PARTICIPATORY DESIGN OF PUBLIC SPACES FOR
URBAN AGRICULTURE, ROSARIO, ARGENTINA

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Abstract

Urban agriculture is increasingly recognized for its potential contribution to more sustainable urban development. Urban agriculture includes the cultivation and raising, processing and marketing of food and non-food crops, medicinal and aromatic herbs, fruit trees, as well as animal products within urban and periurban areas. Urban agriculture positively impacts urban food security, local economic development, environmental management and community building. To reconcile the demands posed by urban growth with urban agriculture activities of high social and economic value, urban agriculture however should be included into land use planning and design, and regulated by municipalities, assuring its proper management and avoiding potential health and environmental risks. Open and green urban spaces could be designed for multifunctional urban agriculture and combine natural habitat, food production, educational, recreational and leisure activities. Such design processes would benefit from broad participation of urban planners and architects, urban farmers, citizens and slum inhabitants as to enhance ownership and engagement, more effectively use available local resources and give the process a higher credibility and wider outreach. This article shares the experience of Rosario, Argentina where the city planners and University staff collaborated with two low-income communities in the design and implementation of a multifunctional neighborhood park, public square and road reserve. A step-by-step participatory design process was followed: starting from initial visioning, defining and relating the various existing and multi-functional land uses desired, to elaborating the site plan, and agreeing on implementation procedures. The article briefly contextualizes the site and its inhabitants, illustrates the design process and the results achieved and highlights some of the problems encountered. Participatory design of open spaces for urban agriculture in Rosario- though a complex process- proved to have contributed to improving socio-economic and environmental conditions in the city, while also serving as a source of inspiration to other cities in the region.

Keywords: Urban Agriculture, Urban Planning, Neighborhood Upgrading, Participatory Design, Multifunctional Public Spaces.
URBAN AGRICULTURE AS A STRATEGY FOR MORE SUSTAINABLE CITIES

Growing urbanization and urban poverty
The creation of "sustainable cities" and the identification of ways to provide food, shelter and basic services to city residents is a challenge to many city authorities around the world. The 21st century will keep witnessing massive and rapid urbanisation. By 2015-2020, well over half of the world's population will be living in cities. If present trends hold, the vast majority of these people will be living in irregular settlements, without access to decent food, shelter, water and sanitation. UN-Habitat calculated in 2001 that at present over 30% of the poor live in the cities, but that this number will rise to 50% by 2035. (UNCHS, 2001 and UN-HABITAT, 2004).

These global phenomena can also be witnessed in Rosario, Argentina. Information provided by the Public Housing Service of the Municipality, indicate the presence of 91 irregular settlements in 2005 where more than 110,000 inhabitants (constituting 12.1% of the total population) try to assure a living, compared to 10.4% of the population living in irregular settlements in 1992. Urban poverty levels mounted up to 42% in 2004, of which 17% is considered to be living in extreme poverty (PAU-SPV Municipalidad de Rosario, CEAH, FAPyD UNR and CEPAR, 2006).

While more urban dwellers may show low living standards, cities are also centres of information, ingenuity, and collaboration, where new approaches to housing, employment, service and food provision are being introduced and, increasingly, mainstreamed in new forms of building, working and living in the city. Urban populations are setting new standards and cities must re-invent themselves with new references. Urban agriculture is one livelihood strategy which the urban poor uses in combination with other strategies (Mougeot, 2005). Urban land management should aim to put urban land resources into efficient and sustainable use, which is not necessarily only the economic "highest and best use" as postulated by many governments. This requires, first of all, recognition of the prevailing problems and acceptance of urban livelihood strategies including urban agriculture, but also realization of benefits and opportunities created through productive use of open and green spaces in cities (Drescher, 2005).

Benefits and risks of urban agriculture
Urban agriculture can be been defined as "An industry located within (intra-urban) or on the fringe (peri-urban) of a town, a city or a metropolis, which grows and raises, processes and distributes a diversity of food and non-food products, (re-) using largely human and material resources, products and services found in and around that urban area, and in turn supplying human and material resources, products and services largely to that urban area" (Mougeot, 2000).

