

Topic 4

PARTICIPATORY TECHNOLOGY DEVELOPMENT

The urban agriculture production system is characterised by a variety of agricultural micro-enterprises, the performance of which is not only limited by bio-climatic, land and socio-economic constraints but also by important technical restrictions. Although urban farmers are quite dynamic and innovative and have a vast scope for technical improvement, the rate of development and diffusion of technologies to these systems is still limited (USAID 1989, FAO 1999, Fall and Fall 2001).

From Video "Urban Agriculture", RUAFA 2001



Watering Crops on a Roof in Dakar, Senegal

the people are involved in other economic activities, their agricultural plots may be far apart from their houses, and they may know few other farmers, or they may come from another socio-cultural background which hinders communication and cooperation.

In the rural setting, farmers have developed a whole body of traditional technical knowledge over time. A part of the urban farmers comes from farming origins, but others are farmers by need or choice and may lack such traditional technical knowledge. Even so, the knowledge of someone from a farming background may have limited value in the city: soil and water conditions are different, other crops should be grown, and other constraints and opportunities have to be dealt with.

Contrary to rural farmers, urban farming households are most often combining farming with multiple other economic activities, but may have a much better insight into the urban market and the food demands of urban citizens than their rural colleagues.

A farm in the rural area normally involves various components that mutually reinforce each other. In the city, farmers may just concentrate on one component (e.g. production of fodder) and leave the other components to other households (e.g. raising of animals).

Other important differences with rural areas that have to be taken into account when developing agricultural technologies in the urban context include:

- ❖ high pressure from competing land uses and high insecurity of land tenure;

Appropriate Methods for Technology Development

Low level of technology development in urban farming systems, the adaptation of agricultural production technologies to the specific conditions of the urban context, and the low level of acceptance by urban farmers, is due to the following factors:

- ❖ the bias towards rural agriculture in the agricultural research and extension institutions and the limited attention given to agriculture by most urban authorities, until recently;
- ❖ the lack of technologies well adapted to the urban production conditions (adapted varieties, technologies for space confined production, and also technologies for the safe use of urban wastes and wastewater);
- ❖ lack of attention for the innovations made by urban farmers themselves; and
- ❖ lack of participation of urban farmers in the identification of

the priorities for technology development and in the testing and evaluation of new or adapted technologies.

This poses multiple questions concerning the approach and methodologies applied in urban agriculture research and extension. This article will seek to answer these questions by exploring the methods and procedures that may be applied with success to urban agriculture.

URBAN AGRICULTURE AS COMPARED TO RURAL AGRICULTURE

Urban farmers and urban farming conditions differ from those in rural areas, a fact that has important consequences for the research and extension methodologies for urban agriculture.

The urban farming population is more heterogeneous in its social, economic and cultural background. In rural communities, farmers conform to a large part of the community, they know each other, and the exchange of information and technologies is continuously taking place. In the urban setting, farmers may live in neighbourhoods where most of

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- ❖ space for agriculture is limited, leading to a high need for space-saving technologies and intensification of production;
- ❖ in many cases, the urban environment is already contaminated (air, soil and water pollution by cars, industry and household wastes) and waste management remains a serious problem. Use of agrochemicals in agriculture may easily affect urban drinking water or the neighbouring households. Certain diseases may be propagated by agriculture if not properly managed. In urban areas - due to the proximity to large numbers of people - such effects are more damaging than in the rural areas. Environmental and health concerns require serious consideration when developing appropriate technologies for urban agriculture;
- ❖ marketing opportunities are stronger than in rural regions. Urban areas have a high demand for large amounts of quality, fresh and processed products. Direct access of producers to consumers is possible. There is high demand for low-cost food-processing technologies; and
- ❖ labour costs are higher as compared to in rural areas.

IDENTIFICATION OF TECHNOLOGY NEEDS

The identification of the need for specific technologies is the first step in the research-development chain. This involves the characterisation of the production systems and farming households present in the selected area in order to arrive at a reliable diagnosis of the problems and their ranking, and further to identify the technology to be developed,

jointly with the urban farmers. Also, other stakeholders at various levels of the production, distribution, transformation and consumption chain should be included in this analysis (Drechsel 2001).

The study of the location implies physical and socio-economic characterisation of the target area. Special attention should be given to the analysis of the direct stakeholders: their number, ethnic group and social behaviour. This analysis

needs to be participatory and ending with a consensual characterisation of the various social groups involved, especially concerning their skills, preferences and technology needs (Quansah 2001 and page 38 of this magazine). A variety of participatory and other rapid appraisal methods and instruments can be applied in the situation analysis, such as focus group interviews, community resource mapping, seasonal calendars, problem trees, Venn diagrams and ranking. Adaptations of these methods to the specific urban setting are needed. The participation of the direct stakeholders in the process of situation analysis is an important condition for identification of priority technology needs and the criteria that should be taken into account during technology development and testing in urban agriculture. But one should also take into account the limitations of participation: for the farmers, transaction costs of participation may be high, reliability of the information gathered in participatory processes should be guaranteed by triangulation (combining various sources and methods), intensive participation may generate expectations that are beyond the resources or mandate of the researchers, etc. Furthermore, the complexity of information levels after consulting stakeholders, usually of different social origin can be high and thus stratification is recommended.

Special attention needs the direct and active participation of sensitive groups. The leadership of men often prevents young people and women from expressing themselves, which can lead to biases in the information gathered regarding the functioning of the farm households and their technology needs.

