

Continuous Productive Urban Landscapes: urban agriculture as an essential infrastructure

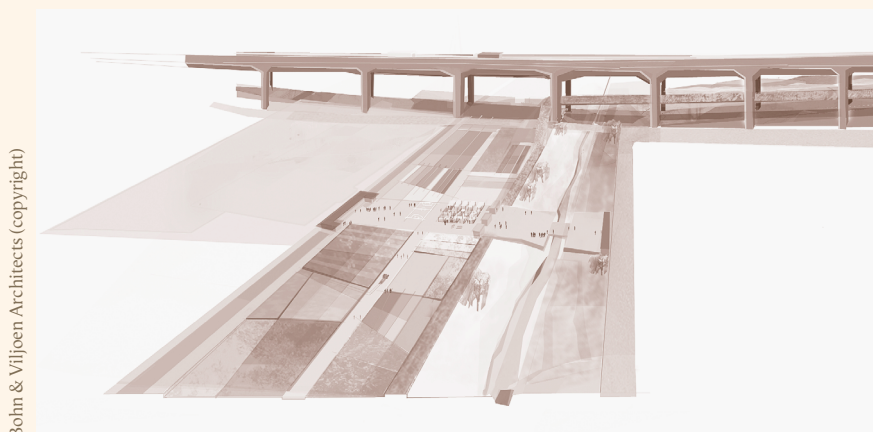
This paper is written from a U.K. perspective and uses London as an example of an expanding city.

Experiences showing the beneficial effects, and in some cases essential benefits, of urban agriculture have been described in this magazine, other journals and websites.

Most of these experiences show benefits related to food security and income, with a primary focus on the South. However, the benefits of urban agriculture are potentially applicable to a far wider population, as the integration of urban agriculture into a multifunctional (mixed) land use strategy has the potential to significantly reduce a city's ecological footprint. The question arises as to why urban agriculture is not being implemented or propagated on a far wider scale in existing and emerging cities,

Within the design professions, the reason for this neglect of attention to urban agriculture results partly from the lack of quantified and comparative data for the environmental impact of remote food production. In the case of agriculture the energy used on a farm is relatively small, but once "food miles" and petrochemical and food processing inputs are taken into account, the energy impact becomes much larger.

Apart from lack of knowledge about the energy arguments in favour of urban agriculture, at least two other reasons can be found for the lack of support for urban agriculture in mixed-use development. A major reason is that it is seen as producing less financial return from land which could otherwise be commercially developed. Another reason is that there is



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The Beam Valley Fields proposal for the Thames Gateway.
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no understanding of what a city, in which urban agriculture is integrated, would be like to live in.

To answer the first concern it is necessary to articulate the reasons for considering urban agriculture as an element of "essential infrastructure" within sustainable cities. Just as we see roads and energy systems as essential, urban agriculture should be considered likewise. The big advantage of urban agriculture over other elements of infrastructure is that it offers a number of ancillary benefits at no or low cost to the city.

The first part of this paper will articulate some of the main advantages of urban agriculture, and the second part will present a vision for a city that integrates urban agriculture.

ARTICULATING THE ADVANTAGES OF UA

The (potential) benefits of urban agriculture in terms of social impacts, health improvement, community building, poverty alleviation and environmental improvement are already fairly well covered in a number of publications. Such arguments include:

The potential for combining sustainable transport strategies with open space strategies including urban agriculture (green grids / ecological corridors). Bringing qualities and functions, traditionally associated with the "countryside", into the city. The potential for retaining an urban density while developing urban agriculture: utilising open space to maximise the use of natural energy

This negative environmental impact of remote non-organic food production is highlighted in a study commissioned by the Department for the Environment, Farming and Rural Affairs, DEFRA, on Food Miles. (ED56254, Issue 7, The Validity of Food Miles as an Indicator of Sustainable Development, Final Report for DEFRA, July 2005). An article titled "Food miles report suggests cost of food transport is £9bn" in Farmers Weekly on the 15 July 2005 summarised its conclusions as follows:

- "The total economic, environmental and social costs of food transport is estimated at £9bn.
- Food transport has a significant and growing impact on road congestion, road accidents, climate change, noise and air pollution.
- The quantity of food transported by Heavy Goods Vehicles in the UK has doubled since 1974 and food transport currently accounts for 25% of the distance covered by HGVs.
- Consumers travel an average of 898 miles a year by car to shop for food.
- In total, food transport produced 19mt of carbon dioxide in 2002 of which 10mt were emitted in the UK."