Urban agriculture is a practice widely found in Latin American, Asian and African cities, as well as cities in Europe and North America. Apart from contributing to food security, nutrition and income generation, urban agriculture may provide recreational or educational functions, while at the same time preserving the cities' green spaces. Other advantages include: improved availability and access to fresh produce; local production and reduction of transport and storage; development of related micro-enterprises for input provision, processing and marketing of produce; increased recycling of nutrients (turning urban organic waste and wastewater into a productive resource); improved social inclusion of disadvantaged groups and community development; urban greening and community involvement in maintenance of green spaces (van Veenhuizen, 2006).

No overall figures exist on the true scale of urban agriculture, but some partial indications do exist. In Amman, Jordan 22% of urban households are engaged in some form of urban agriculture (Department of Statistics, 2002), while in Amsterdam-The Netherlands, over 7000 families are cultivating 300 ha of city land (Wilbers, 2005). In Accra, Ghana 90% of the vegetables consumed in the city are produced in urban and peri-urban areas (Armar-Klemesu, 2000). In Cienfuegos, Cuba, 17,000 urban agriculture jobs were generated between 1995 and 2003 (Socorro, 2003.), while in Rosario, Argentina, 10,000 families are involved in food production and a large group of them is marketing their produce on farmers markets, obtaining a monthly income from 40-150 US$ (Dubbeling, 2004).

Urban agriculture is not a panacea however. It may also have negative effects if certain associated risks are not taken into account and proper preventive and guiding measures have not been taken. These potential risks may include contamination of...
crops with pathogenic organisms due to irrigation with water from polluted streams or with insufficiently treated waste water, vehicle exhausts affecting crops grown by the roadside, soils contaminated by industries used as a production medium, agro-chemicals getting in the water supply or transmission of diseases from domestic animals to people (Birley and Lock, 1998). Urban agriculture may also contaminate local water sources if overly high inputs of chemical fertilisers and pesticides are used (Rabinovitch and Schmetzer, 1997).

POLICY SUPPORT TO URBAN AGRICULTURE

It is basically for these reasons that - until recently - urban agriculture was given little policy attention, other than restricting it or permitting it only as a temporal use of urban land until other urban functions (housing, industrial development etc.) took over its use. However, urban agriculture is increasingly being recognized for its contribution to the Millennium Development Goals (reducing poverty and hunger), as a source of local food production, for its contribution to community food security and sustainable urban development.

In it is in this context that the nonprofit American Planning Association adopted a policy in May 2007 that encourages its members, to help build “stronger, sustainable and more self-reliant” local food systems. A food system encompasses the production, processing, distribution and consumption of food and the management of waste. The policy states that until recently, most planners were only peripherally concerned with food systems. In justifying its new policy, the planning association said a city that can supply and control its food needs will have more say in what it eats, an opportunity to eat fresher foods and insulation from disruptions in national food distribution. All that, plus the fact that dollars spent on locally produced food have a greater chance of cycling back through the community, and that food grown nearby bears a lesser liability for greenhouse gases released in transport (Rich, 2008).

In Argentina, policy support to urban agriculture was a clear response to its 2001 economic crisis, when gross domestic product was shrinking, the unemployment rate had reached 25 percent, the Argentine peso had lost 75 percent of its value, and the rate of inflation was climbing to an unprecedented high. With their country’s economy in shambles, the citizens of Rosario had to adapt to survive. Many began cultivating available plots of land throughout the city to ensure a steady supply of food for themselves and their families. Recognizing the value of this novel practice to alleviate suffering and ensure food security, local authorities started to make public lands available for farming. The city also provided many of the urban farmers with tools, seeds, and other essential supplies (Guenette, 2006).

