The central component of the 'smartcity' is urban agriculture and the establishment of an ecological symbiosis between nature and built form, addressing the hybrid of programme and landscape.

Smartcities

C. J. Lim

What is a 'Smartcity'? *[1] The* Smartcity differentiates itself from the 'Eco-city' by embracing new paradigms of programme, form and sociological interaction. It is neither a fixed place nor a singular approach but rather a manifesto for the production of a space relevant for the twenty-first century.

The Smartcity is not a creation from a blank slate, but an evolution of long-standing sustainable principles that intertwine with contemporary desires for a healthier physical, mental and social existence in an increasingly alienating world. It aims to preserve and enhance natural and cultural resources, expand the

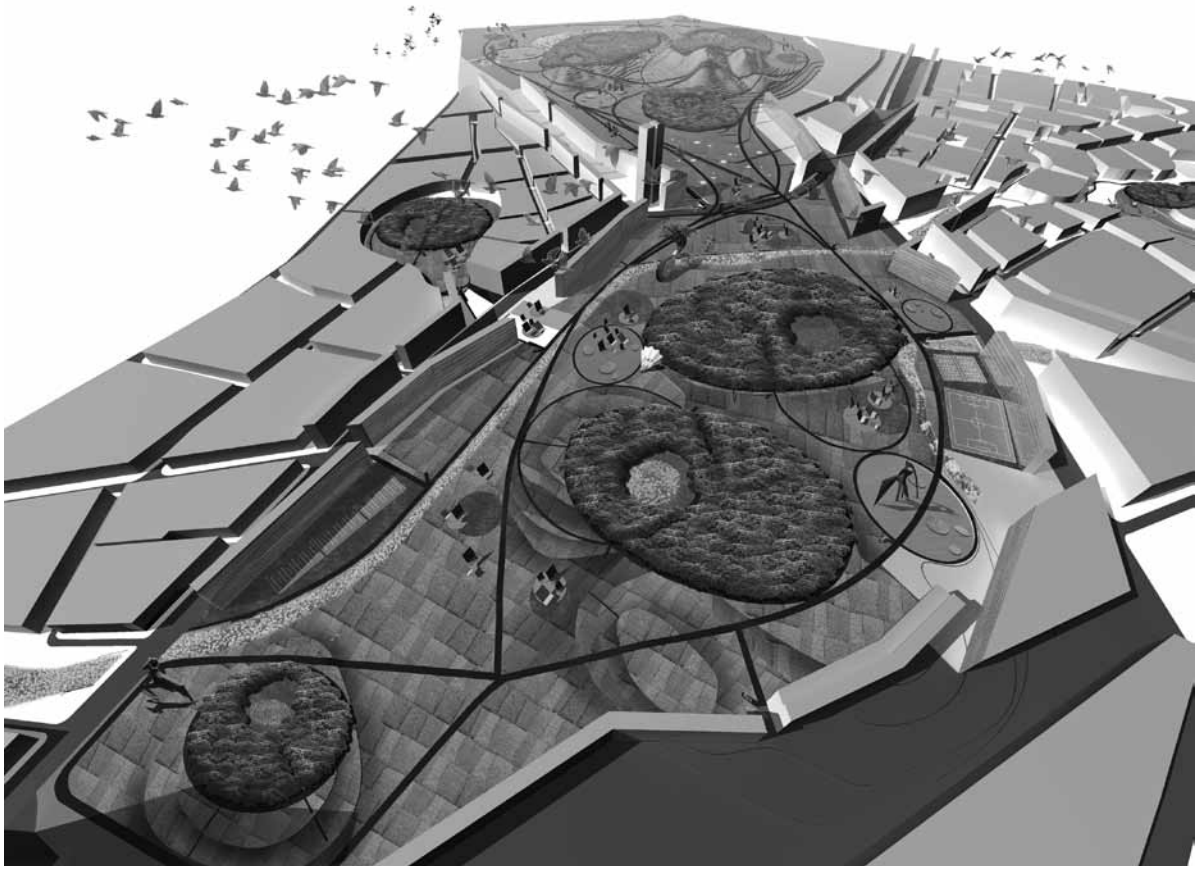


1 Nordhavnen Smartcity, Denmark masterplan

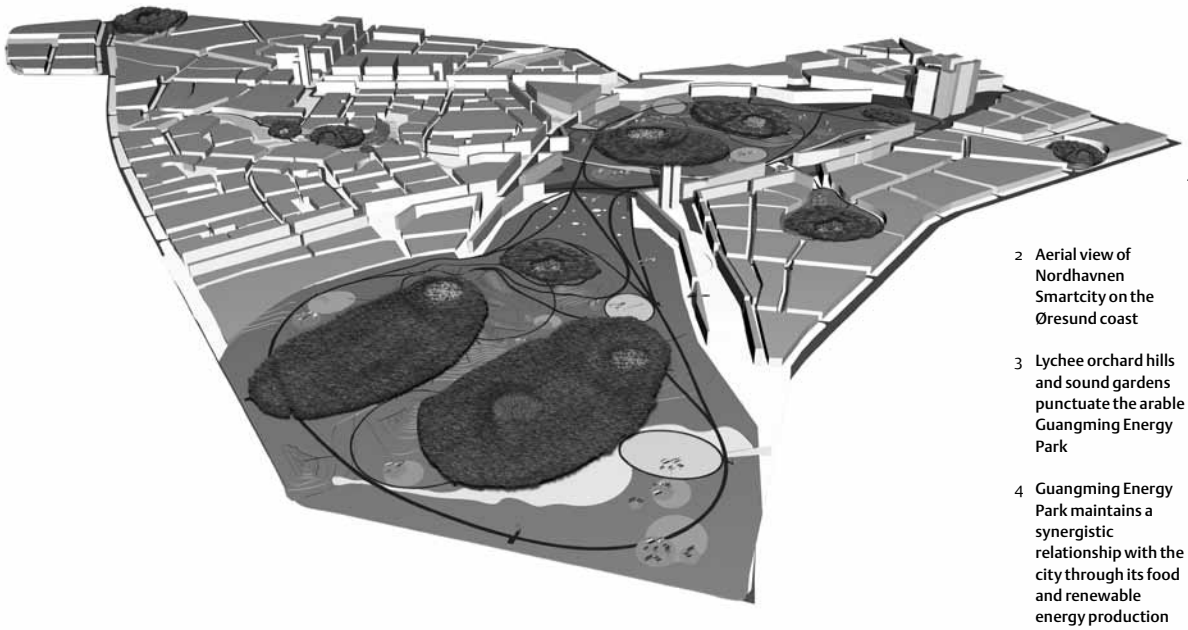
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2 Aerial view of Nordhavnen Smartcity on the Øresund coast

3 Lychee orchard hills and sound gardens punctuate the arable Guangming Energy Park

4 Guangming Energy Park maintains a synergistic relationship with the city through its food and renewable energy production

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range of eco-transportation, employment and housing choice, and values long-term regional sustainability over short-term focus. The currency of an 'eco-' prefix has become devalued through overuse and abuse, and 'sustainability' is a blanket expression – clearly, some aspects of our lifestyle are worth sustaining and others are not. Deciding and acting on which category they fall into, however, is not as straightforward as it appears. Conservation of energy and the environment are key priorities, but so too is