

Developments in urban agriculture have been practitioner-led. Researchers are trying to catch up and identify what contributions they can make. Research could learn from the successes and failures addressed in other forms of agriculture, and thus identify and address the researchable questions in a pro-active way. Those who wish to engage in the development of agriculture in cities will need to take a constructivist approach to innovation facilitation, whereby they should recognise that they are just one of a set of actors involved in the process.

From Video "Urban Agriculture", RUAFA 2001



Children school vegetable garden in Ecuador

The contribution of indigenous technical knowledge (ITK) of agriculture from rural settings has yet to be evaluated. However, given the different context, the different resource base and the different functions urban agriculture fulfils, it is safe to say that the process of adaptation and development of knowledge and technology for urban agriculture will generate a need for innovation.

# The Contribution of Research

## *a Methodological Review*

**H**ere, the authors review some methods that have been used in the study of urban agriculture, from actor-oriented and action-research perspectives. The term *methodology* will be used to designate a system of methods and principles used in a particular

### METHODOLOGICAL IMPLICATIONS OF URBAN AGRICULTURE CHARACTERISTICS

Urban agriculture is prone to change. Space and available resources vary both quantitatively and qualitatively over short periods of time. This dynamic causes heightened degrees of complexity in the relationship of agricultural use with its environment. The urban setting can present people with different opportunities of employment and income generation (formal and informal). Urban agriculture is therefore one of a repertoire of livelihood activities, especially so in the more marginalised sectors of the urban population.

Researchers are thus facing a system that is prone to change (pressure exerted by exogenous forces), and where a complex set of relations exist with other land uses and activities in the same context. Research then needs to take a dialectical approach to any situation analysis and impact assessment whereby the current mode of urban agriculture is understood as a response to exogenous and endogenous factors.

### RESEARCH METHODS

#### *Social science*

Social research methods such as surveys, questionnaires, case studies and interviews have been widely used to assess the impact and contribution of urban agriculture on food security and nutrition, and in terms of management decision-making (see Table 1 for examples). Methods have been adapted from Farming Systems Research to provide typologies of production systems, target group identification, system characterisation and problem diagnosis as elements towards the implementation of effective solutions to the problems identified. Information collection and data analysis is very often carried out by multidisciplinary approaches.

The case study approach has been used by many to understand specific urban agriculture systems seeking more generic lessons. Nugent (2000) analysed several case studies and found that they are extremely variable in their sampling methods, scope and presentation of data. Gender analysis is another methodology that has

### Different disciplinary have been used to study urban agricultural dynamics

discipline or set of disciplines. *Methods* can be defined as the techniques of a particular field or subject. A *tool* is any object, skill, etc. used for a particular task.

Different disciplinary foci have been used to study urban agricultural dynamics such as urban development and land use; strategies of urban farmers involved in production; natural resource management; production systems; and commodity and food systems. Many of the approaches aim to involve different actors by consultation through questionnaires, survey, interviews or participatory methods.

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been adapted recently to the study of urban agriculture (Hovorka 1998 and in this issue on page 7). To assess temporal changes, historical analysis and documentary investigation have been used to evaluate the evolution of agriculture in the city and to synthesise different information sources in an attempt to explain its present forms.

Participatory methodologies for appraising local living conditions and natural resources are increasingly widespread, but approaches that involve local people in evaluating urban agriculture projects or monitoring local conditions are less well-developed and documented. In order to analyse allotment management and use in terms of gender and ethnic identity, methods of Rapid Rural Appraisal have been used such as semi-structured interviews, seasonal calendars, mapping, time lines, SWOT

## Approaches that involve local people in Monitoring and Evaluation are less well documented

(Strengths, Weaknesses, Opportunities and Threats) and force field analysis (Perez-Vazquez and Anderson 2000).

### *Economic research methods*

For some urban farmers, particularly where the food produced is traded, financial costs and profit maximisation are very relevant. For those for whom agriculture is a form of subsistence or a hobby, other economic issues are important. For this reason selecting the appropriate techniques according to the socio-economic context and purpose is a priority. Other less tangible economic benefits that should be valued include the reduction of risk, less dependence on external inputs and demand for credit.

A quantitative technique often used is cost-benefit analysis (CBA). CBA uses market prices to value inputs and outputs, but it only offers partial results, however. The production function approach measures different input quantities and the amount of physical or monetary output (Ruben and Heerink 1998). The production function approach is very data intensive. Jansen et al. (1996) estimated the profitability and sustainability of peri-urban vegetable production in Vietnam. Little attention has been given to livestock rearing in this context, and its role in providing income for urban families and its role in social integration.

Only recently, the non-material benefits and externalities derived from urban agriculture such as leisure, relaxation, exercise and others have been evaluated using ecological economic methods. There are several that have been used to value non-market benefits, and a choice among these methods should be based on the aims and object of the valuation study. Usually three sets of techniques are used for valuing or estimating the values of services not explicitly priced by markets. Those are: a) the hedonic technique, which measures the value of resource services that are obtained through the purchase of some market good (Freeman 1979); b) the travel cost technique estimates values using the travel costs that individuals incur to access a resource service; and c) contingent valuation method (CVM) that elicits values directly from the individuals who are potentially affected by a change in management policy (see Henn and Henning on page 49). The CVM has been used to estimate the "whole" value of benefits and services derived from allotments, through assessing individuals' willingness to pay (WTP) and willingness or intention to accept (WTA) in compensation, comparing plot holders with residents (Perez-Vazquez 2000).

