd, one of the organizers explains what they want to do:

“We are trying to reinvent the supermarket. We find that the supermarket is a fundamentally unsustainable way of distributing foods because you need to have everything on the shelf at once which means you have to throw out tons of stuff every day. What we are trying to do is figure how we can make sure that all of the food we bring into the city is actually consumed, not just bought, but

actually consumed. We are trying to figure out the best ways to do that” (Andreas Lloyd, Personal Interview, February 2011).

The coop is a shareholder organization, charging 100 DKK (13 euros) for membership. Once you are a member, you can choose to receive a bag of locally sourced, organic food for 100 DKK, every week. Members meet four times a year to discuss the direction of the coop. The membership also entails volunteer work. “As a member of the food coop you are obligated to work 3 hrs a week,” Lloyd explains, “and we try to encourage people to do more than just that bare minimum because anyone can pack vegetables for three-hours but it takes more effort to be part of one of the groups that makes everything works.” There is a “steering committee” that acts as a regulatory organization during meetings and for buying purposes, but these positions are available to anyone who wants them. All of the work at KBHFF is completely voluntary with the exception of an accountant. KBHFF realized a need to diversify and to keep the business organized so there are different voluntary positions that mimic positions in a conventional company, such as a marketing director, an IT specialist, quality control, and a distribution specialists. KBHFF has four distribution centers around the city, where people can come on Wednesdays to pick up their bag. “The way it works is that all the shops that are represented in all the different groups and every other week we have a review and get an idea where everyone is at and we try to discuss and solve various issues that arrive and it is also typically the coordinating group who is in charge of delegating responsibility,” Lloyd explains. There are ten value-principles steering the workings of the organization that are focused on locality, social and environmental sustainability, and biodiversity. KBHFF is growing fast enough that they are not using any marketing. “We are afraid that if we get a huge surge of members all at once, we will have a hard time because our infrastructure is fairly fragile. What we do is we try to get members tell others in a grassroots form of marketing and so far we have a stable growth curve. We got 25 new members in the last two months and that is good enough for us” (Ibid.). The goal of the organization is to help to create a sustainable future. “We want to be part of the sustainable future and that means we need to be sustainable, socially environmentally and economically. In the economic part, we can't be sustained by external funding regardless of whether it is public or private. So we have to make enough money on our own so that it is a sustainable business” (Ibid.).

Their vegetables are sourced from various producers in the region. “It's been a big deal for the farmers,” Lloyd explains, “giving them a more direct connection with the customer, taking out the profit oriented middle-man.” The typical farmer Lloyd says, is an idealist organic cultivator ideologically opposed to the supermarket paradigm and using the vegetables they grow as a second

income. The producers deliver their produce on Tuesdays and Wednesday mornings, and the food goes out on Wednesday afternoon.

Of the 100 DKK that KBHFF charges for the weekly food bags, 93-94% percent go purchasing the vegetables and taxes and other expenses, leaving 6-7% as profit (Ibid.). They spend no money on marketing as they are concerned that their volunteer staff would be unable to cope with a large influx of customers.

In 2010, KBHFF grosses 2.4 million DKK. The net has not been calculated. Lloyed explains that they are looking for outlets to spend their money by reinvesting in the system, but are having trouble finding people interested in taking projects on: “we get all sorts of emails and things from people who want to collaborate in various ways. Most of the time it is not very concrete, more often it is that they want us to sign their manifestos or something like that rather than it is we got this UA thing going, so we are just waiting I guess.”

4.2 Case Study – Madrid

In Madrid, the urban agricultural scene is much more traditionally based. With some areas of irrigated agricultural land to the south, the metropolitan area has a history of agricultural production. The agricultural sector has been strong in the north of Madrid, Sierra Norte, but agriculture has in part been abandoned due to depopulation because of the urbanization or emigration of local residents. Notably, the Lozoya River, running through Sierra Norte has been dammed extensively to supply water for the City of Madrid, reducing the ability to provide irrigation for agriculture. Concurrently the soil in and around Madrid is notoriously poor. Only the areas with large supplies of water, downstream or East from the city, are producing for irrigated agriculture. The area suffers from certain water difficulties, experiencing only around 400 mm of rain annually, and around 10 mm for the notoriously dry and agriculturally important months of July and August (AEMet). The metropolitan area of Madrid is very large at just over 10,000 square kilometers, but much of this is in the form of sloping hills and dried topsoil that produce with difficulties without water. The context of agriculture in Madrid lead the research to be very much geographically determined, insofar as there were only a few places where outdoor agriculture would be feasible. Research was conducted in the south of Madrid and in Getafe, along the Río Manzanares, and the Jarama river valley in Rivas-Vaciamadrid. Because of the geographical nature of the urban agriculture being studied in Madrid, the case studies will be examined from two field-trips occurring in the aforementioned river valleys.

Due to the complexity of searching an Urban Region of five-million people for specific

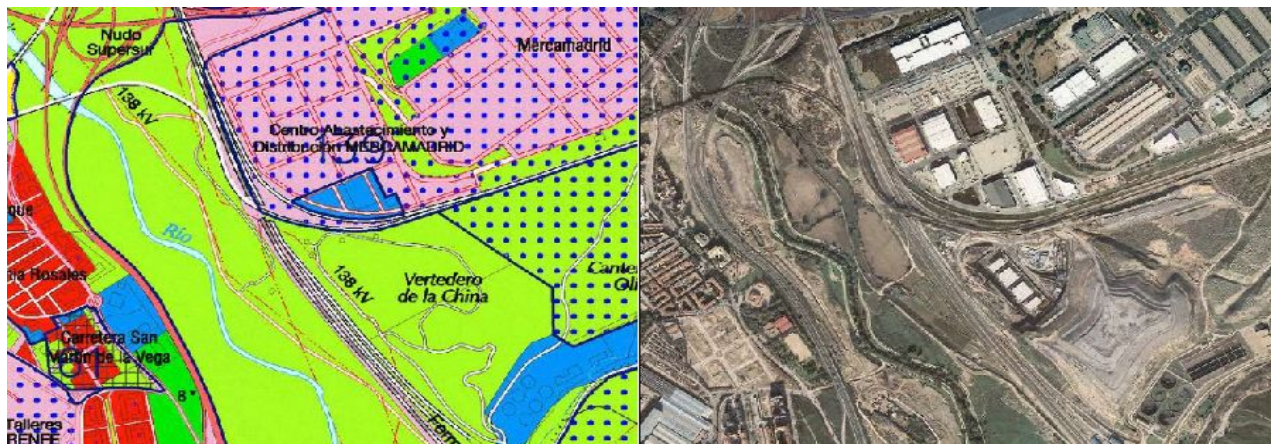
entrepreneurial urban agricultural allotments and the language barrier, myself and Professor of Geography, Doctor Fernando Moliní, chose to locate places within the city, or on the very periphery, where a source of water would enable cultivation. In this sense, the research of agriculture within densely built-up areas was not undertaken, however, the proximity to this dense fabric is significant, as both case studies are within the Madrid capital region, and could effectively provide locally sourced food to market.

We conducted interviews with several men during the field trip along the Manzanares. I will refer to them as Farmers 1 through 6, as some were reluctant to give names and the information gathered does not require referencing.

4.2.1 South of Madrid – Informal agriculture on the upper Manzanares flood planes.

Located in the south of the city of Madrid, the Manzanares irrigated flood plain is just south of the junction of the E-5, E-90 and M-40 corridors. Here, the Manzanares is being used to irrigate crops. The immediate area surrounding the informal urban agriculture settlement took the form of conventional agriculture growing corn in monocultured fields. Interestingly, when researching the zoning data for this part of the city, the land being used for monoculture corn crops is designated “public green space” (Madrid Cartographia).

(Image 4.5)



(Source: www.madrid.org. Planeamiento Urbanístico y Ordenación del Territorio)

The first group of informal farms are near new highway bridges and close or underneath massive power-lines. In the settlement there were upwards of twenty or twenty-five separate lots, see Image 4.6 below, which have been in this form, or something close to it for many years (Farmer 2, Personal

Interview, May 9, 2011). There has recently been work for a high-speed-rail installation in the area, and Farmer 2 suggested that because the completion of the preliminary stages of construction had gone on without pushing out the agricultural plots, that their use of the land, though informal, is respected. The land belongs to the municipality and the farmers do not have a permit to use it, but no one has told them they have to stop using it as for the moment it has no better use. The tenure of the land was discussed in all three interviews, but there seemed to be no alarming developments that suggested an end to their use beside the cancellation of the sewer plant from which they use the water to irrigate, although maybe they may be able to take the water directly from the river.

The particular demographic encountered on the excursion is relevant in a few ways. Primarily because it confirms the notion of urban agriculture as a leisure activity. These pensioners were spending their days in the gardens, having wine, floating among the crops – granted the interviews were conducted in May, when harvest are not as high as later in the year, thus reducing man hours necessary to maintain a garden every week – keeping themselves healthy with activity and creating a fungible income. Fungibility is another important aspect of the relationship these pensioners had to the land they were using. By bringing home some produce and thus reducing the need to purchase from a grocer, the farmers were performing a duty while still leisurely enjoying their pension years. Lastly, and equally important, is the view these men had on modern society. Frequently they complained about young kids stealing crops, the fallibility of the government and the problems with tourists destroying traditional Madrid.

(Image 4.6)



(Source: Google Earth)

Generally the produce from the farms did not go to market, instead these plots are typically used as kitchen gardens, providing for friends and family. When questioned about the possibility of selling the produce the common reason was the cost of transport or the reluctance to ingrain oneself in the markets where one farmer explained that there were already too many people selling their produce to make any money (Ibid.)

The crops growing here are varied and are typically being cultivated without herbicides or pesticides. However, there were some chemical fertilizers being used. The informality of the gardens establishment carried through to the process of cultivation. To the men interview, the benefits of providing food were paralleled with the benefits of working outdoors and the question of organic or ecological gardening, while acknowledged, seemed not to be recognized as a concept that necessitated full compliance.

A lack of young people involved in this settlement meant that many of the gardens were going to friends or acquaintances instead of staying in families (Ibid.). Farmer 3 explicitly cited this as a major issue, in between diatribes about the lack of moral fortitude of these young people, but allowed that he too was at a loss for finding a familial inheritance.

4.2.2 Perales del Rio, Getafe – Informal agriculture bordering the Manzanares.

(Image 4.7)



(Source: Google)

* Informal, formal and planned-formal lots are all represented here in green, red and blue respectively.

Disambiguation is below.

While on excursion to the informal agricultural lots running along the Manzanares in Perales del Rio, the plots were vacant therefore I was unable to conduct any interviews. It is presumable, however, that the production and distribution patterns of these informal lots paralleled those of the informal lots farther up river, explained the previous section.