NEED FOR INTEGRATING URBAN AGRICULTURE INTO LAND USE PLANNING AND DESIGN

Political recognition of urban agricultural practices, however, is a necessary but insufficient condition for urban agriculture to maximize its contribution to more sustainable, productive and inclusive cities. Urban agriculture is still not recognized as an integral part of urban planning and design. It often remains a component temporarily “added to the urban fabric.”

To reconcile the needs posed by urban growth with the need for activities of potentially high economic and social value, urban agriculture should be included in urban development and land use plans and be regulated by municipalities (Cabannes, 2002). Availability of and access to land are among the basic requirements for urban dwellers to enable food production. Basic questions are: “What areas of (peri)urban land could best be used for urban agriculture and how to increase access to those areas for the poor?” And how could processes connected to urban agriculture work as an overall principle to design and organize resilient, productive and food-secure “garden cities or neighborhoods”?

Such idea of creating “garden neighborhoods” is not a new one. The urban designs of Ebenezer Howard and Raymond Unwin (England), Frederic Law Olmsted, Henry Wright and Clarence S. Stein, (North America) already address many aspects of the food system. More recent Local Agenda 21 programmes aim to environmental qualities (like green areas, water management, good quality air) with residential qualities (creating conditions for a healthy and safe living environment...
where people can experience nature and food production) (Adriaens et al, 2005).

Additionally sustainable development requires different approaches from the often "top-down" led approach ("designing behind the table"), to involve all relevant public and private actors as early as possible in the process so that they can deliver input and feel committed (European Council of Town Planners, 2002). How could the role of the designer and planner may become less concerned with controlling the final design and more aimed at providing the tools and methods for perceiving and tapping into the under-utilized land and human resources in-situ, and act as catalysts to promote participatory and citizen-driven models for the creation of sustainable neighbourhoods, with agriculture fully integrated into the urban topography? Hence, an additional challenge lies in linking architects, urban planners, local or national governments, social movements, slum inhabitants and the homeless in participatory, grassroots, "bottom-up" processes of planning, design and management of spaces for urban agriculture (Minimum Cost Housing Group, 2004).

THE NOTION OF PARTICIPATORY LANDSCAPE DESIGN

Landscape design should not only take into account the type and quality of natural resources available, but also modalities for appropriation and transformation thereof as well as the attitudes of public and private organizations and the local community towards it. This notion allows -from an operational point of view- to define concrete scenarios for landscape design in which physical and biological processes are closely associated with social-economic dynamics. This requires on its turn the articulation of political, institutional and social interests, as well as the (re)definition of concepts of "urban landscape design" (Fernandez, 1999).

Landscape design thus implies a process of social appropriation which generates feelings of identity and ownership between the land and the community throughout time (European Council of Town Planners, 2002). Such social appropriation can be best achieved through public participation in design.

The concept of participatory design differs from traditional approaches to landscape design (Romero et al, 2004). In a participatory design process, designs are made based on the inputs of and consensus between the clients (the users), landscape architects and other involved actors (for example the Municipality). This with the objective of making optimum use of and valorizing the contributions of each of these stakeholders in the design, management and financing of the project (Pesci, 2000).

Participatory design, as other participatory planning processes, has in principle the following benefits:

- It contributes to more participatory governance, public-private partnerships and helps bridge the gap/overcome distrust between citizen groups and the government;
- It allows for better situation analysis and quality decision making (through a better understanding of priority issues and the needs of different stakeholders involved and a better linking of different sources of knowledge, information and expertise);
- It improves the likelihood of success and sustainability of implementation (through enhanced acceptance and ownership, improved mechanisms and processes for coordination, and mobilising and pooling of scarce human, technical and financial resources);
- It gives the process (and its results) a higher credibility and wider outreach.

