Green spaces and the ecological quality of housing: The case of Cypriot settlements

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Introduction

As stated by many landscape architects such as Colvin (1948), an understanding and an appreciation of ecology is central to the discipline of landscape architecture. Accordingly, implementing policies for ecological development would not simply mean the sensitive location of urban development in relation to landscape features such as hills, valleys, streams and woodland. Of equal importance is respect for the ecological function of green spaces.

In the context of housing, which seems to act as a container of changing circumstances, where individuals and groups play an important role in the creation of their habitats, ecological development deals with improving the quality of life of the local community through the prudent use of local resources. The aim, therefore, is for a high degree of local self-sufficiency, which is related to ecological site design.

Acknowledging these ideas, this paper evaluates the green spaces of Cypriot settlements by highlighting the typical characteristics of older and newer housing developments in order to determine some of the basic clues for future development.

Why are green spaces important?

The biggest challenge in today's contemporary human settlements developments seems to be the quantity, nature and location of green spaces within those built environments. However, as many authors agree, "quality" has been put up against "quantity" and green spaces have been associated more with quantity and less with quality. Green spaces in a city contribute to human activity, climate amelioration and ecological diversity, without separating or isolating people from each other, which is necessary for human interaction and community development. The understanding of the quality of nature in each place, expressing it in the design of communities, integrating it within our towns, and respecting its balance are essential ingredients of ecological site design as a determinant of "urban ecology."[1]

In fact, the need for ecologically sensitive settlements was first addressed 102 years ago by Ebenezer Howard who proposed the Garden City (1898) as an ideal community of 30,000 inhabitants surrounded by a green belt. Howard intended the Garden City as a refuge from the alienating character of the big city and a compensation for the deficiencies of country life. A new type of entity, it was to combine the social advantages of the city and the healthy conditions of the countryside. In comparison to other approaches used in garden cities, Howard revealed his originality in the creation of true, complete urban units, enabling a productive relationship with the surrounding countryside (CHOAY, 1969; CROSBY, 1973).

There are three major benefits in terms of energy saving from the creation of urban developments, taking open spaces into consideration:

- by creating more permeable surfaces in urban settings, they help reduce stormwater infrastructure and increase aquifer recharging;
- by promoting a greater presence of trees and other vegetation, urban spaces assist in carbon sequestration, taking carbon dioxide pollution out of the air, which reduces greenhouse gases and climate change, etc.; and,
- by having open spaces scattered throughout the urban setting, pedestrian traffic is encouraged.

Plants may enhance our environment through protecting water quality, reducing soil erosion, improving air quality, lowering summer air temperatures, conserving natural resources and screening busy streets. However, for a proper land design, the location of the plants, their species, year-round effect, shade effect, and windbreak effect should be considered.

Good soil and the optimum use of water are the basis for healthy plants. The key to good soil is the addition of organic material, such as compost. In locations with established trees and shrubs, it is difficult to incorporate organic material, but applying and maintaining a 2 to 3 inch layer of an organic mulch (coarse leaves, shredded bark, pine needles, wood chips) will gradually improve the soil.

As the soils vary greatly in their ability to hold water, watering of gardens and lawns should be done consciously, by using a proper sprinkler system.

It is not just human demands that need to be satisfied in the provision of open space. Networks of open space must also be considered in terms of wildlife requirements, with the aim of increasing the range of habitats for other species. Parks and gardens cannot satisfy all these needs. Less formal areas such as greens and commons, local nature reserves, small woods, wetlands,[2] and multi-use wildlife corridors, all need to be con-

sidered because each has a different influence, some defining the larger context of the region, some focusing on the identity of a small neighborhood. Accordingly, a planning strategy should consider the defined range of open space in order to establish a green network, which is important to secure bio-diversity and a sustainable ecology (MOUGHTIN, 1996).

Landscape design plays a critical role in establishing a balance between nature and ecology, and the needs and requirements of contemporary urban life. Landscapes and built forms can modify microclimates on both greater and lesser scales.

Plantings can be used to control microclimates in three ways:

- the first is by absorbing and reflecting solar radiation, creating cool shades beneath, reducing ambient summer temperatures and allowing radiation to pass through in the winter;
- the second is by creating a zone of calm air under the canopy; and,
- the third is the cooling function that trees provide by the release of cooling water vapor from their leaf surfaces through evaporation and transpiration.