the conservation of heritage, tradition and human interaction. Each generation is the proprietor of its own values, and the current zeitgeist has reacted against the mass-produced and anodyne, whether in the guise of housing, jobs and clothing or fruit and vegetables. Without ignoring technological advances, the Smartcity embraces leanness and the low-tech by adopting an operating system that filters out excess and reboots our social space. Smartcity living does not ask for 'more' but determines how to use less in the creation of a healthier mental and physical existence *[2]*.

At the time of writing, more than half of mankind – some 3.3 billion people – are living in urban areas. By 2030, this is expected to swell to almost 5 billion.[1] We are simultaneously experiencing a global food crisis resulting from low productivity, government policies diverting food crops to the creation of biofuels, climate change and intensifying demands from an exponentially expanding population. 'The world is heading for a drop in agricultural production of 20 to 40% depending on the severity and length of the current global droughts. Food producing nations are imposing food export restrictions. Food prices will soar and, in poor countries with food deficits, millions will starve.'[2]

At the forefront of the Smartcity manifesto is urban agriculture. The hybridisation of agriculture and urban fabric can lead to an association that is symbiotic rather than parasitic, reducing carbon emissions and food shortages in addition to providing less tangible but equally significant environmental and social benefits. Food in most cultures is the glue that binds families and communities, and the restoration of the primal link between town-dwellers and their sustenance would constitute an important foundation to an increasingly ungrounded universe *[3, 4]*.

