How greenery affects the urban living environment

Carlotta Manto, First degree in Science of Architecture, Politecnico of Milan, Italy

1 Introduction

Urbanization

The twentieth century is the century of urbanization, until the first half the developing world was predominantly rural, fewer than 20% of people was living in cities and town. During the second half of the century, a massive number of people beginning to move from rural areas to urban areas, especially in developing country (Mougeot 2006:2). The global proportion of urban population rose dramatically from 13%, 220 million, in 1900, to 29%, 732 million, in 1950, to 49%, 3.2 billion, in 2005 and it is estimated to rise to 60%, 4,9 billion, by 2030 when more people will be living in urban areas than in rural areas in middle and low income countries, approximately 4,9 billion in cities and 3,1 billion in countryside (UN-HABITAT 2004). In most of the developing countries cities are growing two or three times faster than the country's overall population (Mougeot 2006:2).

This phenomenal growth can also be attributed not just to economic opportunities, but also to loss and degradation of farmland due to development, pollution, land grabs and conflict, proximity and ease of mass transport. Another important aspect that determined that growth is the lowering of the rate of infant mortality and increased life expectancy worldwide.

Urbanization occurs as individual, commercial, and governmental efforts to reduce time and expense in commuting and transportation while improving opportunities for jobs, education, housing, and transportation. Living in cities

permits the advantages of the opportunities of proximity, diversity, and marketplace competition. However, the advantages of urbanization are weighed against alienation issues, stress, increased daily life costs, and negative social aspects that result from mass marginalization. Suburbanization, which is happening in the cities of the largest developing countries, was sold and seen as an attempt to balance these negative aspects of urban life while still allowing access to the large extent of shared resources.

Cities offer a larger variety of services, such as specialist services that aren't found in rural areas like proper sanitation and education.

Obligatory and unplanned migration often results in rapid growth of slums (Mougeot 2006:4).

The problem of the rise of informal settlements is growing faster in the megalopolis; is the case of Manila that is a city where insufficient housing for urban immigrants has paved the way for the rise of informal settlements. These communities are located in or near danger zones and are lacking in basic services like water, electricity, health and substandard roads, drainage, and sewage systems.

People from all over the country have migrated to Metro Manila and it was a real city’s population explosion. Population expanded from 5,93 million in 1980 to 7,95 million in 1990, 9,93 million in 2000 and is projected to reach 19,43 million in 2020. Even if the region has 12 million residents, its population is estimated to balloon to 16 million during the daytime, counting those who come to work from nearby provinces. The metropolis’ population density is the highest in the country, with 19,317 people per square kilometre, according to the 2010 census of the National Statistics Office. Manila itself is considered to be the world’s most densely populated city, with 43,079 people cramped per square kilometre (National Statistics Office) (Dagle and Mendoza 2012).

2 Factors Shaping Urban Shelter Design

Urban environment

As urban areas grow in population, they expand outward damaging the natural environment and destroying ecosystems. The rapid and usually unplanned growth

of many cities in developing countries is putting a strain on the natural resource base (Mougeot 2006:7).

Greenery coupled with an improved environment is an overall improvement in the wellbeing of the urban population. A more liveable city is a healthier city (Mougeot 2006:7).

Humanity is increasingly urban, but continues to depend on nature for its survival. Cities are dependent on the ecosystems beyond the city limits, but also benefit from internal urban ecosystems (Bolund and Hunhammar 1999:293).

In the case of the urban environment, it is possible to define the city as one single ecosystem or as composed of several individual ecosystems. An ecosystem can be defined as a set of interacting species and their local, non-biological environment functioning together to sustain life. It can be possible to use the term urban ecosystems for all natural green and blue areas in the city. The ecosystems found in the cities are: street trees, lawns/parks, urban forests, cultivated land, wetlands, lakes/sea, and streams, also playgrounds and golf courses (Bolund and Hunhammar 1999:294).

It can be advantageous to generate ecosystem services locally for pure efficiency reasons, but also on ethical and educational grounds. It is also clear that urban ecosystem services contribute to the quality of urban life; the quality of life for urban citizens is improved by locally generated services. Hopefully, an increased awareness of the ecosystem services could contribute to a more resource-efficient city structure and design. An understanding of the importance of ecosystem services could also mean that unexploited urban areas can be maintained or even expanded. As cities are expected to grow at a rapid rate in the coming decades, it is important that the ecosystem services in urban areas and the ecosystems that provide them are understood and valued by city planners and political decision-makers. That's why, while designing, ecosystems should be studied and planned.

