

MAY 20 1999

# Urban Agriculture

*Food, Jobs and Sustainable Cities*



Published  
by the United Nations  
Development Programme  
(UNDP)

# Contents

The following is the UNDP Technical Advisory Group for this volume:

*G. Shabbir Cheema* Director, Management Development and Governance Division  
*Frank Hartvelt* Deputy director, Science, Technology and Private Sector Division  
*Jonas Rabinovitch* Senior urban environment advisor, Urban Development Unit  
*Robertson Work* Senior programme advisor, Urban Development Unit

The following is the writing team from the Urban Agriculture Network:

*Jac Smit* President  
*Annu Ratta* Economist  
*Joe Nasr* Planner

The following were responsible for the design and editing of the volume:

*Rosemary Phillips* Development editor  
*American Writing Corporation* Copy editing and design

Illustrations viii  
Introduction to the series xv  
Foreword xvii  
Preface xxiii  
Acronyms xxv

## PART I: THE GLOBAL SIGNIFICANCE OF URBAN AGRICULTURE

1. Cities that feed themselves	3
Myths and reality	5
Basic concepts	9
Urban agriculture and urban systems	12
The urban nutrient cycle	12
The urban food system	14
Structure of urban agriculture	18
Preproduction	18
Production	20
Postproduction	21
Notes	22
2. Urban agriculture yesterday and today	25
A brief history of urban agriculture	26
Asia	34
Africa	38
Latin America	41
Europe and North America	44
Europe	44
North America	46

Copyright © 1996  
by the United Nations Development Programme  
One UN Plaza, New York, New York, 10017, USA

The views expressed in this paper are not necessarily shared by UNDP's Executive Board or other member governments of UNDP.

Cover photo: Cultivation in downtown Nairobi by The Urban Agriculture Network.

Summary: Comparisons across continents 47  
Notes 48

## PART II: WHAT IS URBAN AGRICULTURE?

### 3. Who are the urban farmers? 53

Low-income farmers 54  
Middle- and high-income farmers 59  
Domestic and international agribusinesses 62  
Farmers cooperatives 64  
Special groups of farmers 66  
Women farmers 67  
Immigrant farmers 68  
Crisis farmers 69  
Notes 71

### 4. Where is farming found in the city? 73

Types of spaces used 75  
Around the house 76  
Community spaces 78  
Surplus or reserve public and private spaces 80  
Roadsides and other rights-of-way 82  
Streamsides and floodplains 85  
Water bodies and wetlands 87  
Steep slopes 89  
Duration of use 90  
Permanent use 91  
Long-term use 93  
Short-term use 94  
Location within the metropolitan area 96  
Core 98  
Corridors 98  
Wedges 99  
Periphery 100  
Access to land and tenure 101  
Notes 104

### 5. Producing food and fuel in urban areas 107

Aquaculture 109  
Aquatic plants 109  
Fish and other seafood 111

Horticulture 113  
Container horticulture 116  
Soilless horticulture 117  
Animal husbandry 120  
Poultry 121  
Small livestock 123  
Large livestock 123  
Agroforestry 125  
Other urban farming activity 129  
Fauna 130  
Flora 130  
Notes 133

### 6. Which organizations influence urban agriculture? 135

Different roles for different organizations 135  
Support organizations 137  
Farmers associations 139  
Non-governmental organizations 139  
Governments and public authorities 142  
Local governments 142  
National governments 145  
Institutions 146  
Institutional providers 146  
Research institutes 146  
International development agencies 148  
Other stakeholders 152  
Partnerships among organizations 154  
Notes 156

## PART III: BENEFITS, PROBLEMS AND CONSTRAINTS

### 7. The benefits of urban agriculture 159

Health, nutrition and food security 160  
Social benefits 165  
Economic benefits 168  
Employment, income generation and enterprise development 168  
The national agriculture sector and urban food supply 173  
Economic use of land 177  
Sustainable urbanization 179  
Environmental enhancement 179