### *Ecological research methods*

Ecological methods have been used to evaluate and determine the significance of biodiversity, particularly agro-diversity, and its contribution to food production. In addition, ecological methods

**Table 1**

Study purpose	Reference
❖ To determine urban gardens used at different housing densities in the suburban areas of London	Mackintosh and Wibberley 1952
❖ To acquire information about two types of urban cultivation (plot gardens and front yard) in Lusaka, Zambia	Sanyal 1986
❖ To examine the situation of UA in South Africa	May & Rogerson 1995
❖ To provide donors, researchers and development practitioners with an overview on research and development projects in the tropics and subtropics	Gura 1995
❖ To identify the influence of the policies changes on the income and cropping system of peri-UA in Vietnam	Jansen et al. 1996
❖ Evaluating environmental degradation caused by keeping livestock in Dar es Salaam, Tanzania	Molongo 1997
❖ To evaluate household food production in Harare, Zimbabwe	Smith & Tevera 1997
❖ To examine the urban popular gardens in Havana, Cuba as food security	Chaplowe 1998
❖ To test the positive impact of UA on household food security and nutritional status in Kampala, Uganda	Maxwell et al. 1998
❖ To investigate the amazing effects of the environment for keeping dairy cattle in the city (Dar es Salaam, Tanzania)	Mlozi 1997
❖ To analyse the characteristics of UA in Kenya set within a wider conceptual and socio-economic context	Memon and Lee-Smith 1993
❖ To collect data on the socio-economic situation, goals and problems of sheep keepers (72) and non-keepers of small ruminants (64) in two locations, a central and a peripheral quarter of Bobo Dioulasso, Burkina Faso	Siegmund-Schultzea et al. 1998
❖ To determine the contribution of urban gardens to the nutritional intake and the effect of the gardens on the community in Havana, Cuba	Moskow 1999
❖ To describe commercial vegetables produced in Lagos & Port Harcourt, Nigeria and to determine the profitability of farm resources in UA	Ezedinma and Chukuezi 1999

have been used to study positive and negative impacts of the urban agriculture activities on the environment and to determine undesirable side effects such as urban sanitation (Siegmond-Schultzea et al. 1998), contamination and various types of damage, and to quantify the effects. A few studies have attempted to identify the beneficial aspects of growing food in urban areas, providing habitats for wildlife and many other environmental benefits. However, studies to determine the significance of encouraging biodiversity in these open spaces, for example, as a way to preserve natural or native resources have not been carried out.

In order to determine soil quality, the soil macro- and micro-organisms have been used as a reliable bio-indicator of soil

## Effective knowledge networks are required

quality in addition to other chemical and physical analyses (Lavelle et al. 1992, Linden et al. 1992).

For analysing spatial change, land-use and landscape change, Geographical Information Systems (GIS) have been used as a tool for planning and understanding these changes (See under topic 3).

Environmental methods have focused on ways of dealing with wastewater and organic wastes (Lewcock 1995, Nunan 2000). Entomological methods have also been used to identify the main crop pests in allotments (Atkinson et al. 1979). In addition, environmental indicators have been used to assess sustainability of urban agriculture, including a diverse set of other indicators (Jansen et al. 1996, Barret and Browne 1991, Lynch 1995, Rees and Wackernagel 1996).

### THE NEED FOR NEW METHODS FOR ASSESSING URBAN AGRICULTURE

A closer examination of the literature on research on urban agriculture reveals that most studies have used methods such as interviews and questionnaire surveys. These studies are associated with ideas of home-consumption in cities and the household economy. Studies are essen-

tially related to empirical investigations of the incidence and importance of urban agriculture for urban food production with an emphasis on the descriptive verification of their significance. The methodologies used may be grouped in three broad categories:

- ❖ research based on questionnaires;
- ❖ use of participatory methods and case studies; and
- ❖ a combination of economic and ecological methods.

New or adapted methods are required for a better diagnosis and design of urban agriculture related activities in order to identify their importance and contribution, the roles of the different stakeholders, and to assess the rapid changes. These methods should enable the use of different approaches (qualitative and quantitative) to assess biological, social and economic aspects, as to provide better knowledge of the urban environment and the available resources and constraints.

If research is to make a valid contribution to the development of urban agriculture and to the sustaining of urban centres, effort is required for the establishment of effective knowledge networks whereby researchers can engage with urban agriculture and try to find answers to the researchable questions. There is also a need to investigate rural-urban linkages through flow analysis and impact of flow analysis, to identify actors involved, to evaluate income derived, to evaluate income distribution, and to access benefits in terms of resource access and control (Tacoli 1998).

New paradigms like pro-poor research & action have been developed over the last few years based on the need to understand livelihoods as a result of the access to and use of assets by households within the context of formal and informal institutions. The Sustainable Livelihoods Approach <http://www.livelihoods.org> developed by DFID UK presents a checklist for research and action on poverty, and frameworks such as this need to be incorporated into research protocols on urban agriculture.

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