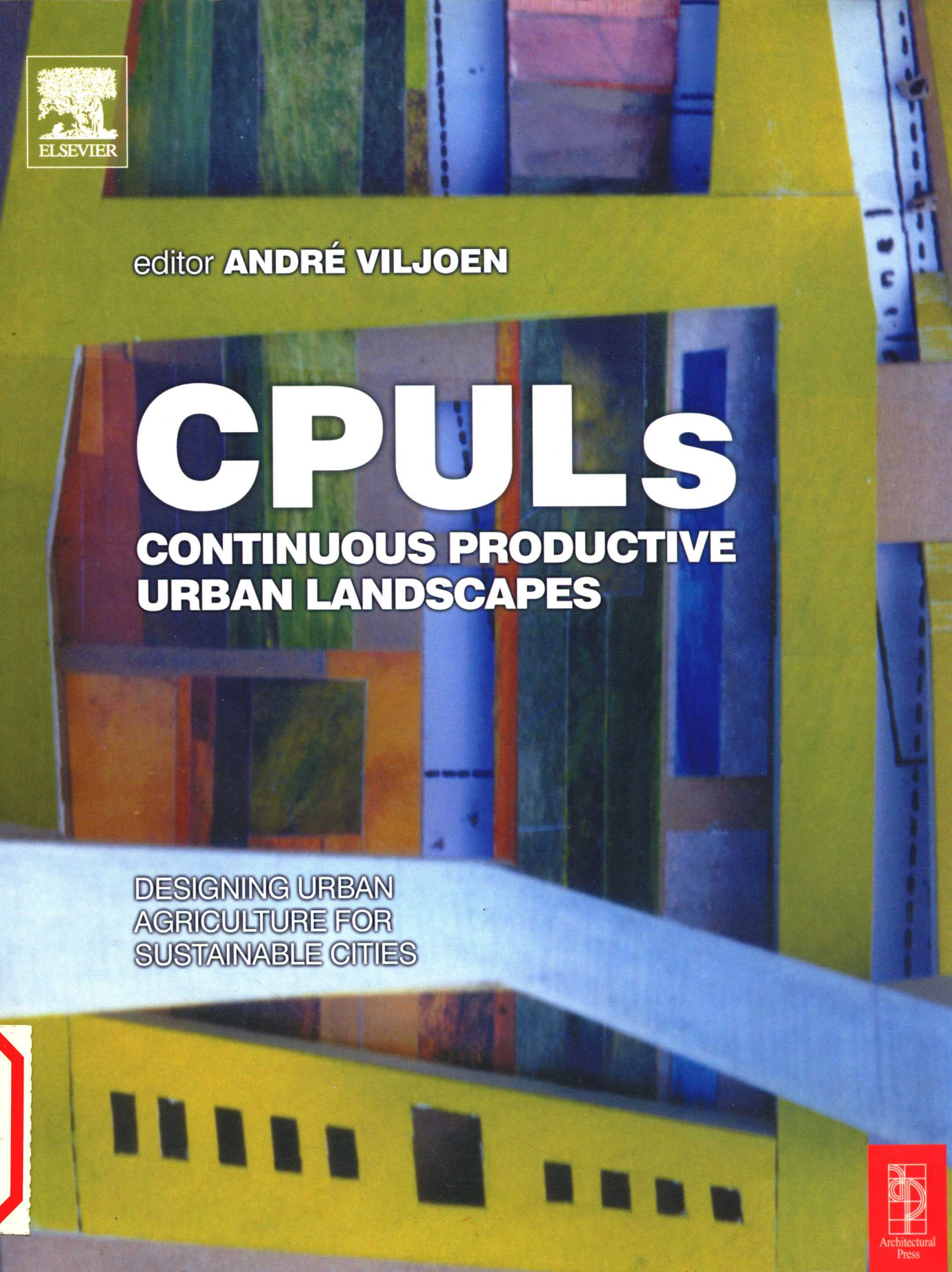
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CONTINUOUS PRODUCTIVE URBAN LANDSCAPES
DESIGNING URBAN AGRICULTURE FOR SUSTAINABLE CITIES
Architectural Press

CONTINUOUS PRODUCTIVE URBAN LANDSCAPES: DESIGNING URBAN AGRICULTURE FOR SUSTAINABLE CITIES

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Joe Howe

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FOREWORD

With a vision and a strategy the 21st century city will be green, a healthy place for all and will generate zero net pollution. This book offers a vision and a strategy.