Efficient urban management	183
Waste management benefits	185
Conservation of resources	188
Disaster mitigation	190
Productive use of hazard-prone and sensitive areas	190
Mitigation of civil and economic crises	191
Notes	194
<b>8. Problems related to urban agriculture</b>	<b>197</b>
Health and hygiene problems	199
Crop cultivation in polluted city environments	199
Use of chemicals in urban farming	200
Use of domestic waste in urban farming	201
Rearing livestock in cities	204
Environmental problems	205
Other problems	207
Inefficient use of resources	207
Aesthetic impacts	208
Notes	209
<b>9. Constraints on urban agriculture</b>	<b>211</b>
Sociocultural biases and institutional constraints	211
The "modern" view of cities	212
"Traditional" sociocultural biases	212
Institutional constraints	213
Constraints on access to resources	215
Irrigation	216
Land and water surfaces	218
Constraints on access to inputs	219
Constraints on access to services	221
Credit	222
Other services	223
Special risks of urban farming	226
Postproduction constraints	227
Organizational constraints	229
Notes	230
<b>PART IV: THE FUTURE OF URBAN AGRICULTURE</b>	
<b>10. Promoting urban agriculture through policy and action</b>	<b>235</b>
Interventions within and across sectors	235

Increase public knowledge and support	236
Build political will	236
Improve organization and communication among farmers	237
Develop a policy framework and build institutional capacity	238
Expand research and training	239
Improve access to resources, inputs and services	242
Maximize health, nutrition and food security	242
Achieve sound environmental and urban management	245
Intervening at the most effective level	249
Community-level actions	250
City-level actions	250
National-level actions	252
International-level actions	253
Notes	255

#### Appendices

A. Acknowledgements	259
B. Glossary	268
C. Sources for cases	269
D. Countries cited in figures, cases and photos	275
E. Cities and towns visited by The Urban Agriculture Network, 1991-95	277
F. Selected resource people	279
G. Selected readings	288
H. Response form	299

# Illustrations

## Tables

2.1	Global estimates of urban agricultural activity	26
2.2	Selected data on the extent of urban agriculture	27
3.1	Presence of urban farmers in selected cities	55
3.2	Gender composition of urban farmers in selected cities	67
4.1	Extent of urban land used for agriculture in selected cities	74
4.2	Types of land used for urban agriculture in selected cities	75
4.3	Forms of land ownership and potential for farming in urban settlements	102
5.1	Farming systems common to urban areas	108
6.1	Roles of organizations that influence urban agriculture	136
6.2	Examples of NGOs active in urban agriculture	138
6.3	Examples of governmental organizations active in urban agriculture	143
6.4	Examples of universities and other institutions involved in research on urban agriculture	148
6.5	Examples of international agencies supporting urban agriculture	149
7.1	Examples of the impact of urban agriculture on health, nutrition and food security	161
7.2	Examples of the impact of urban agriculture on job and income generation	170
7.3	Cities among the world's 100 largest metropolitan areas spend 50% or more of household income by all income groups on food	175

7.4	Examples of urban agriculture's waste management benefits	187
8.1	Problems associated with urban agriculture	198
10.1	Community, city, national and international roles in promoting urban agriculture	249

## Figures

1.1	Evolution of the food-growing nutrient cycle	13
1.2	Processes in the urban food supply system	16
1.3	A closed-loop urban food system	19
2.1*	Historical intensive gardening outside a Chinese walled city	28
2.2	Plan of Aachen, Germany, 1649, showing widespread farming inside and outside the city walls	29
2.3*	Pre-Columbian chinampas of the valley of Tenochtitlan (present-day Mexico City)	30
2.4*	Cultivation under cloches in the marais of Paris in the 19th century	31
4.1	Flat plain of the Niger and farmable gaps between the settled zones of Bamako	86
4.2	Areas suitable for permanent or long-term urban agriculture	91
4.3	Recycling of nutrients in a chinampa	93
4.4	Four-zone model of a city	97
4.5	Land use map of greater Beirut, 1986	100
7.1	Main contributions of urban agriculture	159
7.2	Two models of urbanization	178
8.1	Areas irrigated with wastewater and producing contaminated vegetables, Santiago, Chile, 1990	202

## Cases

2.1	Urban agriculture systems in pre-Columbian America	29
2.2	The 19th-Century marais of Paris	31
2.3	Urban agriculture in Singapore	34
2.4	Urban agriculture in Indonesia	36
2.5	Urban agriculture in Tanzania	40
2.6	Urban agriculture in Peru	43
2.7	Urban agriculture in the Netherlands	45
3.1	Small-scale horticulturists in a squatter settlement in Lusaka	56

