SUSTAINABLE NETWORK AS A PROCESS: FROM DETERIORATED SPACES TO PRODUCTIVE LANDSCAPES

Introduction

Urban landscape can be approached as a platform for both social growth and environmental integration. This paper discusses a municipal programme in Rio de Janeiro, Brazil, named Rivers' Guardians. Its main objective was to seek solutions to rivers cleaning that were effective, economical, and had social and environmental repercussion in that it also directly involved local population.

The paper is organized as follows: initially, it briefly discusses concepts of landscape, sustainability and resilience. Then it presents the River Guardians Programme, with a special focus on urban agriculture. It concludes arguing, among other issues, that the processual character of the landscape will foster its potential in increasing the quality of life, promote cultural and environmental sustainability as well as enriching local cultures.

Landscapes in movement

Landscape is a concept in movement, being built through collective studies and experiences. Therefore, one of the challenges of landscape studies is its multidisciplinary approach. When the idea of landscape is connected with the idea of sustainability the challenges are even greater.

Within the environmental discourse the concept of sustainability, particularly when applied in urban areas, takes a lot of interests, appropriations and contradictions (Thompson 1998, Costa 2000). Many authors argue that sustainability implies in both ecological and social diversity, and environmental degradation would be fundamentally a cultural issue. Concerning rivers landscape, for instance, research has shown that in Brazil laws protecting areas on river banks alone are not sufficient to ensure their integrity, since the dynamics of socio-cultural processes are not properly considered under this same legislation (Martins 2006, Britto e Silva 2006). Besides Thompson (1998) has argued that the concept of sustainability, when adopted as a guiding principle, will certainly have consequences in ethical, aesthetic and cultural approaches to landscape. From this perspective, environmental and cultural dimensions have to be both acknowledged in our understanding of sustainable networks as processes.

Resilience is also a particularly strategic concept concerning the idea of landscape change and its impact on the directions of its transformation. Berkes et al (2003) argue that urban areas have little natural resilience in relation to climatic stress, for example, but some measures aimed at the design and planning of a green infrastructure and urban land can greatly reduce the problems - particularly the management of vegetation and surface waters, which are of particular importance.

The resilience concept - which in general terms, refers to the ability of a system back to its original state - cuts across different fields such as law, ecology, psychology, physics, among many others. In Architecture and Urbanism the idea of resilience has its main origin in the work of Kevin Lynch (1980), when he discusses the performance dimensions of good urban form. One of these dimensions would be the ability of the urban form to adapt to new uses,

needs and interpretations, and resilience would be one of its main aspects. This concept has been included as one of strategic perspectives for research and practice focused on issues related to sustainability, biodiversity, landscape change, and other approaches that seek a better interaction between natural processes and cultural dynamics.

Working with the concept of resilience in landscape studies and design means finding effective ways to deal with the issue of change, and how to respond to it so it will not lead to loss of future options. Ahren (2009) argues that resilience is very much strategic because, in order to be effective, it must be closely based and informed on environmental, ecological, social and economic reality and on the dynamics of each particular place. It should also be integrated through an approach able to blend different scales. He argues that urban resilience can be built from diversity, connectivity and networks that structure critical urban functions, such as hydrology, biodiversity, mobility, recreation, among others.

Rio de Janeiro

In the city of Rio de Janeiro, informal settlements (*favelas*) or low income settlements, particularly those located along river margins, bring powerful examples of the connections between the ideas of landscape changes, sustainability and resilience. These areas present particular challenges for design and landscape planning. Initially seen as transitional landscapes, today *favelas* are recognized as landscapes of resistance, with specific cultural and spatial values. An important perspective to study these informal settlements would be from local people's experience of landscape, particularly when they are located in protected areas such as river banks and forests. Research has already pointed to problems arising from urban pressure on protected areas (Coelho Netto, 2005, Costa et al 2007), which can be transformed into deteriorated spaces.

A high number of informal or low income settlements are located along river banks. Despite rivers and their banks being protected by environmental legislation, their margins have been occupied over the years by those who do not find the ways to inhabit the formal parts of the city. Looking both at the social and environmental aspects of this situation, in a number of cases public authorities in Rio managed to face the challenge to change the landscape transformation process, from deteriorated spaces to productive landscapes.

Rivers' Guardians Programme

The Rivers' Guardians Programme was launched in 2001, as an initiative from Rio de Janeiro's Municipal Environment Secretary (Secretaria Municipal de Meio Ambiente – SMAC). This initiative was built on some of the staff's former experience in dealing with the city's urban rivers. They have noticed the little efficacy of the mechanical cleaning of the majority of Rio's urban crooks and rivers: a couple of months latter all the litter was back again, meaning that all the cleaning would have to be repeated over and over, in an almost endless process.