Productive urban landscapes have two huge challenges to address: CO_2 emissions are projected to increase by two-thirds in the next 20 years, and as the global food production increases so does the number of people going hungry, with the number of urban hungry soaring.

The symbiotic relationship between a productive landscape and the human settlement system is as old as civilization. During the past 200 years that millennium-old positive relationship deteriorated into a further and further separation of town and landscape. The good news is that during the past quarter-century the agriculture industry has turned a corner towards greater integration with our modern cities.

One of the earliest archeological evidences of CPULs (4,000 years ago) are the semi-desert towns of Persia. Underground aqueducts brought mountain water to oases where intensive food production was conducted, substantially based on the use of urban waste within the settlement.

A marvellous example in history is Machu Picchu in Peru. The Spaniards did not discover this nutritionally self-reliant city for 100 years. Scarce water was reused time and again, step-by-step down the mountain. Biointensive vegetable beds were designed to catch the afternoon sun and stretch the season. Water and land crops were brought together to resist the frequent mountain frost. There are many such stories from all corners of the earth.

The industrial revolution brought the railroads, chemical fertilizers, petroleum fuel, tinned food and refrigeration and a separation of the food system from where we live. Socially this converted to the creation of the 'city slicker' and of the 'country bumpkin'. Ecologically it brought many dreadful patterns of sickness, worst today in the Himalayan city of Katmandu.

Our current industrial and agricultural systems transport by ship, rail, truck and plane over 80 percent of all extracted natural resources to four percent of the Earth's land and on that urban four percent convert over 80 percent of it to waste and pollution. The interpretation '*waste is food*' enables us to conceive of operating systems that utilize waste (heat, sewage, waste-water runoff, organic solids, construction debris, etc.) to green the city and feed the urban population of the globe by closing now-open nutrient cycles.

In the later 1970s there emerged reports of a resurgence of agriculture in the city from (alphabetically) Bogota, Dubai, Lusaka, Madrid, Manila, Moscow, New York, Vancouver and from many corners of the globe. A United Nations survey of 20 countries around-the-world and library research conducted in 1991-1993 concluded that there was the beginning of a new urban-based food system evolving worldwide.

This book is a 21st century breakthrough in defining an urban design/planning conceptual approach to re-incorporating a productive landscape, including agriculture, into the human settlement (CPULs). As reported in the chapter 'Food in Time' in the previous hundred years there were several such models created including famously: Le Courbusier, Paul & Percival Goodman, Ian McHarg, Louis Mumford, and Frank Lloyd Wright. We have both history and great creative minds to guide our hands to this gigantic task.

Agriculture, reaching from fish farming to ornamental shrubs, is moving to the mostly urban market and becoming less centralized in a few corporations. The potential for CPULs it seems to me is eminently workable based on two characteristics of 21st century cities: constant renewal and constant de-densification.

Cities today are constantly renewing themselves. Yesterday's factory sites, shopping malls, and housing estates are collapsing and standing idle for a decade or two or three. These sites, which are idle on an interim basis, are a foundational element in the locally-based food system and the ecologically sustainable (green) city.

The emerging 21st century city can be identified as 'the Edgeless City'. The concepts of city boundary, greenbelt, and suburb are all obsolete. The city that was focussed on the river, the seaport, the railyard, and the limited access highway intersection are all obsolete. Cities are becoming formless, edgeless and seemingly endless. In Africa the city extends from Abidjan to Lagos, in Asia from Kobe-Osaka to Tokyo-Chiba, in North America from Portland Maine to Norfolk Virginia, and in Europe from Barcelona to Genoa.

Once enlightened by the CPUL concept our eyes can see possibilities everywhere: the waste heat from supermarket refrigeration is a source of energy for food production, flood plains are productive if producing crops and costly if used for housing, fruit and vegetable production on rooftops saves heating and cooling costs, reduces air pollution and enables fresh cuisine, a security fence is a potential for productive and ornamental vines.

Greening the 21st century city will improve our health, stabilize our economy and bring us all closer together as we meet in the garden.

Jac Smit, AICP

PREFACE

This book is intended to contribute to the ongoing debate about the future shape of cities.

Supported by emerging international research, it presents a vision for integrating Continuous Productive Urban Landscapes (CPULs) into existing and future cities. CPULs are urban spaces combining agricultural and other landscape elements within a strategy of continuous, open space linkages.

The book focuses on design and planning questions raised by CPULs and examines the various qualities CPULs can bring to the urban fabric. Chapters by Katrin Bohn, André Viljoen and Joe Howe present the case for CPULs, exploring the situation today, the historical context and proposals for CPUL design strategies. A series of underpinning chapters, written by specialists, develop and expand upon these issues.