The structuring of the gardens here, however, were more professional; both in terms of the level of protection in the form of barbed wire fencing, and dogs (Appendix D.1), and the focus on maximizing production in so far as the use of more efficient irrigation techniques, and the construction of better growing conditions (Appendix D.2). As seen in Image 4.8, there are several separate garden plots here. Many of the gardens here were organic or ecological and one hung a sign on from a fence “Huerto Ecologico,” or in English, “Organic Garden.” This scale of production lends itself to organic gardening, with various “companion planting,” and manageable sizes making pest and weed supervision less labor intensive. It is interesting to examine Image 4.7 & 4.8 to see the monocultural fields being tilled on the bordering property. This type of agriculture is using chemicals for herbicides, pesticides and fertilizers and will certainly drift to the informal allotments next door. Chickens were present in many of the plots which means there is a general maintenance that needs to be kept in more regular intervals than if it were solely vegetables.

(Image 4.8)



(Source: Google Earth)

The extension of more professional structures, the diversification through animal husbandry in the form of poultry farming, and the protection of the crops behind bigger security fences suggests a larger and more sustained production of goods. This could mean there may be some vegetables, or chicken eggs

or meat, making it to market, or that the level of fungible income these gardens provide enable those cultivating the soil to be more independent consumers.

4.2.3 Getafe, Perales del Rio- Formal allotments on the Manzanares

The formal settlements, to the west of the M50 corridor intersecting the villages of Llanos and Perales del Rio, cover roughly half a square kilometer and make dozens of separate plots. The plots measure either 200 square meters or 400 square meters, and are distributed uniformly on the grounds.

The membership for these allotments is managed by the, citizens association of Getafe. Annual fees are roughly 150 Euros. The annual fee of 150 Euros does not, however, account for the infrastructural costs of getting water to the site, the cost of the water itself, the small sheds (Image 4.9) or the fencing. Farmer 5, a pensioner, explained that he is spending upwards of 600 Euros a year before the cost of soil, seeds, fertilizers etc. The enrollment fee, a one time fee of 300 Euros, ensures a minimum tenure of ten years.

(Image 4.9)



(Source: Personal photo, May 9, 2011)

The three farmers interviewed at this site were all practicing organic agriculture as it is compulsory in the norms of the place. The statutes of the agreement they signed to get the plot forbids as well, commercial use of the land meaning the farmers are not allowed to bring the yield from this land to market. According to Farmer 6, the practice of selling the goods, while forbidden, is still common, especially in harvest times when the food produced is too much for a household to consume (personal

interview, May 9, 2011). Farmer 5, who commutes to the town from 50 km away explained that the demand is so high for this type of allotted agricultural plots, that some people are coming from even greater distances. The demand is evident on the other side of the M50 bridge, where the citizen association is clearing fallow field for another allotment garden.

4.2.4 EcoSecha – Entrepreneurial urban agriculture in the Jarama River valley.

Eco Secha is an social entrepreneurial venture on six hectares of land protected from urbanization in the Jaramas River Valley, on the eastern edge of the Rivas-Vaciamadrid municipality. The organization has another farm, of three hectares that operates from the municipality of Chinchón in the Tajuña Valley. Eco Secha, is in cooperation with the municipality of Rivas to create jobs in the agricultural sectors, more particularly in the ecological agriculture sector (personal interview, May 9, 2011). The municipality of Rivas controls over 100 hectares of agricultural lands, protected from urbanization, in the immediate agglomeration around Eco Secha, where it will be used to promote job creation through ecological initiatives, from education to farming. The municipality rents the land to Eco Secha at a level competitive with local market values for agricultural lands.

The initiative is ten-years-old, but began with different goals than it now has. Originally it was established as an educational platform, but quickly, in order to maintain economic sustainability, they shifted to a production and distribution model based around organic agriculture. They have been farming for five-years at this location and plan on being solvent in the coming years.

On these six hectares, Eco Secha produces food for a customer base of between 200 and 400 households. Customers pay no enrollment fee, they pay only 40 euros monthly for a weekly bag of produce, ranging between six and eight kilograms. The weekly bags are harvest on Tuesdays and Wednesdays and distributed on Tuesdays, Wednesdays and Thursdays, so there is generally no more than 24-hours between harvest and when the consumer receives it.

Eco Secha employs seven workers, three on the farm and four in other capacities such as distribution and marketing. Of the seven workers only two are full time. Currently, the organization is having trouble maintaining a bottom line. The costs of payroll, farm equipment, distribution and marketing are proving to be difficult to manage. The most pressing issue, is funding machinery. A tractor, for instance, can take a years worth of profit in one purchase, but this type of equipment is necessary to sow and harvest six hectares of land. Eco Secha operates outside of any subsidies and though they are not solvent now, they plan to be so in the coming years. The plan to distribute the

vegetables around Madrid is to be supported by publicity and commercialization. They hope that their identity as a local organic farm will grow steadily with the marketing campaign and with word of mouth through the community.

(Image 4.10)



(Source: The City of Madrid, <http://www.madrid.org/cartografia/planea/planeamiento/html/web/VisorPlaneamiento.htm>)

Eco Secha's goal as an organization is to provide fresh, locally sourced, organic foods to the market of Madrid. Speaking with Michael, an employee of a consulting firm working jointly with the municipality and Eco Secha, he explained that the danger of chemical residues on industrial agricultural products was a major catalyst for many involved in the project. Furthermore, as a community they are interested in locally sourced food. Eco Secha utilizes greenhouses to extend their production four to six weeks on either end of the season. In the winter, they source from regional organic farms that produce in greenhouses. The only problem with distribution in the growing season is finding people to buy the bags of produce in the month of August. "The problem is when you have the most production, in the summer, is when people want to go to the beach, so there are fewer people around when the harvest is the strongest. The way to continue profitability is to can the goods we can't sell" (Michael, Personal interview May 11, 2011).

The plans to diversify Eco Secha are ambitious however. On the property an old farm house,

owned by the municipality, is under plans to convert to an agriculture education center to attract tourists and city folk to the farm and to proliferate the idea of organic, local production. Furthermore, there are educational classes being held in the months of July to bring in more revenue and create important community connections.

The future of the organization, at the time of the interview, was not clear. With an old tractor needing to be replaced and a recent theft of an expensive van purchased for distribution, Eco Secha has a lot of work to do to sustain itself economically.

4.3 Haleiwa, Hawaii – Meleana's Farm

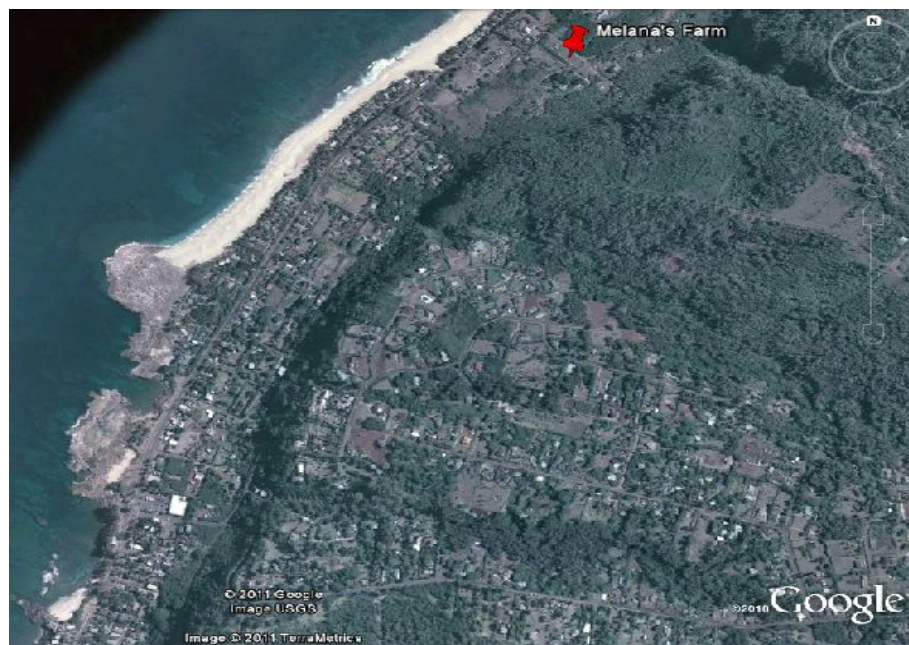
Hawaii has a strong reputation for sustainability in North America, with a very progressive energy policy and state mandates requiring solar heating for various applications. The agriculture scene is dominated by multinational corporations producing fruits and sugarcane. There is however a very popular sustainable agricultural community, bolstered by the University of Hawaii's agricultural department.

(Image 4.11)



(Source: Google Earth)

(Image 4.12)



(Source: Google Earth)

In the summer of 2010, I left Europe for the duration of the two month break afforded by the Masters program. I arrived in Haleiwa, Hawaii looking for work at a local CSA. After sending my resume around and making a number of personal visits to established farmers markets, I found an organic farm that needed laborers. Mealeana's farm, is on a little over 1 hectare of land, and they produce exclusively for a local CSA. While working there I became fully immersed in the wonderful world of community supported agriculture. Mealeana's farm is run by a young entrepreneur who made inroads to the sustainable living community by establishing a solar-panel company that wholesale distributed to various companies around the archipelago of Hawaii (in the state of Hawaii, it is mandatory to utilize solar-heating to heat water in any new construction.) After making a fair bit of money Mealeana and a business partner purchased the small plot and began farming in earnest.

The initial goal was to establish the farm as a CSA, and fully contribute the remaining produce to a coop for the area "Pupukea", a sloping hill tumbling from an ancient volcano into the ocean, on which several farming projects have been initiated to take advantage of the relatively fertile soil and the fantastic weather.

Mealeana's example is a prescient one because of its lessons for upstarts. When she first began the farm she vowed to be fully organic and free of GMO's. The problem with being religiously zealous about being GMO free, is that the Papaya plantation, some 5 miles south, contaminated a large amount of the three-hundred plus papaya trees strewn across the seaside property. The financial implications of testing every tree (through clipping and labeling leaves from each) were not encouraging. Nonetheless, to preserve the sanctity of the project, Mealeana and her business partner tested each and every tree and found that nearly two-thirds were in fact those of the GMO strain. The only option in her eyes was to cut them down and start anew. Luckily her business partner rejected this idea and forced Mealeana to reconsider; though at the last time of contact the issue still remained unresolved.

Today, the variety of produce is impressive. Below is a list of what the farm produces for their CSA:

- 450 grams of cooking greens.
- 225 grams of salad.
- Various amounts fruits: avocado, papaya, lime/lemon, lilikoi, guava, tangerine, orange, grapefruit, mango, banana, tomato.
- Various herbs: Parsley, cilantro, basil, oreganos, chives, rosemary, olena, hot peppers, mint or arugula.
- Root veggies in the form of radishes, carrots, beets or jicama.
- Starch in the form of sweet potato, kalo, green banana, asparagus, pumpkin.
- A processed good such as pesto, babaganoush, kombucha (fermented tea), a baked or pickled good.

- Eggs are available for \$3 USD for six, and goat's milk is being processed for the farms personal use - dairy is subject to strict handling laws making small scale production difficult.