From this finding, a new procedure from the public sector was launched, this time involving local riverside population in the cleaning process, as an attempt to guarantee the cleaning efficacy. The new strategy also has focused at a manual cleaning of the rivers rather than the mechanical one. This was also due to the degree of difficulty of accessing the rivers' waters, since either many rivers banks were too steep or the banks had different appropriations, as for instance informal settlements (*favelas*), among many other. The Rivers' Guardian Programme was then put forward, having as its main objective to seek effective and economical solutions for rivers and crooks' cleaning, as well as social and environmental

positive impacts since local riverside population would be directly involved.

The Rivers' Guardians were selected from *favelas* or other low income settlements located nearby the rivers and crooks. The selected dwellers, preferably those unemployed, were hired to work in the cleaning and maintenance of the watercourse and its respective bank closest to their community. For this end, they received proper training through courses organized by the Mayorship, where they receive basic information concerning environmental education, cleaning procedures and proper treatment of the collected litter. Selection and training was conducted by technicians for the River Guardians Program in partnership with the Environmental Education Program, both from SMAC. The team was then formed with local residents, and one leader was selected among them. Once the team was completely organized, the River Guardians began their activities under the supervision and coordination of SMAC's technicians.

Fig.1: River Guardians at work (source: SMAC).

Funding for Rivers Guardians Programme came from the Mayorship only, including the selected team monthly income, tools, uniforms, and other necessary items. Initially, in 2001, the program covered experimentally only five rivers of the more than 250 waterways in the city of Rio de Janeiro, involving 40 people from riverbank communities. The success of the project consolidated the program within the city's public policies, which was important to expand its scope and coverage. In 2006 the program involved more than 700 people in 111 teams, working on the cleaning and maintenance of 92 rivers and crooks in Rio de Janeiro. All of the guardians were *favelas* and low income communities inhabitants, living nearby the area they were in charge for. Depending on local characteristics, a community had more than one team, and a river had more than one community along its margins.

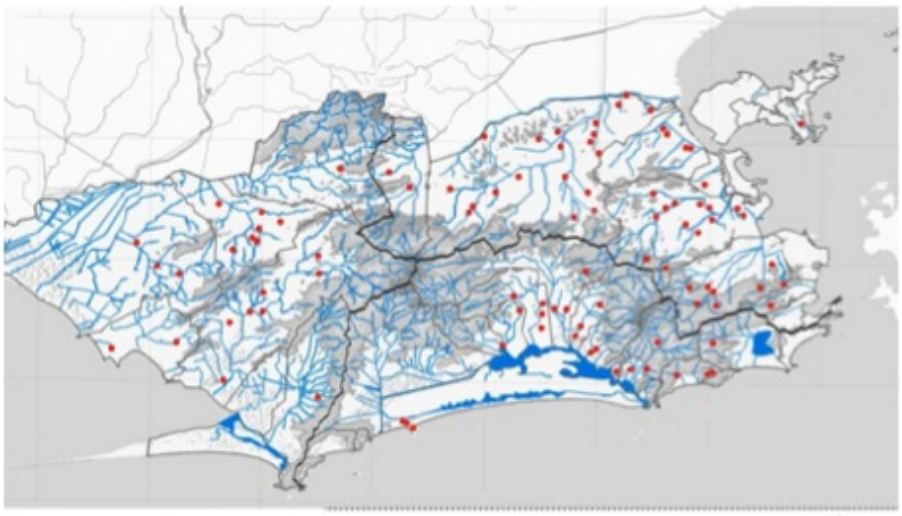

Fig.2: Location of the Rivers' Guardians Program in relation to Rio de Janeiro's urban rivers (source: research group).

In some *favelas* and other low income communities, the guardians had other duties besides the cleaning and maintenance of the river and its banks. They played an important role in reproducing, within their community, the knowledge they had acquired either in the environmental education course or in their daily practice of taking care of the river. In this way, they were also trained to give talks about environmental education in schools and residents associations, turning themselves in agents able to multiply the Rivers Guardian's Program idea.

Depending on the guardian team and how local population responds to the program, this initiative had reverberated in different environmental and social terms within the rivers and communities concerned. However, in a general way, the program had achieved positive results, both in social and environmental terms.