Urban agriculture within CPULs, integrated into individual cities, can contribute to more sustainable food production and open space management. If the design potential of CPULs is to be realised, it is necessary to understand the arguments supporting urban agriculture.

CPULs will form part of an urban infrastructure and as such, their adoption implies embarking on a long-term development strategy which is equally applicable to established and emerging cities. The book explores different ways of implementing CPULs, using both visionary proposals and practical experience to support the argument for their adoption.

André Viljoen, Katrin Bohn and Joe Howe

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Moreover, André would like to thank Jorge Pena Diaz, from the School of Architecture at City University José Antonio Echeverría (CUJAE) in Havana for facilitating the initial field trip to Cuba, and our ongoing work in Cuba and the UK. In Cienfuegos, Prof Padron Padron and Prof. Socorro Castro who made our visit so fruitful. Tom Phillips for joining in with the urban agriculture adventure and our ongoing research at the Peckham Experiment. Eddie Edmundson and Yania Lucas from the British Council in Havana for their ongoing assistance. In particular I would like to acknowledge support for my second field trip to Cuba with Tom Phillips, and for arranging Yuneikys Villalonga's assistance in Havana. And a special word of thanks to all the urban farmers, administrators and planners in Cuba who answered our questions and let us photograph, draw and learn about their organoponicos, which have now been running successfully for over 10 years. Rene Van Veenhuizen, from RUAF (Resource for Urban Agriculture and Forestry) for assistance and support. Angela Blair from the Rowley, Regis and Tipton primary care trust for introducing us to the Sandwell food mapping project. Warren Carter from the Moulsecoomb Forest Garden and Wildlife Project in Brighton, for providing access to the project. The Royal Institute of British Architects, Modern Architecture and Town Planning Trust, for supporting the project initially with a research award. Robert Mull and Prof. Mike Wilson at London Metropolitan University's School of and Architecture Spatial Design, and the Low Energy Architecture Research Unit, where the project originated.

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Joe Howe wishes to acknowledge the support of the Economic and Social Research Council (ESRC) for funding research undertaken during 2000–2001, which was concerned with urban agriculture and land-use regulation in metropolitan areas of the UK. This research has fed into the book.

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David Crouch is Professor of Cultural Geography, Tourism and Leisure at the University of Derby, Visiting Professor Geography and Tourism, University of Karlstad Sweden; author of several publications related to Allotments including (with Colin Ward) *The Allotment: its landscape and culture* (Faber and Faber/Five leaves Press 1988, 1994, 1997, 2001). He has contributed to a number of reports for NGO's and government, as well as producing for BBC2 TV, 'The Plot' in 1994.

Herbert Giradet is a social anthropologist and cultural ecologist now working as a writer, consultant and film maker. His main focus in recent years has been the sustainable development of cities and contemporary lifestyles. He is widely published, a prolific documentary maker and has been invited to work on sustainability in many countries around the world. Herbert is the recipient of the UN Global 500 Award for Outstanding Environmental Achievement, an honorary Fellow of the Royal Institute of British Architects and Chair of the UK Sustainability Alliance and Schumacher Society.

Dr Susannah Hagan trained as an architect at Columbia University and the Architectural Association. She is Reader in Architecture and head of the MA Architecture: Sustainability, at the University of East London and also teaches on the AA's Environment and Energy Graduate Programme. Her book, *Taking Shape*, explores the relationships between the built and natural environments.

Phil Harris is Professor of Plant Science at Coventry University and International Research Consultant for the Henry Doubleday Research Association. Current research interests include tropical crop development, 'organic' or sustainable agriculture, forestry, and relevant techniques of plant biotechnology, often related to overseas development. Research and consultancy activities in sustainable agriculture and forestry have involved work in Bangladesh, Brazil, Cape Verde, China, Cuba, Ghana, India, Japan, Jordan, Kenya, Oman, Sierra Leone, South Africa and Spain.

Dr Joe M. Howe is a senior lecturer at the University of Manchester's School of Planning and Landscape. His research focuses on the relationship between sustainability and planning. This has encompassed work on urban food growing and recently on the relationship between water management and land use planning and management. He has advised numerous Government bodies (including DEFRA, ODPM, DTI and the Treasury) and NGOs on water and land use management issues.

