Perceptions and Implementations of Urban Green Infrastructures in France: Three cases of studies (Paris, Marseille, Strasbourg)

Laure Cormier*, Etienne Grésillon**, Sandrine Glatron***, Nathalie Blanc****
Post-doctoral position geographer, CNRS Ladyss, Paris Diderot university, laurecormier@yahoo.fr,Assistant-professor geographer, CNRS Ladyss, Paris Diderot university, etienne.gresillon@wanadoo.fr,***Researcher geographer, CNRS Laboratoire Image, Ville, Environnement, sandrine.glatron@live-cnrs.unistra.fr,****Research director geographer, CNRS Ladyss, Paris Diderot university, nathaliblanc@wanadoo.fr*

Introduction

Green infrastructures have gradually become imperative in planning since the end of 1990s in Europe (Jongman *et al*, 2004). Numerous urban areas in France mobilize and reinterpret the notion according to stakes of their territory (Blanc, 2012). With the promulgation of Grenelle 1 and 2 Laws (in 2009 and 2010), today every local authorities have to integrate an ecological reflection on green infrastructures into its planning projects at metropolitan and local scales, called "trame verte". To cover a plurality of contexts of cultural, social, geographical and eco-systematic levels, three cities were retained to understand how this reflection is set up: the municipalities of Paris, Marseille, and Strasbourg. Indeed, in Ile-de-France, a number of initiatives reflect the interest of the regional, departmental and municipal authorities for green infrastructures and biodiversity issues: the Seine St-Denis departmental observatory of biodiversity and natural habitats (City hall of Paris, on 2004), the creation of the regional agency Natureparif (2006), the regional strategy for biodiversity (2007), the Paris biodiversity plan (2011). Furthermore, the city of Marseille, influenced by the example of Barcelona metropolitan area and its anellaverda (green ring), plans the development of a green infrastructure on its municipal territory. It confided the study to the Planning Agency of Marseille Urban area (AGAM) which elaborates scenarios for connecting the residual non-constructed spaces, to endow the city of a green infrastructure addressing the environmental issues of sustainable development. Finally, the region Alsace was one of the first regions to integrate a reflection into these environmental policies on green infrastructure in France (in the late 1990s). The Strasbourg local planning in 1992 and the metropolitan plan in 2007 (SCOTER) mention the term "greenway" in their statutory documents. Currently, as part of the development of the urban local plan (PLU), Strasbourg urban community defines a network of greenways in an ecological perspective.

Through the consideration of vegetable continuities in town, the notion of green infrastructures brings a revival in the current urban thinking. If scientists in ecological sciences were interested since a few years in this question to fight against biodiversity erosion, green infrastructures appear as a new field of investigation for human sciences. Multifunctionality associated with this

notion of meshing offers new challenges as for practices and perceptions of inhabitants. How decision making can take into account and translate their expectations regarding scientific models proposed and political issues? Its diverse dimensions introduce inevitably new modalities of the public debate organization which remain to invent in most cases today. We have compared in each of the studied sites the three following spheres, often distinct from one another: political, scientific and inhabitants.

I/ SIMILARITIES AND HETEROGENEITY OF GREEN INFRASTRUCTURE POLICIES

Strong common characteristics

In view of the analysis of these three municipalities, the first observation that can be made is the absence of zoning statutory integration of green infrastructure in the urban local plan (PLU). Indeed, none of the three PLU reserve in their rules and graphic document refer to a consideration of an ecological network. However, these documents are old, and the three PLUs are under review. Laws Grenelle 1 and 2 bring a new dimension in the development of these documents by requiring municipalities to "take into account" ecological continuity in their regulation.