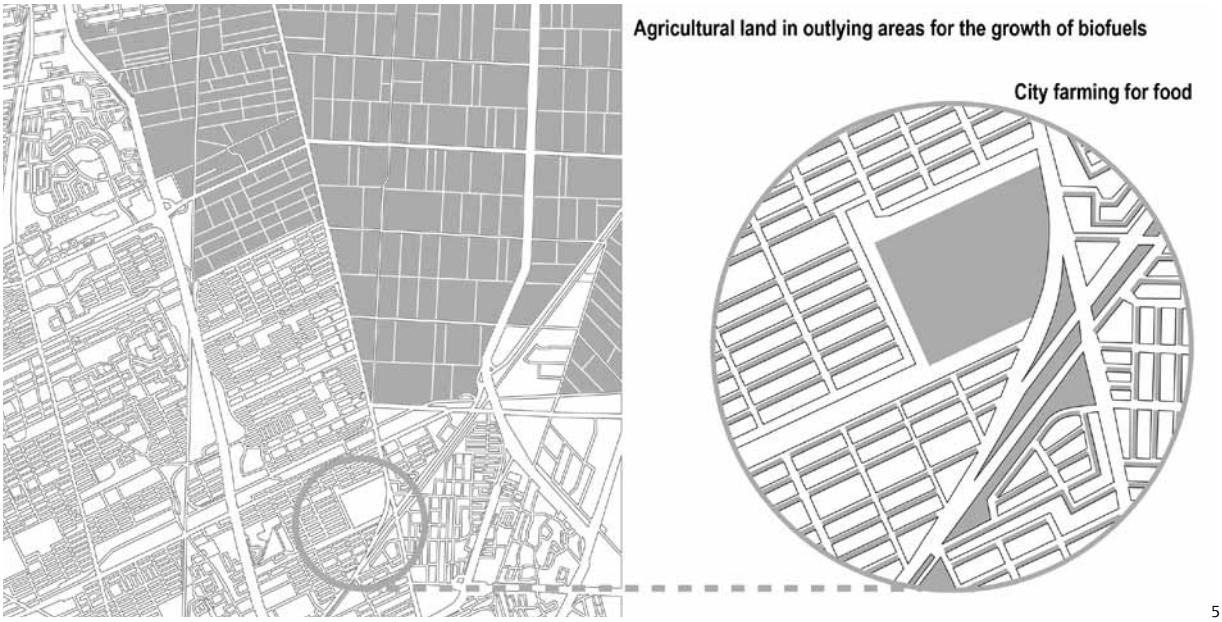
Therefore, 'Smartcity' is a vision, a manifesto and provocation. A vision of how the city of the twenty-first century might appear if we are serious about living sustainably and wish to leave any form of legacy to our descendants. Instead of a reactive approach to the manifold problems that contemporary life has thrown up, the Smartcity examines how we might live from first principles, taking the key component of any city – its people – as its starting point and raison d'être. These six manifestos address how we might get from the present to the proposed vision of the Smartcity:

1. Scenic Positions

At its most simplistic level, the 'design' positions farming within the city, taking advantage of beneficial adjacencies between programme and function *[5]*. Urban solid waste and greywater can be used as fertiliser and irrigation; food transport and associated carbon emissions are removed from the equation. Proposed intervention sites vary considerably in scale and context.

Urban agriculture is not a new phenomenon; its popularity and adoption has waxed and waned over the millennia, from the recycling of urban wastes and *qanat* tunnel irrigation networks in ancient Persia for agriculture, to the stepped cities and farming terraces of Machu Picchu that can be considered as a precursor to hydroponics. In more recent times, victory gardens during the First and Second World Wars were employed to alleviate food shortages with rooftops, balconies, pontoons and

5 Imagining Recovery - Farming within the city takes advantage of programmatic and functional synergies



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6 Imagining Recovery – Ready access to nutrition and reduction in food-miles

public parks appropriated for the food production. In a remarkably ambitious programme, gardening classes, literature, seeds, fertiliser and committees were organised, yielding over half a billion dollars worth of war-garden crops at the end of the First World War in America alone.[3] The metrics of the Smartcity will be clearly manifest, growing before our eyes while beautifying our environment.

In peri-urban areas, the intervention is more profound and far-reaching. New housing developments can be planned to integrate farming at the scale of landscape. Buildings can be planted into the natural topography, surfaced in growing media, oriented to receive or protect from sunlight, and integrating water conservation and waste recycling components. In addition to supplying food for consumption and commodity, energy demand can be dramatically reduced. With food production concentrated in urban and peri-urban areas, agricultural land in outlying areas can be used for the growth of biofuels, without causing deforestation abroad.

