Could urban agriculture be the next design revolution? Gil Doron explains how horticulture, a subject that has until now remained remote from the concerns of contemporary architects, is ripe with potential, bringing with it many ecological, economic and social benefits for the city dweller. He also points out that at all levels, whether at the scale of window boxes, balconies or roof gardens, or on the scale of full-blown farms, vegetation and agriculture exist in most cities in the world right underneath our noses.¹
When everyone was asked to propose ideas for improving our inner-city block at a recent tenants meeting, I suggested transforming the front lawn and roof into food-producing gardens. The idea first came to me when I saw a Chinese couple trespassing on our lawn to pick pears from a tree I didn’t think yielded any edible fruits. Apparently, these pears can be cooked and made into jam. My proposal was to divide the front lawn into allotments of about 10 metres by 30 metres. Each flat would maintain its own allotment where residents could grow vegetables, hire the local gardener to grow vegetables for them, maintain a lawn or rent their allotments to other residents. The roof top would also be used for growing herbs and vegetables in large containers. To my surprise, a few elderly tenants responded immediately with the question: ‘Is there going to be a war?’

During the two world wars, urban agriculture flourished in England’s cities. The real threat of starvation posed by blockades prompted campaigns to increase indigenous food output, much of it from urban agriculture. During the First World War, the number of allotments roughly tripled from around 450,000 to 1.5 million. At the outbreak of the Second World War, the UK’s minister of agriculture launched the ‘Dig for Victory’ campaign, as part of which more than half of all manual workers produced food from either an allotment or their gardens. However, after the war and throughout the 1950s and 1960s, a great deal of food-growing land was returned to its original prewar uses or lost to new development. The combined effect of the new welfare state, effectively full employment and increasing prosperity meant that people no longer saw a need to grow their own food.

Reasons for Urban Agriculture

Today, economic hardship is the main reason why urban agriculture is so common in cities in developing countries. Across Chinese cities, 85 per cent of vegetables consumed by residents are produced within those cities, and Shanghai and Beijing are fully self-sufficient in vegetables (Hough, 1995). In other Asian and Latin American cities, between 10 per cent and 30 per cent of the fruit and vegetables consumed is produced within the city’s limits. The greatest amount of urban farming can be found in Havana, where it is promoted and sometimes financed by the state: for example, there are 20,000 small orchards and plots on a total of 2,770 hectares. Most, if not all, of the food production in the capital is organic.

Urban agriculture holds economic benefits for developed countries as well. The US government’s urban gardening programme estimates that a $1 investment in food-growing projects yields $6 of produce. Urban agriculture on a small scale can complete the food basket for the poorer population in Western cities and generate jobs in food growing, processing and marketing. A number of developed and relatively affluent countries and cities understand these benefits: for example, Hong Kong urban agriculture meets 45 per cent of local demand for vegetables, and Singapore is relatively self-sufficient in pork, poultry and eggs, and grows 25 per cent of all the vegetables consumed by its population. Most surprisingly, according to the US Department of Agriculture, a third of the country’s agricultural output comes from urban/metropolitan areas.

The environmental benefits are as much an incentive for growing food in cities as the economic ones. The current global food economy is heavily reliant upon nonrenewable resources (gas and land) and generates a large amount of waste. Growing food in the city shortens the distance between producer and consumer, thus cutting energy consumption considerably. It was suggested recently that if food in the UK were produced organically, consumed locally, and only when in season, the level of carbon dioxide emissions would be reduced by 22 per cent. This reduction is twice the amount the UK has committed to under the Kyoto Protocol. Urban agriculture also brings some reduction in the demand for land resources since it decreases the need for...
landfills for waste through the use of composting and less packaging.

Involvement in growing food is a healthy occupation and a popular way of relieving stress. More formal horticultural therapy has helped those suffering from mental health problems, and is also used in rehabilitating homeless people with drug- and alcohol-abuse problems.

Growing food in a communal way, in community gardens and city farms, breaks down barriers between people with regard to differences in age, ethnicity, class and gender, stimulates a sense of ‘ownership’ of, and pride in, the local environment, and galvanises people to cooperate on other issues of social concern. City farms and community gardens also have educational value, with some schools incorporating food growing into the teaching of science, geography, maths and environmental education.