On the other hand, public participation in design:

- Needs a clear definition of who should be involved and how to overcome difficulties in promoting participation of the poor;
- Requires skilled human resources and additional financial means. Technical-professional staff should not only have a sound theoretical and practical knowledge, but also have the capacity to interact with, relate to, appreciate and integrate the contributions of the various stakeholders;
- Needs reconciliation of different priorities expressed by the different stakeholders;
- May require more time than other approaches to allow for required changes in institutional cultures;
- Needs a clear strategy on how to address existing power structures and may lead to an undue increase in the influence of some stakeholders (especially when there is a lack of transparency throughout the process) (Hemmati, 2002; Partners and Propper, 2004).
Politicians and planners are faced with many competing claims for the use of scarce land in and around cities. High costs of green open space management dominate the thinking of many planners and authorities, even though a more “multifunctional - combining different functions within one area” approach or public-private partnerships can help to reduce costs (Drescher, 2005). Many possible win-win situations exist to meet urban and peri-urban challenges as urban planners seek to create attractive land-use combinations -including urban agricultural. Urban producers may provide recreational and educational services to urban citizens or act as co-managers of parks. They may offer health services (on-farm care and remedial activities for people with psychological or physical problems) or nursery facilities that grow ornamental plants and tree seedlings for urban home gardens, streets and parks. Aquaculture may be combined with water storage and recreation; production of added-value agricultural products such as cheese, jams and cosmetics, combined with recreation and tourism; and urban forestry, which offers health and microclimate benefits, combined with energy crops and recreation (van de Berg and van Veenhuizen, 2005; Deelstra et all, 2006).

Focusing primarily on London, Viljoen, Bohn and Howe (2005) make the point that by combining urban development planning with proper designing of a "productive green grid" tens of thousands of people could be fed from local agricultural produce and benefit from a pleasant landscape offering opportunities for leisure and recreation at the same time. In their attempt to design open spaces for multifunctional agriculture, landscape architects and planners in Rosario have defined the following typologies to be part of such a productive green structure:

**Garden-Parks:** Larger public green areas in which recreational, productive, educational and commercial activities are developed. Designs should integrate playgrounds and areas for leisure and sports with areas set aside for vegetable and fruit production as well as the production of medicinal and ornamental plants.

**Educational-productive squares:** These are neighborhood squares designed for recreational, productive, educational-cultural and possibly commercial uses. Their structure and functioning will
respond to community needs for playgrounds, social meeting places, urban greening and production.

**The productive street:** A diverse and dynamic public space, designed to integrate small-scale productive activities, community meeting spaces, processing and marketing activities as well as a productive green structure (for example fruit trees). This will enhance the streets' potential as a space for social interaction, without obstructing the normal traffic and pedestrian flow.

**PROMOTING PARTICIPATORY DESIGN OF OPEN SPACES FOR URBAN AGRICULTURE**

**Rosario: a case-study**

Following their objective to design different open public spaces for urban agriculture, the Rosario Municipal Urban Agriculture Programme, the programme "Rosario HABITAT", the Public Housing Service, and the National University of Rosario decided to implement the project "Designing sustainable neighborhoods (2004-2006)", part of a larger international project denominated "Making the Edible Landscape". The areas selected for the project were the Molino Blanco Sur and La Lagunita settlements.

The La Lagunita settlement is located in the western part of the city. The area was first occupied over 20 years ago by families coming from the interior parts of the country. Its population of around 1300 inhabitants (300 families) lives in precarious dwellings, is largely unemployed or alternatively collects and separates urban wastes. Only 40% of the houses are constructed with bricks and over half of the population lives below the poverty line. A participatory upgrading programme was planned already, now offering the opportunity to integrate urban agriculture and provide households with food-production and new income generating opportunities.

La Lagunita’s inhabitants had no prior experience with urban agriculture, but were interested to develop related activities on their own plots, on the

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3 The project “Making the Edible Landscape (2004-2006)” was coordinated by the Minimum Cost Housing Group of McGill University (Montreal, Canada) and supported by ETC Urban Agriculture-The Netherlands (field coordination) and IDRC-Canada (financial support). The project took place in the cities of Rosario (Argentina), Kampala (Uganda) and Colombo (Sri Lanka).
public square and on land belonging to the community centre. The area set aside for the creation of an educational-productive square (15.232.73 m²) was characterized in 2005 by several dumpsites, marginal housing, small footpaths, some isolated trees/bushes, a work-shed and a soccer-field in bad shape.

