

Micro-gardens in Dakar

Micro-gardening is an innovative response by farmers to urban constraints, but also to urban demands with respect to the quality of products. The urban context in that sense is conducive to technological innovation because of the numerous developments and interactions which take place.



A meeting of the UPROVAN Farmer Association in Dakar

The city plays a prominent role in technological development (Lefebvre, 1968): “For a very long time, the Earth has been the great laboratory, (..) it was just recently that this role was taken over by the city”. Specific circumstances in Dakar have stimulated the development of micro-gardening, such as the annual arrival of many new inhabitants (about 100,000 according to IUCN, 2002), the subsequent search for new livelihood opportunities, the problematic access to farming land (Mbaye and Moustier, 1999; Fall and Fall, 2001), and several efforts of NGOs and researchers promoting urban agriculture.

A micro-garden is a soil-less farming system, which involves the cultivation of plants on either solid substrate or in water (hydroponic). This technology has been tested by FAO in Latin America and the Caribbean (see for instance articles by Abensur Riós and César Marulanda in UA-Magazine no. 10, 2003). Since

1999, the Department of Horticulture in Senegal has been coordinating a project called the Micro-gardens’ Programme. This department has played a crucial role in innovation, firstly by taking the decision to entrust researchers with the project, which was to be developed together with the farmers. Another innovation was to have the researchers and farmers experiment with a number of solid substrates such as groundnut shell, rice husk and laterite. These ideas originated from the researchers but were tested by ten beneficiary families.

A micro-garden consists of a container and a planting substrate on which the crops grow. In the Micro-gardens’ Programme the plants are most often first raised in nurseries by the farmers themselves using a solution of nutrients. The stock solution is made by chemical industries and bought at the market. Initially the programme provided the solution free of charge to the farmers, but after special training the farmers started to make their own (Programme Report, 2004).

The innovative character of the technology is in the application of a modern production technology – hydroponics – in small areas, such as a courtyard, terrace, roof, the city council compound or school grounds. This is done, for example, in the backyard of the municipality building (*commune*

d’arrondissement) of Ouakam and in the *Centre de Sauvegarde* of Pikine-Guédiawaye. The major determinants are the availability of land and the willingness of the municipal authorities to support the implementation of micro-gardening. Micro-gardens are generally managed by women’s economic interest groups (EIGs).

HUMAN RESOURCES IN AGRICULTURAL RESEARCH

Before the project could be launched, the organisation of the Department of Horticulture’s research management and agricultural administration (under the Ministry of Agriculture) needed to be adapted. First, agricultural technicians of the Horticultural Development Centre (CDH), particularly those working in the agricultural supervision services like the Departmental Rural Development Service (SDDR), needed to be familiarised with this new technology. This department was responsible for the training of the beneficiaries. The programme particularly worked with farmers who were members of economic interest groups (EIG). An EIG is an association of people who join forces to create a small enterprise oriented at processing and marketing local products. Each EIG has 12 members and the beneficiaries’ training sessions were decentralised and held at district level. According to the Department of Horticulture, “a five-day training workshop addressed to the regional technicians of the project

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was organised in December 2002. At national level, some 1440 people from the country's ten regional capitals, the departments of Dakar, Kaffrine and Linguere, benefited from the training". The trainees were selected according to their degree of poverty and willingness to participate in (micro) gardening (in line with the objectives of the Micro-gardening Programme).

Most of the trainees were women (more women than men are members of EIGs), and since women's access to land is very limited, their role in urban agriculture is strengthened by providing them with a micro-garden. It is also mostly women who are involved in hydroponics. A survey conducted by the author in 2005 found that, 36 of the 180 Dakar-based farmers (market gardeners, orchardists, flower growers, micro-gardeners, animal breeders, fishermen and rice farmers) were women. Twenty-five of these women were engaged in micro-gardening.

The programme is ongoing and new farmers are being trained and supported in Dakar as well as in the regions. Individuals or agents from private institutions wishing to undergo training pay only the cost of materials. The agricultural technicians who conduct the training are paid by the project. Another survey conducted in 2006 among 98 of the farmers in Dakar showed that participants found the duration of the training rather short.

The success of the micro-gardening activity is due primarily to the micro-gardeners' higher production. According to the Programme, a micro-garden can provide 6 cropping cycles each year and obtain an average yield of 30 kg of vegetables/m²/year. The 2006 survey also showed that most participating families consume between 5 and 9 kg of vegetables per month, which is more than what non-participating families consume (on average between 1-4 kg). Surplus production is sold to neighbours and friends, or others interested in organic produce, and provides additional income.

No marketing training is currently provided, but the programme is looking into ways of including this in the regular training. In addition, in order to better

manage this marketing effort, micro-gardeners would like to have a specific place to sell their products. This would provide them with the opportunity to explain the quality of micro-garden vegetables and their benefits to consumers' health. Already a few restaurant owners have started using micro-garden lettuce: who verify their origin.

Micro-gardens can be located in various places, 75% of micro-gardens in Dakar and Pikine are located on terraces (roof gardens). In other parts of the country, they are placed on the ground in courtyards or outside the home.

USING URBAN WASTE

Many micro-gardens are made out of recycled materials, both the containers as well as the substrate. Containers can be made of wooden boards from boxes found at the port of Dakar, plastic bowls, buckets, tyres cut longitudinally and polystyrene boxes formerly used to package fish.



Micro gardens on rooftop in Dakar

The solid substrate or water (for the hydroponic production of leafy vegetables) filling of the containers is often made up of waste. Solid substrates are made from agricultural waste: groundnut shells (60%) and rice husks (40%), both of which can be replaced by laterite gravel (a material that is used less and less). The shells and husks need to be cleaned and stored for at least twenty-four hours to facilitate fermentation. The different researchers and the project team experimented with these materials with a view to improving access to the technique: by using the most abundant substrate in each regional context, the price for farmers could be minimised. In Dakar, these inputs are offered in an increasing number of places, to ensure their proximity to the beneficiaries and thus reduce transportation costs. These materials have to be bought by the farmers.

Macro and micro-stock nutrients have to be kept in a cool place. In addition, micronutrients need to be stored in a dark place. Their dosage depends on the substrate (liquid or solid), the type of plant and its growth stage. The two examples in the box were given by the micro-gardening project for liquid, hydroponic substrates. The water is often tap water used for irrigation. However, well water is also used and the possibility of using rainwater is also being considered.

CONCLUSION

In Dakar, researchers and farmers collaborated in the development of micro-gardens. Research contributed to the understanding of plant nutrients and the use of solid substrates to replace the soil. In addition, participative training was provided to the farmers, in farmers' schools. This innovation is a technical response to the constraints and advantages found in the city. In Dakar, the port and food processing industries can be considered as advantages for the supply of substrates and wood used in the fabrication of micro-gardening tables. The soil-less fresh vegetable production system has been adopted by some inhabitants (50 percent of the surveyed producers mentioned that they commenced their agricultural activity in 2000). However, the poorest beneficiaries need help in order to strengthen their self-reliance.

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