On a larger scale, as an amenity and provider of comfort in urban spaces, trees, plants and sometimes water are valuable assets. Where wind is a problem at the edge of the city or around high buildings, trees can provide valuable shelter. By improving the quality of life outdoors, people will be less tempted to sit inside, where they usually consume energy in one form or another, e.g. lights, television, etc. (EDWARDS, 1996).

It has been observed that the usual method of designing housing projects usually only takes into consideration the user's requirements with regard to the dwelling unit, and neglects to consider the need for open spaces. In fact, spaces around dwellings have great importance both in creating and/or enhancing social interaction among residents, and enriching daily life in individual units, especially in hot climates. As Marcus and Sarkissian (1986) highlighted in their comprehensive study on clustered housing, "the success of housing depends more on how the spaces between buildings are handled than on interior design."

Trees and the economic and social quality of housing environments

Housing is in many respects the most central environmental setting encountered by individuals during their daily routines, taking into consideration its psychological and social significance. Housing environments may provide a haven of security and a comfortable, supportive milieu from which individuals organize their daily plans and activities. When the congruence between people and their surroundings is impaired, however, emotional disturbances, health problems, and social disorder may occur (VAN VLIET, 1999). Accordingly, the provision of housing is the most important social need in the development of any city. In most cities, over 80 percent of urbanization consists of housing.

Recent studies make one thing abundantly clear: urban trees, at least those in public projects, should be considered more than just "amenities." These trees should be considered necessary parts of the urban infrastructure, just like streets, electric lines, water and sewer facilities. Street trees, for example, are important not only because they absorb noise and air pollution, lower utility costs, and provide a habitat for birds and other wildlife, but also because the street and its frontages are a community's major public arena. Trees growing along a street visually tie a neighborhood or a development together and make it a unit.

Today, in developed countries, a growing number of home-builders, developers, and other kinds of businesses are embracing landscaping and tree protection measures because they realize that protecting trees also makes economic sense. It has become clear that landscaping and green space increases profits for developers while providing numerous other benefits to both the user and the community.

An analysis of the reasons people gave for liking trees on their street is revealing (APPLEYARD, 1981). Trees

- provide shade
- make the street more alive by their movement and richness
- are soothing to the eyes
- purify the air and increase the oxygen content
- hide buildings
- add a sense of privacy
- provide contact with nature and give warmth as opposed to the hardness of cold concrete
- cut down on noise
- can make the streets look neat
- provide an identity if they are unique.

Tree-lined streets are more than just shaded passageways linking buildings. They give us a chance to bring nature into the heart of our communities, while linking us to our past. Scientists have also discovered a rational beauty in trees. Trees can significantly reduce temperatures in town and city centers, countering the "urban heat island" effect. This is accomplished not only through the shading effect of trees, but also through the trees' ability to store large quantities of carbon — a key factor in global warming (ARNOLD, 1992).

In terms of the social quality of housing environments, trees are thought to be effective in the formation of stronger communities. This was verified by a survey in a Chicago housing project conducted by scientists at the Human-Environment Research Laboratory of the University of Illinois. In this survey, interviewees living in buildings surrounded by trees reported significantly better relations with their neighbors, stronger feelings of unity with their neighbors, and a greater feeling of security, in comparison to those living in buildings surrounded only by paved areas without trees (SULLIVAN and KUO, 1996).

The reason why trees might contribute to better relations between neighbors could be explained by the fact that outdoor spaces with trees are used significantly more often than identical spaces without trees. In urban areas, trees create outdoor spaces that attract people. When people are drawn to spaces with trees, they are more likely to see and interact with their neighbors, and so they are more likely to get to know each other and become friends.

Further, a natural environment with a range of vegetation offers children the best opportunities for free play. When we make neighborhoods and towns without nature we destroy the places of fantasy and autonomy that children need. Leftover lands, small and large parks, preserved riverbanks, and open shorelines are places that become the refuges of the young. The man-made environment is dominated by adults, but the natural world, however small, should be a fundamental right of childhood. Children need enough wilderness to make their own places, and live out their own fantasies.[3]

Acknowledging the fact that children play creatively in wild spaces, Marcus and Sarkissian (1986) suggested that "when designing a housing development on a suburban or rural site, a portion of the site should be left in its 'wild' state, not even providing maintenance or clean-up from site personnel." A number of other researchers supported this idea. The EIKOS Group (MARCUS and SARKISSIAN, 1986) stated that children will spend more time playing in such a wild setting than they would on even the best designed play sculpture. On the other hand, where natural landscapes no longer exist, Dutch landscape planners even plan "wild" areas or urban forests well ahead of construction so that they are ready for use when families move in (LAURIE, 1979). Recent housing developments in Denmark

include "play woods" adjoining traditional equipped play spaces. These play woods have been well used (CHASE and ISHMAEL, 1980).