Jeremy Iles's career in the environmental sector has included roles at Friends of the Earth (Transport Campaigner), the London Wildlife Trust (Director), overseas work in Bangladesh and Eritrea as Field Director for VSO, and as a Regional Manager on the National Cycle Network Project at Sustrans. He took up the role as Director of the Federation of City Farms and Community Gardens in autumn 2000.

Dr Howard Lee's interest is in sustainable agriculture. His contribution to this book stems from his work at the Agroecology Research Group, Wye Campus, Imperial College. His main research areas are: managing the water resource base in agroecological water catchment zones; nitrogen dynamics in farming systems and environmental impact; the environmental impact of organic waste management on farms and in the community and the use of geographical information systems to predict the environmental impact of farming.

Dr Margi Lennartsson is Head of the International Research Department at HDRA responsible for scientific research activities of the Association. HDRA is a registered charity involved in research, advisory work and

promotion of organic food, farming and gardening. The aim of HDRA's research programme is to develop the techniques used in organic agriculture and to advance the knowledge of organic production systems, focusing on commercial organic horticulture and domestic gardening in temperate areas and on small scale, resource poor systems in developing countries.

Dr Beacon Mbiba is the Co-ordinator of the Urban and Peri-Urban Research Network Peri-NET, South Bank University, London. Research interests include local level development planning, land transformations and sustainable human settlements. He has published a number of articles on urban and peri-urban agriculture and has taught at the University of Zimbabwe and the University of Sheffield.

Simon Michaels is a landscape architect, urban designer and environmental planner. He works as an independent consultant, and is a director of f3, the UK's Foundation for Local Food Initiatives. He also runs Environment Go, an internet information service for environment professionals, and advises on internet strategies for environment sector organisations.

Angela Paxton works at the Centre for Alternative Technology in Wales and is currently setting up a community scheme with community composting, organic nursery and demonstration gardens. She is author of *The Food Miles Report, The Food Miles Action Pack* and *A Feast Too Far*, all available from Sustain.

Jorge Peña Diaz is an architect, lecturer and researcher at the Centre for Urban Studies, School of Architecture, City University José Antonio Echeverría (CUJAE) in Havana. His research has focused on the integration of urban agriculture in Havana. He has been a visiting academic at the University of Brighton and has collaborated with a number of international research and academic partners.

James Petts has a background in economics and the food industry. He is currently working for the Countryside Agency in England and has previously worked for Sustain (where his chapter was written) as a policy officer, co-ordinating the East London Food Futures project which aimed to initiate local food projects and develop a network of projects in East London, as well as working on a number of other projects to develop a more sustainable and just food economy.

Nina Planck opened London's first farmers-market in 1999. Today London Farmers Markets operates a number of weekly farmers-markets, which provide home-grown food to city dwellers and crucial income for family farms in the Southeast. Her goals for the farmers-markets are more food produced within the M25 (London's ringroad), and more organic food. She is the author of the Farmers-Market Cookbook and was an advisor to the Prince of Wale's Rural Task Force.

Graeme Sherriff graduated from Keele University with an MA in Environmental Law and Policy. His MA dissertation, based on an extensive survey of food growing projects in the UK, looked at permaculture and its relevance to sustainable agriculture. After graduating, Graeme worked on practical environmental improvement and community building projects as part of Groundwork and then became involved with research on related subjects at the University of Manchester.

Jac Smit, between the ages of 12 and 22, held jobs in a diverse range of peri-urban agriculture fields including production, processing and sales of: poultry, vegetable, livestock [goat, cow and horse], orcharding [apple, cherry and maple], and ornamental horticulture. He acquired a first degree in agriculture and a master's degree from Harvard University in city and regional planning. As project manager, technical director and principal planner he incorporated agriculture into the regional plans for Baghdad, Calcutta, Chicago, Karachi, and the Suez Canal Zone. In the early 1990s he carried out a worldwide study for UNDP to define the current and potential role of urban agriculture, which was launched at the Global City Summit in 1996. Since 1992 he has been the president of the Urban Agriculture Network and is a founding member of the global Resources Center for Urban Agriculture that has eight information centers on the five continents. He is a frequent conference presenter and is frequently published in a wide diversity of media.

André Viljoen is an architect and senior lecturer at the School of Architecture and Design at the University of Brighton, where he is undergraduate architecture course leader and runs a design studio with Katrin Bohn. Previously he was Deputy Director of the Low Energy Architecture Research Unit, based in the School of Architecture and Spatial Design at London Metropolitan University. He has participated in a number of European research studies for low energy buildings and his work in urban agriculture and urban design stems from an interest in architecture and environmental issues. Recent research and practice has concentrated on the design implications of the integration of urban agriculture into urban landscape strategies.