- 3.2 Backyard gardeners in Maipú using biointensive methods 58
- 3.3 Growing ornamental crops at home in Lusaka 60
- 3.4 Vegetable and fruit production by Del Monte in Manila 63
- 3.5 Sewage-fed fisheries cooperatives in Calcutta 64
- 4.1 Growing rooftop and patio salad cactus in Mexico City 77
- 4.2 Community farming in a low-income neighbourhood of Kisangani 78
- 4.3 Cultivation at a large industrial site at Camaçari 81
- 4.4 Growing vegetables along roadsides of Dar es Salaam 83
- 4.5 Cultivation in the floodplain of the Niger River in Bamako 85
- 4.6 Wastewater fisheries in China 87
- 4.7 Reforestation of the slopes of Mont Ngafulla in Kinshasa 90
- 4.8 The chinampas of Mexico City 91
- 4.9 Cultivation under electric transmission lines in Rio de Janeiro 93
- 4.10 Community gardens in Barrio Matalahib, Manila 95
- 5.1 Wastewater purification using duckweed 110
- 5.2 Sewage-fed aquaculture in San Juan, Lima 112
- 5.3 VAC yard horticulture in Viet Nam 115
- 5.4 Shallow-bed gardening on inner-city rooftops in Port-au-Prince and Saint Petersburg 118
- 5.5 Farming without soil: women's hydroponic cooperative, Jerusalem, Bogotá 119
- 5.6 Backyard poultry farms in Morogoro 121
- 5.7 Milk production in the Oyster Bay district of Dar es Salaam 124
- 5.8 Food and fuel production programme in Lae 127
- 6.1 Promotion of urban farming by the Undugu Society in Nairobi 141
- 6.2 Government-planned urban farming in the Shanghai urban region 144
- 6.3 AVRDC's multipronged programme 147
- 6.4 International agencies promoting urban agriculture in Tanzania 150
- 7.1 Growing food for community kitchens in Lima 164

- 7.2 Social benefits of urban farming supported by Peru Mujer in Lima 167
- 7.3 Integrated urban farming in Pikine, Dakar 171
- 7.4 Income generation and enterprise development in Jakarta 173
- 7.5 Urban farming for import substitution in Sri Lanka and Ghana 176
- 7.6 "Productive ecological settlements" in Ajusco, Mexico City 182
- 7.7 Growing vegetables on garbage dumps in East Calcutta 188
- 7.8 Cultivating vetiver grass for environmental and disaster control 190
- 7.9 Greenhouse farming in response to civil war in Beirut 192
- 8.1 Cholera outbreak in Santiago caused by the use of raw sewage in urban agriculture 201
- 9.1 Influence of government policy on the development of urban agriculture in Lusaka 215
- 9.2 Using treated wastewater for irrigation in Tunisia 217
- 9.3 Producing organic fertilizer from urban waste in China 221
- 9.4 Pro Huerta, a national agency in Argentina that supports small-scale urban farmers 224
- 9.5 Cooperatives for livestock production, processing and packaging: Urban Food Foundation, Manila 227
- 9.6 Saturday market for urban produce in Managua 229

#### Photos

- 2.1\* Raised-bed horticulture in Singapore 35
- 2.2 Horticulture on surplus land at a racetrack in Jakarta 37
- 2.3 Urban cows and cowherd in Morogoro, Tanzania 40
- 2.4 Community kitchen garden supported by CARE in Lima 43
- 3.1 Urban gardener and his family cultivate for their own consumption and the market in Lusaka 56
- 3.2 Husband and wife backyard gardeners in Maipú, near Santiago 58
- 3.3 Middle-income ornamental horticulturists at work in their front yard in Lusaka 61
- 3.4 Kitchen garden for a restaurant in greater Bogotá 62

- 3.5 Medium-size poultry business in Lusaka 63
- 3.6 Lagoon in Calcutta farmed through a fishermen cooperative using treated sewage 65
- 3.7 Women selling their farm products at a street market in Abidjan 66
- 3.8# "Victory garden" in front of the San Francisco civic centre during the Second World War 70
- 4.1 "Cactus in a box", Mexico City 77
- 4.2\* Community garden in a churchyard in San José, Costa Rica 79
- 4.3 Maize being grown in front of a government hospital in Port-au-Prince 81
- 4.4 Roadside horticulture in a wealthy residential area of Nairobi 83
- 4.5 Intensive horticulture in a floodplain near the city centre of Dar es Salaam 87
- 4.6 Catfish pond in urban Taiwan (province of China) 88
- 4.7 Mixed cropping on steep slopes outside Nairobi 89
- 4.8 Chinampa aqua-terra farming system of Mexico City 92
- 4.9\* Cultivation on airport buffer land in Manila 94
- 4.10\* Vegetables growing in community gardening plots in Barrio Matalahib, Manila 96
- 5.1 Duckweed cultivation at the Asian Institute of Technology, Bangkok 110
- 5.2 Integrated fish cultivation near Panama City 111
- 5.3# Community garden at the Presidio military base in San Francisco, an example of consumption-oriented horticulture 113
- 5.4 New onions and maize, Pikine, Dakar, an example of income-oriented horticulture 114
- 5.5 Container gardening in Santiago 117
- 5.6 Hydroponic cultivation for the market in Jerusalem, Bogotá 119
- 5.7 "Bookcase" chicken raising in Santiago 122
- 5.8 Pigs raised on market waste in Ghanna, Abidjan 124
- 5.9 Ornamental tree nursery in the heart of Nairobi 126
- 5.10+ Urban agroforestry with multicropping in Lae 128
- 5.11 Vineyards overlooking central areas of Freiburg, Germany 131
- 5.12 Large-scale ornamental horticulture in Port-au-Prince 132

