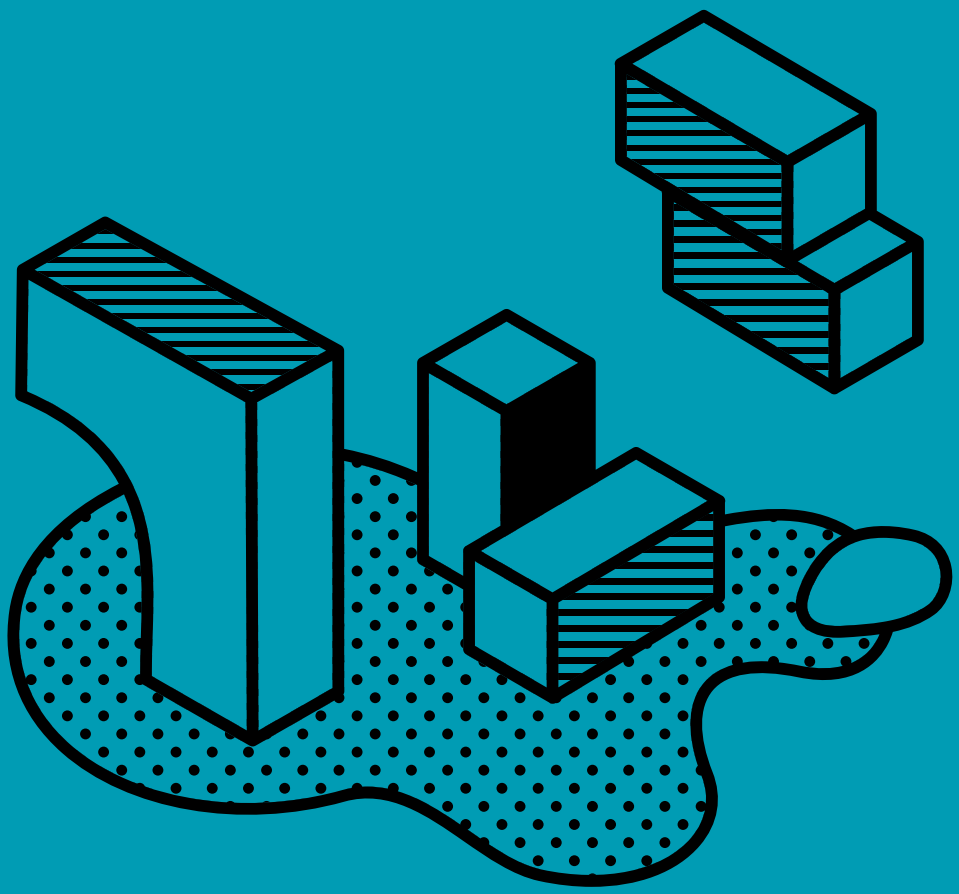
Designing Brussels Ecosystems

Metrolab Brussels MasterClass II



Bernard Declève
Geoffrey Grulois
Roselyne de Lestrange
Andrea Bortolotti
Corentin Sanchez Trenado
(eds)

Metrolab series

Designing Brussels Ecosystems

Metrolab Brussels MasterClass II

Bernard Declève
Geoffrey Grulois
Roselyne de Lestrange
Andrea Bortolotti
Corentin Sanchez Trenado
(eds)

Ecosystem: a spatial or aspatial notion?

Marine Villaret

‘But the more fundamental conception is, as it seems to me, the whole system (in the sense of physics), including not only the organism-complex, but also the whole complex of physical factors forming what we call the environment of the biome – the habitat factors in the widest sense. Though the organisms may claim our primary interest, when we are trying to think fundamentally we cannot separate them from their special environment, with which they form one physical system.

It is the systems so formed which, from the point of view of the ecologist, are the basic units of nature on the face of the earth. Our natural human prejudices force us to consider the organisms (in the sense of the biologist) as the most important parts of these systems, but certainly the inorganic ‘factors’ are also parts – there could be no systems without them, and there is constant interchange of the most various kinds within each system, not only between the organisms but between the organic and the inorganic.’

– A. G. Tansley, 1935, *The Use and Abuse of Vegetational Concepts and Terms*, p. 299.

Since its introduction in 1935 by British botanist Tansley, the **notion of ecosystem** has raised a debate about the spatial or aspatial dimension of this ecological unit, an ecosystem that can be understood both as an environment (territorial space) or as a system (reticular space). As a result, two fundamentally distinct branches of ecology have arisen, both of which are now studying the metropolitan ecosystem with a potential complementarity.