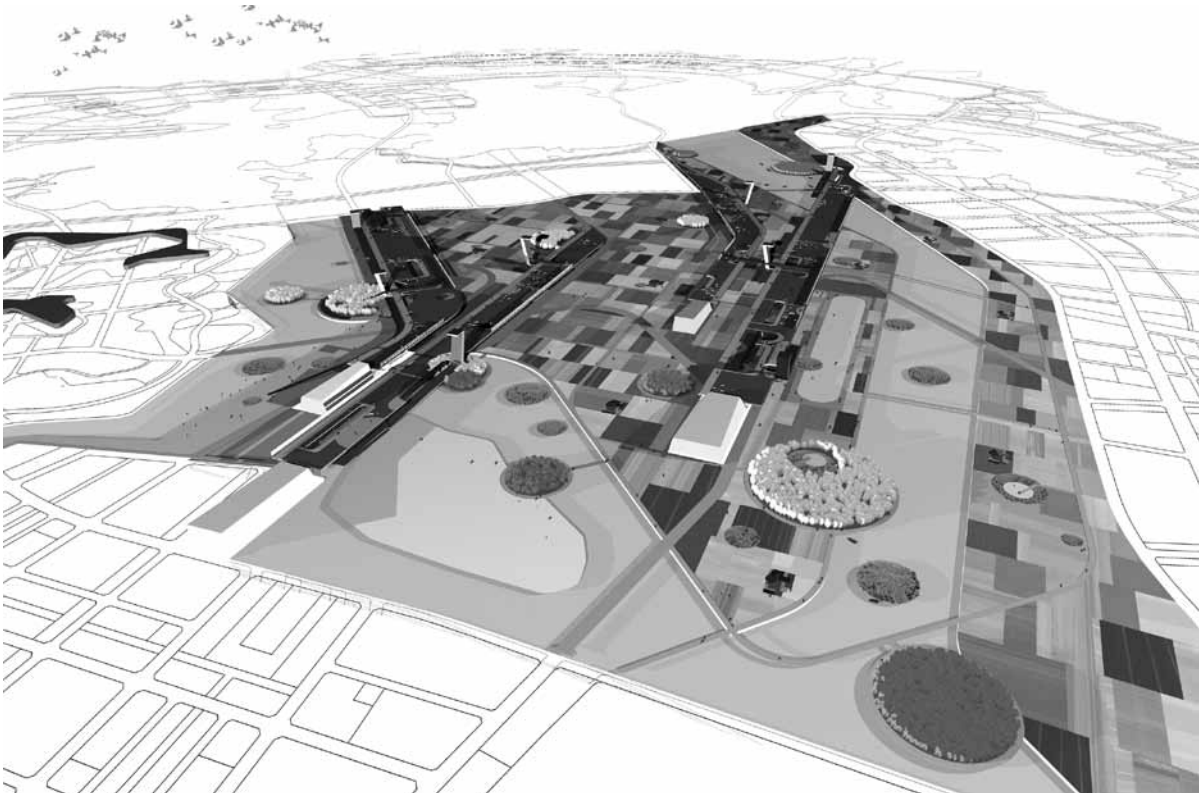
2. From Soil to Table

Prior to their fall from grace for eating from the tree of knowledge, the fruit from the Garden of Eden provided Adam and Eve with food aplenty without having to toil for their sustenance *[10]*. Since humanity's earliest days, we have yearned for immediate access to fresh healthy food. Refrigeration and rapid transport systems have, to a certain extent, made time and distance an irrelevance. In developed nations, however, processing, packaging, transport and storage account for 80% of the energy used to place food on the kitchen table. Produce in the United States travels an average of 1300 to 2000 miles from farmer to consumer.

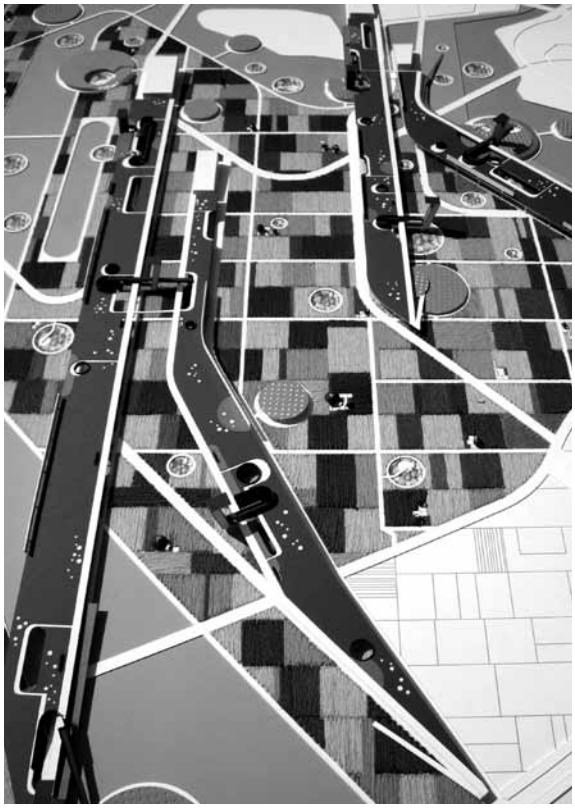
The modern food industry epitomises the Marxist theory of alienation[4] perhaps better than any other labour activity. Unlike other trades and crafts that have followed esoteric and non-essential vectors, procurement of basic sustenance has always been a universal and innate occupation – foraging, hunting, husbandry and harvesting are straightforward exchanges of human capital in the form of energy expended and nutritional recompense. The abstraction of food from its origins through processing, portioning and packaging constructs a disassociation between the food producer and product, and between urban consumer and rural supplier. The consequence of this disassociation is that we, as consumers, are not seeing the clear effects of climate change and energy shortage on food production. Food supplied through the supermarket monopolies is still highly affordable despite the rising prices of fuel essential for modern agriculture, but the cost of food we do not see takes into account the expense of environmental damage. Excess nitrogen runoff from fertilisers causes eutrophication of our lakes and rivers, resulting in contaminated water and the destruction of aquatic ecosystems. Land-based ecologies are not spared either, despoiled by pesticides and herbicides. It is important to note that these are not simply costs to the environment, but fiscal costs to the general public in the form of subsidies, clean-up costs and health treatment for poor nutrition, obesity, contaminated food and disease.