Green dimensions of Cypriot settlements

The Cypriot town was well known for its fruit gardens in early years. These gardens were an important component of the hierarchy of exterior spaces, extending from public square to semi-public street, semi-private courtyard and/or private garden. Within this hierarchy, settlements did not appear green when walking along the streets, where greenery in more private spaces was not exposed to the street environment.[4]

Referring to the urban texture in old Nicosia, Saalman (1968) indicated that "scattered houses stood here and there amid fields and vegetable gardens, a kind of country within the city." At the end of the 1300s, Niccolo Martini, a notary from Campania, found parts of Nicosia sparsely inhabited, noting that "within the city were many gardens, orchards, and fields" (COBHAM, 1969). More than two centuries later, in 1553, another traveller, John Locke, stated that "it is not only thoroughly inhabited, but had many great gardens in it, and also many date trees, plenty of pomegranates and other fruits" (COBHAM, 1969). These features continued into the Ottoman period. As proved by the writings of Alexander Drummond, who visited Nicosia in 1750, the town provided room for a great number of gardens, planted with orange, lemon, cypress, mulberry, olive, and almond trees. These trees exhibited a delightful variety to the eye of one who walked upon the ramparts (COBHAM, 1969).

In vernacular Cypriot houses, there is a rich variety of open and semi-open spaces, such as open-to-sky courtyards, verandas (an open transitional space where the dwellers sit and receive guests while watching the street) at the front and *sundurmas* (an open shed facing the courtyard) at the back, all with access to greenery. It is the courtyard house that offers unique opportunities for landscape design (OKTAY, 1999b).

In a courtyard (*avlu* in Turkish, *havli* in local Cypriot Turkish and *avli* in Greek), compared to other kinds of open terrain, the sense of enclosure and small scale is easily manipulated and given a mixture of hard and soft treatments. The courtyard, with its fruit trees, flowers and small vegetable plot, is the closest relation the house has to nature; and thus it also provides the inhabitant with direct access to nature (fig. 1). Greenery is especially desirable for the shade it provides, the heat gains that it prevents and the relief it gives to the eye. Dixon (1879) described that in the past, every family in Nicosia had a

Fig. 1: Cyprus — Access to nature in the courtyard, Kyrenia.

courtyard with a date palm, a pomegranate, a lemon tree and water. They also had a fruit garden, growing mostly oranges, located in their neighborhood. These orange gardens were unique features of the city and were perceived as borders between districts.

The other types of houses which are very characteristic in the towns are those with front and side gardens with local fruit trees and flowers.[5] These outdoor spaces are well integrated with the house by means of semi-open spaces, such as verandas.

In this context, a study of Lefke, a coastal town situated between two valleys and in the mountains of Northern Cyprus, provides useful clues in terms of sustainable landscaping.[6]

- First of all, in respect of the town, the use of locally appropriate plants[7] helps to create areas of different themes.
- Second, they are used as bordering elements, as a common characteristic of vernacular Turkish settlements. For instance, orange trees define one district, whereas date-palm trees, olive trees, orange trees and eucalyptus trees define others.[8] The trees serve both as shading elements and fruit sources (figs. 2 and 3).

In some districts, aqueducts are used as dividing elements in addition to their watering function and aesthetic contribution to the landscape (fig. 4).

On the smaller scale, the hierarchy of open spaces in the residential areas provides a variety of uses of vegetation. The private front yards are well defined and "air-controlled" by cypress trees and grapevines (fig. 5). The semi-private backyards are for growing vegetables. The watering function is successfully done in these spaces with the use of wastewater collected from the kitchen and distributed via the simple canals created by the residents.

Fig. 3: Cyprus — Aqueducts as dividing elements in Lefke.

Fig. 2: Cyprus — Green environment in Lefke.