TECHNOLOGY DEVELOPMENT

The objective of technological development, after identifying the technology needs or registering the demands, is to develop schedules and/or procedures that allow the improvement of production. Related but equally important questions in urban and peri-urban sites such as the protection of the environment also allow considering elements other than simple production performance criteria.

Research in research facilities

Tests and laboratory work may be needed during the first phase of the technolo-

gy development process, in order to get a good grasp of the technological basis, especially when the technology is still in a basic stage with high uncertainties on performance, resource requirements and risks involved. But this work must be focused on the identified priority need, and take into account the characteristics of the main stakeholders and farming systems, and the agreed criteria to monitor and evaluate performance of the technology.

Maintenance of communication with the direct stakeholders during this stage is recommended to enhance transparency and ensure successful participation in later stages of testing and diffusion of the technology.

Participatory technology development

Participatory methods for development, adaptation or evaluation of technologies have gained wide acceptance since they offer a number of advantages over station research. The technologies are tested and adapted to the conditions where they have to be applied, which often differ widely from the conditions in the research station. By doing so, the chances to adapt the technology to the local conditions and farmer preferences are enhanced substantially. Especially in the urban environment this is of crucial importance since most agricultural researchers are not very well acquainted with the urban farming conditions and the preferences of urban farmers.

Farmer involvement enables to make use of farmer's knowledge in local conditions, and their creativity and problem-solving capacity. Due to the adaptation to the local farming conditions and the evaluation criteria of the direct stakeholders, the resulting technologies will be more easily adopted by the local farmers.

Researchers, urban farmers and other stakeholders should closely cooperate in the design, implementation and evaluation of local experiments, going through a number of steps or stages.

The identification of urban farmers willing and able to participate in the local experimentation is a first and crucial step. The project "Senegal food system" (Fall et al. 1993), identified producers that are characterised by their flexibility and openness to innovation, patience and discipline



Farmer describing his livelihood

ILEIA

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important for the successful implementation of the experiments (Fall et al. 1994). The Participatory Technology Development project in Peru and Bolivia asked local farmers to identify the farmers that are well known for having innovative ideas and trying them out on their own farm (De Zeeuw 2001). Other criteria used were:

- ❖ their knowledge of and interest in the crop, animal or cultural practices to which the new technology relates;
- ❖ their capacity and willingness to share their knowledge with others;
- ❖ their representation for the various social strata and farming systems in the area; and
- ❖ equal participation of male and female experimenters.

After identifying the farmer-experimenters, the points of view of researchers and farmers are brought together concerning the objectives and expected outcomes of the experiments, the design of the experimental plan, the selection of the site(s), the establishment and management of the experiments, as well as its monitoring, registration and evaluation.

Technicians will make suggestions on the criteria to be used to choose the experimental sites and take a leading role in the design of the experimental plan. However, the producers will make decisive contributions as they know their surroundings and will have to be able to manage and evaluate the experiment as their own.

The experimental plan should be simple. It is not a matter of transferring protocols from facilities or experimental models from laboratories to the field. Rather, it implies translating biological or socio-economic indicators into more accessible terms. The monitoring and evaluation of these experiments must involve all partners, especially the users. The establishment of follow-up calendars will aid in planning this activity. The organisation of follow-up teams that include representatives of partners, researchers, extensionists and producers seems effective to exchange and harmonise their views on the development of the experiment and the results obtained.

The dissemination of results deserves special attention. The farmer-experimenters may also act as farmer-extensionists during and after the realisation of the experiments and the organisation of field days on the experimental plots. Networking with other local organisations appears to be a useful tool to secure appropriate follow up of the experimentation in an extension programme (Cardinale et al. 2001, Fall et al. 2001). During the whole experimental process, emphasis should be given to strengthening the experimenters group, to enhance their experimental capacities and their direct linkages with research institutes, NGOs and other sources of technical information, and to assure small funds for the local experiments, in order to ensure continuation of the experimentation and technological innovation process after the researchers have left (Niang 2001, Diop and de Jong 2000).

There is a quickly growing repertoire of approaches, steps, techniques in Participatory Technology Development (see for instance: CIAL approach developed by Ashby (Ashby and Sperling 1998), PTD-approach by ETC (van Veldhuizen et al. 1997), Farmer to Farmer approaches, the Farmer Field School approach (Van der Fliert and Braun 2001 and Prain on page 37), etc. Some of the experiences with such approaches and methods are included in other articles in this magazine.

CONCLUSIONS

A large number of conventional and participatory methods and instruments exists that are developed for use in rural areas. However, their adaptation to the urban context is in the early stages, and the challenges indicated in the initial sections of this article still largely remain. It was observed during the recent workshop in Nairobi, that agricultural researchers who enter the urban sphere tend to become more conventional in their choice of methods (e.g. survey type of methods for the situation analysis, classic experimental designs and researcher controlled experiments, etc.).

Adaptation of the methods to the urban context is in the early stages

One of the reasons, it was claimed, is to gain recognition and to reduce their feelings of insecurity in this new field. Such a tendency should be reversed and conscious attempts are needed to carefully adapt existing methods and instruments - and create complementary ones - in order to make these methods and instruments more appropriate and effective for use in urban agriculture.

Most urgently needed are concerted efforts of national governments, research institutes and universities in cooperation with NGOs, extension organisations and municipal departments, to set up projects oriented at facilitating technology development and diffusion in urban agriculture. Within such programmes, room should be created for the careful design of the (preferably participatory) methodology and the documentation and evaluation of the experiences gained with the application of such methods.