Arturo Perez Vazquez is completing a PhD in the Department of Agricultural Sciences Wye Campus, Imperial College. Its subject is the future role of allotments in England as a component of urban agriculture. He has received an Agropolis Award from the Cities Feeding People Program run by Canada's International Development Research Centre (IDRC).

Richard Wiltshire is a senior lecturer in Geography at King's College London and Research Officer for QED Allotments Group, a Local Agenda 21 Initiative in Dartford. His recent research focuses on the development of allotments and community gardens in Japan, and he is the co-author (with David Crouch and Joe Sempik) of *Growing in the Community* (Local Government Association, 2001) and *Sustaining the Plot* (Town and Country Planning Association, 2001) with David Crouch. He is a Steering Group member for the Allotments Regeneration Initiative.

AN INTRODUCTORY GLOSSARY

LANDSCAPE AND ENVIRONMENTAL CONCEPTS

Continuous Productive Urban Landscapes (CPULs, pronounced See Pulls) are

- the theme of this book, and do not yet exist in cities.
- a coherently planned and designed combination of Continuous Landscape and Productive Urban Landscape.
- open urban landscape.
- productive in economical and socio-cultural and environmental terms.
- placed within an urban-scale landscape strategy.
- constructed to incorporate living and natural elements.
- 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.

Continuous landscape is

- a current idea in urban and architectural theory, short sections of which have been established in various cities.
- a network of planted open spaces in a city which are literally spatially continuous, such as linear parks or inter-connected open patches, sometimes referred to as an ecostructure or green infrastructure.
- virtually car-free, allowing for non-vehicular movement and encounters in open urban space.
- an alternative use of open urban space if compared to existing spatial qualities of roads and dispersed patches of used and unused open urban space.
- an enormous walking landscape running through the whole city.

Productive urban landscape is

- open urban space planted and managed in such a way as to be environmentally and economically productive, for example, providing food from urban agriculture, pollution absorption, the cooling effect of trees or increased biodiversity from wildlife corridors.

Urban agriculture is

- agriculture which occurs within the city.
- in most cases high yield market gardens for fruit and vegetable growing.
- found on the ground, on roofs, facades fences and boundaries.
- if economic conditions are difficult, likely to include small animals.
- developing to include aquaculture (fish production).

Peri-urban agriculture is

- agriculture occurring on the urban-rural fringe, or within peripheral low-density suburban areas.
- similar to urban agriculture, although the size of sites is often larger.
- UPA refers to a mix of urban and peri-urban agriculture.

Ecological footprint is

- the theoretical land and sea area required to supply the resources needed to sustain an entity (city, person, organism, building, etc.)
- partially reinstated in urban areas if CPULs are successfully implemented

Ecological intensification is

- an increase in local urban biodiversity.
- a compensation for an existing loss of biodiversity found in many urban areas.
- one of the benefits of CPULs.

Vertical and Horizontal intensification is

- increasing the number of activities or uses of a particular piece of land by overlaying one above the other.
- for Vertical intensification: usually achieved by constructing a building or series of platforms on the site, some or all of which may be used for vegetation or agriculture.
- for Horizontal intensification: applied directly on the ground by increasing the number of uses for a particular piece of land at different times and by providing access and spaces for a variety of activities and uses.
- also found in market and home gardens, layers consisting of tall to small trees, shrubs and bushes, field crops, root crops, water crops, plus fish, poultry and rabbits.
- possible, by planting on fences and walls of all types.
- multicropping, season extension, rooftop use, basement mushroom growing and floating islands (Kashmir and Burma).
- an important feature of CPULs.

TYPES OF URBAN AGRICULTURE

Sprawl is

- the expansion of cities outwards, generally at suburban densities and reliant on the car for access to work, culture and recreation.

Brownfield sites are

- plots of land which were previously occupied by industry, e.g. factory sites.
- often contaminated by chemical waste products from their previous industrial use.
- generally considered to be a primary source of new land for development in existing, and especially post industrial cities.
- currently being used as sites for new urban buildings.
- suitable for CPULs, if appropriate soil conditions exist, or if contaminated soil is treated or renewed in areas where edible crops will be grown.

The CPUL model challenges the notion that all brownfield sites should be built upon, but does not challenge the principle that all land should be used to maximise its sustainable return.

Greenfield sites are

- pieces of land which have never been built on before, e.g. farmland, forests, parks and wilderness.
- often the preferred sites for new suburban development (sprawl).