The implementation of urban agriculture – the cultivation, processing and distribution of food within the city – would have the twofold effect of making these processes transparent and offer a means for the re-establishment of food and its production as a social relationship rather than commodity. It will mean an end to a nonsensical

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7 COS, South Korea – Aerial view of a sustainable food production smartcity

8 The relationship between lawn piers and existing agricultural carpet of the COS Smartcity

boomerang trade that sees the UK importing 22,000 tonnes of potatoes from Egypt and exporting 27,000 tonnes in the other direction.[5] Urban agriculture will result in food immediacy within cities, providing nutrition and health benefits, and the city will benefit from urban greening and the maintenance of green open spaces. Bringing living food back to where we live will not re-establish the Garden of Eden, but there will be no second, third and fourth parties responsible for the commodification of produce, giving a new meaning to hand to mouth existence *[7, 8]*.

Today, the enduring dream of green space and growing food for oneself can be found in the allotment; a land reform system that has taken the form of the American community garden, the Russian *dacha*, the French *jardin familial*, the Dutch *Volkstuin* and the Danish *Kolonihave*. Growing one's own food in Russia is a long-established tradition, among the affluent and underprivileged alike. In Germany, according to the concept of granting, there are the *Kleingärten*, the *Schrebergärten*, *Kolonie*, *Parzelle*, *Armengärten*, *Sozialgärten*, *Arbeitergärten*, *Rotkreuzgärten* and *Eisenbahnergärten*. Perhaps most noteworthy is the intercultural garden, a project of the German Association of International Gardens that aims to improve racial integration and promote intercultural interaction.

3. Cultivating Community

The global recession and 'credit crunch' must be seen as an opportunity as well as catastrophe, enabling society at large to realign itself with a grounded value system that repudiates rampant consumerism and exploitation *[9]*.

Similarly, it is time for the designer to reassess the

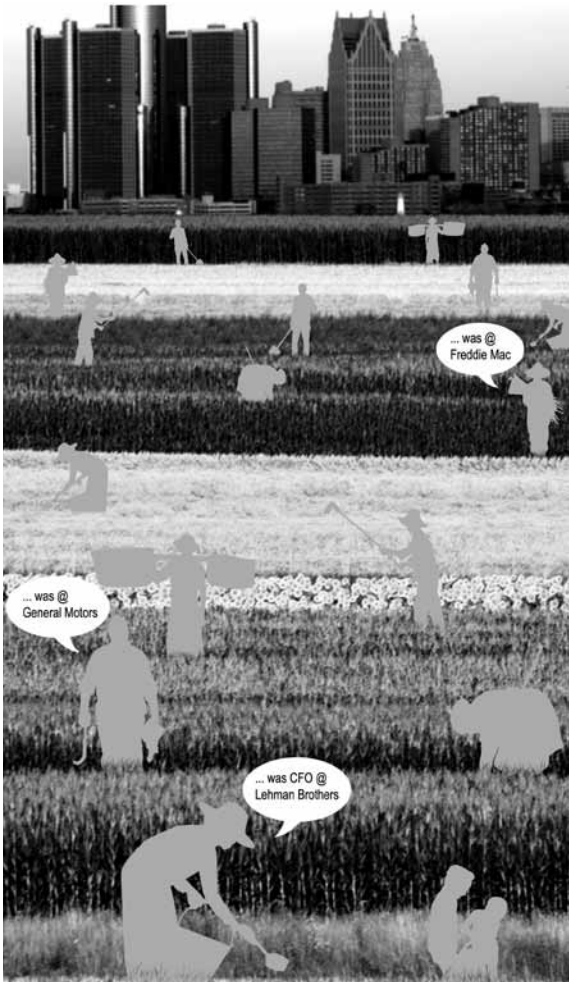
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values of the profession. In order to regain public and political confidence, design needs to offer intelligent solutions that focus on need and demonstrate added value. Beauty will not be judged purely through the lens aesthetic but also through the elegance of efficient arrangements and systems.