The orientation of the three new local development plans reflects this evolution. Zoning documents have not yet been made, but cartographic definition of green infrastructure is underway in the three municipalities, mainly using method based on photo-interpretation. It is undertaken by a design office of landscape/environment/ecology for Marseille, and by municipality's services for Strasbourg and Paris. To integrate statutorily green continuities in local urban planning documents, the legislator may act on different devices that could interest both to public and private spaces. However, regarding planning documents of the three cities, spaces included in this definition are almost essentially public: roadside trees, parks and gardens, the edges of banks ... to act statutorily on ecological continuity issues requires a political courage which local councilors in France are quite reluctant to show. However, there is a true will from the municipality of Paris to act on private space from a regulatory point of view by defining the notion of « protected green space » for « durable private green space […] aiming at improving the global quality of those spaces and their plantations » (PADD PLU, Paris).

Finally, reading the various scenarios, we understand the difficult existence and prospects of the idea of continuity in the city, intrinsically linked to the concept of green infrastructure. If it appears cartographically, it's because of a particular geographic location. The green continuity requires support, and so is therefore strongly imbricated to with the road or watershed networks. In town, building densification allows the creation of a green physical continuity only on spaces

along streets or rivers. So As a result, we could observe a strong correlation of green and blue frames as evidence, particularly in the example of Strasbourg. However, reading the various documents, we can observe a general trend that aims to overcome the generic term “trame verte et bleue”, which is now strongly linked to a planning disposition because of Grenelle’s laws.

Using a distinct vocabulary to express the idea of green continuity, "ecological networks" for Strasbourg, "ecological corridor" for Paris, allows greater interpretation latitude for planner, particularly in resources mobilized and areas concerned. Thus, it is associated with the definition of “trame verte” in a regulatory perspective, the desire to integrate different forms of ecological management for more spaces (Cemetery / sports field) that does not seem to be covered by Grenelle laws. This linguistic demarcation, that may seem insignificant, reflects planner’s unease in front of the regulatory aspect of “trame verte”. Thus, in view of the various interviews we have carried out in these three cities, this regulatory dimension appears too restrictive for two essential points. It raised the relevance of such a device on the real effect on the biodiversity increasing; regulation does not intend to act on management of the areas concerned. Futhermore, the range of regulatory tools for green spaces in planning law, relatively small, do not seem suited to urban logics (Camproux-Duffrène and Lucas, 2012).

Moreover, even if green infrastructure policy in France today, as intended by Grenelle laws, aims to act mainly on biodiversity, various actions on the three cities highlight a social dimension that cannot be ousted in favor of a single ecological vision. Green infrastructure social functions are strongly associated with ecological functions, and in some cases are the main arguments of planners especially in order to convince elected officials. Indeed, considering the economic and the quality of life issues, preservation of biodiversity does hardly make sense for them. Planners in charge of green infrastructure in the three municipalities unanimously raise the necessary scientific caution that should bring researchers in an ecological definition. Waiting for clear criteria to recognize the ecological character of a space, they want to have a flawless argument in order to pressure on local officials.

The importance of local context

If there are similarities between these cities, there are also differences. The greatest disparity relates to the progress thought on green infrastructures between three cities. While Marseille is currently committed in this green infrastructure definition, Strasbourg approached it since 1992 in its planning documents and Paris especially from 2011 through its biodiversity plan sets a broad plan of action for biodiversity. The concept of “trame verte” takes different meanings in those three cases, depending on areas identified, objectives and regulatory means mobilized.

Green infrastructure concept in Marseille is a new idea for the public decision maker. Only a few planning documents refers to it explicitly, and they are recent. However, the city reflection on this topic has been engaged for 7 years. Various documents and testimonies agree to draw a green infrastructure in a peripheral position of the dense city. It identifies forests and creeks