Researchers have been experimentally studying the influence of greenery on human attitudes and functioning. One of the main findings is that natural environments are consistently preferred over non-green urban settings, or environments dominated by artefacts (Yannick, Willems, Brengman and Wolf 2010:57).

People prefer walking around and enjoy the public space if they have greenery all around, especially in warm countries where you need shade in the city. It involves people in the community life because it gives space for the recreation activities and it's useful to exalt the cultural and heritage site. Studies have also tested the effects of plants on consumer behaviour in shopping areas. They found that consumers were more inclined to walk around in the shopping streets and mall when there is vegetation spread out and that the presence of greenery led to higher exploration rates. The presence of plants was also associated with increases in interaction with other people (Yannick, Willems, Brengman and Wolf 2010:58-60).

Besides the shade, greenery brings climate welfare cutting down the heat island effect, refreshing the wind, filtering the air, regulating the microclimate, reducing the noise and pollution and draining the rainwater. It gives better aesthetics to the urban fabric and lightens the environmental impact of buildings, gives variety and diversity to the overlooking of the urban areas.

Urban agriculture

The world population is now fifty percent urban, cities are growing so fast as never before and urban agriculture expands with the growth of a city, especially in a low-income economy as part of the informal and formal economy. The available data indicate that urban agriculture is growing at least as fast as urban population, and in many countries considerably more rapidly (Smit, Nasr and Ratta 2001:4). Just thirty years ago there were only five megacities, three of these were in developing countries. The number of megacities is predicted to increase very rapidly and over the next decade it will reach the number of 23. But the megacities represent just the tip of the urban iceberg. Statisticians calculate that by 2015 there will be no fewer than 564 cities around the world with one million or more residents (Mougeot 2006:3-4).

According to those statistics it's good to highlight that the knowledge of farming is changing a lot according to the bigness of the cities, in a village, town, or small city, people could establish a connection to the soil and nature during their lifetime. But in a large city or megalopolis, residents have lost or are losing their connection to the reality of food production. In fact, much of the latest human

generation is unlikely to ever know where food comes from beyond the retail and fast food outlets, especially in the evolved countries, like United States. While in Asia, for example, urban farming continued its important role throughout the last century, in these rapidly urbanizing countries, urban agriculture is increasing at least as fast as the urban population (Smit, Nasr and Ratta 2001:5).

Archaeologists discovered remains of ingenious large-scale earth and water works in and around the cities of ancient civilizations and this is the evidence of the presence of agricultural production since the born of humanity for a multiplicity of purposes: for food and fodder, building materials, fencing, and even medicine. So it is clear that urban agriculture is here to stay. In fact, as we have seen, it never really went away (Mougeot 2006:3).

The location of agriculture in the city is influenced by land-use regulations, the real estate market and land tenure. Today some enlightened city administrations are embracing the concept of urban agriculture rather than trying to avoid and forbid It. Far from banning that practice, policymakers and planners have encouraged food production as a critical urban function. Cooperation and control give better result instead of opposition and restriction and can maximize the benefits of urban farming while minimizing the problems. This can clearly be seen in and around some Asian cities, where urban agriculture has had a long tradition (Smit, Nasr and Ratta 2001:6) (Bolund and Hunhammar 1999:299).

Urban agriculture is increasingly on the international agenda, recognized as a key part of a comprehensive solution to the problems of the runaway growth of cities in developing countries. International donor agencies are now more willing to fund research to better understand the phenomenon and find ways to make urban agriculture more effective, safer, and more responsive to the needs of the urban population (Mougeot 2006:10).

A continuing intensification of urban agricultural practices is one clear trend while less clear is the overall impact of such a trend on the urban environment. Of course urban agriculture alone will not solve the ecological problems of growing cities, but it does help to protect the environment. Some intensification, such as the broad growth of waste reuse, both solid and liquid, is largely favourable to urban ecology (Mougeot 2006:7).