The Smartcity introduces new programmatic functions to disused and forgotten sites within the city. As well as making use of idle locations, employment opportunities will also flower. The Smartcity programme comes with a host of fresh employment opportunities that are cross-sector and require a range of skills in the renewable energy, recycling, agriculture, construction and transport industries. The business case for 'greening' the economy is robust. A United Nations report on green jobs indicates that with energy and commodity costs soaring and growing pressure to adopt greener practices, the global market for environmental products and services is projected to double from $1370 billion per year at present to $2740 billion by 2020. Half of this market is based in energy efficiency, and the balance in sustainable transport, water supply, sanitation and waste management. The potential for improving labour markets is greatest in developing nations, where over 40% of the global workforce and their dependants are condemned to a life in poverty and insecurity.[6] The communal creation and maintenance of a productive landscape offers a means to cultivate a larger responsibility towards recovery among each and every one of us, repairing a diverse and fractured society. The design is delivered by all, no longer the exclusive remit of the designer or builder.

Financial institutions and agricultural *terroir* may appear unlikely partners, but in the wake of the 2009 global financial collapse, region specific gourmet food has operated as a viable, if unlikely, form of currency. Credito Emiliano – a regional bank in Montecavolo, Italy – has been accepting Parmesan cheese as loan collateral since 1953. The bank owns two climate-controlled warehouses in which US$187.5 million worth of parmigiano-reggiano are stored. The loans may account for less than 1% of the bank's revenue, but are vital in preserving Montecavolo's culinary heritage and local economy, given that the cheese needs to age for five years. Other artisan food products such as prosciutto in San Daniele and brunello in Tuscany, have also been considered as unconventional collateral; these commodities are all highly site-specific, both in terms of raw material and local knowledge, and lend credence to Marx's labour theory of value; a commodity should be worth the amount of time and human labour invested in it. The panacea to a deleterious food industry is to replace damaging large-scale monoculture with larger numbers of smaller mutually supporting diverse permacultures. Communities share much in common with agriculture, and one can show the way forward for the other.

9 Imagining Recovery – Communal creation of a productive landscape in disused and neglected sites offers a means to cultivate employment and social responsibility



9

4. Rise of the Eco-Warriors

Today's eco-warriors include scientists, politicians, entrepreneurs, financiers, celebrities and designers among their number *[10]*. As the eco-warrior spirit has percolated down over the years from persecuted prophets to everyday members of society, there are two groups of unlikely players that have taken the stage in the war for humanity – storytellers and farmers.

Over the past decade, there has been a tidal shift in public awareness of unsustainable environmental practices, and this can be partly attributed to storytellers in the mass media. Science has provided us with the statistical proof that humanity is both perpetrator and victim of widespread environmental damage, but facts and figures are poor vehicles for galvanising the electorate and grass roots action. At the end of this decade, the film world has seen a glut of movies with green agendas, most notably Davis Guggenheim's *An Inconvenient Truth*, and Robert Kenner's *Food, Inc.* The former documents Al Gore's commitment to exposing the 'planetary emergency' that global warming represents, the latter the detrimental effect the food industry is causing to health, farmers' livelihoods, and the environment. Both documentaries were produced by Participant Productions, a company with a mission to raise awareness of world problems in the public

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consciousness through compelling narrative. They understand that statistical abstraction is unable to engage the public imagination in the way that story-shaped issues can. When even James Bond movies tap into the zeitgeist – the villain in the *Quantum of Solace* (whose name is *Greene*) is not bent on world domination, but the monopoly of water supplies in Bolivia under the guise of a bogus environmental organization – the critical mass necessary to effect change cannot be far away.

The second group of pivotal players are farmers, the individuals we have delegated to put food on our tables while we engage in more rarefied pursuits. In the Smartcity, with urban agriculture at the forefront, empowered farmers will take on a new instructional role, advising communities on how to best cultivate their crops. In a recent list of fifty people who could save the planet, chosen by an expert panel assembled by *The Guardian* newspaper,[7] five are farmers or have had farming experience, including Al Gore who worked on his family's small-holding as a boy. Also recognised is Bija Devi, who has been a farmer in the foothills of the Himalayas since the age of seven. She now spearheads an international movement to conserve cereal, pulse, fruit and vegetable strains that are at risk of extinction from modern agricultural practices. Having established an extensive bank of indigenous seeds, Devi travels around India disseminating endangered crops and the ancestral knowledge to cultivate them, simultaneously insuring against climate change, soil infertility and disease, and preserving a rapidly disappearing cultural tradition.

Outside the Smartcity, the remit of farmers will become broader. Trained and reinstated as custodians of the land, a new breed of professional farmer will husband energy, natural ecosystems and forestry, arbitrating between the need for carbon sequestration, wildlife habitats, raw timber material and biomass. Provenance will enter the public lexicon in relation to energy and manufactured materials as well as food.