- 6.1\* Sign posted at a large community garden for families of Costa Rican public forces, listing cooperating public agencies and NGOs 137
- 6.2 Training and research centre of SEMTA, an NGO in La Paz 140
- 6.3\* Master plan for Canton, which includes agriculture 144
- 6.4 Researcher at an AVRDC experimental facility in Taiwan studying small-scale aquatic home gardens 147
- 6.5 GTZ's horticultural demonstration site in Dodoma 150
- 7.1 Community kitchen in Lima that uses produce grown in community gardens to improve the nutritional quality of meals 164
- 7.2 Fresh meat being sold at a farmers market in Managua 165
- 7.3 Community gathering in Sagbe, Abidjan, for the smoking of locally caught fish 166
- 7.4 Training facility operated by Peru Mujer on hospital grounds in Lima 167
- 7.5 Small-scale ornamental horticulture production and retail at a roadside near Dakar 169
- 7.6 Large ornamental horticulture enterprise in Bogotá 169
- 7.7 Drying fish in Pikine, Dakar 171
- 7.8 Hawkers market in Nairobi 174
- 7.9 Start of a reforestation campaign in Villa El Salvador, a suburb of Lima 180
- 7.10\* Attractive, well-maintained vegetable garden, San José, Costa Rica 183
- 7.11 Sheep grazing on public land in Rome 184
- 7.12 Composting bin at a 75-year-old community garden in Zschortau, near Leipzig, Germany 186
- 7.13 Animal-powered cart bringing produce into Beijing 189
- 7.14 Greenhouses within the "green belt" of Beirut 192
- 8.1 Young farmer applying untreated sewage on leafy vegetables in Pikine, Dakar 203
- 8.2 Animals roaming in fields outside Asmara, Eritrea, polluting them with uncomposted feces 205
- 8.3 Goats grazing on park land in Oyster Bay, Dar es Salaam 206
- 9.1 Sewage-based experimental aquaculture pond at the Asian Institute of Technology, Bangkok 216

- 9.2 Vermi-composting of domestic waste for use as fertilizer in Jakarta 220
- 9.3\* Extension service specialist training a neighbourhood volunteer leader in Panama City 223
- 9.4 High wall protecting an orchard in Lima 226
- 9.5 Rice mill at a women's cooperative in Dakar 227
- 9.6 Packaging herbs in Abidjan 228
- 9.7 Home-processed salsa being sold at a market in Managua 229

\* From the collection of Urban Resources Systems, Patricia Goudvis, photographer.

+ From the collection of Urban Resources Systems.

# From the collection of the American Community Gardening Association.

All other photos from the collection of The Urban Agriculture Network.

## Introduction to the series

The trend, now well known, is irreversible: the number of people living in cities will more than double in 35 years. In 1990 the world's urban population stood at 2.4 billion. In 2025 it is expected to reach 5.5 billion, a trend accelerating in developing countries, whose share of the total will rise from 63% in 1990 to 80% in 2025.

At the same time, it is clear that past incentives to keep the developing world's people in rural areas—on the theory that growth of cities led only to unemployment—have not worked. The rural-versus-urban development model has not been successful, because people want to go where the jobs are, and jobs are seen to exist in cities. Thus, it is necessary to help people help themselves to a better life—wherever they are.