Allotments are

- found in the United Kingdom.
- for the non-commercial growing of food and flowers, rented to individuals by local authorities.
- typically 250 m^2 in area.
- clustered together in groups, a small allotment site having about 20 plots and a very large site containing several hundred plots.
- avilable from local authorities to individuals who request them.

Schrebergärten are

- found in Germany.
- similar to allotments, but not only for food growing.
- also used as weekend leisure gardens, often with a small summer house.
- with different names, spread all over Europe, further east used more for food growing.
- generally bigger than allotments but with similar situation and organisation.

Parcelas and Huerto intensivos are

- found in Cuba
- similar to allotments, though an individual plot may be larger and may be farmed by a family or group of individuals.

Organiponicos (popular and de alto rendimiento) are

- high-yield urban commercial market gardens, found in Cuba.
- based on the Chinese bio-intensive model.
- producing food for sale to the public, using raised beds and intensive organic farming methods.

Autoconsumos are

- similar to Organiponicos, but located within state enterprises with the main purpose of supplying food for employees; their yield is less than for an Organoponico.

Community gardens are

- managed and used by local communities or neighbourhoods for recreation and education.
- sometimes found on unused or abandoned urban sites, or in grounds of public buildings, e.g. public housing, hospitals, retirement homes.
- often have a small building for use by the community, in particular children and disadvantaged groups.

City farms and urban farms are

- similar to a community garden, but with animals, usually horses, goats, sheep, pigs, ducks and chickens. Their significance is educational rather than productive, although a limited quantity of produce may be generated.

Home gardens/back gardens are

- plots found behind detached or semi-detached houses, traditionally used for leisure and/or vegetable growing.

FOOD

Food security

- is defined as giving populations both economic and physical access to a supply of food, sufficient in both quality and quantity, at all times, regardless of climate and harvest, social level and income (WHO Europe, 2000).

Seasonal and local food

- is basic or core, backed up or supplemented by the globally based food system.
- is dependant on local climate and conditions for growing period, and uses the minimum of artificial stimulants, i.e. a greenhouse might be used to extend the growing season, but heating and manufactured growth promoters are avoided.
- can contribute to a reduction in imported food.
- is not going to replace all imports of fruit and vegetables.
- is an alternative to a multitude of semi-ripe imported crops currently available in developed countries.

Organic food

- is grown without the use of artificial fertilisers and pesticides.
- can contribute to reducing urban waste creating a circular urban metabolism by using compost produced from organic, domestic and farmyard waste.
- is a feature of CPULs.

Supermarket food

- relies on the importation of crops from around the world to provide the maximum choice for consumers.
- cities provide different environmental, social and economic contexts for CPULs.

Box schemes are

- a commercial service delivering a selection of organic fruit, vegetables and sometimes other products to individual homes or to a neighbourhood depot for collection.

Food miles are

- the distance food has been transported between primary production and consumption.

ECONOMIC TERMS

Factors of production

- the entities required to produce a good or service, often thought of as land, labour, and capital, but more recently widened to include human capital, social capital, physical capital, environmental capital, and financial capital.

Household

- a group of people who live in the same dwelling and share common housekeeping and eating arrangements.

Opportunity cost

- the nearest alternative cost of a factor or activity.

Fungible income

- the indirect income gained from the substitution of market-bought produce.

Formal/informal

- distinction between recorded commercial activities (formal) and unrecorded semi- or non-commercial activities (informal).

Shoe leather costs

- the incidental costs associated with travelling to and from locations of work or activity.

Barriers to entry

- the obstacles preventing new businesses entering a market.

Usufruct

- the use of land not owned by the users themselves.

Utility

- the usefulness of a product or service, the satisfaction which a consumer gets from a good or service he or she has bought, or the way in which a good or service contributes to a consumer's welfare (Collin, 2003).

Elasticity

- the responsiveness of either demand or supply to changes in price or quantity.

Externalities

- the external economic, social and environmental costs and benefits of an activity.

Food access

- both geographical and monetary degree of access to food, determined by income, supply, transport, public provision, storage, and other factors.

Acronyms

CAP – The Common Agricultural Policy (EU)

FAO – Food and Agriculture Organisation of the United Nations

GDP – Gross Domestic Product

GNP – Gross National Product

PPG – Planning Policy Guidance (UK)

UA – Urban Agriculture

UNDP – United Nation's Development Programme

UPA – Urban and Peri-urban Agriculture

WHO – World Health Organisation of the United Nations

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