

Water and green politics for a bio-eco approach to urban design

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ABSTRACT: Green, soil and water are powerful means of ecological design in public neighbourhood spaces. These spaces, which form the urban “porosity”, become, in an eco-sustainable approach, multipurpose systems suited to improve the urban metabolism (oxygen production, recycling of water and organic wastes) through the use of space itself as shaped by soil movements, water pools and green masses. Open spaces at neighbourhood scale are increasingly crucial means of enhancement of environmental urban quality, which does not imply that historic towns have to be transformed in woods, nor in new garden city models. The quality of neighbourhood life could be improved by solving the problem of water saving by systematic recycling, so that trees and green masses can be allowed to grow up and mitigate the summer microclimate through evapotranspiration while bettering the air quality by oxygen production. Mitigation of summer microclimate means energy saving in artificial air conditioning and reduction of CO₂ and heat from air conditioning plants. A proper design outcome could be obtained through a truly integrated approach and should produce both agreeable places to live in and self-sustaining and balanced ecosystems. The paper will deal with possible strategies for the use of green, soil and water as means of ecological design in public neighbourhood spaces, while testing the minimum surface dimension suitable to obtain substantial advantage degrees in water recycling, summer microclimate mitigation and air cleaning.

Keywords: green, water, urban spaces, open spaces

1. FROM HISTORIC TO SUSTAINABLE TOWN

The dramatic shortage of water on the planet and the even more dramatic change of climate, due to the over heating of the biosphere, ask for new policies of habitat, to be enterprised in agriculture, industry and towns.

In historic towns a certain balance between green masses, buildings and population has, up to a certain point, been kept. It is only since the second half of XX century that population growth, together with the increasing of built volumes, has been questioning the old models, asking for a new approach to urban design and policies.

What are the most urgent policy problems to be solved in modern towns? I would say that 1) reduction of the urban footprint and 2) urban microclimate mitigation - are by sure among the first steps to be made.

Two precious basic resources for human life and cities revitalization like water and green, up till now available on a large scale but today in a critical phase of scarcity (this is especially true for water, and consequently for green masses) are strictly related and both needing a special policy management in order to modify the cities asset.

Water and green can be considered "living" materials, to be confronted in towns with buildings concrete and stone volumes. In order to grow plants and green masses we need water, and in order to reduce the urban need of water, while reducing the urban footprint, we need to close the local water cycle through recycling, by means of special depurating plants, or by means of oxygen supply.

2. LARGE SCALE GREEN STRATEGIES: THE NEW AGRI-URBAN LANDSCAPE

2.1 How to enrich towns with a landscape of green and leisure typical of countryside?

The landscape definition given by the European Convention (2005) suggests the creation of a new kind of environment, no longer definable as country or town, but taking a completely new form of bio-eco-social organization in periurban systems. A new way of using and enjoying agricultural resources, together with a new style of productive and social life of people.

In 1998 Pierre Donadieu, professor at the École du Paysage in Versailles, Paris, published the important essay 'Campagnes

Urbaines', where the hypothesis to get over the old dichotomy town - countryside, through the recognition of a new potential landscape, in between town and country is suggested. Such a landscape still 'in nuce' ten years ago, is today becoming an expanding reality waiting to be recognized.

The XIX - XX century English philosophy again and again theorized the necessity of integrating town and country. Beside Patrick Geddes' star-shaped city models, where the country is prolonged to the town's hearth, we can mention XIX century garden cities (Ebenezer Howard), and, in XX century, the post-war urban new towns and the London Greenbelt as a decentralization politics in the frame of 1943 Greater London plan. In XIX century anarchists like Petr Kropotkin, who lived many years in London and strongly influenced William Morris philosophy about environment and society, always preached a close alliance between town and country. Urban and industrial limits to growth would start an economic integration process with fields works and a new form of collaboration between industrial and farm workers.

Of course, the 1998 town/country relation is not the XIX century one. Towns are by now become conurbations or megalopolis where, as Donadieu writes: "*Metropolization* is the principal cause of *de-agriculturalization*". Modern metropolis is modifying its traditional relationship with the country, not only through the sprawl of concrete, but also through the inevitable alteration of the productive agricultural functions at the urban outskirts.

Citizen's discomfort for the 'all concrete' urban environment faces farmer's discomfort for his fields surrounded by infrastructures, polluted by industrial settlements, etc.

Which point of view is to be taken? The citizen's or the farmer's? Donadieu's theory,

based on several inquiries about actual tendencies in France, as well as in Spain, in Italy (Milan) and in extra European nations, suggests that a third way is to be taken. Encouraging to reconsider these new forms of residential and agriculture environment in an unprejudiced way, accepting the possibility of a spurious and new landscape, neither properly town nor properly country, with new functions of mutual help between citizens and farmers.

From such exchanges a new kind of agriculture should grow in peri-urban areas, producing daily fresh and good quality food for citizens, playing a precious function of environmental balance, offering citizens the possibility to reach easily the country with their bicycles. Vice versa the farmers could have an easy access to urban services (school, hospitals, etc.) while considering the opportunity, individually or within their family group, to get a second job in some workplace in town.