recognized by various levels of protection: Natura 2000 ZNIEFF 1 and 2... While metropolitan political discourse oriented green infrastructure policy serving biodiversity, its statement in the text is not so obvious. Indeed, stated objectives seem more akin to orders under tourist, recreational and urban than ecological, ensuring "the attractiveness of the conurbation." Along with this metropolitan policy definition, the municipality of Marseille is currently reviewing its urban local planning. Although planning document convenes ecological and sociological arguments, working papers are primarily focused on the quality of life by organizing "network of all urban nature parks, gardens, neighborhood gardens, trails, quality urban". Local elected officials seem reluctant to develop a green infrastructure politics (chargé de mission of the city, Consales et al. 2012), a phenomenon observed in many cities in France (Cormier, 2011). However, the green space and planning department of municipality statutorily registered in a frame a minima in urban local plan. It will set aside areas for a potential political will in the future. The frame is then defined as a patch primarily based on areas not carrying conflicting issues, public green spaces. There is not a linear and continuous infrastructure; strictly speaking, it is more a succession of patch based on non-conflicting issues spaces: mainly public green spaces. Consales and colleagues (2012) denounce the weakness of political commitment on these ecological issues in front of "a powerful densification process which tends to be superimposed on a vast network of green natural spaces potentially be mobilized in a project of green infrastructure". This lack of political commitment tends to favor the loss of semi-natural areas, particularly vulnerable when they are not protected by an environmental legislation.

In Strasbourg, green infrastructure concept has reached a political maturity. The first document to be referenced is local urban plan of 1992, essentially declined in anthropocentric paradigm, where vegetated area allows the city to heal its urbanity. Consideration of the idea of continuity is already in the planning early 1990s and is strongly associated with the hydrological context. But it was not until early 2000 that environmental issues were considered in planning documents. This concern is greatly influenced by pressures of environmental groups and regional policy. Indeed, Alsace is one of the first states to become interested in green infrastructure characterization in order to halt the loss of biodiversity. In 2007, the metropolitan plan devotes its second and third chapters to natural areas preservation of by stating the objective of keeping "natural areas to ensure global ecological balance". Despite this ambitious goal, the concept of green infrastructure is unclear. The green infrastructure term is associated with the preservation of exceptional areas (natural spaces, linear streams, varied landscapes) but is never actually defined. Today, the metropolitan level is in the implementation phase of a document defining the spaces belonging to the ecological network. It is a preliminary step for the identification of green infrastructure in the urban local plan. The use of ecological network term is not a chance, it responds to a desire to adopt an environmental policy wider than a "trame verte" policy.

The consideration of green continuities has a past in the French capital. Since city planning works undertaken by Haussmann and Alphan late 19th (Arrif et al., 2011; Carcaud Cormier, 2010) to the Biodiversity plan of 2011, we can observe a large change in its consideration. The

first mention of green infrastructure term at the local level is supported by a study, in 2003, for its integration into urban local plan. This document defines it as "all green spaces constituting parks, squares, public gardens and promenades of the city." the green infrastructure concerns, therefore, all green spaces and tree lines. In an anthropocentric paradigm, Paris green infrastructure has to assume objectives which are essentially social, aesthetic, and improvment of the quality of life. Paris urban local plan (2006) fits well in this thought, relying on key spaces: green spaces, woods, Seine, canals, cemeteries. However, it adds another dimension by integrating a specific regulation on private spaces for green infrastructure. This device translates a political will to have control over private spaces, through regulatory tool, to sustain green spaces. We must await the adoption of the Biodiversity plan (November 2011) by Paris Council for a real display of the city ecological policy. The Parisian green infrastructure is clearly defined through linear forms and punctual forms. The elements taken into account, more varied and at different scales compared to the local urban plan, show a biocentric vision of the green infrastructure. Semantics mobilized in the text essentially belong to ecological vocabulary. Various concrete measures are proposed to achieve this goal: both regulatory (eg. Stopping the use of synthetic herbicides and pesticides in all green spaces, including private spaces), creation or restoration of spaces (eg. creation of 40 ponds or wetlands to 2020), knowledge and awareness (eg. creation of a biodiversity observatory).