There lies an enormous challenge—to prepare the cities and the settlements around them not merely to absorb this population but to assist in finding or creating livelihoods, social services, adequate shelter and an environment in which they can flourish. It is a challenge that will be faced by the second United Nations Conference on Human Settlements—Habitat II—in June 1996. This series, developed for Habitat II, will help those people preparing for the conference, those attending it and those working to follow up on Conference commitments with action around the world.

The United Nations Development Programme (UNDP), working closely with the Conference leadership, has produced this series of books. UNDP has a history of working in urban settings and is strongly committed to the goals of Habitat II as goals that fit into UNDP's vision of sustainable human development. That development not only generates growth—it distributes the benefits equitably.



It regenerates the environment rather than destroy it. It empowers people rather than marginalizes them. It gives priority to the poor, enlarging their choices and providing for their participation in decisions that affect their lives. And that development is pro-city because it is pro-poor, pro-nature, pro-jobs and pro-women.

UNDP also published in 1991 a strategy paper on urban development cooperation, "Cities, People and Poverty", followed in 1992 by a policy paper on the urban environment. The two papers provided guidelines not only for UNDP but for the UN system.

This new series builds on past publications and provides direct support to UNDP's "Action Package" for Habitat II, with various national, regional and global activities. That package calls for UNDP to work with UN system partners in each developing country to help countries prepare for the Conference and its follow-up by reviewing past policies, selecting best practices for replication, and preparing national urban action plans. UNDP organized, among various other activities, regional workshops in Accra, Amman, Bangkok, Katmandu, Quito, and Warsaw to build local partnerships with NGOs and others to promote urban development. UNDP called an International Colloquium of Mayors in 1994, beginning a round of activities to strengthen cities' ability to serve their residents' needs.

This series focuses on practical issues—on urban agriculture and sustainable livelihoods, rural-urban linkages, approaches to participatory local governance, gender equality, the role of the informal sector, employment generation and building the capacity of those who administer the cities of the world.

At this point, solid information built on realism and experience is needed more than theory. These books provide such information and guidance. I commend my colleagues at UNDP and the collaborating institutions and agencies for producing this series. I urge our country offices to continue to work closely with the people in each country to make urban life productive and sustainable.

*James Gustave Speth*  
*Administrator*

*United Nations Development Programme*

## Foreword

This book has four main purposes: (1) to present a comprehensive picture of urban agriculture in Asia, Africa and Latin America; (2) to define a distinct industry that needs to be recognized and treated as such; (3) to persuade leaders in government, non-governmental organizations, research institutions and other public and private entities to conduct research, support action projects and eliminate unnecessary constraints to the growth of the urban agriculture industry and (4) to foster a climate that empowers practitioners and the agencies that back them to fulfill the industry's potential for improving public well-being and the quality of urban life.

The book reveals that urban agriculture has been overlooked, underestimated and underreported. It outlines the historical prejudices and biases against urban farming, which for the most part are either unfounded or obsolete. Actual problems that can result from ill-practised cultivation and animal rearing in urbanized areas are identified, as are the many benefits of well-planned and well-executed urban agriculture.

Additionally, the volume reviews the history and current status of urban farming in terms of its relevance for the future, describes some of the urban agricultural enterprises that exist in a score of countries and explores potential methods of promoting the urban agriculture industry.

Through extensive interviews and correspondence, it has become clear that urban agriculture has been underrated in all but a handful of countries—and mostly overlooked by the international development community. During the 1980s, the industry was in a period

of rapid growth, which included a transfer of methods, particularly from Asia to Africa and Latin America. Nutritionists, energy specialists, geographers, urban planners, agriculturists and social scientists began to report on this growth at an unprecedented rate, each from their own point of view. This book is, we believe, the first effort to pull together their findings. We therefore consider it to be a "wake-up call".

As an industry, urban agriculture is closely linked to several urban, ecological, social and economic systems. It provides economic benefits for urban farmers and their communities and cities. It enhances the living environment and can improve efficiency in urban management. It contributes to better public health (if practised properly) and furthers social participation in the community. It can play an important role in reducing some types of hazards and in aiding the survivors of others.

Because of these multiple linkages and benefits, urban agriculture—more than most other industries—requires partnerships between public and private interests to achieve its potential. Yet urban farmers by and large believe that they are isolated pioneers without support. They have difficulty accomplishing what other industries consider routine, such as buying necessary inputs (seeds, fertilizer and tools), borrowing capital or buying insurance, acquiring a manual or obtaining instructions on how to produce a new product or crop or even protecting their activities against theft. Through solidarity and dissemination of knowledge, urban farmers should have a more secure foundation that ensures better returns for their efforts.

