



A Multifunctional and Living Landscape as a Key to Sustainable Cities

Clergeau Philippe A*

Department Homme & Environnement - UMR CESCO, France

*Corresponding author: Clergeau Philippe A, Department of Homme & Environnement - UMR CESCO, France

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Abstract

The sustainable city model implies multidisciplinary approaches and a change in urban project methodology. Early diagnosis provides an important platform for new project design, and among the elements examined, geographical and ecological factors should enable existing processes and biodiversity levels to be highlighted, conserved and enriched. The creation of an ecosystem should be the primary objective. This intention could fully guide possible scenarios and enable reactions to future uncertainties, be they technical, political or design decisions. A sustainable urban project would also benefit from integrating post-delivery analysis and indeed the implementation of adaptive management that periodically examines future changes to landscape or constructions, both as biotechnological entities and as places subject to human practices.

Keywords: Urban design; Urban planning; Methodology; Biodiversity; Landscape; Ecosystem

Sustainability is based on a multifunctional urban landscape

Cities cannot be sustainable without a full and functional consideration of ecological processes. The ecological justifications, political issues and service provisions that underlie the development of nature in cities are now well known [1]. They are as much about well-being (atmosphere, gardening, health, social ties...) as they are about regulations (thermal, pollution...). Beyond the need for landscaping projects capable of providing these services, however, it is biodiversity that we wish to put at the heart of the evolution of 21st century urban planning [2]. Indeed, most landscaping involves a very limited number of plant species that can perfectly meet specific service requirements. The functioning of natural systems is completely ignored even though it seems to be the only consideration that guarantees sustainability. For example, the choice of alignment trees are limited to a few species (plane trees, chestnut trees, etc.) that are used everywhere for their resistance to the urban environment. However, the fragility of the system is obvious, the slightest health or climatic accident will destroy the entire plantation. The disappearance of the elm tree from the south of France is an excellent example. It is by diversifying and above all by mimicking ecological models that coherence as a whole can be ensured, limiting systemic fragility. We must consider complex food chains that continue to function perfectly even if one species in the

food chain disappears. The notion of biodiversity relies upon both plant and animal species and the interrelationships between them. In cities, unless we continue to invest in expensive technologies, one objective of sustainability of nature's services to urban dwellers would be to bring together the systemic processes we observe in more natural environments.

This approach implies considering a territory, a landscape, or a large space as inherently multifunctional if it is to be considered sustainable [3]. A multifunctional landscape must - whether we like it or not, - integrate geographical and ecological models that will generate present and future dynamics. Observing, analyzing and designing, this landscape involves the inclusion of factors that go far beyond the competences of today's architectural practices.

Geography and ecology at the heart of urban planning

Several planning professionals have already stressed the essential link between nature and the design of human settlements, even though the notion of ecological modeling is not central to their approach. In his analysis of project management, Aberto Magnaghi [4] suggests the need to consider the bioregion. He stipulates that the regional context is no longer to be conceived as a natural space to be protected but as a set of energies and information that contribute

to the sustainable capital of the system. Several architects such as Yves Chalas [5] take up this idea of nature's involvement on urban design. Jan Gehl [6] also advocates taking into account the living in a Man-Nature relationship at different scales, notably between buildings and between cities. However, naturalists such as Knapp [7] or Le Roux [8] highlight the destruction of habitats around cities and emphasize the need for full protection of areas and species threatened by urbanization.

There are many obstacles to more widespread consideration of urban ecology, but they seem above all to involve approaches that are overly disciplinary. It would seem particularly commendable to move beyond the mere conservation of cultural or natural heritage. Naturalism and the protection of nature should not be perceived as a direct confrontation to urban planners' intentions, as doing so may prevent any positive evolution of the professions involved with regards to ecological design and management. On the one hand, the objectives of conservation biology seem to have to be challenged in the urban system: species can no longer be considered in the same way. On the other hand, current urban planning is still essentially based on classical concepts taught in architecture schools and reflected in urban morphologies. An economic, ecological and social transition for a sustainable city requires a complete reversal of paradigms, in particular the highlighting of geographical features and the development of biodiversity as a source of services for the city dweller.

Fundamental work on a new urban morphology remains to be undertaken [9]. A withdrawal from dogmatism is required, allowing the creation of a new research-action interface between disciplines that are already very "transdisciplinary", such as urban planning and ecology. Exchanges between these disciplines [10] raise several common issues such as the role of private spaces in the physical and ecological functioning of the city, the importance of city dwellers' participation in the emergence or re-emergence of the notion of the common good (natural heritage?), the definition of new spatial and temporal boundaries for all development projects or the need for a methodological formalisation. Even if each project is indeed a case study in its own right, this methodological question of urban design seems essential in making changes to current development strategies.