The new landscape for the new life style should be recognized and exploited by concerning projects, accepted and practiced by people.

Energy saving advantages would then come from: a) locally produced food, eliminating transport costs; b) climate improvement; c) organic recycling of town wastes for green cultivations.

3. MEDIUM SCALE WATER STRATEGIES THROUGH RECYCLING: AN EXAMPLE OF URBAN PARK DESIGN

Dynamic flows of water in seas, rivers and canals, are considered “living” waters in that they are dynamically enriched by air oxygen, by so gaining the power of “digesting” and eliminating (up to a certain degree) eventual polluting substances.

But what if the area of water circulation

is limited?

I want to describe here a brilliant project by the famous architect Toyo Ito for the Municipal Housing Corporation (EMV – Empresa Municipal de la Vivienda) of the city of Madrid (España), in the frame of European (EU) standard Ecovalle Programme, dedicated to accomplishing “sustainable” urban planning.

Located in the southeastern outskirts of Madrid, in an extremely arid landscape, crossed by the dried up river Gavia, the park was conceived as part of a major redevelopment effort to clear a slum area on the fringes of the historic city of Vallecas. Straddling both sides of the river Gavia, the park covers a vast area of 39 hectares.

The directives of the international competition were: 1) the design of a long watercourse as a percolating filtration system, receiving 6.000 m³ of water per day, from the regional sewage treatment facility. While running through the watercourse, water is further purified and returns to the river.

The architects were also asked to use natural processes and materials in order to revitalize the local ecosystem.

Toyo Ito's bright idea was to design a very complex orographic system as a network of “ridge trees” and “valley trees” of water course so that the total course of water, from the sewage treatment to the river Gavia wetland, would be multiplied and, during the percolating course the purification of water would be almost complete, reducing the BOD value from 5 to 1.

4. NEIGHBOURHOOD SCALE WATER AND GREEN STRATEGIES. GUIDELINES FOR A SUSTAINABLE APPROACH TO URBAN DESIGN THROUGH WATER SAVING AND GREEN MASSES

Up to now town development has been guided by traditional approaches of urban planning based on a geometric and abstract concept of space. The present research is aimed to update these approaches bringing them into a systemic and environmental sphere of thought. It takes into account the living dynamics of plants and the circulation of stochastic fluxes of water and air. It proposes concepts integrating aesthetics, dynamics, culture, sociology and ecology.

The final report will deal with possible strategies for the use of green, soil and water as means of ecological design in public neighbourhood spaces, while testing the minimum surface dimension suitable to obtain substantial advantage degrees in water recycling, summer microclimate mitigation and air cleaning.

Green, soil and water are powerful means of ecological design in public neighbourhood spaces. These spaces, which form the urban "porosity", become, in an eco-sustainable approach, multipurpose systems suited to improve the urban metabolism (oxygen production, recycling of water and organic wastes) through the use of space itself as shaped by soil movements, water pools and green masses. Open spaces at neighbourhood scale are increasingly crucial means of enhancement of environmental urban quality, which does not imply that historic towns have to be transformed in woods, nor in new garden city models.

The quality of neighbourhood life could be improved by solving the problem of water saving by systematic recycling, so that trees and green masses can be allowed to

grow up and mitigate the summer microclimate through evapotranspiration while bettering the air quality by oxygen production. Mitigation of summer microclimate means energy saving in artificial air conditioning and reduction of CO₂ and heat from air conditioning plants.

A proper design outcome could be obtained through a truly integrated approach and should produce both agreeable places to live in and self-sustaining and balanced ecosystems. A considerable advantage of a truly integrated approach is the creation of high quality halting-spaces which could be compared to the traditional, historical ones in allowing a complete formal perception and a pleasant rest.

It is then very important to define the minimum size suited to allow public halting-spaces (or urban "pores") to perform their primary bio-eco functions. Neighbourhood water cycle and green masses form indeed a complex system which has to be planned and dimensioned according to the dimension of the neighbourhood population.

Traffic spaces also have to be re-thought in order to obtain climate moderation and safety for pedestrians, cyclists and car-drivers.

Green, soil, water, halting and movement spaces form a multipurpose network system strictly integrated to the urban fabric. Which implies that urban morphology has to be designed according to the metabolic flows of resources.

Following these premises, the objective of our research is to define strategies for the use of green, soil and water as means of ecological design in public neighbourhood spaces, while testing the minimum surface dimension suitable to obtain substantial advantage degrees in water recycling, summer microclimate mitigation and air cleaning, integrating those natural resources with the social and cultural dimensions of the site.

More specifically, the guidelines will define earth and water strategies to get:

- 1) Soil permeable surfaces for rain water recovery
- 2) Water stocking systems
- 3) Water depuration through biological treatments for domestic and gardening use

The guidelines will also define earth and green strategies to get:

- 1) Water supply
- 2) Microclimate control through solar shading, evapotranspiration and wind barriers
- 3) Soil fertilization
- 4) Oxygen production
- 5) Air filtration
- 6) Durable improvement of the urban living environment

These guidelines are aimed to become a tool for urban design both in historic towns and in new settlements.