The Molino Blanco settlement is located in the southern district of Rosario. It was created around 40 years ago on vacant land bordering the Saladillo stream. Molino Blanco can be characterized as a high-density and marginal settlement with regular flooding risks. Its population of 3500 inhabitants (800 families) is in its majority unemployed or earns a minor income in waste collection and community gardening. As part of an upgrading programme, almost 30% of the population would be resettled to a new settlement as their houses were built on the flood area. The settlement would also be regularized and provided with basic municipal services. The flood area (56.286.45 m²) characterized in 2005 by the presence of community gardens, illegal and marginal housing, dumpsites, trees and bushes, a soccer field, would then be set...
aside for a Garden-Park (PAU- SPV Municipalidad de Rosario, CEAH, FAPyD UNR and CEPAR, 2006).

THE PARTICIPATORY DESIGN PROCESS

The participatory design process in Rosario included the following activities:

1. Formation, preparation and capacity building of an interdisciplinary design team, formed by planners, architects and urban agriculture.

2. Base-line studies, analysis of secondary and collection or primary information (field work, meetings with interest groups and interviews with key-informants) on current and previous characteristics and land uses.

3. Preparation of materials (maps, graphical and visual materials and models to share information on the site and facilitate a creative design process; videos and images on similar sites and possible designs to broaden the vision of the participants, etcetera).

4. Implementation of a series of community design workshops in order to:
   - Discuss with the users their needs, visions and aspirations associated to the sites.
   - Broadening the vision of the participants regarding the possible forms of multifunctional land use of the site.
   - Defining the various (land use) components, their relations and (physical) dimensions.
   - Collective construction of design plans and models. Discussing management aspects of the area.
   - Revision of draft proto-typical site plans. Programming of implementation activities and assigning responsibilities.

5. Elaborating the site plans and subcontracting the work.

6. Implementation of the project.

7. Monitoring and evaluation for internal learning, feedback and improvements.

DESIGN OF THE EDUCATIONAL-PRODUCTIVE SQUARE

In the first community design workshop, the visions of each resident on the desired educational-productive square were registered. Their visions, expressed in drawings, use of journal clippings or with words, formed the basis for the further design. Based on the individual visions, collective group visions were developed, presented and discussed. This first workshop helped to establish a coopera-
tive feeling among the participants and confidence in the fact that individual opinions were taken into consideration.

In a second workshop and with the objective to broaden their vision on possible forms of multi-functional land use for the site, participants were shown examples of productive squares found in other cities around the world and were taken to visit other squares as well as urban agriculture gardens in their city.

In a third and fourth workshop, the common land uses desired for the educational-productive square were identified, including a meeting area, a playground and an area for growing. The various components were discussed, prioritized and their possible dimensions (surface areas) identified. The
components were then clustered according to their uses (recreational, productive, educational etc). Finally, relations between the clusters/components and their (spatial) relations to the environment (the surrounding streets, houses and neighborhood) were discussed.

In a fifth workshop all land use components, with their proposed dimensions and locations, were projected on a map of the area, in order to arrive at consensus on there location and on how circulation at the site could be best assured. These projections were later used by landscape architects to prepare the architectonical site plans for the area. The educational-productive square in La Lagunita integrated in its final design various pay-grounds, sport fields, a meeting and BBQ area, a demonstrative garden and an educational footpath.

In a final workshop, agreements were made on and responsibilities defined for implementation and management of the site. Construction costs of the productive square were financed by the Rosario Habitat programme. Community members and local school children took care of the creation of the demonstration garden, painting of the play...
Similarly to the process in La Lagunita, a series of participatory community design workshops were organized in Molino Blanco Sur related to the design of a garden-park and productive street. Again the workshops served to identify the needs and aspirations of the community regarding future land uses, analyze conflicts and potential solutions, decide on the components and spatial design of the areas and elaborate final site plans. The garden-park now integrates growing areas (community gardens), a soccer-field and a playground for children as well as a series of community footpaths. The design took into account criteria such as requirements for production (fencing, irrigation), public safety (lights and a small watch-house) and development of activities related to input supply and commercialization (a small greenhouse and a market-space).