Sustainability must Address Uncertainty

The ideal of sustainability also calls into consideration the adaptability of the city, a concept to which the establishment of a temporal scale is difficult. The sustainable city must be able to react to various successive requirements and anticipate other future risks, perhaps simply practices as yet unidentified. Sustainability should thus imply an ability to react as new requirements emerge. It is no longer a question of responding to a future problem but rather enabling future reactions to future problems. This calls for new ways of thinking about urban forms, about the plasticity of special use and therefore on project development. How can an urban project offer full latitude of expression for a future that is defined as uncertain? It seems difficult to envisage buildings or infrastructure demolition as a way to meet new adaptive capacities.

In reality, the organization of the building is not very evolutionary in space and time. Even if the design of urban forms can take address the typologies and uses of buildings in a prospective vision, it seems that flexibility should be most sought rather in unbuilt spaces, both public and private. It is undoubtedly at this level that functional evolutions such as new modes of transport or new uses can best be expressed. The implementation of an urban green space plan in north of Paris [11] has thus proven its success as a structuring tool for spatial reorganization, both in terms of rapid adaptation to societal demand (nature in the city, atmosphere, social cohesion, etc.) and in terms of a longer-term response (thermal regulation, shallow water management, biodiversity conservation, etc.), and in terms of preserving land use opportunities for the future.

A sustainable urban project should allow subsequent adjustments and favor new urban forms more easily (e.g. consideration of the respective building locations) as well as designed and planted unbuilt spaces that are likely to undergo major modifications (not necessarily as land reserves but rather as a support for new practices). As is the case in landscape ecology, it is the analysis of the composition and configuration of the different elements of the site, at different spatial scales, that explains the function and possible evolution of the territory. It would then seem more effective to define a project first of all by its ability to evolve through an organization of spaces that are defined as non-constructible.

In concrete terms, an urban project would first take into account its location, the structure of the site's spaces and their functioning, and then endeavor to organize the locations of the buildings in such a way as to meet any space constraints over time (for example by leaving spaces between buildings possibly for public transport or green spaces with soft mobility, or by organizing them to avoid flooding unobserved for the time being). If they have been designed in this way, green spaces then become the preferred support for any potential future development. They become the soul of the project design.

Taking this perspective into account means overturning current urban design procedures by moving away from the programmatic parameters of housing, offices and cars and aiming more systematically at diagnoses that cross-reference geographical, landscape, sociological and ecological analyses. A major question that arises today in urban development projects is how a project impacts the surrounding or peripheral spaces and neighborhoods. How can a development bring positive effects to the environment in time and space (in terms of services, mobility, reduction of heat islands, biodiversity, etc...) not only within the target site limits but also beyond the boundaries of the area to be developed? The notions of the geographical limits of the project and transdisciplinary then become fundamental. Placing oneself upstream of the project in time and space would make it possible to integrate these sets of geographical scales and to position oneself above all in an approach that takes into account future developments. Here again, the management of complexity linked to uncertainty requires a complementary approach.

Which diagnosis?

Consideration of the strategies to be implemented quickly leads to the need for co-construction between the human and social sciences, life sciences, engineering sciences and design sciences to bring out an urban morphology in accordance with both an objective of responding to new environmental constraints (climatic, energy, digital, budgetary, etc.) and a transitional capacity to achieve it (adaptable city, resilient city, etc.). Alongside these academic analyses - and the training that could be linked to them - a pragmatic approach to the organization of exchange methods within the project design process seems to be an essential tool. The architect Jan Gehl [6] proposes exchange platforms and Clergeau & Blanc [12] suggest cross diagnoses at the very beginning of the project.

This diagnostic approach involving different competences (urban planner, architect, specialist in mobility, in commercial centres, landscape gardener, ecologist) has been tested in the case of an analysis of urban renewal in southern Toulouse with a pooling of the different readings and possible objectives for each; it is from these transversal discussions that the proposal for the rehabilitation of a major boulevard integrating localized urban densification, development of public transport and creation of an ecological corridor (Mirail-Garonne program – Urbane Agency) was born [13]. We also tested this method in a more modest way in the development of a green and blue grid plan for the community of communes of Plaine Commune (north of Paris). A naturalist's office, an ecologist, a landscape gardener and a sociologist-urbanist provided complementary maps that, when integrated into a potential ecological network, resulted in a general scheme of proposals [11].