#### Study approach and audience

This volume focuses on urban agriculture in Asia, Africa and Latin America, particularly on cities visited by UNDP consultants from The Urban Agriculture Network during four study trips in 1991 and 1992, and on subsequent tours of other cities. It makes only occasional references to urban agriculture in Europe, the Middle East, the Pacific islands, the Caribbean and North America. This was a decision made at the outset because it was foreseen that the greatest potential benefits could be realized in the developing regions represented by the countries visited. However, the findings and conclusions of this document do refer to reports on other geographic areas where the information is available. It is important to note that some wealthy

countries, including Japan and the Netherlands, have long been leaders in urban agriculture.

The intended audience for this book includes policy-makers, researchers, development agency staff, government agencies, non-governmental organizations and private organizations concerned with food security as well as those involved in agricultural production, processing and marketing; urban hunger and nutrition; microenterprise development; the urban environment and waste management. The priority audience is in the developing countries but includes international agencies and readers with related concerns in industrial countries. For instance, recent books on "green" and ecological cities have chapters on urban agriculture, and it is hoped that this book will resonate with some of their readers. There is also considerable interest in urban agriculture among the supporters of sustainable agriculture. The views expressed in this book are not necessarily shared by UNDP's Executive Board or other member governments of the UNDP.

#### Background

The findings and conclusions are based on field research the organization conducted in 18 countries in Asia, Africa and Latin America during 1991 and 1992, supplemented by additional trips to several other countries, along with desk and library research that reviewed studies from the early 1970s through 1995. More than 300 interviews and more than 100 site visits were conducted with farmers, government officials and representatives of non-governmental organizations, community groups and research institutes. Important information was also obtained through visits to research and operating agencies of the United Nations and participation in workshops and conferences.

The book is thus not the work of one author or even a team, but has literally hundreds of committed authors: the members of The Urban Agriculture Network. The beginnings of the network date to early 1991, when UNDP/DGIP, with the technical support of the Urban Development Unit, launched this benchmark study of urban agriculture to provide a common base of knowledge on the issues, strengths, problems and concerns related to urban farming. By emphasizing a global field-visit approach, UNDP enabled a network to form gradually, with the study authors initially acting as its central node.

### Reading and using this book

Part I of this book outlines just how significant urban agriculture is and why its processes fit into the urban food and ecological systems. It provides an overview of urban farming today and in the past, including some success stories from different regions of the globe. Part II gives a detailed characterization of urban farming—defining who the farmers are, where farming is undertaken, what crops are farmed and how, and which actors play a key role in the activity. Part III discusses the benefits of urban farming and the problems it can cause when poorly practised, as well as the constraints farmers face. Finally, part IV looks to the future to define a strategy for promoting urban farming throughout the world.

Various readers may wish to use this volume in different ways. *Leaders of development agencies* may be less interested than farmers in studying the many examples of different urban agricultural enterprises. They may, however, wish at least to scan the case studies in parts I and II, which present snapshots of particular applications. Part IV, on the other hand, is addressed to their municipal, regional and global agendas and may be of less interest to practitioners.

Certainly *farmers* know all too well the information in the chapter in part III on the constraints facing urban agriculture. This book nonetheless can provide them with useful comparative information as well as serve as a source of ideas from other countries and regions. Perhaps a sense of belonging to a global community of fellow practitioners will emerge from their reading of parts I and II.

Some *specialists* will know far more than what can be found in this book on their particular area of interest; they may, however, be able to integrate that focused knowledge into other domains with which they are less familiar. A sanitation specialist, for example, may be surprised by the significant links of waste to the urban food system.

*All readers* will gain from part III, which contains chapters on the benefits, problems and constraints of urban agriculture. If a consensus can be found about what can and should be done, a new urgency will be created to break the shackles that are retarding urban agriculture's development.

### Concluding thoughts

As you read, keep sight of some of the broader implications of farming in the city: towns, cities and metropolises that are ecologically sustainable; an opportunity for the poor to become nutritionally self-reliant

and to supplement their income; and a thriving industry that contributes to economic development. This is the promise that farming holds for urban areas.

Some public officials, business leaders, leaders of non-governmental organizations and other key individuals may already be persuaded of the merits of urban agriculture. It is hoped that this book will help convince others as well.

*Anders Wijkman*  
*Assistant Administrator and Director*  
*Bureau for Policy and Programme Support*  
*New York*  
*January 9, 1996*

## Preface

This volume is due largely to the funding, foresight, enthusiasm and leadership of the Science, Technology and Private Sector Division and the Urban Development Unit of the Management Development and Governance Division of the United Nations Development Programme.