There is no initial fee to join the CSA and the baskets cost \$25 a week. Currently the farm is operating with around 25 subscribers. Clearly \$625 dollars a week is not enough to sustain a business. There are supplemental funds coming from weekly farmers markets as well, where Meleana's sells the surplus of the week's cache. Furthermore, there are some positive externalities that make life easier on the three full-time employees at the farm, including a lack of electricity utility bills, as the only electricity used is for powering three refrigerators, the rest is powered by photovoltaic solar panels; a lack of grocery costs; and a vibrant trading system among areas residents that resembles a coop. Plus, the geographical location enables workers to gladly accept a lower pay in exchange for food, lodging and the chance to live in one of the most beautiful places on the planet, just meters from the most famous surf-breaks in the world. Still, much of the operation is being subsidized by the families solar company and some nominal investments of federal funds aimed at new farmers, for which the money can only be used for equipment.

The economical sustainability of the farm has yet to be achieved, but there are several reasons that this is the case. Primarily, the reliance on a non-committed customer base, the lack of commercial exposure and questionable managerial tactics. In the quest to provide fully organic, non-GMO produce, the ability to maintain the financial interests of the farm was compromised when transgenic species from a neighboring Papaya plantation infested her own Papaya trees, prompting her to spend a great deal of money on testing the 300 Papaya trees on the property. The results showed that there had been infestation so the trees were scheduled to be cut down. In short, the means were defeating the end. An end that, when considering the geographical placement, and fertility of the soil, should be considerably easier to achieve than in most urban areas. The problem with Meleana's is the operators forgot that there needs to be a financial bottom line as well as the ethical vectors of ecological and social sustainability. Many environmentally and socially conscious start-ups are modeling their business under the triple bottom line (TBL) approach. TBL captures an expanded spectrum of values and criteria for measuring organizational success, effectively equalizing the bottom line in terms of the three sustainable factors, social, ecologic, and economic.

CHAPTER 5: Discussion

The questions I sought to answer through the process of writing this paper are as follow: How can urban agriculture provide solutions to sustainability issues with industrial or conventional agriculture? Is an entrepreneurial approach to urban agriculture necessary for proliferating the practice? Is urban agriculture a worthwhile venture if it is not organic? While the answers have been partially answered implicitly throughout the text, I will discuss them through the framework of the three tiers of sustainability: Social, economic and ecological. First, it is important to review the contextual differences between Copenhagen and Madrid.

5.1 *Copenhagen*

Copenhagen's fabric is densely inhabited and utilized at a rate much higher than Madrid. Recalling the land use percentages, Denmark is using 52% of their land for cultivation, while Spain is using 37% (CIA World Fact Book, 2009). The urban fabric is extensive in Denmark, and particularly around Copenhagen. With the unavailability of land, Copenhagen provides a prime testing ground for urban agriculture. The case studies exemplify the innovative nature of the urban agriculturalists in

Copenhagen. Yet, the actual production of food was much lower in the case of Copenhagen. The density of the urban fabric requires that any single place is used heavily as a community place, and generally the circumstances of the tenure predetermine this. Thus we see an overwhelming slant toward social entrepreneurship, using the gardens as education and social platforms to activate marginalized communities.

5.2 *Madrid*

While Madrid enjoyed a great deal of land, on which a little innovation could produce a great deal of results, the sociocultural boundaries, and indeed the financial barriers inhibited the growth of local production. In Madrid, while job creation was indicated as a motivating factor for one the case studies, the circumstances allowed for a much more singular effort toward vegetable production. The fungible nature of the informal farms in Madrid was the single most defining characteristic.

5.3 *Social Sustainability*

The social advantages are ones that are difficult to quantify, especially in terms of the informal allotments in Madrid and the subsidized gardens in Copenhagen, where there is a very low barrier for entry. In the cases of ByBi and Eco Secha, the goal of these organizations is to create jobs, before making profit. Indeed there are ambiguities to the process that could create certain barriers to certain communities, but the social sustainability of such ventures is generally unchallenged.

Comparatively, social equity in the food system is generally challenged due to the centralization of the food system as opposed to localization. In keeping within a European realm, any inequalities in the food system are caused by the inaccessibility to food, typically caused from a lack of mobility, due to economic circumstances. There are, however, institutions and money enough, to provide localized production opportunities to marginalized groups. The example of Prags Have and Dyrk Nørrebro in Copenhagen are excellent for illustrating the type of initiatives that could provide both food and social environments to help these people network.

5.3.1 *Possible public-health hazards*

As discussed in section (2.5.1) the cultivation of food in cities can pose health risks to the public. Consuming contaminated food and effluents from chemicals or livestock can pollute the surrounding air, water or soil. Growing organically would lower the probability of farming chemicals reaching public water supplies or seeping into drinking systems. The use of uncomposted organic

fertilizers, in the form of recycled sewage or animal refuse, can also pose threats, however this is more of an issue in developing countries, where animal refuse is more likely to be used without processing.

Livestock regulations in the developed world are very strict, lowering the chances of a larger scale livestock operation within urban or metro areas that could compromise human health. Some of the informal lots in Perales del Rio kept chickens, posing a threat of possible contaminants being spread, however the scale was very small, and contained.

The largest threat of contamination from farming in cities developed, post-industrial cities, is from heavy metals or pollutants. As brownfield areas are prime locations for urban agriculture, the danger of heavy metals or other contaminants is inherent. Prag's Have in Copenhagen, settled on an industrial lot that had been checked and cleared for containing hazardous levels of pollutants but was deemed safe. Less apparent contaminants include air pollution and water pollution from outputs within cities. Such concerns were not realized in any of the case studies, suggesting that farmers took necessary precaution in site selection, or the vegetables have not been tested. As the case studies in Copenhagen were confined in dense urban areas, where threats of contaminants are their greatest, the yield from the farm went to weekly or bi-weekly public meal spreading the consumption of the vegetables to many people. In Madrid, the threat for illness would be greatest, as the case studies on the Manzanares were typically harvesting for a small group of people who consistently consumed produce from the gardens, if contaminated. However, lower population density and pastoral surroundings would diminish the likelihood of contaminants from air or water pollution. But it is important to remember that cities in the developed world will have very strong regulations for air and water quality.

5.4 Ecological Sustainability

Chapter 2 thoroughly discussed issues with the ecological sustainability of industrial agriculture, thereby suggesting urban agriculture as a solution to the problem, albeit a convoluted one. The issues with the ecological sustainability of urban agriculture are valid, but as I suggest, they are far outweighed by the advantages to shifting the paradigm away from a centralized food production system. The need to shift paradigms away from the current model of food production is evident, and the sustainability of it leaves its future in question, both in human and ecologic terms. To answer the challenge to urban agriculture's ecologic sustainability, we can look at the case studies of Copenhagen and Madrid.

Urban agriculture, if incorrectly practiced, can be just as detrimental to the environment, as industrial agriculture (Smit, Ratta, Nasr 1996). If practitioners ignore the nutrient loop, inputs will

become as synthetic and artificial as those in conventional agriculture and continue polluting the atmosphere, the soil and the water of surrounding areas (Ibid.). Due to the population density of cities, if the intensity in which conventional agriculture applied inputs were mimicked in an urban context, the detrimental effects would be much more apparent, and hazardous to the health of the surrounding population. Urban agriculture, as I have discussed it – as a means of not only localizing food and challenging the conventional paradigm, but also as a means of cleaning the city by reintegrating nutrient loops – is essentially organic or ecological.

5.4.1 Ecological vs. Conventional urban agriculture.

Cities, as Despommier describes them, are a great sink of vitality (Despommier 2010). There are enough nutrients in cities to grow food on a scale that would at least challenge conventional agriculture (Ibid.). Urban agriculture's ecological sustainability can be seen in a microcosm, such as an aquaponics system which is discussed below, or it can be seen in macro terms by recycling organic materials on a community level, diversifying the energy output stream back into inputs, and better utilizing energy saving practices. In Madrid, conventional methods were being used in the informal allotments on the upper Manzanares, see section 4.2.1. The use of fertilizers, herbicides or pesticides does not make an operation unsustainable by default. In fact, there may be an argument to continue chemical agriculture in smaller plots as it promotes growth and can, in the beginning, be used as a means to promote urban agriculture over conventional agriculture. Furthermore, it is important to understand the context of each garden. The informal allotments on the upper Manzanares, are surrounded by monoculture, conventional agricultural fields where there annually tons of chemicals will be used as inputs. Utilizing chemicals on a smaller scale, to produce for a family, will have little ecological consequence when compared to conventional agriculture. Organic agriculture can also create procedural barriers as was seen in the case of Meleana's Farm, in Hawaii. By being religiously zealous about organic and non-transgenic species, Meleana was forced to spend large sums of money on testing for GMO contamination and planned on cutting down infested trees. What is important to examine in each case is whether the method of urban agriculture being utilized creating is creating more ecological damage or is it creating less? Indeed the quantitative analysis is difficult to arrive to with such various case studies, but the discussion in chapter 2 should lend some valuable literature to make an educated decision.

5.4.1.1 Closing the Loop

What needs to be established, alongside the cultivation of plants, is the reintegration of nutrient streams. In June of 2011, I proposed an urban agricultural project to the Copenhagen municipality, in which a dynamic plan involving both cultivation and organic recycling for input to agriculture was proposed. See Appendix B, for the example. The case studies in Copenhagen, are working with the reintegration of the nutrient stream, though sometimes without explicit intent to do so. At Prags Have, the garden is composting everything from the gardens, and all of the kitchen waste for the twice-weekly peoples kitchen. Here they integrate the stream of output back into production as a means to save money, or because they have little money available, as a means to continue operating.

At Dyrk Nørrebro, Anders, one of the organizers, became involved because he had a strong interest in creating a more sustainable food production system. Anders and his colleagues base much of their resources from recyclables, whether it is the boxes they are planting in, or the left over biomass they are composting. He also has taken a personal interest in closing the loop, by seeking out and collecting organic materials from supermarket waste-bins. Upon hearing this I was both amused and impressed. As a student in Copenhagen I have used “dumpster diving,” as a means of subsistence. Dumpster diving is the collection of discarded foods from supermarkets and greengrocers. Locating proper locations to dumpster dive can be difficult and the collection involves a sometimes messy operation involving rubber boots and gloves to search through mounds of decomposing organic material. Anders sees this as an opportunity and collects available organic materials for composting. The next season at Dyrk Nørrebro will be cultivated almost completely by locally sourced nutrients.