Fig. 4: Cyprus — Private front yards in Lefke.

Fig. 5: Cyprus — General view of CMC Houses in Lefke.

The semi-public spaces between houses are defined by the vegetation as well. In these areas there are many fruit trees from which the residents of the district benefit.

On the other hand, Lefke Ataturk Park, the central common space of the town, reflects a sustainable quality too, with some fruit trees such as loquat and pomegranate combined with flowers. People use this public space both for leisure activities and picking fruit.

It is widely recognized that the presence of vegetation around housing has positive effects. In low-income housing, e.g. in Lefke, the Cyprus Mines Corporation (CMC) Workers' Housing,[9] trees and vegetation were found to attract residents outdoors and to foster neighborhood ties (fig. 6). In comparison to those living next to more barren areas, residents had increased social activity, knew more about their neighbors, had stronger feelings of belonging, and reported that their neighbors were more concerned with helping one another.

However, after the closing of the CMC mine, the vacated land, which is approximately 100 ha, caused great environmental problems in the area.

- Firstly, because of the remaining toxic copper elements in the soil, it is no longer possible to develop the land for new functions; new housing development is not possible because copper-contaminated soil destroys the building materials used in buildings; the planting of trees or other greenery is not sustainable because of the toxicity of the soil.
- Secondly, the deteriorated soil has created water pollution in the area, as can be clearly observed by the color of the sea near the coast in this area.[10]

The existing housing fortunately is separated from the toxic land by means of a "buffer zone" created by the planting of eucalyptus trees. This "buffer zone," however, provides a purely visual separation from the unusable land.

Thus, this example demonstrates the importance of soil quality in the development of towns.

Lapta is another Cypriot settlement worthy of analysis in terms of sustainable landscape. It is a village in the west part of the Besparmak mountain range, where nature is an important determinant of the town's image (fig. 7). The residents of Lapta grow their own vegetables and fruit in their own gardens. The artificial and green environment is well balanced, and the design of the houses is sensitively integrated with the slope of the topography by means of their terraces, providing a feeling of aesthetic harmony and the possibility of social gathering (figs. 8 and 9).

As revealed by the author's survey-based study (OKTAY, 1997), open spaces are a cornerstone in the daily life of people in Northern Cyprus, and satisfaction with their dwellings greatly depends on the quality of their private and semi-private open spaces. However, in the new developments, these spaces lack the qualities, which provide positive meaning and availability for use by the residents. They are often built on flat sites with no trees, and stand as isolated concrete towers, missing the opportunity to create some unity through the use of landscaping. It is also unfortunate that there are no conscious efforts to green the surrounding spaces.

Residential exterior spaces lack responsiveness to the users' needs, their life style and their socio-cultural conditions. This is especially true in the case of multi-storey housing developments which contradict many social and cultural norms in Cypriot towns. In the design of these schemes, neither the physical and the aesthetic characteristics of the outdoor spaces nor their functions and uses have been considered. They appear as isolated wastelands of spaces; streets have become

Fig. 6: Cyprus — View of the vacated land of the CMC mine in Lefke.

Fig. 7: Cyprus — Green environment in Lapta.

Fig. 8: Cyprus — Lapta houses with rich greenery.

Fig. 9: Cyprus — Lapta houses with rich greenery.

mere vehicular channels without any three-dimensional definition and public use. The general appearance of the housing areas does not reflect a logical balance between the open spaces and built-up spaces, but rather displays a monotonous view of a group of concrete blocks. Hence, these spaces seem to hold no meaning for their owners.

Satisfaction is lower in general with regard to apartment-type housing, where private open spaces, usually in the form of balconies, are far from being an extension of the living environment.[11] Furthermore, there is serious dissatisfaction with the provision and/or qualities of collective open spaces in all housing areas.[12]

Conclusion

It is widely accepted that an ecological development should demonstrate sensitivity to the function of green spaces at all levels of urban environment, particularly in housing environments.