II/ THREE CITIES, THREE IMAGINARY PEOPLE

In all three cities, twenty-four "focus groups" composed of six to nine people were gathered around two to three researchers. The focus group method does not bring out the diversity of representations but the significant number of the participating citizens (total 160), the sampling technique, and some redundancies in the comments encourage us to think that despite the lack of representativeness, we are facing a satisfactory significance of the remarks.

Two methods have been developed to study the speech of the inhabitants. The first seeks to quantify the words with the Alceste software. It distinguishes classes by frequencies and degrees of meaning of word association by calculations of statistical indices such as Chi2. The Chi-square index identifies words significantly associated with a class of speech. The second method is to identify ideas and themes specific to the greenway. These two analysis have described the practices and representations specific to the three urban areas.

Different discourses in relation to greenways

Throughout the text focus group the classification descendant of Alceste has determined that each city develops has different discourses (Table 1). Lexicometric analysis shows that Parisians are concerned about wildlife. They first speak of unwanted animals strongly related to humans (dove, rats). They want managers to limit their spatial progress because they see wildlife as potential pests. Then they talk about desirable animals like squirrel, fish, and rabbits. They would like green infrastructure to increase their number. Parisians don’t see what these corridors or

developments could look like in a dense city. And a Parisian says that " I imagine urban green infrastructures means mesh, maybe something that would link city to countryside, but it is true, I cannot visualize it. I don't know what form it might take in a big city like Paris."

Table 1: Classification proposed by the Alceste software with the most used words (Σ) and significant (ΣCHI ²) showing the importance of the city.

Class 1			Class 2			Class 3		
Word / descriptor(*)	∑	∑CHI²	Word / descriptor(*)	∑	∑CHI²	Word / descriptor(*)	∑	∑CHI²
Paris (*)	376	517	Marseille (*)	521	456	Species	116	402
Dove	88	402	Dustbin	248	325	Animal	112	288
Rat	80	240	Pick up	46	163	Vegetable	52	280
Squirrel	40	225	Dog	80	147	Corridor	56	143
Fish	30	131	Shit	20	68	Strasbourg (*)	183	85

In Marseille, the stakes are different and the environment first evokes problems of public health. Greenspace focus on issues related to the treatment of waste (garbage collection, excrement) and dogs on leash. For inhabitants of Marseilles environmental projects are not yet a priority. We must first address incivility problems. The urban green infrastructures refer primarily to the tramway built. Then, it is a potential link between surrounding hills and city center.

In Strasbourg, vocabulary used is similar to ecologists and environmentalists discourses. People are familiar with concepts attached to urban green infrastructure (corridor, biodiversity). Environmental groups in Strasbourg explicitly mention (sometimes spontaneously and at the beginning of interviews) greenway expression. For non-environmentalists, though the term itself is not quoted, the description of places of naturalness clearly shows this strong idea of continuity for plants and animals movement. However, it is when urban people practice green infrastructure daily that it is best known, and rather for "human" uses. In addition, nature is a necessity and will recharge a major goal of urban life as evidenced by these words: "I saw nature in two ways: firstly, in terms of observation, watch this space there, and on the other hand, try to integrate more. First, for reasons of health "and to" observe nature, contemplate, managing to join in this observation the whole society, it creates an urban fabric. The city back to life." For Strasbourg,

urbanization is not incompatible with preservation of nature. They are willing to change their mode transport and to review the design of their city.

These large differences induce visions of urban green infrastructures, very different attitudes and behaviors from one city to another.

Urban practices are also different

Elements of a urban green infrastructure are more known in Strasbourg than in other cities because urban people use them daily. Continuities are apparent, perceived and described. Strasbourg inhabitants observe and contemplate nature by walking, cycling.

In Paris and Marseille on the contrary, nature elements are rather related to stationary practices in parks. In Paris, parks and gardens are always mentioned. In both cities, people come to sit, read, relax, listen to music, play and their children often run into these parks and gardens. That's why continuity is much less easy to perceive or project.