I too have taken a personal interest in the nutrient cycle and applied for a grant in July of 2011, to build an aquaponics system. Working through Prags Have, I received 5000 DKK or roughly 700 Euros, to build the system as part of an exhibition for a conference on reusing urban spaces, organized by Giv Rum. Aquaponics is the combination of aqua-culture and hydroponics and involves cycling effluent laden fish water through a hydroponic gardening system and back into the fish tank. In this model, plants are provided with a complete and balanced diet of nutrients and fertilizer, by way of a bacterial process in which ammonia is turned to ammonium-nitrite and ammonium-nitrite is in turn changed to ammonium-nitrate, which is a high quality fertilizer; see section 2.2.1 for a discussion of conventional agriculture’s energy intensive methods of nitrogen fertilizer production. Aquaponics is essentially a closed ecosystem, with a small amount of fish food being the only input; see Appendix C, for information and photographs of the project at Prags Have. While aquaponics operates nicely

outside, with variable conditions, the environment in which it is most effective is indoors. Indoor agriculture is the most energy intensive form of agriculture and urban agriculture is particularly attuned to indoor agriculture because of the nature of the built environment.

5.4.1.2 Indoor agriculture

Indoor agriculture can come in two forms, one in which the power of the sun is being directly harnessed and one in which electric lights are used to create photosynthesis. Conventional greenhouses use solar power for photosynthesis but require an enormous amount of energy to maintain optimal growing temperatures. There are methods to lower the footprint of greenhouses, such as double pained glass, tighter construction, alternative fuels for heating and even heating with farm animals such as goats. The strongest barrier to making greenhouses more environmentally friendly is the larger start up costs to construct with the aforementioned materials. Indoor agriculture using electricity, has similar problems, but with emphasis on the electricity used by the lighting source. Typically, an indoor operation that has a roof will also have better insulating characteristics, as there is no concern with letting in sunlight. But the cost of energy can be prohibitive. Using alternative fuels such as solar or wind to power bulbs or nodes with lower energy level requirements is a common tactic. But the extra cost of such technologies can create problems at the start of any indoor venture. Costs can be overcome, it is simply a matter of shifting the paradigm and creating a market for such things. If such technologies were profitable from the producer to the consumer, the practice of indoor agriculture would surely popularize. In Copenhagen, the aquaponic system will head indoors in October where it will be tested with various light sources to determine which would effect profitability the most.

The most important aspect of urban agriculture is redefining conventional methods of production that neglect to embrace the nutrient stream as a means of production. Urban agriculture can provide many things for urban areas, and it can also create ecologic destruction and human health hazards if it is not properly practiced, but most importantly it provides an alternative to industrial agriculture's paradigm of production, marketing and consumption. This is not to say that urban agriculture should entirely replace rural production of food, but its power as a partial alternative to rural production is what can be exploited.

5.5 Economic Sustainability

Urban agriculture's strongest barrier to success is creating an economically sustainable organization. There are typically three models that determine the type of venture that needs to be

established. Informal, formal and subsidized. In Copenhagen and Madrid, all three were examined.

5.5.1 Informal Urban Agriculture

Informal urban agriculture can operate outside of subsidies, but is generally of a scale that does not allow for income to be produced outside of fungible income. However, informal agriculture is an important and valuable practice for proliferating urban agriculture outside of entrepreneurial ventures. In the global north, informal agriculture can be utilized as a guerrilla strategy to localizing food production. In Madrid, we saw two informal agricultural settlements where food production and leisure were the motivating factors. While being able to exist without paying rent, the informality of these lots makes any business venture unlikely as there are no formal agreements to block appropriation of the land once it is acknowledged as profitable. Furthermore, if one were looking to get into business, a formal arrangement would be the only logical criteria. That being said, informal urban agriculture and entrepreneurialism are not mutually exclusive. Seed bombs, a ball of nutrients and seeds in launch-able balls have become popular lately in the urban agriculture community and a company has formed the idea into a profitable company. Seedbomb.co, is a for profit organization distributing seedbombs, seedbomb vending machines, and seedbomb products to urban agriculturalists and providers of gardening equipment alike. The idea is to utilize neglected grounds in the city, including highway by passes, road islands, vacant residential lots, vacant commercial and industrial lots and public and private park lands. Though the legality of “seedbombing” private property is legally questionable, the company operates at a profit. See GreenAid.Co for more information. The downside of informal urban agricultural plots is the lack of oversight. While people practicing agriculture are focused on the health of the soil by default, the immediate watershed could be compromised from unregulated use of chemicals or human effluents. There is no way to regulate such establishments unless governmental organizations acknowledged them and established a regulatory committee or policing force, which would probably not be a feasible use of tax dollars.

5.5.2 Formal Urban Agriculture

Urban agriculture on formally administered plots is tailored to entrepreneurial ventures, but does not predicate the success or necessity to do such. Eco Secha, in the Jarama River Valley in Madrid is a formally established entrepreneurial agricultural venture, but the future of the farm is uncertain. To refer back to section 3.2.1, discussing the constraints of urban agriculture, Eco Secha suffers from procedural barriers. From the management to the selected staff, the organization could be better run,

but their main problem has been the costs of equipment and recently problems with theft. In the municipal allotments back in Getafe, the farmers there were not allowed to sell their goods, even though it was practiced, which effectively destroys any chance of creating a logical business venture. Alternatively, in Copenhagen, ByBi and the organizers had professionals involved, a full marketing scheme, and a plan for where the project would be in 6 months, in a year and in two years. It was very professionally done and was already showing a profit within a year of establishment. It is important to recognize that ByBi while agricultural in nature, does not require a large amount of land, instead just enough space to house bee hives. This and the lack of daily maintenance is a major factor in their ease of operation and profitability.

5.5.3 Subsidized urban agricultural

Subsidized plots are effective in proliferating urban agriculture as an educational platform. In Copenhagen the cases of Dyrk Nørrebro and Prags Have provide a place for local residents to come, learn how to cultivate fruits and vegetables and discuss issues with the prevailing system of food production. The ability to make money is often limited due to contractual agreements with the municipality. However, subsidized plots can be used as an incubator for entrepreneurial ventures. Using tax payers money for such ventures is not possible in all cities. In Madrid for instance, the likely hood to acquire such benefits from the municipality is far smaller than in Copenhagen. As in any subsidized project, there are areas in which to be critical which essentially look at whether the money is being well spent. Prags Have's initiative is successful, but measuring the success of a socially motivated project is difficult. As an observer I found myself to be surprised at the amount of money provided by the municipality, over 130,000 DKK, this does not include other subsidies for events such as the conference that I took part in with the aquaponics system. I often considered the amount of money being spent with the visible benefits. The garden is beautiful, and there were members of the marginalized community taking part in the daily activities, but the number of those taking part was not extensive. Nina, one of the organizers even expressed her disappointment saying, “at the beginning it was a very positive feel, with members from the community taking part daily, but it seemed to slow down after the beginning.” I visit the garden daily to tend to the fish and plants in the aquaponics system and I am often there alone. Furthermore I am often forced to jump the gate because the garden remains locked if the main organizers are not present. When people are there the children from the neighborhood come down and play in the dirt, but is this enough to validate such a large investment by the municipality? I think in a place like Copenhagen it is a valid project because of the sheer financial

might of their social system, but in other cities, with less developed social systems, it may not be feasible. This is why I think there should be an entrepreneurial aspect to it. If the organizers approached the municipality with a business plan to utilize the money to make more money to invest in the project, it would revolutionize the capabilities of the municipal authorities. For now however, the trend is to use what money they have and develop the garden according to the subsidies.

Chapter 6: Conclusion

6.1 *Research Questions:*

- How can urban agriculture provide solutions to the many issues with industrial or conventional agriculture?
- Is an entrepreneurial approach to urban agriculture necessary for proliferating the practice?
- Is urban agriculture a worthwhile venture if it is not organic?

6.2 *Summary*

The dynamics of the food systems are such that lines of inquiry do not stop at one conclusion, rather the questions continue on and on into an imbroglio of topics that range from carbon footprint to rural-urban relations or watershed quality. It suffices to say that practicing agriculture in cities is a highly complex undertaking. The dynamics of two capital cities further complicates matters, both in terms of research and practice. Through the process of researching and writing, the answers to the first question

became implicit in Chapter 2, where the field research seemed to be more informative in answering the second and third questions.

The answer to the first question is fairly direct. Urban agriculture enables food production to happen on smaller and local scales, thereby diminishing the need for transport and marketing. As urban agriculture is smaller scaled and subject to more scrutiny, much of the chemical and transgenic usage is mitigated. Socially speaking, urban agriculture can provide work to marginalized communities and relieve the stresses that industrial agriculture has on local economies by reducing the demand for industrially produced food. Conversely, urban agriculture can be seen as an inane practice taking jobs from rural communities. Such a statement could be rebuffed by noting the impoverished immigrant labor forces involved in agriculture and the mechanization of the process that has greatly reduced the need for laborers. Determining economic sustainability is a difficult task. A first response may point to agribusiness and how successful corporations involved in it are, compared to urban agriculture ventures that can hardly be called a strong industry. This part of the discussion is difficult to address as there are some opposing ideologies that would look at the situation differently. A fundamental economist might point to the revenues of agribusiness whereas social liberal would point out the fallacy of the success as it is concentrated in large corporations and at the cost of the environment (Shiva 2000; Nelson 1994; McClintock 2010).

The second question can not be explicitly answered. Entrepreneurialism as a tactic to proliferate urban agriculture as an everyday practice appears to have no effect or is avoided because of financial risks. Social entrepreneurship is a strong method for proliferation, but agricultural practices as a secondary objective to social equity are typically not practiced at optimal levels. The key word is proliferation. Entrepreneurialism as a method of proliferation requires a great deal of entrepreneurial spirit, enough to spread across an entire sector of work that has a limited capacity for innovation. Of course, entrepreneurs will probably not hurt the situation, but the evidence from the case studies seems to suggest that the strongest means for proliferation lie in social entrepreneur urban agriculture projects. This may also have to do with the stage of development urban agriculture is at. At this point in time, education and outreach to raise awareness of the issues with industrial agriculture and the benefits of urban agriculture may be more effective than more practical undertakings.

The short answer to the third question, is urban agriculture a worthwhile venture if it is not organic?, is, maybe. Organic production provides many benefits. Most importantly, it can be used as a tool to reintegrate waste-streams into input streams, through composting. Composting provides

economic and procedural benefits to any agricultural venture as it simultaneously handles outputs and free source of fertilizer. There are circumstances in which chemical fertilization is necessary in urban agriculture, particularly if there are economic motivations behind it. Using chemicals does not negate the effort of starting an urban farm, but the practice should be highly regulated by the farmer. Recall the case of Meleana's farm which was forced to spend money on testing for transgenic species and faced the choice of cutting down the hundreds of infected trees. The conclusion I came from the case studies pointed to the method of growth, be it organic or inorganic, as being less important than the organization or procedural structures of the garden. While it is unlikely that inorganic urban agriculture in Copenhagen and Madrid would pose any serious threats to the environment or public health, organic agriculture should not be abandoned.

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Appendix

Appendix A: Definitions

In order to fully understand the sustainability debate, it is important to define terms. We cannot think of any environmental study without thinking about its political as well social roots, pressures, and restraints. Furthermore, there is historical context to consider which makes certain issues more sensitive than others. In order to properly frame urban agriculture within the sustainability movement, it is important to determine what “sustainability” is and where came from.