At the same time, increasing concern for a more liveable environment, resource conservation, and a sustainable way of life will promote the potential of urban agriculture as a means to reduce pollution and green the environment. Even water shortages and increasing energy costs could stimulate urban agriculture.
Urban agriculture is better adapted than rural agriculture to producing crops using little or no soil and also because rural agriculture system is less adept at responding to such diversified product requirements than are the smaller urban production units closer to markets (Smit, Nasr and Ratta 2001:10).
It is useful for the environment because is possible to make productive use of organic waste products, for example, wastewater can be used to irrigate crops and organic waste is used to fertilize or to feed the animals.
One other good aspect of farming is the fact that less food has to be trucked into the city contributing to sustainability and having a positive environmental impact, it also helps to reduce a city's ecological footprint even as the city continues to grow.
Urban farmers contribute to the greening of the city, helping to reduce pollution and improve air quality, by cultivating every available piece of open space, even rooftops. They are able to have crop and animal production on rooftops, in window boxes, on roadsides, beside railroads, beneath high tension lines, within utility rights of way, in vacant lots of industrial estates, on steep slopes and banks of rivers, and on the grounds of schools, hospitals, prisons, and other institutions. In short, urban agriculture is anywhere and everywhere that people can find even the smallest space to plant a few seeds (Mougeot 2006:5) (Smit, Nasr and Ratta 2001:12).
Urban agriculture is not carried on as a temporary necessity by recent immigrants from rural areas, but also includes commercial operations producing food in greenhouses and other spaces. The produce is usually processed and marketed by the producers and their families (Mougeot 2006:6).
A regular supply of home-grown food can make a considerable difference to the lives of the urban poor. The availability of fresh vegetables and other foods coupled with increased opportunities for income means improved overall health, and perhaps the opportunity to break out of the cycle of poverty, because poor families can save money and even gain some selling their extra production. Any

surplus may be sold, and the income used to improve living conditions or even to invest in more profitable small enterprises, processing and marketing city-grown products (Smit, Nasr and Ratta 2001:8).

Many of the migrants reach the cities with no resources, bringing with them only what they can carry. One predictable outcome of this massive population shift is urban poverty because employment is generally hard to find. Most of the urban poor live in slums and squatter settlements, without adequate clean water, sanitation, or health care (Mougeot 2006:4).

The global level of urban poverty, currently estimated at 30%, is expected to grow to 50% by 2020, with nearly all of this growth are taking place in the world's less developed countries (UN-HABITAT 2004) (Mougeot 2006:4).

The role of women in the urban agriculture

Urban agriculture in many countries is women's agriculture, like in Africa and South Asia (Smit, Nasr and Ratta 2001:15).

The poorest urban farmers are especially women, who are liable at any time to be forced out of business by wealthier or more powerful groups, or by land speculators. Urban agriculture, as a means of improving food security and earning extra income is particularly attractive to women as it allows them to work close to their homes and to provide extra food to improve the nutritional status of their children. Women and children are always among the most vulnerable, so it comes as no surprise that it is often women who predominate in urban food production. The trend toward women farmers is consistent with the global advance of women toward equality and the global trend toward urbanization and smaller farms. This trend seems likely to continue for another generation, improving food security and health (Mougeot 2006:6).

However, women often face difficulties accessing land, water, labour, capital, technologies, and other services. In most countries, they likely have received less education than men and, in some countries, they are prevented by laws, customs, and attitudes from owning assets or even from making decisions about how any assets are to be used. A woman is also expected to maintain the home, prepare food, and care for the children, the sick, and the elderly. All of which too often limits their ability to contribute more to urban food production (Mougeot 2006:7).

Despite these restrictions, women do find ways to succeed in the business of urban agriculture, sometimes even dominating the trade of produce that is grown by urban farmers. Women will buy directly from producers and either resell in smaller quantities or process the produce and sell prepared foods. The most successful women act as banker for the agricultural producers, providing cash advances to farmers to ensure continuing supplies (Smit, Nasr and Ratta 2001:16).

3 Design of Sustainable Shelter and Neighbourhoods

Allotment gardens

An allotment garden is a plot of land made available for individual, non-commercial gardening. Those gardens are characterized by a concentration in one place of a few or up to several hundreds of land parcels that are assigned to individuals or families. In allotment gardens, the parcels are cultivated individually, contrary to other community garden types where the entire area is tended collectively by a group of people.

Generally the size of a parcel ranges between 50 and 400 sm. The gardeners are usually organize in association that lease the land from the owner and they have to pay a small membership fee to the referred association and have to abide with the corresponding constitution and by-laws (Holmer and Drescher 2006:32).

The history of the allotment gardens is closely connected with the period of industrialization and urbanization in Europe during the 19th century. Most of the families that moved from the rural to the urban areas were living under extremely poor conditions suffering from inappropriate housing, malnutrition and other forms of social neglect. To improve their overall situation and to allow them to grow their own food, the city administrations, the churches or their employers provided open spaces for garden purposes. That’s why the initial name of allotment gardens was gardens of the poor (Holmer and Drescher 2006:32).

The idea of allotment gardening started in the city of Leipzig in Saxony whit the “Schreber Movement” in the 1860s. It was a public initiative promote for let children play and later on adults tended towards taking over and cultivating farming. This kind of gardening rapidly gained popularity also in many other European countries (Holmer and Drescher 2006:32).