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systems in buildings. The potential for hybrid buildings, combining food and (solar) energy functions. Other indirect benefits regarding quality of life, due to adjacency to cultivated fields and/or market gardens (see also the article by Wolff in UAM no. 13).

However, further new emerging and re-emerging arguments need to be highlighted and developed.

At the scale of urban development, density of occupation (people per square metre) has become a single measure for sustainable development. This emphasis on density has arisen as the result of a partial acceptance of influential reports on sustainable development, such as the UK's 1999 Urban Task Force report . This report strongly advocates mixed use development at relatively high densities as a means of achieving sustainable cities. While the report takes a broad view of sustainable development, and does not exclude urban agriculture, in many instances density is being used as a rarely challenged single measure for sustainability. The consequence of this over-simplification, is that little opportunity is left for urban agriculture or other forms of greening.

Other recent and old concerns are (re-) emerging, which support the case for considering urban agriculture as part of a city's essential infrastructure. The issue of Peak Oil for instance (Peak Oil is the point in time when half of all oil reserves will have been extracted). There is a growing consensus that the peak has or is close to being reached. This has clear implications for the contemporary food industry, and it is receiving increasing attention. Another debate is about the question of what to do with the countryside when farmers have stopped producing food due to imports. Although a case is made for urban agriculture, there is no consensus about the desirability to reduce food imports, indeed it is argued that importing food can provide vital revenue to exporting countries.

The work of the nineteenth century farmer and theoretician von Thünen deserves revaluation here, since his economic theory related agricultural yields to transportation, value and

Table: Comparison of indicative costs of transport and urban agriculture

*Full specification public highway 10m wide	£2000 /m2
*Basic specification private access road 10m wide	£200 /m2
*Raised beds on contaminated ground, based on the Cuban organoponico model	£50 /m2
*Market garden on uncontaminated ground, planting directly in the earth	£0.5 /m2

production. This theoretical position makes the case for the central (urban) location of horticulture and dairying. This work is of contemporary relevance since it is based on non-mechanical transportation and minimum access to preservation (e.g. refrigeration), both essential factors affecting the embodied energy of food, both in the North and the South. Another two practical concerns need to be addressed when discussing the integration of urban agriculture in the city: cost and available space.

A comprehensive financial appraisal of UPA in relation to cities within Europe or cities at a similar stage of economic development has not yet been undertaken. There is an urgent need for such an appraisal of local food systems (such as the CPUL concept described below) versus current food strategies. But a rough calculation, comparing the costs of constructing roads and urban agriculture, already gives interesting insights.

This table, which is based on cost estimates supplied to the authors in June 2005 by the quantity surveying firm RLF Consulting, shows the relatively low cost of developing and maintaining urban agriculture as compared to roads.

While a full economic comparison would need to include many other external factors such as health benefits from fresh local food, verses food mile costs, etc., it appears that a strong economic case may be made for UPA, if a full costing taking account of transport savings and environmental benefits is undertaken.

CONTINUOUS PRODUCTIVE URBAN LANDSCAPES (CPULS)

A comprehensive and illustrated design concept is required if people are expected to imagine a city enhanced by urban agriculture. The Continuous Productive Urban Landscape (CPUL) concept attempts to provide such a vision and coherent design framework. CPULs have

been defined by the authors as a coherently planned combination of connected open urban spaces which include space for urban agriculture and ecologically productive landscapes.

CPULs may be thought of as a new kind of extended public park, integrating traditional recreational and leisure facilities, with areas devoted to urban agriculture fields, ecological corridors, cycle and pedestrian routes. CPULs aim to be productive in economical (food production), socio-cultural (quality of life) and environmental (carbon dioxide emission reduction, improved biodiversity, air quality and the provision of heat island sinks) terms.

An essential feature of CPULs is that they are developed at an urban scale, and contribute to a city-wide landscape strategy. They would be constructed to incorporate living and natural elements and are designed to encourage and allow urban dwellers to observe activities and processes traditionally associated with the countryside, thereby re-establishing a relationship between life and the processes required to support it.

A CPUL IN LONDON

In order to assess the space available for CPULs within an expanding European city, the authors and Dr Jorge Pena Diaz, from the Instituto Superior Politécnico “José Antonio Echeverría”, (ISPJAE) Havana, undertook a study in 2004 with the Architecture and Urbanism Unit at the Greater London Authority entitled, *London Thames Gateway: Proposals for implementing CPULs in London Riverside and the Lower Lea Valley* (Viljoen et al. 2004).