A.1 Sustainability

The earliest rumblings of the sustainability movement lacks a clearly determined temporal location, however the causal determination is quite clear – the anthropogenic forgeries of ecological degradation. Since the first static settlements, where structures of permanence were built, there would have been modified behaviors in-tuned with what we would today call “sustainable practices” yet the movement itself is not that old. Significantly, the industrial revolution can be cited as one of the largest causal factors that contributed to the degradation of the environment -- and global population boom simultaneously worsened the situation (Voinov and Smith 1994). Towards the close of the 19th century, advocacy groups began proposing conservation initiatives, and the first national park was established in

1872, in the United States. Whereas the conservation movement was mostly reactionary and reduced to simply blocking development of pristine land, the sustainability movement took form as a proactive movement that attempted to guide policies and actions through legislation or by example (Ibid.). Sometime in the mid-20th century, the population of earth began to consider the consequences of this new-found material wealth and general healthfulness. The gathering environmental movement pointed out that there were environmental costs associated with all of these material benefits the industrialized world was enjoying (Shiva 2000). With the oil crisis of the 1970's the issue became a bona fide political standpoint and in the 21st century we see the global context of sustainability with the phenomenon of global warming.

Institutionally, the Brundtland Report, in 1987, defined sustainability in terms of development; “(that) which meets the needs of the present, without compromising the ability of future generations to meet their own needs” (WCED, 1987). The problem with this broad definition, in terms of defining policy, is that it is opened to differing interpretations. Primarily, the debate of sustainability is approached from two factions. The anthropocentric and the ecocentric camps. For the purpose of maintaining a concise paper, ecocentric sustainability will be the focus of the discourse.

A.2 Anthropocentric

Anthropocentric sustainability separates humans from the natural ecological order of things. This is a somewhat archaic approach and examples of humans deigning themselves superior is so strongly instituted into the human psyche that it can be found in many places in the bible "human lord over the land." QUOTES. The problem with this approach is a dualism that separates humans and nature and a general lack of appreciation for nature's systems, particularly ecosystems and bioregions. What this point of view fails to recognize is that humans are part of the ecosphere and what we do to it we do to ourselves. This approach to using nature, especially in the context of modern capitalistic consumption paradigms, is not sustainable.

A.3 Ecocentric

Ecocentric sustainability focuses on nature as the paramount concern but entails two structurally distinct approaches. “True ecocentrism,” which is based on the ideology that the human species is no better than any other species and should lower its ambitions and needs (Voinav and Smith 1994). The other ecocentric approach is actually an anthropocentric one, since it stresses the ecological priorities because it understands that the only strategy of sustainable survival for the human being is to limit

itself to the ecologically feasible level (Ibid.). “In the first case we make our decisions in favor of ecological benefits as a result of our faith and belief in nature and species rights, while in the second case we basically act because of our wisdom and understanding that in the long run the humans will only benefit from nature conservation and harmony, and actually choose the priority of ecological interests based on logic and some knowledge” (ibid; 1). Anthropocentric approaches may focus on economic or social benefits, effectively making decisions to maximize these benefits without equalizing ecological concerns. Indeed eco and anthropo-centrism may eventually merge as humans begin to consider the long-term effects their current practices may have on the ability of future generations to thrive. “However, it should also be realized that for this factor to become meaningful we must assume a total revolution in human perception of its role and place in the modern world as well as its existing living standards and priorities” (ibid.).

A.4 Social or Ecological Entrepreneur:

Social or ecological entrepreneurship, while similar to conventional entrepreneurship, is about effectively creating social or ecologic value, determining where there is opportunity to do this, and the proactivity to accomplish directives while managing the risks of the venture (Roberts and Woods 2005). Where conventional entrepreneurship is solely guided by the creation of economic value, social or ecological entrepreneurship is principally guided by creating social or ecological value and oftentimes, unless there is sufficient financial backing to operate outside of the market, includes economic considerations as well. This style of entrepreneurialism is effective in creating proactive systems of change instead of relying on reactive regulatory models that characterize conventional systems of handling problems in these sectors. Essentially, social and ecological entrepreneurialism is a reward based approach to dealing with social and ecological problems instead of a punitive approach (Ibid.).

A.5 Allotment Gardening

Allotment garden, often called simply an allotment, is a plot of land made available for individual, non-professional gardening. Such plots are formed by subdividing a piece of land into a few or up to several hundreds of land parcels that are assigned to individuals or families. In allotment gardens, the parcels are cultivated individually. Allotments are an urban construct as they are typically reactions to demand for more bucolic areas by those living in urban agglomerations. Allotments are typically located within cities or on their periphery, as frequent access is necessary to maintain the gardens. The lack of space in

residential areas that requires the formation of allotments is conventionally a working class circumstance and thus allotments are often considered to be working class or blue collar establishments. Allotments can be owned or rented from a private, public or foundational source. Though typically not zoned for housing, some allotments in Denmark have lodging as the gardens became important weekend getaways for the burgeoning middle class during the middle of the last century.

A.6 Community Garden

Community gardens are single plots of land worked on collectively by a group of people. Historically, community gardens relieved the same problems that allotment gardens did, insofar as the relief of overcrowding in industrializing cities and providing food for marginalized members of communities. Community gardens experienced a similar life-arc to allotments as well, insofar as the rise in popularity for food necessitates during the war years and a resurgence in the seventies and eighties as community building enterprises. Today, community gardens can be privately or publicly owned however more typically of the public sector, and always nonprofit. Because of the typical surrounding morphologies of community gardens which lay more typically, in more dense urban areas, they have the distinct ability to valorize urban unused or abandoned urban space. This can be seen as problematic insofar as it may contribute to gentrification in areas, and it may create problems for spaces with clearly defined tenure as the value of the space used may increase through community garden operations.

2.7.2 Slow food

A.7 Slow Food

The slow food movement, established in 1986 to protest the installation of a McDonald's near the Spanish Steps, in Rome, is promoted as an alternative to fast food and strives to preserve traditional and regional cuisine and encourages farming of plants, seeds and livestock characteristic of local ecosystems. The organization's goals of sustainable foods and promotion of local small businesses are paralleled by a political agenda directed against globalization of agricultural products. In this way it is an organization catalyzing cooperation between urban dwellers and food producers within, or just outside of, the city limits, thereby enabling a more sustainable food-system.

In Italy, where the slow-food movement began, small-scale urban farmers have organized into cooperative and associations to protect their interests. Being closely tied to the green movement, these urban-agriculturalists insist on the merits of locally grown produce (Smit, Ratta and Nasr 1996). In fact,

around Europe and North America, within the last decade, a groundswell of consumer interest in supporting local farmers has emerged, spearheaded by the slow food movement (Despommier 2010).

France and Germany have both aligned institutional efforts to promote urban agriculture as part of the "sustainable agriculture" movement aimed at promoting nutritionally self-reliant communities. In Berlin alone, there are 80,000 urban agriculturalists, who make up a very strong political force (Smit, Ratta and Nasr 1996).

The Local Agenda-21 has been a force for improving agricultural methods throughout Europe and has resulted in many urban policies that enable the development of urban agriculture. In Norway and Austria, after the Local Agenda 21 initiative, national food policies were drafted that include commitment to greater self-reliance, with a focus on the small sustainable producer; directly encouraging urban, and peri-urban agriculture in their predominantly urban countries (Ibid.). In Mediterranean countries, indoor agriculture has come a long way from the first greenhouses. The use of plastic domes and tunnels and controlled irrigation stretch the growing season, save on water and increase yields per hectare - a substantial amount of this increased production is in peri-urban areas.

As energy prices continually increase and transport costs multiply, urban food production offers increasingly more advantages and the Slow Food movement is a globally connected actor involved in disseminating information.

A.8 The Dust Bowl

The Dust Bowl, was one of the first and most illustrative agricultural crisis caused by industrial agricultural practices. The phenomenon was caused by severe drought coupled with decades of extensive farming without crop rotation, fallow fields, cover crops or other techniques to prevent wind erosion (NOAA 2010). Deep plowing of the virgin topsoil of the Great Plains had displaced the natural deep-rooted grasses that normally kept the soil in place and trapped moisture even during periods of drought and high winds. In the early 1930s, many farmers were trying to recover from economic losses suffered during the Great Depression. To compensate for these losses, they began to increase their crop yields. High production drove prices down, forcing farmers to keep increasing their production to pay for both their equipment and their land (Ibid.). The soil's ability to hold water and the subsequent dust clouds, lead to a massive exodus of rural laborers from this part of the country, and the description of the era as the "dust bowl," a wholly desperate time, ecologically, economically and socially. The western-world's desire to never live through a culture of scarcity lead to groundbreaking technological advances in agriculture.

A.9 Community Supported Agriculture

Community supported agriculture (CSA's) are the most common and strongest movements in the United States for local production and distribution of foods. CSA's emerged in North America in the late 1980s. "It is estimated that upwards of two-thousand CSA's now operate across the United States and Canada" (Winne, 137, 2008). In short, a CSA is a marketing system that sells each member a subscription, or share, of the season's projected harvest, usually well in advance of the first harvest. Costs of membership vary as does the regularity of distribution, but typical CSA arrange weekly distributions and charge weekly or monthly -- it is most common that produce found at a CSA or farmer's market is less expensive than supermarkets, and most CSA's are certified organic.

The amount of produce members receive depends directly on how successful the farmers are, thus the risks of agriculture are shared with consumers, thereby wresting the need to rely on industrial agriculture's regularity. CSA's can be funded from government grants, NGO's, various subsidy mechanisms or strictly from members (as is the case in KBHFF which I will discuss later). "Working shares" can be offered to those lower-income members to provide food to marginalized sectors as well as fund-raising efforts, which Mark Winne (Ibid, 138), a principle purveyor of CSA's and farmers markets in the U.S., notes that "these approaches and a respectable tendency toward *inclusivity* have reduced the perception that CSA's, as well as organic and locally produced food, are the special province of a moneyed elite."

CSA's have contributed mightily to consumer's understanding of where and how food is produced, which of course reinforces the identity of locally produced food. "The notion of "community" supported agriculture certainly brings the producer and consumer closer together, but it also makes it clear that the food and the farm are associated with a particular place, not just the amorphous global food system, whose places and producers are nameless and faceless" (Winne 138, 2008).

Appendix B: Østerbro Green Initiative A proposal submitted on June 5, 2011, to the municipality of Copenhagen.

B.1 Øster Farms

Øster Farms: An Urban Agricultural Initiative

Project Proposal June 2011 ::

an Introduction

We are **UrbanRise** - Jacob Waltman, Isis Frisch – a trans-disciplinary collective dedicated to improving urban life through planning & interventions, focusing on creative & sustainable alternatives.