Intellectual guidance was provided by an advisory committee drawn from private and public agencies. Members of this committee actively participated in review meetings over a two-year period (they are acknowledged in appendix A). A second round of study trips, sponsored by a number of agencies, added to the body of knowledge. (The countries and cities visited during the course of this study are listed in appendix E.)

The field work undertaken as part of this study was successful in large measure because of the vast knowledge, warm hospitality and boundless generosity of hundreds of members of an ever-expanding network. An early draft of this report was sent to 50 experts, and many of their comments significantly shaped this final version. (They, too, are credited in appendix A.)

The unofficial network was formalized in 1993 by the creation of The Urban Agriculture Network, a non-profit resource centre based in Washington, D.C. This centre has accumulated a considerable collection of books, articles, unpublished reports, bibliographies, videos and radio programmes that are available for consultation by anyone interested (appendix G offers an indication of the breadth of the collection).

However, The Urban Agriculture Network was not created merely as a resource centre. It is intended as a foundation from which a network of urban agriculture practitioners and supporters can be launched—a “network of networks”. The beginnings of regional nodes are already visible. A Latin America-wide conference has led to the launch of a network in that region; another network is sprouting in

a few countries in Africa; and a conference was held in December 1995 in South Asia, with a view towards forming a network in that region as well. The momentum towards greater recognition of this industry seems finally to be gathering.

Some clarification is appropriate. First, most chapters emphasize issues associated with the lowest-income population. This treatment is not based on any characteristics inherent to the industry. Rather, it reflects UNDP's, and the authors', special interest.

Second, the book is neither a technical how-to manual nor an academic document. It is based largely on interviews and field observations. Written sources are cited (in notes at the end of each chapter and in appendix C); however, information obtained from the first-hand sources on which much of the book is based is not similarly referenced in the notes that follow each chapter.

In the case examples, first-hand sources are referred to as "Urban Agriculture Network case file". Where possible, contacts are identified to benefit readers who wish further information. If detailed contact information is listed in appendix F (selected resource people), that provided in the case is abbreviated.

Third, because urban agriculture consists of many diverse activities, not all conclusions or summary statements are valid in all instances or all countries. Moreover, general statements cannot encompass the full scope of urban agriculture efforts. As a result, exceptions and contradictions will occasionally be found in this volume.

In addition, some examples of urban agriculture are based on secondary material. Some that existed in the 1980s may no longer exist; similarly, some former successes may no longer be thriving. Urban agriculture is often transitory. But even as one site is abandoned or reused, another is put into intensive cultivation. Participants and active organizations also come and go—again, an intrinsic characteristic of urban farming itself. Updates from readers will enable the material to be updated in a future edition.

For this purpose, and so that readers can alert us to any conclusions that may prove wrong when more data are available, a response form is provided (appendix H) to help guide next efforts.

*Jac Smit  
President  
The Urban Agriculture Network  
Washington, DC*

## Acronyms

AVRD	Asian Vegetable Research and Development Center
CEPIS	Centre for Sanitary Engineering and Environmental Sciences
FAO	Food and Agriculture Organization (United Nations)
GTZ	German Agency for Technical Cooperation
HUFACAM	Huertos Familiares, Aborizacion y Crianza de Animales Menores
IDRC	International Development Research Centre (Canada)
NGO	Non-governmental organization
ODA	Overseas Development Administration (United Kingdom)
SIDA	Swedish International Development Authority
UNCHS	United Nations Centre for Human Settlements
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNICEF	United Nations Childrens Fund
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
WHO	World Health Organization (United Nations)

**P a r t**  
**one**

**The global significance  
of urban agriculture**

C h a p t e r  
**one**

# Cities that feed themselves

At first glance, the term “urban agriculture” may appear to be an oxymoron. Agriculture is considered the quintessential rural activity, and urban agriculture is often perceived as archaic, temporary and inappropriate. Some consider it marginal at best, perhaps a constructive recreational activity or an aesthetic function that helps to beautify the “ugly” city. In fact, urban agriculture is a significant economic activity, central to the lives of tens of millions of people throughout the world. It is a rapidly growing industry that is increasingly essential to the economic and nutritional security of urban residents and that has far-reaching economic, environmental and health implications.