The security provided by allotment gardens became necessary during World Wars I and II. In many cases agricultural products did not reach the city markets anymore or were sold at very high prices at the black markets. Food production within the city became essential for survival (Holmer and Drescher 2006:33).
The importance of allotment gardening is due to the fact that, in situations of weak economy and high unemployment rates, it could become a part time job, and its main importance was to enhance food security and improve food supply. Nowadays, in times of busy working, allotment gardens have turned into recreational areas and locations for social gatherings. They are green oases within oceans of asphalt and concrete and they are substantially contributing to the conservation of nature.
In 1895, the first allotment garden of Sweden was established in Malmö, followed by Stockholm in 1904. Anna Lindhagen, a social-democratic leader was the promoter of that type of gardening, she wrote books about the usefulness of allotment gardens for families and communities.
The Swedish Federation of Leisure Gardening was founded in 1921 and represents today more than 26,000 allotment and leisure gardeners. The members are organized in about 275 local societies all over Sweden. The land is usually rented from the local authorities.

4 The Role of Architects

Example: allotment gardens of Cagayan de Oro, Philippines

In 2003, the first allotment garden of the Philippines was established in Cagayan de Oro as part of a European Union funded project (Holmer and Drescher 2006:33).
As a first step in establishing an allotment garden, the chairmen of the pilot barangays approached private landowners and asked if poor residents could use their vacant land for food production only. The conditions for the land use were then formalized into a memorandum of agreement jointly signed by all stakeholders: the landowner, the local government unit, the academe and the community members. The urban poor families agreed to use the land for food production only, not for construct residential structures and in return, the

allotment garden association received agricultural equipment, tools and supplies necessary to start the operation (Holmer and Drescher 2006:34-35).
In the garden the people are growing vegetables, herbs and tropical fruits and if possible they also keep animals. Each allotment garden has a compost heap to collect biodegradable waste that derives not only from the garden but also from the neighbouring households and that is converted into organic fertilizer. Furthermore all gardens are equipped with urine-diverting ecological sanitation toilets; it is a process dealing with human excreta. Before to establish this method a survey was conduct and in order not to lessen the market opportunities of the gardeners and to minimize possible health risk, human faeces is used not for vegetables production but only for trees (Holmer and Drescher 2006:33).
The project has been awarded with a best practices award of the German Government in 2004 that also signaled further support for up scaling the activities in future. The city government of Cagayan de Oro is presently mainstreaming the concept of allotment gardening into its overall city planning and development (Holmer and Drescher 2006:36).
In order to strengthen the allotment garden program, additional trainings in community building will be conducted, especially as regards democratic rules, capital build-up and marketing. Further, continued agronomic research is needed in the areas of crop improvement, integrated pest management, plant nutrition, water management and post harvest handling (Holmer and Drescher 2006:37).

San Isidro Allottment Garden at Barangay Kauswagan.

Sant Ignatius Demonstration Garden, Marnesa Farm.

Example: greenery in suburban residential district of Marikina City and Shec Community

The study case, reported in the paper: Quantitative and qualitative characteristics of greenery in suburban residential district of Metro Manila, was conducted to better understand the present situation of urban greenery in Marikina City that is one of the 17 municipalities of Metro Manila and comprises 14 barangays. The analysis is based on the study of trees' characteristic and lot's use. The intention of the study case is to show how the quantitative differences of greenery were related to qualitative differences, depending on the year or period of development of the residential areas (Hara, Ogasawara, Palijon and Takeuchi 2007).

The results show that the characteristics of greenery change according to the land-use category. For example fruit trees are not use in Public Space and Road land use because they don't provide enough shade for pedestrian like shade trees. In Residential land use ornamental trees are preferred because residents want to decorate their house with plants to be more beautiful and attractive. In Vacant land use banana trees and other fruit trees are planted by residents of adjacent lots (Hara, Ogasawara, Palijon and Takeuchi 2007).

Public Space land use

Road land use

Residential land use

Vacant land land use

Shec community is a site visited during the study trip in Philippines. It is a low incoming residential area in Pasay City in Metro Manila. One of the great aspects of that community is that the families that live there have to grow plants and greenery; that's why it contribute to the welfare of the houses and of people. Greenery is a easy and cheap way to beautify an area, but is also good for the climate because it is possible to use plants to provide shade and the wind is refreshed by them. People can easily plant productive plants even in small vases so they can save money and also increase their income selling extra vegetables.

Shec community

Shec community

Shec community

Shec community

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