Fig. 3: Cleaning work (source: SMAC)

In fact, in a number of communities, regular flooding with flooded streets and full of litter were part of the daily lives of many of those who lived near a watercourse. The Rivers Guardians teams, in many communities, played an important role not only in the cleaning process, but also – and sometimes mainly – in reverting the perception and the experience of the communities of the rivers as dumps. With the litter removal, rivers margins got cleaner and therefore allowed other appropriations, among them the practice of urban agriculture.

Urban agriculture is the one practiced in urban spaces, private or public, in urban centers and suburbs. In general, the crops are for personal consumption or for sale on a small scale in local markets. Compared to rural agriculture, urban agriculture requires less space and can be found in a wide range of locations and types: backyards, vacant lots, green roofs, parks, terraces and vegetated walls, river banks, among many others. This brings new questions related to different functions and uses of urban open spaces, and consequently its shape and design. In other words, it opens up new ways of thinking about urban green and its social and environmental impact.

One of the new uses and appropriations of the riverbanks, once cleaned after the actions of the Rivers Guardians, was the planting of vegetable gardens. The planting of vegetables brought new values to a space that was previously deteriorated and therefore useless. Most of the community gardens were maintained by the guardians, but many others were also maintained by community members. Vegetable and fruits produced, in general, were donated to the community.

This was a turning point in changing the river margins in productive landscapes. In fact, this has been a rather common activity in other Brazilian cities since the margins of urban rivers are clean. The city of São Paulo, for example, took the initiative to plant fruit trees along the banks of urban rivers, forming true linear orchards.

Studies on urban agriculture either in Brazil (p.e. WinklerPrins & Oliveira 2010) or in other countries (p.e. Han & Pieschel 2009) have pointed out to many positive aspects that deserve greater attention by studies on landscape change. These aspects are related to a number of themes, such as the social and environmental contribution of urban agriculture. From a social perspective, it was noted the poverty reduction from the production of food for own consumption or local sale; recreation and leisure from an occupational activity; and the strengthening of popular culture from the local production of food, medicinal and ornamental plants, to quote but a few. From an environmental perspective, it was noted the reducing the distance between food production and consumption, formation of microclimates and maintenance of biodiversity, promoting better water infiltration into the soil, prevention of the presence of rats and other disease vectors. Above all, there seems to be always an added value to landscape, which was previously rejected, unused and unproductive, and which become a productive landscape in a broader sense.

Certainly the presence of the Rivers Guardians was not enough to solve all the social, economic and environmental problems of the *favelas* and low income communities situated along Rio de Janeiro's urban rivers. However, it was undeniable the significant change in people's perception of their nearby rivers. It was slowly becoming not a problem, but a place of leisure and work opportunities. In other words, rivers were no longer residual places for local residents, taking another meanings in the everyday experience of their living places.

The Rivers Guardians was a program of low cost and high performance in socio-environmental terms. Despite being one of successful initiatives in relation to the protection and preservation of rivers in Rio, as well as in terms of income generation, it was a program

with little public visibility compared with other public policies of the municipal government in dealing with preservation and recovering of the urban landscape.

There were many problems faced by the program. Among them, it could be noticed the limitations of its catchment area. Considering the extension of Rio's hydrographic network, the program has shown a rather limited reach regarded the urban scale. The program was implemented in around 30% of the city's watercourses. If one also considers that the program's actions take place mainly in the river area located primarily close to a community, and not really along its course as a whole, it could be argued that its scope would be further reduced. One of the obstacles to expanding the reach of the program is the small number of technicians linked to the SMAC program. Demand was very high, and there were times that there were more than 100 requests from riverside communities to create new teams.

Conclusions

The Rivers' Guardians Programme was a successful initiative regarding both river preservation and income generation for low income population. It has materialized the idea of resilience in landscape, both in environmental and social terms. It has also shown how sustainability can be target when cultural and environmental dynamics are approached together.

Almost all the rivers and streams Rio de Janeiro have problems of environmental degradation, in greater or lesser extent. There is an urgent need to define guidelines for recovery and re-use of their banks and their integration into the city landscape. This program has shown that participatory processes should be present between these guidelines.

Many of the rivers and streams, despite the state of environmental degradation, are still alive and therefore able of being recovered as urban environmental infrastructure, as well as productive landscape in a variety of ways. For this end, we must recognize social and environmental values in landscape transformation. As argued by Corner (1999), when regarding landscape as a verb, not just as a noun, to underscore its processual nature, and its ability to enrich local cultures.

Fig. 4: New values for the nearby river (source: research group).

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