London Riverside and the Lower Lea Valley, are sites east of London, designated for the city's future expansion and are respectively planned to accommodate 32,875 and 21,754 new housing units by 2016. Both of these sites contain large areas of contaminated

brownfield sites, and both are adjacent to potentially uncontaminated land available for periurban agriculture. The Lea Valley, site for the 2012 Olympics, is also famous as home to London's at onetime extensive but now depleted market gardens, which supplied the city's fruit and vegetable requirements.

The CPUL concept compliments an ambitious "green grid" strategy for creating a network of connected open spaces, currently being promoted by the Greater London Authority. The CPUL study indicated that notwithstanding constraints on the availability of land, sufficient land is available to create a viable CPUL. The potential yield from urban agriculture sites within the proposed CPUL will vary enormously depending upon the type of agriculture practised. If yields found on traditional English allotments are assumed, then one could expect sufficient fruit and vegetable production, within the London Riverside CPUL, to feed 4000 persons. If, however, yields based on 50% of those produced by high-yield *organoponicos* in Cuba are assumed, then 39,000 people could be fed (50% is an estimate to allow for climatic differences). Thus a CPUL strategy could make a significant contribution to the improvement of urban sustainability within the London Thames Gateway. The authors suggested that pilot projects be set up to validate yields, for instance, and to identify other practical issues that a theoretical study alone cannot address.

At the time of writing, work continues on the development of proposals for the green grid strategy, and it appears that a number of different consultants are being commissioned to undertake design studies. It is evident given the large number of stakeholders and bodies involved with different aspects of implementing the Thames Gateway plan that the follow-through of these ambitious strategic plans will prove to be difficult.

The authors have raised the idea, with the Olympic team, of integrating the CPUL concept into the London 2012 Olympic plans to enhance the organisers' stated aim of running the "greenest games the world has ever seen." At the time of writing it is unclear if this idea will be taken any further.

CONCLUSIONS FROM THE LONDON CPUL STUDY

Several specific problems need to be addressed before CPULs can be implemented more widely. These are similar to those encountered when planning for other large-scale urban infrastructure projects. Some of the main issues are:



Industrial landscape near West Ham



Open urban space in Daggenham.



Pylon landscape near Choats Road.

Land ownership and the need for agreements to purchase or provide access to land. This can be extremely complex, and requires long-term spatial and acquisition policies. It is at this level of policy that a new single space planning body / authority, capable of interacting meaningfully with all stakeholders is required. Lessons can be learnt for governmental bodies and NGOs such as the UK-based sustainable transport organisation, Sustrans, which is independently developing an extensive cycle network across the country. *Competing demands for land, not only from traditional developers / investors, but also from diverse interest groups such as sports organisations and environmental groups promoting wilderness areas.* Building a consensus or linkages between these different stakeholders will be an important task.

Providing adequate infrastructure for market gardeners willing to take on UPA sites. Utilising periurban agriculture sites to support new development should be encouraged, but not to the exclusion of urban

agriculture. Sole reliance on periurban agriculture would result in the loss of associated social benefits of urban agriculture, such as community building, facilities for children's experiences and learning about natural cycles and sustainable development, neighbourhood improvement, etc. Furthermore, expanding cities would never start to

implement a CPUL strategy and would thus minimise the opportunities for local food production, ecological and sustainable transport corridors. Ultimately this would minimise potential food miles savings, and the quality of life, health and environmental benefits associated with urban agriculture.

In addition to these practical and policy-related issues, there is a need to address the public appreciation of CPULs. If CPULs are to compete with urban life

consisting of apartment blocks and superstores, awareness needs to be created and approval gained for the "good life" associated with UA and CPULs. In the UK, as elsewhere in Europe this process is still in its infancy, but encouraging signs are emerging.

References

- ED 56254, Issue 7, 2005. The Validity of Food Miles as an Indicator of Sustainable Development, Final Report for DEFRA, July 2005.
- Urban Task Force, 1999. Towards an Urban Renaissance. London: E&F Spon
- Viljoen, A. Bohn, K. Pena Diaz, J., 2004. London Thames Gateway: Proposals for implementing CPULs in London Riverside and the Lower Lea Valley. PDF copies of the full report are available from <http://www.brighton.ac.uk/arts/research>. Follow links for Research Activity, Individual Researchers, Viljoen. The report is found under publications.
- Viljoen, A (ed.), 2005. Continuous Productive Urban Landscapes: Designing Urban Agriculture for Sustainable Cities. Oxford: Architectural Press.