20th-Century Architecture

Urban food-growing in general, and allotments in particular, featured prominently in Ebenezer Howard’s Garden Cities of Tomorrow, first published in 1902. In each city, five-sixths of the area was devoted to food production. Residential space was to be divided into generous plots of 20 feet by 130 feet, which Howard envisaged would be sufficient to feed a family of at least five people. In addition, allotments ringed the settlement peripheries. Critically building on Howard’s ideas, Le Corbusier promoted pre-urban and urban agriculture on a large scale in his ‘Contemporary City’ proposal expounded in The City of Tomorrow and its Planning, first published in 1924. In his ‘Contemporary City’ plans, Le Corbusier designed three types of sites where food could be grown: in unmediated proximity to the city, in the ‘protected zones’, he envisaged large-scale agricultural fields; for detached suburban homes, he included large kitchen gardens which took up more than a third of the plot (over 400 square yards); and in his most detailed model for an urban setting – the cellular or honeycomb-type neighbourhood – he combined the kitchen gardens of each flat into one field of allotments, almost 10 acres in size. In this plan, he indicated how the growing of food would be managed:

There would be a farmer in charge of every 100 such plots and intensive cultivation would be employed. The farmer undertakes all the heavy work. The inhabitant comes back from his factory or office, and with the renewed strength given him by his games, starts to work on his garden. His plot, cultivated in a standardized and scientific way, feeds him for the greater part of the year. There are storehouses on the borders of each group of plots in which he can store his produce for the winter.

Pre-urban agriculture on a large scale was also introduced by Frank Lloyd Wright in The Living City. Wright’s vision of the ‘living city’ could best be summarised as integrating agriculture into dispersed suburban settlements, creating a new landscape. As an idea it transgresses the distinction between urban and suburban, and also helps to articulate a vision of a city driven by ecological intensification, where food growing stands equal to traditional development in the built environment.

The Facade: Windowsills, Balconies and Roof Tops

Urban agriculture, because of its various scales and locations, can be the subject of all design professions – from landscape and urban design, to building and interior design, and even product design. At its smallest scale, food is being grown on windowsills and balconies. Currently there are no statistics showing the number of people in the UK or Europe growing herbs and vegetables in this way. However, the fact that all the major supermarket chains sell herbs growing in pots says something about the demand for this product. It is true that almost any windowsill or balcony can contain a few pots for such growing activities, but windowsills and large balconies purpose-built for agricultural uses can be a setting point of such buildings, and contribute to the promotion of urban agriculture on a small scale. Such design intervention is demonstrated in a new Bed Zed project in Brighton. Another, more radical, proposal is Bohn & Viljoen Architects’ green facade for a project in the Shoreditch area of London.

If vertical landscaping on apartment blocks is still a rare phenomenon, roof gardens have become ever more popular, especially in cities where land values and density are high. They are common in the US, Japan and Europe, especially in Switzerland and Germany, where there are planning requirements to install them. Food production is possible on an intensive green roof where the soil is deep enough. Such roofs can hold vegetables and even trees, but are costly at around £150 per square metre, and in residential blocks and private houses it is more usual to see people growing vegetables and herbs in large boxes and pots. Either way, community roof gardens, or simply growing food on balconies, can bring neighbours together and generate a new urban and social space, as shown in a charming project by John Puttick, a Bartlett graduate, who won a RIBA silver medal for his proposal.
A vertical landscape can be productive. In addition to the growing of food, other advantages of the project include saving energy, buffering noise, filtering the air and increased privacy. The aesthetic value of a green facade is also important, changing in colour, density and opacity with the passing of the seasons.

The project shows how growing food in a dense inner-city block can generate an environmental, social and economic chain reaction. It visualises how two brothers, living in a downtown street in Graz, converted their environment over time (the windowsill, balconies and roof) into a patchwork of farms, vineyards and gardens, which resulted in increased interaction and exchange with their neighbours.
Top
Vauxhall City Farm, London
Set against the background of the MI5 Building in London, Vauxhall City Farm is built on a space that was left over, after planning, at the edge of a churchyard and a park. It offers recreational and educational opportunities for different groups and individuals, with a wide variety of farm animals, an ecology area and a herb garden.

Right
Vauxhall Community Garden, London
The garden adjacent to Vauxhall City Farm is a very modest one, but the demand for land for farming (community gardens or private allotments) is on the rise, with waiting times for allotments in some London boroughs anything up to a year. Overall, each year the city farms and community gardens attract around 650,000 visitors.
The Ground: Allotments, Community Gardens and City Farms

The most common, and by far the largest-scale agriculture in cities takes place on allotments, in community gardens and in city farms. In England, allotments were originally small plots held by agricultural labourers, introduced in the 17th century to compensate such labourers for the private enclosure by rich landlords of common land previously available to all for grazing and cultivation. As the Industrial Revolution drew the rural poor to urban areas, allotments became urban phenomena and were used as a source of money and food. Since 1908, urban allotment provision by the municipal authorities has become mandatory. Though there was a significant drop in the use of allotments after the Second World War, since the early 1970s demand for them has increased. Alongside this revival, other forms of urban food-growing in the UK, Europe and North America have developed, notably the city farm and community garden movements. The main reasons for this include the growth in environmental ethics and alternative lifestyles, as well as notions of self-sufficiency. While the city farm is a more European phenomenon, and the community garden traditionally a North American one, unlike the allotment both are cultivated and operated as a communal initiative. As such, food production is secondary to their educational and community-bonding roles.