10 Imagining Recovery - greywater recycling and the experience of recovery

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5. The New American Dream

On the one hand, the currency of architectural design is severely devalued when it comes to economic renewal, even in the spheres of housing and commercial developments that it is associated with *[11]*. We can design spaces to be functional, flexible, to have green credentials and even to be beautiful. We can improve quality of life and show a professional regard towards society at large; on the other hand, our contributions are for the most part guided or stymied by government policy and developing agencies. We can contribute through think-tanks and sit on advisory bodies, lobby our politicians with reasoned arguments but all too often offer little beyond an impassioned impotence.

The real power of the designer, whether of food packaging or a city masterplan, lies in the visualisation of an alternative reality, a reality that is demonstrably better but inconceivable without the designer's shared vision. Too often, this alternate reality is glamorous but bogus, used to sell banal consumerism. As imagineers, however, we are in a position to seduce the general public to embrace positive and profound change so that progress is not hampered by cultural bias and financial conservatism.

The American ideal of the single-family detached house and automobile is deep-rooted but requires reevaluation in order to effect change. Wisteria Lane needs to be supplanted by a dream that is both leaner and more expansive, comforting but challenging. Architects and urban designers must finally convince, persuade and cajole us into understanding that shared experience and pooled resources can offer an improved and viable model to individual self-sufficiency. The notion of the compact city, which offers so many beneficial synergies, is at odds with the hegemony of the motorcar and picket-fenced neighbourhood. Change has to be gradual, and will be abetted by both new wireless technologies that permit remote correspondence and transactions and a modal shift in transport such as that implemented in Curitiba, Brazil, that will support physical interaction and societal cohesion.

The Smartcity mediates between, but does not homogenise, the rural and the urban. Green space and fresh air are injected into the city while a layered mixed live-work programme is introduced to the countryside, enabling universal access to both open space and requisite modern conveniences.



11 Imagining Recovery – Grocery shopping in New York's Central Park; Car boot allotments in Detroit

6. The Perpetual Motion Machine

The solution that urban agriculture delivers, channelling urban waste back into farming, which in turn feeds the cities, creates a closed production cycle that is self-perpetuating *[12]*. Of course, the impossible perpetual motion machine produces more energy than it consumes and therefore violates the law of conservation of energy, but if one expands the commonly-received notion of wealth to include the benefits of fresh air, the amenity of green space, social inclusivity, community and personal empowerment and good nutrition, the logic becomes less far-fetched.

Urban agriculture provides a circular economy; the solid organic waste of city dwellers can be alchemically transformed via anaerobic digestion into gaseous energy and fertilising digestate; grey- and black-water from showers, sinks and gutters can be treated and re-channelled to irrigate our crops provided they are in close enough proximity. With the added ingredient of sunlight, we have food from a living grocery store to propel another cycle of the human perpetual motion machine *[13, 14, 15]*.

Urban growth can no longer continue through synthetic linear processes that are colossally wasteful, discharging contaminants into the air, ground and water. Circular organic systems are in comparison regenerative, and it makes sense to ride the wave of these natural systems, harvesting the fruits of a harnessed ecology and feeding the process as necessary to reap disproportionate benefits from minimal investment. Natural systems are self-perpetuating and symbiotic. And it is high time that mankind rejoined these systems as a constructive rather than destructive force.

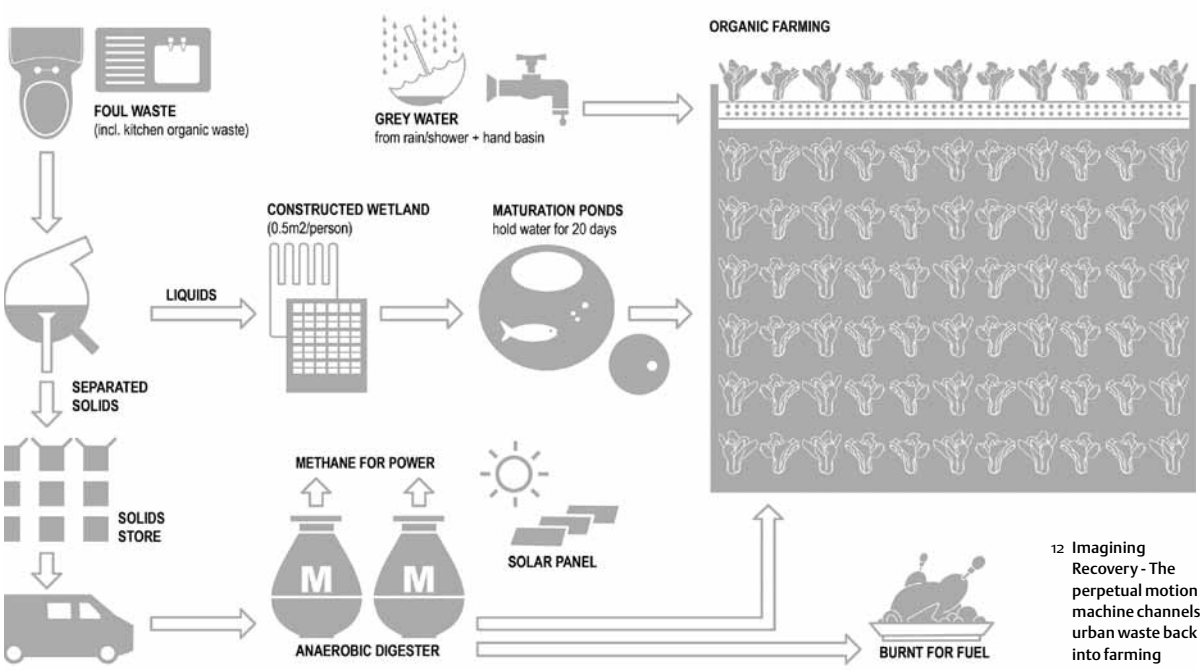
And the LORD God made all kinds of trees grow out of the ground – trees that were pleasing to the eye and good for food.