Østerfarms is an integrated urban agricultural project that combines leisure, education, organic farming and entrepreneurship for the environmental, social and economically sustainable future of Østerbro that supports Østerbro's vision: 'Livskvalitet og et aktivt byliv'¹. Patches of underutilized land will be turned into green oases where citizens can meet to relax, to buy organic vegetables and honey, discover

¹ Bydelsplan for Østerbro, 2009

ways to grow their own food, learn how to lead a more sustainable lifestyle and enjoy that beautiful ocean breeze that is powering all those famous Copenhagen windmills!

The short term aim is to provide education, recreation, leisure, and a good working experience for young people. The long-term aim involves a branding of Østerbro as a “Living Community,” in which a sustainable lifestyle is fully integrated into daily life. The overall aim of the project is to bring sustainability-education into common practice for young people in Østerbro.



The Project :: ØsterFarm

Nordhavn’s planning history has left a great deal of unused space in considerably large plots. ØsterFarm is a holistic approach based on a system of bio-dynamic agricultural practices that will make use of these plots to the benefit of the community and the environment. Recent planning documents for Østerbro show that residents aged between 12 and 17² are underrepresented in cultural opportunities, furthermore, Nordhavn has already been identified as a possible outlet for cultural and recreational experiences. We think the time is right to capitalize on the trend of sustainability and green living, things that many young people find intriguing and hip today.

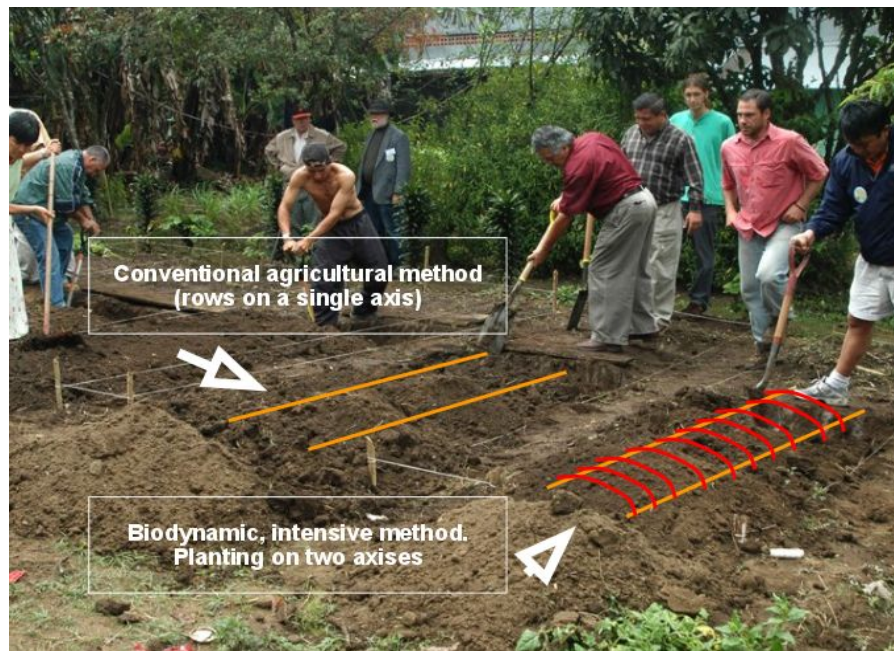
Some raised beds utilised to grow organic vegetables and a small beehive for producing 100% Østerhoney are just the beginning – the process itself will be an educational exercise primarily for youngsters. Cozy orchards preserving local types of fruit offer arenas for community gatherings and little info shops (maybe offering some self-brewed mint tea) become meeting places to find out how to grow your very own window farm. Beginning on a small scale and gaining in momentum by attracting people with delicious produce and honey, these gardens will eventually sustain a high-level of food production.

² ibid pg. 11-12

Urban Agriculture - Locally produced food can guarantee quality standards and is environmentally more sustainable as it does not need to be transported long distances!

Bio-dynamic gardening is a horticultural process involving raised-bed plots, with concave shaped rows on which several of the same species of plant are placed next to one another-- changing the axis of traditional agriculture which will typically be formed on a y axis, whereas bio-intensive techniques use both axes, placing multiple plants at closer distances.³ The benefits of bio-dynamics are as follow:

- reduction in water consumption
- increase in soil fertility and
- thus a reduction in amount of purchased* fertilizer
- reduction in the amount of energy used per unit of production (measured in calories)
- a large increase of income per unit of area, due to higher yields⁴



Recreation for all age groups, and equity for minorities - Østerbro has a large percentage of

³Jeavons, John. "How to Grow More Vegetables." *10 Speed Berkely Press*. Berkely, CA 1974

* fertilizer is a main component of any agricultural venture, however we propose integrating a composting system to supplement the planned initiative. The benefits of composting residential and commercial organic wastes include a reduction in the volume of waste and a recycling of nutrients. This would bring Østerbro one step closer to a "closed-loop" system.

⁴ Ibid

youngsters⁵ who lack in recreational and cultural opportunities⁶ – similarly, citizens have expressed the need to ensure recreational and cultural opportunities for “ordinary” adults aged 30-50, to ease membership to those not already in traditional associations, and to integrate ethnic minorities into community associations.⁷ Urban agriculture enables socially stratified communities to come together and cultivate relationships while tilling the land and transmitting important values for our health and the health of our environment.

Education - the aim is to reach as many people as possible but focusing on youngsters in order to convey awareness, conscience and knowledge on various issues of sustainability – our supposition is that by educating children, parents will at least become aware, if not involved. Most of this knowledge will be directly linked to the everyday life experience of consuming food and will be divided into two main sections:

A. Basic Knowledge

For example: Where does our food come from? How is it produced? What composes a healthy diet for the human body while being sustainable for our environment? What are the environmental costs of different foods and why? How do fertilizers and pesticides affect our food and our environment?

B. Practical Knowledge

This is directed more at the actual participants of the urban farms and gardens, teaching them the technical knowledge of bio-dynamic farming and bee-keeping while introducing them to different forms of organic agriculture allowing for their own development in the direction they are interested in (e.g. permaculture).

Environmental benefits & Economic opportunities - The environmental benefits are multitudinous: reduction of long-distance transport of goods contributing to a reduction of pollution and emission of greenhouse gases, reducing use of environmentally harmful pesticides and fertilisers, creating awareness in the population for further sustainable ways of living (recycling, re-using, repairing, compost, vertical window farming in your own flat, and so forth). At the same time the increasing production of fresh organic produce and honey from beehives will enable the ØsterFarm to largely, and with time even fully, sustain itself as these can be sold locally. The option of opening small cafes to invite more people to hang out in the gardens may also offer an opportunity to finance the projects.

Technological advancements notwithstanding, the trend we see in Copenhagen already points to a local approach to the food system. By integrating the young people into urban agricultural adventures Østerbro can get a head start in the process – by investing 125,000 DKK now, Østerbro can move toward a fully sustainable food system for those living in Nordhavn and eventually all of Østerbro, and establish itself as a truly “green” community.

⁵ Bydelsplan for Østerbro 2009; pg.8

⁶ Østerbro Lokaludvalg, <http://www.oesterbrolokaludvalg.kk.dk/page/135.html>

⁷ Bydelsplan for Østerbro 2009; pg.19

Implementation :: Timeline & Costs

By placing the plots in Nordhavn*, we can help to ensure more sustainable social development for the proposed residential areas in Nordhavn, by creating inroads for all social groups. Furthermore, the many developments in farming can be transported. Portability is a key in urban agriculture as tenure is rarely permanent and flexibility is a virtue – transporting only requires collecting embedded soil and any structural pieces and moving them to an available plot.

The early phase would be initiated by members of the cultural and creative class (such as art collectives associated for example with the Bolsjefabrikken) and knowledgeable bio-dynamic farmers such as us at, UrbanRise. This would involve setting up rudimentary info shops from recycled materials to create spaces for meeting and exchange and parallel preparing the basic foundations for the farming plots.

Marketing - an extensive marketing strategy that is specifically aimed at youngsters but also at a broader audience will inform people about these projects and start collaboration with other cultural centres and institutions. This will involve slogans such as:

"Honey, the bees are home!" – "No more killer cucumbers!" – "Greenbro" and so forth, accompanied by a series of foto-posters showing young, attractive and fashionable Danes farming and harvesting because, "Farming is sexy".

Phase 1 - The first phase of the initiative will last two years, at a minimum. It takes time for the creation of ecosystems, microclimates, and biodiverse soil - sometimes up to five years. However, it can be achieved in a single growing season if it is properly tended to, but the most realistic time-frame for achieving nutrient rich and balanced soil is two-years. Once the soil-system is nutrient rich and providing adjusted yields (4-6 times industrial agriculture per square meter), Phase 2 can begin by harvest time of the second season. With the money from harvest, investments in greenhouses can be made to extend the growing season, processing of produce can begin for the market, and honey will be ready to process and package within the first season provided that we have a good source of pollen for them to feed from (with the flowers and botanicals selected to accompany the edible plants, the bees will have wonderfully tasting honey and will accommodate the diversity of the ecosystem). At this time the community center will be thoroughly invested in; creating a comfortable and stimulating area to bring in young people interested in ØsterFarms and setting up the framework for education. Marketing will also be heavy at this time in the form of information dissemination at local cultural spots and schools in Østerbro.

Phase 2 - The second phase will involve strengthening nascent partnerships with other community

* Planning documents have indicated that Nordhavn could provide a well suited location for cultural/ recreational initiatives.

organizations, most significantly, we've spoken with organizers of Københavns Fødevarefællesskab (KBHFF), who expressed interest in partnering with a truly local, truly organic urban farm. KBHFF is 4000 members strong and have strong ties to community organizations as each member owns equal parts of the organization. Funding opportunities can be derived from this relationship as well. To be able to provide food directly to them, upon request, is a very strong possibility and would provide great benefits for both organizations. KBHFF mission is to provide an alternative to the "supermarket" paradigm, thereby aligning itself with the same global vision that ØsterFarms holds. Funding opportunities can be derived from this relationship as well. Funds can also be allocated to create a branding of products and to make the farms and the organizations more visible on a city wide scale.

Phase 3 - The third phase brings will begin when the economy of the operation is balanced and entrepreneurial agricultural classes can begin on Nordhavn, to spread the knowledge and enable others to start similar operations. Furthermore a full fledged marketing campaign can begin, and products will be much more visible in the community. The branding of Østerbro as the 'Urban agricultural technological hotspot' can begin as well, perhaps attracting research grants.

Financials - The initial reward of 125,000 DKK, will go to the purchase of soil, seeds, fertilizer, wood, irrigation equipment, and tools for the garden plots (70,000 DKK), and to beekeeping equipment (20,000 DKK) with the remaining 5,000 DKK, being allocated for as-needed expenditures in the first year.

The style of beekeeping commonly used in Denmark provides the best yield if the bees are able to harvest from the beginning of blossoming season, thus we conclude that we can source some revenue by the end of the first year from the harvesting of honey. Though we had a verbal agreement with KBHFF for 10,000 DKK, we have not been able to confirm this on paper over the long weekend, but are confident in their sincerity.