Towards an adaptive management

The conception of the project is not sufficient in itself, however, because in order to achieve sustainability, a systemic approach also requires taking into account temporal and spatial dynamics, and therefore possible changes in constraints and practices regardless of the uncertainties. Adaptive management [14] would make it possible to make allowance for disruptions to an established program and to integrate informed changes in direction. The idea would be to periodically adjust an action program according to the different results already obtained. This form of learning requires both monitoring based on the study of a selected indicators along with the co-construction of analyses and decisions (very often with participatory approaches). This strategy was successfully applied first in wildlife management (how to limit invasive species) in Australia and the United States, and then proposed for forest management. In the case of landscape or urban planning, this strategy would make it possible to modify methodologies, for example in the event of a goal not being achieved. It would also act as an alert system for unexpected changes. This idea is in line with the suggestion of Friedmann [15] who proposed a link between programming urban planning and the experience of the inhabitants through a collective process of continuous learning based on interaction. This strategy would easily be applied to unbuilt public and private spaces.

Just as architecture is constantly innovative, urban planning is also expected to meet this objective in order to respond to the idea of resilience [16]. The cross-fertilization of diagnoses (regarding mobility, commercial centralities, typologies of use, ecological, land use, etc.) seems to be a strong basis for discussions that integrate all contextual elements. Work seems to be particularly targeted on urban forms that best respond to future developments and on unbuilt spaces that should not be confined to alternating roads and gardens. Strategies such as adaptive management can, later on, allow a constant adaptation of space to new constraints and practices, but it is indeed a common interaction between the different trades of the territory that must be at the origin of a new urban planning, and, now, ecology must be completely part of it.

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References

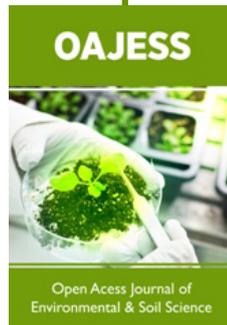
1. European commission (2015) Towards an EU Research and Innovation policy agenda for Nature-Based Solutions & Re-Naturing Cities. Publications Office of the European Union, Luxembourg, Europe.
2. Clergeau P (2016) La ville ne peut être qu'écologique. In Ressources urbaines Latentes R, D'Arienzo C, Younes C, Lapenna A, Rollot M, MetisPresses (edn), Genève, Europe, pp. 115-128.
3. Ahern J (2013) Urban landscape sustainability and resilience: the promise and challenges of integrating ecology with urban planning and design. *Landscape ecology* 28: 1203-1212.
4. Magnaghi A (2010) Progetto locale. Verso la coscienza di luogo, Bollati Boringhieri, Torino, Italy.
5. Chalas Y (2000) L'invention de la ville. Paris, Anthropos/Economica (edn), Paris, France.
6. Gehl J (2010) Cities for people. Island Press, Washington, USA.
7. Knapp S, Kuhn I, Mosbrugger V, Klotz S (2008) Do protected areas in urban and rural landscapes differ in species diversity? *Biodiversity and Conservation* 17(7): 1595-1612.
8. Le Roux DS, Ikin K, Lindenmayer DB, Blanchard W, Manning AD, et al. (2014) Reduced availability of habitat structures in urban landscapes: implications for policy and practice. *Landscape and Urban Planning* 125: 57-64.
9. Heymans A, Breadsell J, Morrison GM, Byrne JJ, Eon C (2019) Ecological Urban Planning and Design: A Systematic Literature Review. *Sustainability* 11(13):3723
10. Clergeau P, Terrin JJ (2017) Pour être résiliente, la ville doit être réactive. *Archistorm* 86: 60-63.
11. Clergeau P, Linglart M, Morin S, Paris M, Dangeon M (2016) La trame verte et bleue à l'épreuve de la ville. *Traits Urbains* n°835: 37-40.
12. Clergeau P, Blanc N (2013) Trames vertes urbaines. Le Moniteur (edn), Paris, France.
13. Clergeau, P (1963) De la théorie de la biogéographie insulaire: à la conception actuelle des paysages urbains. *Les Carnets du paysage* 35: 48-59.
14. Holling CS (1978) Adaptive environmental assessment and management. John Wiley and Sons, London, UK.
15. Friedmann J (1992) Empowerment: The Politics of Alternative Development. Blackwell Publishers. Oxford, UK.
16. Jabareen Y (2013) Planning the resilient city: concepts and strategies for coping with climate change and environmental risk. *Cities* n° 31: 220-229.



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