Ecosystem ecology supported by Howard T. Odum ‘s work, considers the ecosystem as a homogeneous and aspatial entity, structured by exchanges of energy and matter. It has been applied to the study of urban ecosystems, evolving towards an ‘urban ecology’ where the city is understood as a metabolism which is described with a diagram of incoming flows (biogeochemical cycles, water, food), and outgoing flows (pollutants, sewage, waste), thus allowing to identify a possible ‘urban waste’ (Barles, 2002).

Landscape ecology, on the other hand, proposes to define an ecosystem according to its spatial dimension and its heterogeneity (Forman, 1986) which it calls a ‘landscape’ (Burel and Baudry, 1999). To do so, it studies the links between ecological processes and patterns, combining the functional approach of ecology with the structural approach of geography, and inducing various and multiscalar kinds of representations. For example, it uses a set of graphs, quantitative indicators, and Euclidean representations to understand how a *bocage* influences biodiversity and agricultural production in a given location. Whether it focuses on an agrarian or silvicultural *milieu*, it aims to identify the landscape pattern that induces the expression of specific synergies (distinct from another landscape) between living communities and their environment.

Today, ecosystem ecology and landscape ecology seem to be converging towards the study of **metropolitan ecosystems**, the complexity of which requires a deepening of interdisciplinary approaches that bring together environmental, spatial and social sciences. A new proximity that could identify a cohesive spatialization of this ecological unit.

The systemic approach in ecology now recognizes the need for a contextual and multiscalar approach, as highlighted by the fact that urban ecology is evolving into a **‘territorial ecology’** (Barles, 2010). The latter being a field approach that aims in particular to establish an environmental indicator called an ‘ecological footprint’. This would allow, for instance, to measure the water footprint of the Parisian metropolis by looking at water resources and the whole water cycle at the scale of the Seine river (Barles, 2010).

As to the ‘landscape approach’ has always considered ‘landscape as the result of an interweaving of natural processes and human activities, expressing know-how, technical developments and human needs. Reflecting the interactions between nature and societies, [landscapes] evolve at the same time as the latter, under their impetus’ (Lefeuvre, in Burel and Baudry, 1999). Landscape ecology is currently seeking to fully integrate in its approach the sociological dimension as a determining factor of a landscape structure. It no longer deals with a natural ecosystem, but with a **socio-ecological system**.

In conclusion of this brief excursus, the aspatial ecosystem is gradually anchoring itself in a territorial context, and is acquiring a social dimension in addition to the spatial and functional ones. Could it then be that the ecosystem is both a spatial and aspatial concept? The debate remains open about a paradox that Tansley had already stated by presenting an ecosystem as ‘one category of the multitudinous physical systems of the universe’ (Tansley, 1935, p. 299), the expression ‘physical system’ referring to an oxymoron.

Barles, S., & Blanc, N. (Dir.) (2016). *Ecologie Urbaines – Sur le terrain*. Paris: Economica/Anthropos.

Barles, S. (2002). Le métabolisme urbain et la question écologique. *Annales de la recherche urbaine*, 92, 143-150.

Barles, S. (2010). Ecologie urbaine, industrielle et territoriale. In O. Coutard, & J.P. Lévy (Dir.), *Ecologies urbaines* (pp. 61-83). Paris: Economica/Anthropos.

Burel, F., & Baudry, J. (1999). *Ecologie du paysage. Concepts, méthodes et applications.* Paris: Tec & Doc Lavoisier.

Clergeau, P. (2007). *Une écologie du paysage urbain.* Rennes: Editions Apogée.

Forman, R. T. T. (2008). *Urban Regions, Ecology and Planning Beyond the City.* Cambridge: Cambridge University Press.

Forman, R. T. T., & Godron, M. (1986). *Landscape Ecology.* New York, NY: John Wiley & Sons Inc.

Lefeuvre J-C. (1999). Avant-propos in F. Burel, & J. Baudry, *Écologie du paysage. Concepts, méthodes et applications* (pp XV). Cachan: Tec & Doc Lavoisier.

Odum, H. T. (1983). *Systems Ecology: An Introduction.* New York, NY: John Wiley & Sons Inc.

Odum, H. T. (1963). Limits of remote ecosystems containing man. *The American Biology Teacher*, 25 (6), 429-443.

Tansley, A. G. (1935). The Use and Abuse of Vegetational Concepts and Terms. *Ecology*, 16, 284-307.

Proofreader: Lloyd Broda