Marseille is a singular cases, unlike any other cities with presence of wilderness (Calanques for exemple) close to dense city. On the one hand, parks (Borely, Longchamp) that form the urban nature which found many problems civility. On the other hand the creeks are areas perceived as more authentic but different from the city with other laws. The creeks are compared to haven of peace or areas of escape. For some Marseilles urban inhabitants, the center is the opposite of a natural area. A woman "prefers to go by the sea in the wild creeks, (...), there are no buildings, it's natural, it's wild." Another resident is in creeks because she has the "feeling of choking, I'm choking in my neighborhood, I cannot breathe ... I really need" to recharge "in quotation marks, to have an environment that soothes me, either by sight, the sun is on the horizon, the sea, I need to hear these animals, these wasps, to see these little gnats to see these flowers ... ".

Eventually, because of structure of the city, and building lines made by canals and bike lanes, the inhabitants of Strasbourg associate nature with their mobility. Whereas Parisians and the inhabitants of Marseilles go to a park and don’t move of it. They come to these spaces to have a rest and enjoy the quiet. Natural spaces make a break with urban frenzy. Parks and gardens are the opposite of stress, noise and agitation of urban people or traffic.

For all nature is a purveyor of well-being in which the senses have an important role. Despite of the fact that, for some, nature has something synthetic and does not seem quite "real" in town.

III / POSITIONING OF SCIENTIFIC ACTORS IN TERMS OF GREENWAYS

We examined the implications of planners, elected officials and citizens in the construction of green infrastructures in Strasbourg, Paris and Marseille. However, it is important to highlight the importance of the position of scientists in the public debate. Public procurement needs expertise

to guide its approach, mainly in the green infrastructure definition. Researchers participate actively in these projects. Thanks to scientific expertise, municipalities acquire academic skills and political justifications. We focused on the position the research teams involved in the ANR in the three cities. In general, we can observe a strong involvement of researchers with municipalities.

In Strasbourg, local scientists have clearly contributed to support green infrastructure thoughts, which was already underway at metropolitan or municipality level. Metropolitan level has called on scientists (of ecological and human sciences) to discuss their project. Numerous collaborations materialize mainly through internships by students of Strasbourg University in the CUS, the setting up of working group university / metropolitan around environmental issues (biodiversity, urban nature and peri-urban agriculture, urban water and floods).

In Paris, researchers were very busy in projects development, including the "Biodiversity Plan" of Paris. Numerous workshops organized by municipality had created constructive confrontations on the various elements between researchers and council services. It is at these meetings that the feasibility of a green infrastructure has been proposed and well advanced in final report "Biodiversity Plan de Paris - Nature in city - 30 actions." Even though diagnosis and proposals are then assigned to only one design office (which surprises researchers involved in the original project but thus excluded from the operational thinking), the ambition is very strong and subsequently causes the emergence of a real project.

In Marseille, the scientist's role was crucial. Researchers have highlighted policies inconsistencies and governance issues. They were also privileged interlocutors on urban development projects underway. Thus, in the urban local plan of Marseille, through collaboration and committed geographers among planning services, ecological continuity was included in regulatory documents to preserve it from the urban pressure. An approach was initiated in sociology through artistic mediation with locals. Indeed, a dialogue with an artistic association allowed to understand the city of Marseille and its nature spaces from a different angle.

Depending on situations, scientists are either asked to give infrastructure key definition or as to legitimize steps already initiated. Indispensable actors in the knowledge share, their positions may still be ambiguous in the public debate. Indeed, in general, the expertise is sought to clarify the difficulties inherent in the decision process for a policy. Local elected then turn to a person or institution providing the necessary knowledge to take decisions. Several difficulties arise when experts are then involved in the decision process.