Project Relevance :: (and how to promote sustainability)

The scope of the sustainable characteristics of our proposed venture is both global and local, and dynamic in social, ecological and economic sustainability. Globally, we see a problem with the industrial-agriculture paradigm; the low yields, the high pollution in the form of fertilizer, pesticide and herbicide run-off, the destruction of eco-systems, the disruption of time-tested local economies sustaining themselves off traditional agriculture, the monoculture approach denying the soil necessary nutrients and further disrupting local food-systems, the poor quality and possible danger of food once and if it reaches market, and foremost the use of

fossil fuels in transport and fertilizer production⁸9101112¹³.

Urban agriculture allows for many positives. Socially; work is provided, education, recreation, leisure and healthy micro-climates, and most importantly fresh and healthy food is provided. Economically; with little start up money, intensive urban agriculture can produce yields up to 10 times that of industrial methods¹⁴, and the possibility of creating value-added products (processing select crops) can further sustain the economics while assisting in the branding of the operation when the products eventually go to market, which is the end-goal of this venture. Ecologically, urban agriculture creates numerous benefits: A reduction of transport needs will be warmly noted in a neighborhood already concerned with traffic levels¹⁵ and expecting a strong increase in the years to come, creation or recreation of ecosystems to slowly allow a biodynamic environment to reemerge within urban fabric, birds, bees insects and indigenous plant species included, a reduction in the need for petrochemicals, herbicide and pesticides, and nitrogen fertilizers.¹⁶

We consider these benefits to be evident, but assume that there will need to be some well directed marketing, and organization to make this work. There will be three stages of development during which the marketing and those who are benefiting will be strongly related. The first stage involves interesting the target group of 12-17 year-old residents. In order to do this effectively we will propose recruiting some apt young people to help us to promote the initiative, kids who are genuinely interested in the movement. To bridge the gap, spatially speaking, we will partner with schools, and socially aware organization on and around Østerbrogade, where we can disseminate information about events that will be planned on a regular basis to bolster interest. Once we achieve in getting the young-people to the location(s) in Nordhavn some recreational activities outside of gardening will need to be available. We do not propose to force work on those interested, and thus think it is important to provide outlets when their interest wanes, as it does in teenagers. Ideas include the construction of a climbing wall, which would be inexpensive if existing structures could be used, a basketball hoop, and certainly a cafe style refreshment area. The second stage of development will entail the strategy to market the goods produced at ØsterFarms. Furthermore, a more permanent location will be established in Østerbro proper, again on or around

⁸ Smit, Jac, Annu Ratta and Joe Nasir. Urban Agriculture: Foods, Jobs and Sustainability. New York: UNDP, 1996

⁹ Nasr, Joe and Jac Smit "Urban Agriculture for Sustainable Cities: Using wastes and idle land and water bodies as resources." Environment and Urbanization 4.2 (1992) 141-152.

¹⁰ Despommier, Dickson. "The Rise of Verticle Farms." Scientific American Magazine 301.5 (2009) 8 pages.

¹¹ "Why Farm the City? Theorizing Urban Agriculture through a lens of Metabolic Rift." Cambridge Journal of Regions, Economy and Society 3.2 (2010) 191-207.

¹² Nathan. Winne, Mark McClintock. Closing the Food Gap: Resetting the Table in the Land of Plenty. Beacon Press, Boston. 2008.

¹³ Vandana, Shiva. Stolen Harvest: The Hijacking of the Global Food Supply. South End Press, Cambridge, MA. 2000.

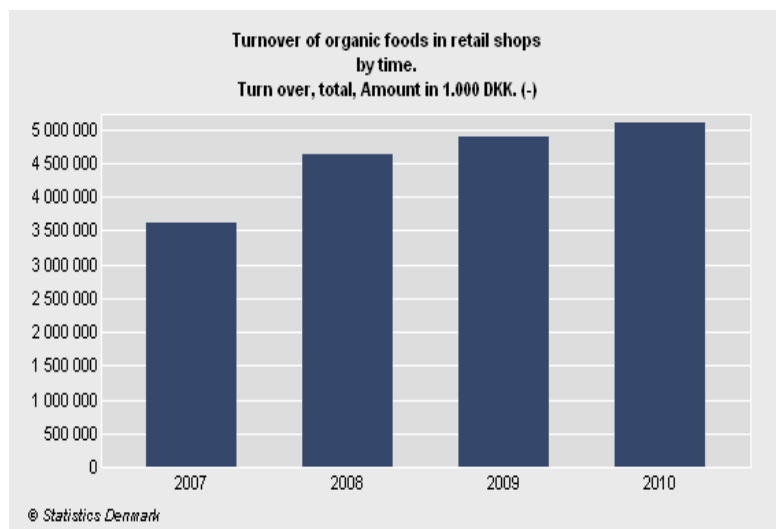
¹⁴ Smit, Jac, Annu Ratta and Joe Nasir. Urban Agriculture: Foods, Jobs and Sustainability. New York: UNDP, 1996

¹⁵ Østerbro trafikgruppe, 2009 Report

¹⁶ Despommier, Dickson. The Verticle Farm: Feeding the World in the 21st Century. St. Martin's Press, New York. 2010.

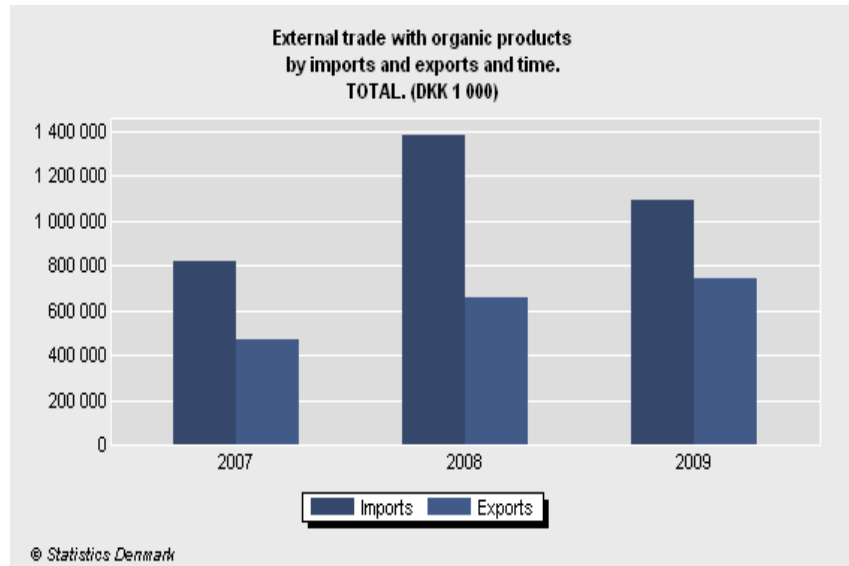
Østerbrogade. From this point we can establish a daily booth at the Fredriksbrogade daily market and we can intensify the branding strategy for the products, coupling the name with the location of operating farms. By the third and last stage there will strong cash-flow from sale of the produce and honey, and the research can begin on different technologies to boost yields such as: greenhouse, vertical/hanging, aquaponic, hydroponic and permaculture agricultural techniques. At this point ØsterFarms can establish itself as a bona-fide producer, distributor* and research facility. This is the stage in which the strongest benefits come to Østerbro as a whole. We see a marketing strategy not only for the produce of the farms, but also for Østerbro as a destination for urban agricultural information and resources.

Analysis of the current “organics,” market shows us that there is *still* considerable growth in market-share, and we think localizing organics can give Østerfarms a competitive edge.



(source: http://www.dst.dk/HomeUK/Statistics/focus_on/focus_on_show.aspx?sci=977)

* Distribution strategies can be centered around bicycle transport, as the food will stay local, and sustainable vehicles such as electric cars, bio-diesel or hybrids. Vehicles will require a partnership, or an advanced version of Østerfarms in which strong profits are being made.



(source: http://www.dst.dk/HomeUK/Statistics/focus_on/focus_on_show.aspx?sci=959)

In recent years there has been a steady increase in the turnover of organic foods, indicating an increasing demand for high-quality produce. However, only 6% of Denmark's agricultural land is dedicated to organic farming¹⁷. This means that much of the organic food has to be imported, as can be seen in the graph below. The ratio of imports has significantly reduced with the increase of land dedicated to organic farming, making Denmark a greener nation. Copenhagen can become a greener city by reducing its own imports and beginning to produce locally.

Strengths :: Weaknesses

Weaknesses (or challenges to overcome):

- A need to overcome the barrier created by the railroad tracks.
- **Dependency on a bridge or tunnel/link to the main part of the neighbourhood**
- The time line may require more time than optimal in keeping young people interested.
- Agriculture is never a certainty, and crops may not flourish depending on varying environmental conditions.

Strengths:

¹⁷(2008 source: <http://www.organic-world.net/denmark.html>).

- Low investment needed.
- Activates many stakeholders within the community; young, old, wealthy, poor, immigrants, ethnic and religious minorities.
- Satisfies social, economic and ecological sustainability standards.
- Moveable and flexible
- The possibilities for expanding are endless, but because of the low investment moderate expectations will provide peace of mind.
- Provides locally produced, tasty and fresh foods.



Criteria for Success :: Evaluation

The evaluation process needs to focus on the multiple aspects of the project and is thus divided into three main categories. The overall performance and success in sustainability education will be indicated by the ratio of the aspects evaluated below. It is important to note that education will not be measured in the stereotypical school-exam way, education involves communication (community) and its advances will express themselves in the success of the agricultural project and the economic aspects.

- Community Building
- Environmental sustainability
- Economic efficiency

Evaluating possible successes for ØsterFarms will entail setting goals for annual crops yields, growth in allocated land, technological advancements and research (greenhouse farming, testing of aquaponics, hydroponics, hanging/vertical agriculture etc.).

Furthermore there should be an assessment of community awareness. The project's success does not wholly depend on community-wide recognition, but it is important to establish goals to evaluate visibility in order to continue to grow and effectively proliferate urban agriculture as a practice.

Finally, the **criteria for success** involves a dedicated time-line for ensuring a productive first season of crops. Planning should begin next winter to ensure that actors are prepared when planting season begins in the spring. For the first year, a minimum of 1 hectare in total land allocation, most probably divided into separate allotments, should be allocated for use of intensive agriculture. The plan would benefit by adding another hectare

each year, expanding to between 4 and 6 hectares, depending on land availability and success.



ØsterFarms

by UrbanRise

copenhagen :: madrid :: vienna

For further information please contact:
jakewaltman@yahoo.com

June 2011

Appendix C: Aquaponics

C.1 Prags Have Aquaponics

In July 2011, I proposed an aquaponics project to the organizers of Prags Have. Prags Have in turn proposed the idea to the organizer of Giv Rum, the organization explained in Section (4.1). Give Rum accepted the proposal and I received, through the workings of Prags Have, 6000 DKK or just over 1000 USD. The aquaponics system was to be an exhibition at an international conference being held by Giv Rum, on the recycling of urban spaces. The conference ran August 18, 19 and 20, during which time I was to assemble the aquaponics system. The photographed results are below.