Acknowledging the fact that housing not only satisfies the basic need for shelter, but also satisfies other needs required for sustainability, certain physical and social values should be considered in the design of housing environments. Access to nature and sensitivity to the natural ecology is one of the most important qualities that should not be neglected. The site should be designed in a way that it promotes learning about nature and its process by children and adults. An attempt at integrating such features as edible landscapes of fruit trees and highly productive gardens into site design would be beneficial for dwellers in terms of lower heating and cooling bills, lower food costs, and reduced risk of flooding and landslide damage. Trees with canopies can be used for their shading effect, and for the definition of spaces both in streets and courtyards. When a more flexible design is possible, the traditional concept of courtyard can be reinterpreted and modified in the multi-storey housing developments, and housing blocks can be arranged around a semi-private courtyard space. Vines, which are an essential element in the gardens of vernacular Cypriot houses, can be effectively adopted in semi-private spaces in new developments, and be utilized for shade. The presence of variety in greenery such as trees and shrubs of different kinds may help create unity in the housing, as well as provide an aesthetic quality.[13]

Cultivated urban land — semi-private and private — may be utilized as an aesthetic means to enhance and define an area. Such areas may also contribute to the establishment of ecological corridors within an urban context, in the form of a "mosaic" of more or less densely built areas (BERGLUND, 1998). In the case of Cypriot settlements, orange and citrus gardens would do best at the city scale.

At a smaller scale, useful outdoor living space is an undervalued resource, which can improve the quality of the built environment. Urban and planning codes often limit or condition the effective uses of these spaces, in particular when applied to social housing. In considering the very low environmental impact of naturally conditioned outdoor spaces and the improved "livability" they provide, it is vital that these spaces are "discovered" as an integral component of sustainable architecture and urban design.

Notes

1. Urban ecology is the general term used for measures taken to solve many environmental problems in one place. In housing, this means conserving energy and water, reducing refuse through sorting at source, animal husbandry, composting, recycling, the use of environmentally friendly building materials, landscaping, pedestrian and bicycle traffic, rather than motor traffic.
2. Wetlands are lands on which water covers the soil or is present either at or near the surface of the soil or within the root zone all year or for varying periods of time during the year, including during the growing season. The recurrent or prolonged presence of water (hydrology) at or near the soil surface is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface. Wetlands can be identified by the presence of those plants (hydrophytes) that are adapted to life in the soils that form under flooded or saturated conditions (hydric soils) characteristic of wetlands.
3. This is why, in recent years, there have been attempts to create "adventure parks" for children in the United Kingdom and the United States, where construction "left-overs," e.g. hardware, wood, etc., and some other material, e.g. automobile tyres, cardboard, etc., are provided to support the development of a creative and educational play environment.
4. This quality is also observed in Anatolian settlements.
5. In most of the cases, the entrance to the house is marked by a jasmine tree planted at the gate.
6. Landscape sustainability was one of the themes of the graduate course "Sustainable Developments" at the Faculty of Architecture, Eastern Mediterranean University (Spring Semester, 1998-99) supervised by the author. The related case study was carried out by Nevter Zafer and Beser Oktay.
7. Lefke's native landscape is formed by olive, orange, date-palm, lemon, tangerine, eucalyptus, pomegranate, banana, cypress trees, grapevines and shrubs.
8. The thematic division is more clear in the CMC Labour Housing District where single people's housing is defined by cypress trees, and married people's housing by eucalyptus trees.
9. The Cyprus Mines Corporation (CMC) was a British company which ran the copper mine in Lefke between 1927 and 1974. Its staff was provided with one-storey, row-type houses near the mine. When the mine closed down, low-income people settled in the workers' housing.
10. Discussions with the Mayor of Lefke.

11. In this survey, balconies were referred to as the most disappointing elements. Two thirds of flat residents (66 percent) complained about the small size; more than one third (36 percent) complained about inefficient sun orientation; more than one fifth (23 percent) stated that there is a lack of privacy; and less than one fifth (14 percent) considered street noise as a problem (OKTAY, 1997).
12. A large majority (89 percent) of residents were not pleased with the provision of common spaces and related settings. The types of common spaces which the residents would like to make use of include passive green areas (72 percent), sports areas (63 percent), common space for young people (62 percent) and children's playgrounds (32 percent). Most residents (71 percent) complained about the lack of sidewalks in their neighborhood, and a large majority of the respondents (89 percent) were unhappy with the provision of greenery in their environment (OKTAY, 1997).
13. Municipalities can support residents by making plants and trees available for planting.

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Acknowledgement

The author wishes to thank Prof. Dr Ruşen Keleş of Eastern Mediterranean University/Ankara University for his valuable comments on the draft of this paper.