The first is inherent to scientific knowledge and discipline that are related to a specific methodology. For example, corridor width in the city is a recurrent issue asked by planners to scientists. But ecologists couldn't give a clear answer. They will provide orders of magnitude for

each specie. They provide factors which are detached from the political field. In principle, the scientist gives results that are intended to be reproducible and universal, while local elected reason with local issues and a specific temporality. These questions lead to in many cases difficulties between scientific sphere and political sphere.

The second difficulty emerges around the green infrastructure concept. Grenelle laws, to define this notion, relied on concepts from landscape ecology science. Thus the green infrastructure plan develops a vision of space linked to a scientific construction. This view of green infrastructure develops relationships between planning and landscape ecology. Ecologist becomes the privileged actors for politic sphere to grasp the concept. But scientist is gradually assuming an arbitrator position that exceeds his powers which are strictly scientific. This arbitrage position is not the scientist competence, but of the representative of citizens.

The last difficulty that can be raised concerns directly the researcher profession. In order to do research, one needs a distance between the studied object and the researcher. The scientist must question if the distance necessary to analyze a phenomena is sufficient in order to keep the greatest integrity. Indeed, expertise could sometimes be dangerous in search results.

CONCLUSION

Thus, these three contexts allow us to evaluate consideration of green infrastructure concept in different spheres of actors system.

Firstly, some logic emerges from the objectives assumed by a green infrastructure policy. We observe a shift of its declination in metropolitan level planning: if greenways were first considered in their social and recreational functions, they are now more mobilized for their ecological functions. But local officials are suspicious of media coverage and the regulatory nature of “trame verte” concept. This reluctance has a semantic consequence in local politics by using many other terms for their green politics. Thus the semantic avoidance offers more freedom of interpretation. “Trame verte” is now associated almost exclusively with regulatory fields. This legislation inhibits any latitude of interpretation which however could contribute to promote biodiversity in city.

These three cases illustrate the diversity of “trame verte” policies that can be carried out in France in their progress, theirs objectives, spaces concerned, and enforced measures. The heterogeneity of these politics is closely related to both geographical and socio-economic conditions of each site. From these three contexts, several factors may be involved in the awareness of elected officials. They are influenced by the local culture versus nature in the city, the system of actors and especially the charisma of the project leader of the green infrastructure policy.

For the implementation of green infrastructure, planners have to understand perceptions inhabitant on a lengthy time at scale of official planning calendar (10 years). Thus, Strasbourg are most sensitive to green infrastructures because of their access to physical continuities. It is important to ensure opening of green infrastructures. If planners close to public spaces reserved for green infrastructure, rejection risk of inhabitants is strengthened. It is necessary to ensure and enroll in green infrastructures in mobile practices (cycling, walking) and static practices (reading, contemplation) of inhabitants.

REFERENCE

Arrif T., Blanc N., Clergeau P., 2011, Trame verte urbaine, un rapport Nature – Urbain entre géographie et écologie. Cybergéo, http://cybergeo.revues.org/24862

Blanc N., 2012, *Les nouvelles esthétiques urbaines*, Paris, Armand Colin.

Camproux-Duffrène, M.-P., Lucas, M., 2012, L'ombre portée sur l'avenir de la trame verte et bleue. Quelques réflexions juridiques, Développement durable et territoires, http://developpementdurable.revues.org/9256.

Consalès J.N., Goiffon M., Barthélémy C., 2012, Entre aménagement du paysage et ménagement de la nature à Marseille: la trame verte à l'épreuve du local, *Développement durable et territoires*, Vol. 3, n° 2.

Cormier L., Bernard De Lajartre A. et Carcaud N., 2010, La planification des trames vertes, du global au local : réalités et limites, *Cybergeo : European Journal of Geography*, 22 p.

Jongman R. H. G., Külvik M., Kristiansen I., 2004, European ecological networks and greenways, *Landscape and Urban Planning,* vol.68, No.2–3, 305-319.