The design of the productive street, bordering the garden-park, maintains the traditional functions of a street, while adding productive elements (small areas for growing, use of fruit trees), as well as complementary components to improve its safe use (lightning, safety, streetlights).

PROBLEMS ENCOUNTERED AND LESSONS LEARNED

The participatory design process required an intense dynamic of training and community workshops throughout the process. Landscape architects and designers had to learn to trust and work with the community and pay attention to community dynamics in order to ensure equal participation of various groups. This also meant that although a general methodology was followed in both settlements, the process had to be adapted to the specific characteristics of each situation. In La Lagunita for example, where community members had no prior experience to urban agriculture, much more time had to be spend on explaining the concept and visiting existing urban agriculture areas than in Molino Blanco. Initial designs in La Lagunita did not include urban agriculture activities, in contrast to those in Molino Blanco.

Also, in Molino Blanco a community gardening organization already existed that allowed them to define common problems and seek solutions that bring improvements to all and to better organize themselves for participation in the design.
workshops. In La Lagunita no such community organization or platform existed and still had to be constructed. Potential conflict situations on desired uses did occur, and new values of open and green areas had to be promoted.

This required extensive information, communication, consultation, reconciliation and motivation.

It is also proved important throughout the process to come to early and clear agreements on the financing, implementation and management of the areas. Responsibilities of the municipality, the private sector and the community were clarified and agreed upon. This also included for example the follow up needed in form of training for urban agriculturalists, specifically on the use of organic production technologies (thus minimizing health and environmental risks).

However, implementation of the works in Molino Blanco Sur has still not been completed due to lack of financing, though partial financing by the National Government of Argentina and the Municipal Parks and Gardens Department has allowed for planting of fruit trees and putting up of fences.

Results of the participatory design processes include increased social acceptance and responsibility of the designed areas. In both cases, the community is responsible for the installation and maintenance of the gardens and other uses. This helped strengthening the relations of the community with their own surroundings and providing it their own identity. On its turn it stimulates inhabitants to feel proud of their own environment.

The increased opportunities for growing and marketing have contributed to community members' improved food security, nutrition and income generation.

Former wastelands have been transformed in aesthetically pleasing landscapes.

The 2 experiences described above have served as examples and "laboratories" for the city of Rosario and other cities in the region. On 20 hectares of public land bordering the ring-way around Rosario, garden-parks are being installed. Involving the Rosario architects and applying a similar participatory design process, a productive square is now also being designed in Villa Maria del Triunfo-Lima, Peru, integrating productive and recreational functions, but also a small wastewater plant for treatment and irrigation. Another garden-park is being designed in Belo Horizonte-Brazil, inspired by the Rosario experience.

CONCLUSIONS

Neighborhood upgrading and housing development schemes are common measures taken by city councils and provide a good vehicle to incorporate urban agriculture into design and planning.

New visions on sustainable urban develop-
ment and urban greening should promote the planning and preservation of open spaces for natural habitats, active recreation and multifunctional agriculture. Cities like Rosario illustrate the benefits of integrating food production in design and management of urban open spaces to improve food security and reduce malnutrition in cities, reduce poverty by enabling income generation and improve the urban environment by making cities more habitable, while also providing for cultural, educational and leisure activities.

Planning policy and guidance is increasingly recognizing the importance of putting local people at the centre of such design and development activities. Such participation should go beyond consultation to embracing a participatory approach to planning and design from the earliest stage of the process up to its implementation phase. Through drawing on the expertise and ideas of local communities and other stakeholders, planners and architects should seek to develop proposals which respond to the needs and aspirations of the end users.

It is the authors’ firm conviction that sustainable design can only be achieved through the involvement and ownership of local communities.

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