Image C.1



Image C.2



Image C.3

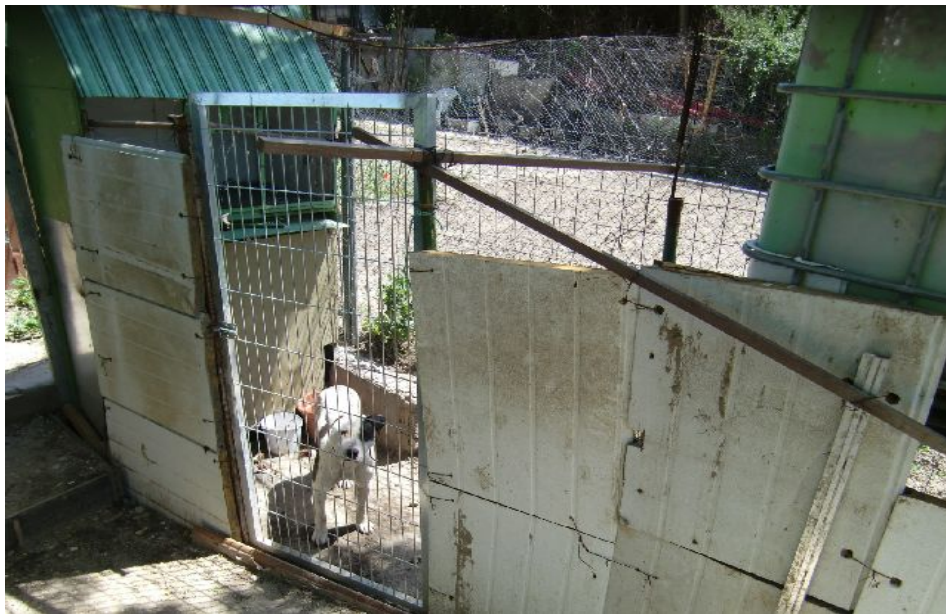


Image C.4



Appendix D: Images

Image D.1



* Canine security at informal allotments on the Manzanares in the south of Madrid.

Image D.2



- Technical irrigation system at informal allotments on the Manzanares in the south of Madrid.

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CURRENT PROJECT WORK

Aquaponics Nu: Copenhagen, Denmark

As a founding partner I head research and development, and business development. Aquaponics Nu, started in September 2011, aims to proliferate the aquaponics technique of cultivating plants and fish. Our goal as an organization is to create new economies around urban agriculture to create more socially and economically sustainable cities. We provide both products and consulting to support aquaponics solutions for urban agricultural initiatives. See www.aquaponics.nu/en

Program contact: Erik Wulf-Svedsen, M.Sc., Copenhagen, Denmark > Eriksteen@gmail.com

Akvaponisk Selskab: Copenhagen, Denmark

As a board member and founding member of the Akvaponisk Selskab, I assists with searching for funding from non-corporate sources. The goal of the selskab is to create awareness of the practice of aquaponics through an open-source foundation of knowledge and technology. As a board member I have sought and secured funding from Copenhagen's largest alternative food distributor, and created partnerships with various ecologically and socially equitable organizations.

Program contact: Andreas Hagerman M.Sc., Copenhagen, Denmark > andreashagerman@gmail.com

Urban Lift: Copenhagen, Denmark

As part of a consulting team investigating the feasibility of establishing floating gardens to act as purifiers on the inner-lake ring of Copenhagen's urban fabric. Feasibility study and project proposal will be submitted December, 2011.

Program contact: Christian Meyer M.A., Copenhagen, Denmark > trulstrambo@hotmail.com

Vom Finstern: Hildesheim, Germany – October 2011

Vom Finstern is an urban art project for which Urban Lift, have proposed a shadow theatre to confront issues with demographic shifts in provincial Central Germany.

Program contact: Anna Jehle M.A., Hildesheim, Germany > abouttheampersand@gmail.com

RECENT PROJECT WORK

Aquaponics: – Prags Gardens (Have), Copenhagen – August 2011

Funded by the municipality's outreach organization, I constructed an aquaponics system as part of a conference on reusing urban spaces. Aquaponics is ideal for urban food production; growing both fish and vegetables in small amounts of space.

Program contact: Nina Woelnick M.A., Copenhagen, Denmark > Pragshave@gmail.com

Tallinn-Helsinki Twin Cities: Tallinn, Estonia - June 2011.

As a member of a small group of students and considerably larger group of experts, I assisted in the drafting of an exploratory document analyzing the feasibility of fostering a “twin city,” economic relationship between Tallinn, Estonia and Helsinki, Finland. The working document can be found here: See: http://issuu.com/tallinnhelsinki/docs/110620__tallinnhelsinki

Program contact: Panu Lehtovuori, PhD, Helsinki Finland > Panu.lehtovuori@artun.ee

Urban Lift: Osterbro, Copenhagen - May 2011.

As the head of an urban consulting cooperative, UrbanLift, I tendered a proposal to the Copenhagen Municipality with the aim to instal urban gardens at a derelict brownfield district being threatened by private, high-end development. Proposal available upon request.

Cooperative partner contact: Isis Frisch M.A., consulting partner at Urban Lift, Vienna, Austria > isis.frisch@gmx.at

Meliana's Farm: North Shore Hawaii - July 2010

As a volunteer I began my first practical experience farming at a organic, non-GMO, human powered farm on the north shore of Oahu. I was able to contribute to the mastering of the interface between the purchaser (the public) and the producer (the private) through CSA initiatives and dynamic marketing systems such as trading, bartering, farmer's markets and home delivery.

Contact: Meleana Judd, Owner and Operator Meleana's Farm, Haleiwa, HI > meleanajudd@gmail.com

4Cities cooperation: Gumpendorferstrasse, Vienna, Austria - June 2010.

Indicating Vienna's Gumpendorfer Strasse, as one of the areas at risk for social displacement through gentrification, we created four working groups to address problems that could be solved without the contribution of private monies. Our proposals, from reducing traffic noise, to bridging roadways, and creating sustained green paths (thus connecting existing green areas) were translated to German and presented in an official ceremony to the district heads of Vienna's 6th.

4Cities cooperation: Quartier Nord, Brussels, Belgium - November 2009

In another cooperative project addressing the problems of gentrification, we looked into informal economies in Brussels' highly-marginalized northern neighborhoods. Through extensive interviews with stakeholders, both public and private, we crafted specific proposals to foster social sustainability. Working from the disparities between the users of the neighborhoods and the inhabitants, we identified a re-appropriation of space, through institutional processes, as the strongest possible initiatives. More information upon request.

MASTER'S PROGRAM

4Cities Unica Euromaster European Union, August 2009 - 2011

4Cities is a two-year interdisciplinary master's program in urban studies, organized within UNICA, the network of universities from the capitals of Europe, financially supported by the European Commission.

Thesis Title: *Urban Agriculture - Practical Applications and the Effect of Entrepreneurialism.*

Program and Thesis Contact: Fernando Molini, Madrid, Spain > fernando.molini@uam.es

PROFESSIONAL EXPERIENCE:

Lingue Senza Frontiere, Sanremo, ITALY June 2008 – August 2009

Supervisor,/coordinator, Teacher

Supervised a group of 11 actors, touring Northern Italy as a TIE production.

Supervised 100 + tutors and 30 directly, during summer season.

Coordinated "immersion" workshops, teaching 1-3 week intensive immersion programs in public schools.

Assisted in the coordination and oration of weekend seminars for Italian teachers of English.

Advised and discussed methods of teaching through "interculturalism" and didactic methods.

Recruiting director of American Universities.
Marketing assistant for “English Summer Camps.”

The Southern Maine Signal. South Portland, ME September 2007 – May 2008

Marketing and Promotions, Journalist

Assisted in organizing a sustainable, socially aware, non-profit magazine that returned all profits to community groups, chiefly schools and municipal departments such as fire, and E.M.S.

Helped in organized eco-friendly printing using vegetable oil inks and %100 recycled paper, and internet subscriptions using flash technology to relieve total usage of paper.

Organized a “gorilla” marketing campaign for launching the publication.

Acted as account executive on all advertising ventures, including indoor billboards, web, magazine and outdoor advertising.

Creative assistant in developing new mediums for outdoor advertising, and the indoor billboard campaign.

UncleTV Production Company, Santa Monica, CA April 2007 – May 2007

Intern

Catalogued dailies.

Performed typical internship duties: answered phones, assisted with paperwork, proofread.

Assisted with rough editing on FinalCut Pro.

Assisted with set up and tear down of music video, commercial, and series shoots.

Transcribed all adlib content, proofread and organized final scripts.

Oxford & Associates, Boston, MA September 2006 – February 2007

Account Executive

Created accounts with new and existing companies through cold-calling and hot leads.

Placed high-end, niche IT consultants with companies in need of a contracted position.

Fostered relationships with client managers through outside sales with an aim for placing high-end IT consultants.

Maintained a flexible expense account.

Traveled to client manager’s office locations and visited under the Oxford & Associates name.

Participated in weekly, national, client-manager meetings to assess new and old marketing strategies.

Received Culture-Club award for producing the most listings for the months of September, October and February.

WGME News 13, Portland, ME May 2006 – September 2006

Assignment Desk Editor

Proofread, fact-checked and organized scripts for the evening and 11 PM broadcasts.

Followed up on news leads and stayed in contact with local municipal departments for information on late-breaking news.

Collaborated with the national AP and sister stations for newsworthy stories outside of our region.

Operated teleprompter.

EDUCATIONAL EXPERIENCE:**WMEB 91.9 FM**, Orono, ME September 2003 – September 2005*DJ, On-Air Personality*

Blocked three-hour broadcasts.

Reported campus events live.

Maintained station's communications with transmitter.

Oversaw all technical and production aspects.

Assisted in various other projects, including: Album reviews, station promotion, outside projects, concert promoting.

The Maine Campus, Orono, ME May 2006 – August 2006*News Writer/ Reporter*

Interviewed subjects, reported campus events.

Published over 25 stories.

Produced accurate and timely stories at correct length and AP style format.

Participated in weekly staff and editorial meetings.

The Maine Channel, Orono, ME September 2005 – May 2006*Anchor, Writer, Producer, Studio Camera, Technical Director, Editor*

Anchored a talk-show program.

Editorialized on talk-show program.

Wrote, produced and edited personal project that aired on the channel.

Attended weekly station meetings to discuss programming and content.

Produced weekly, half-hour, live newscast.

UNDERGRADUATE EDUCATION:**The University Of Maine**, Orono ME June 2009**Bachelor of Arts and Sciences in Communication****Major:** Broadcast Journalism **Minor:** History**LEADERSHIP ACTIVITIES:**

Organize an annual charity triathlon to benefit the Evans Spear Foundation

University of Maine Community Action Team