In an urbanizing world running short of resources, the possibility that cities can depend on the ingenuity of their residents to generate food security for themselves is significant. In countries where hunger and malnutrition are predominantly urban problems, an activity that can contribute to the nutritional self-reliance of a community, city or metropolitan region is significant. In cities choking in their own waste and pollution, an industry that can use urban waste as a basic resource is significant.

Sometimes called metropolitan-intensive agriculture, urban agriculture can be defined as *an industry that produces, processes and markets food and fuel, largely in response to the daily demand of consumers within a town, city or metropolis, on land and water dispersed throughout the urban and peri-urban area, applying intensive production methods, using and reusing natural resources and urban wastes, to yield a diversity of crops and livestock.*

Urban agriculture contributes significantly to the socio-economic development of towns and cities throughout the world. In several economies, particularly developing ones, it is one of the largest

urban productive industries. In low-income cities, it is a prime generator of jobs.

Urban agriculture is an easy-in, easy-out entrepreneurial activity for people at different levels of income. For the poorest of the poor, it provides good access to food. For the stable poor, it provides a source of income and good-quality food at low cost. For middle-income families, it offers the possibility of savings and a return on their investment in urban property. For small and large entrepreneurs, it is a profitable business.

There is no “average urban farmer”. Frequently, the urban farmer is a woman with a family who has lived in a town or city for five or more years, grows vegetables and raises small livestock to feed her family and earns income from sales within the community. But urban farmers also include wealthy producers of specialty crops for expensive restaurants and export, agribusinesses with plantations and out-grower contracts, fishermen cooperatives, “Saturday only” part-timers who grow cassava by the roadside and market gardeners with yearly contracts with supermarkets and hotels.

Urban agriculture is a large industry consisting of many small-scale farmers and some large agribusinesses. Urban agriculture takes place on smaller tracts of land than rural farmers’ fields and on open spaces that are vacant, idle or unsuited for urban development. Although the most common site is the household plot, urban agriculture can be found throughout the metropolitan area. A large-scale operator may rent ten hectares in an industrial zone. A small-scale farmer may make a living on as little as 200 square metres. A household garden may cover 20 square metres or less.

Some typical examples of urban agriculture include:

- ▼ Fish and other aquatic products harvested from tanks, ponds, rivers, sewage lagoons and estuaries
- ▼ Horticulture on excess vacant space at large facilities principally dedicated to other activities (for example, airports, large factories)
- ▼ Rabbits, guinea pigs and chickens raised in bookshelf cages hung on walls
- ▼ Vegetables grown in hydroponic solutions on roofs, patios and stairways
- ▼ Market gardens on vacant plots, in the green wedges between urbanized corridors or along highways and railroads in peri-urban areas.

Urban farming is, perforce, intensive, making the best use of space, with a predominance of shorter-cycle, higher-value market crops. It utilizes multicropping and integrated farming techniques and makes judicious use of both horizontal and vertical space (through such techniques as chicken-coop boxes on shelves, multispecies fish ponds and container farming). Because water is expensive and usually in short supply, urban farming tends to be more conservative and efficient in its water usage than rural farming.

Urban agriculture is oriented to close-by urban markets rather than national or global markets. Proximity to the market predisposes crop selection to perishable products—urban farmers have a competitive edge over rural farmers in being able to deliver fresher produce to consumers. Urban agriculture also normally involves fewer middlemen between farmer and consumer than rural agriculture, and the transportation and storage needs of urban produce are much lower.

The potential of urban agriculture is largely untapped and undervalued. Intensive urban horticulture can yield several times as much produce per area as rural agriculture. Limited availability of resources (land and water) and inputs in urban areas has led to the development of farming techniques that require only a fraction of the water and fertilizer needed for tractor-cultivated rural farms per unit of production. Urban farming also can absorb a significant amount of urban solid and liquid waste, helping the city reduce its waste management problems and costs. And in addition to providing crops and animals for consumption or income, urban farming contributes to environmental enhancement and disaster management (for example, through the planting of trees on steep slopes or deep-rooted tall grass in floodplains).

## Myths and reality

Despite all these benefits, urban agriculture is an ill-understood industry. Urban farming is often minimized as being merely “kitchen gardening” or marginalized as a leftover of rural habits. The benefits of urban farming are lost behind myths that are the products of cultural, planning and policy biases. These biases and their consequences are considered in detail in chapter 9. It is necessary, however, to identify and address the myths surrounding urban agriculture at the outset, since these myths misrepresent the significance of urban farming and hinder recognition of its potential.