Genesis 2:9

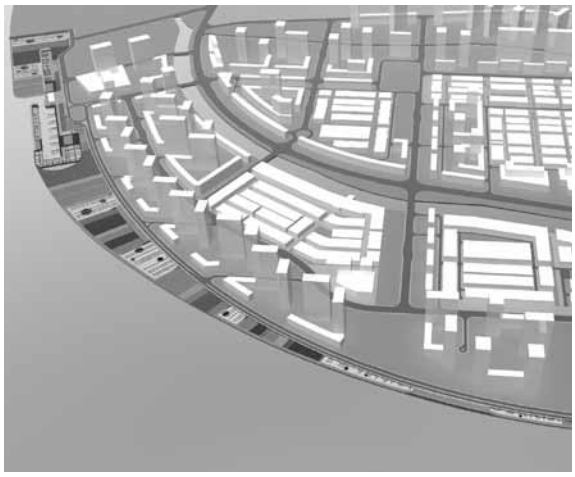
And the LORD God commanded the man, "You are free to eat from any tree in the garden..."

Genesis 2:16

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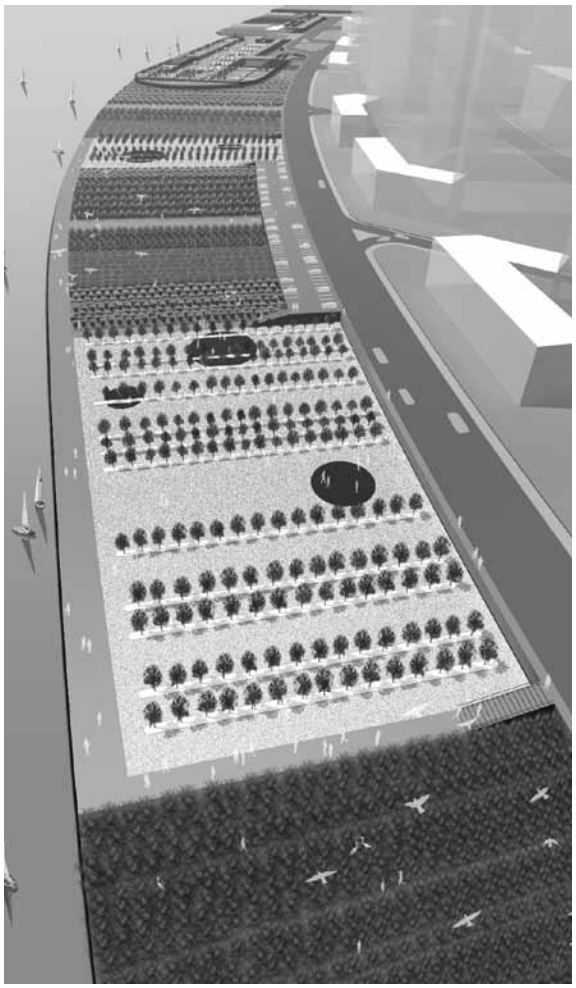
12 Imagining Recovery - The perpetual motion machine channels urban waste back into farming



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13 DongYi Wan East Waterfront, China masterplan - A cultivated amphibious landscape

14 DongYi Wan East Waterfront, China - Amphibious community landscape mixed with wildlife reserves and farmland

15 DongYi Wan East Waterfront, China - An innovative hybrid landscape supports biodiversity

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Biography

CJ Lim is the founding director of Studio 8 Architects (www.cjlim-studio8.com), a multi-disciplinary practice in architecture, landscape and urban planning, focusing on cultural, social and sustainability issues. He is also the Professor of Architecture and Cultural Design at the Bartlett, UCL.

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