Many community gardens and city farms had been empty sites that were squatted in an act of self-help and community regeneration and, with the upturn in the economy in cities such as New York, some of them were lost to 'redevelopment'. Nonetheless, community gardens and city farms have become an important part of cities like London and New York: London’s city farms and community gardens attract some 650,000 people each year, and in tourist guides to Manhattan, the Lower East Side community garden is one of the most highly recommended places to visit.10

Though city farms and community gardens do not offer much flexibility for design intervention, they can be used as sites for design experiments in urban agriculture, especially in the areas of roof gardening, vertical farming and new technologies, ideas currently being discussed by the European Federation of City Farmers.11

The Tower and the Continuous Landscape

Vertical farming would need to be introduced if urban agriculture were to become the main supplier of food in cities. With a few exceptions, cities all around the globe are getting denser and urbanisation, even in dispersed forms, will not leave much available land for conventional farming in or outside the city. It is unlikely that agriculture could compete successfully with other usages, like housing, offices or even recreational open spaces.

Based on these assumptions, Professor Dickson Despommier from the Department of Environmental Health Sciences at Columbia University, in collaboration with the Urban Design Programme, headed by Professor Richard Plunz, have developed the Vertical Farm project. The idea was originally developed to sustain the nutritional needs of 50,000 people in New
York City. The model consists of a 48-storey building, either 90,000 square feet or 250,000 square feet. The crops would be cultivated by a hydroponics system based on the nutrient film technique, which is the most intensive crop-production method currently in use. The farm would have zero net emissions, and derive its energy from methane gas collected from the farm waste as well as the waste of restaurants in the area. It would also be a closed loop, where water would be 100 per cent recycled. The Vertical Farm is currently looking for a private or corporate entrepreneur to finance the second phase of the project and begin feasibility trials.

Pig City, by MVRDV, grew out of a similar analysis of the insufficiency of farmland and the problem of disease and energy waste. It would meet the demand for pork in the Netherlands as well as in countries importing products from Holland. Whether or not it is a real design proposal, the project cleverly addresses the issue of meat consumption and farming, and is part of a series of other real, or theoretical, designs by the group, such as the Expo project, which address the issues of densification, compaction and land-use maximisation so relevant to urban agriculture.

The most cohesive vision for urban agriculture was presented recently in the book *CPUL: Continuous Productive Urban Landscapes: Designing Urban Agriculture for Sustainable...*
Cities, edited by Andre Viljoen. CPULs are coherently planned and designed continuous landscapes (a network of open green spaces) that are environmentally and economically productive. For example, a CPUL provides food from urban agriculture, pollution absorption, the cooling effect of trees and increased biodiversity from wildlife corridors. What is appealing about this concept is its introduction of urban design to the issue of urban agriculture. It is a good example of how architectural investigation into a subject that initially seems very remote from design can reframe the subject itself, and open a new field for architectural involvement.

As with the other projects mentioned above, the CPUL aims at cutting carbon dioxide emissions and reducing the distance between the site of production and consumption. At the same time it disperses the spatial and environmental qualities of green sites all over the city. In addition to transforming parts of parks, wastelands, lawns and roofs into a productive landscape, the CPUL concept calls for the introduction of large-scale agricultural fields into the city or city edges, for example on brownfield sites or car parks. Ideally, where possible, fields surrounding existing supermarkets would be created so that food could be sold directly on site. CPUL concepts are demonstrated in Dominique Perrault’s design for Caen; and another proposal that uses landscape to invigorate urban life, to produce food locally and to create an exciting landscape, is the City Farm design proposal for Bishopsgate Goodsyard in east London.

Most of the design proposals mentioned above are small-scale interventions, and it took some time to find them at all. Current larger-scale initiatives, such as the Vertical Farm and Pig City, are in their experimental stages. Apparently, the 800 million people who are currently engaged in urban agriculture worldwide, among them 200 million on a commercial basis, manage to flourish without help from architects. However, the results of architectural intervention could make urban agriculture a significant part of every city. It could be the next urban revolution to change the face of our cities. The economic, social and environmental benefits of urban agriculture indeed justify one.

Notes
1 Unless mentioned otherwise, the three main sources of information for this article were Andre Viljoen (ed), CPULs: Continuous Productive Urban Landscapes (CPULs): Designing Urban Agriculture for Sustainable Cities, Architectural Press (London), 2005; and Tata Gammett, ‘City Harvest Report’ for Sustain: The Alliance for Better Food and Farming, 1999 (see www.sustainweb.org/urban_index.asp and various studies published on www.cityfarmer.org/notes).
3 New Agriculturist online magazine (www.new-agri.co.uk).
4 Gammett, op cit.
7 Ibid, p 206.
10 www.greenroofnyc.org.
11 See http://lcfl.vgc.be.