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## What ideal green spaces for the city of tomorrow, providing ecosystem services?

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### Abstract

The present study comes within the scope of a research program, which was funded by the French Region Centre-Val de Loire and questioned the fallout of urban green spaces (UGS) for city dwellers and municipalities. Here, the purpose is to identify the ideal UGS for a better urban future. We base our proposal on our knowledge of cultural and supporting ecosystem services (ES) provided by these spaces.

The six medium cities of the Region Centre-Val de Loire were chosen to study these cultural and supporting ES provided by urban nature. Public UGS, higher than 1 ha, were inventoried then classified into five categories. Six of these UGS were selected and subject of a more in-depth study. Their biodiversity (based on the arthropods frequency) and their soils quality (pedology, agronomy and microbiology) were analyzed. In the same time, 321 users and 12 managers of UGS were interviewed.

According to the interviewees, UGS contribute to the urban life quality, the well-being of city dwellers and even the city identity. They are thus approved by all. Users come first in these spaces for the quiet and to feel closer to nature. And indeed, these spaces are biodiversity spaces and they have quite good soils indicators. They provide a diversity of ES, especially cultural services.

All UGS are approved – except for those where traffics are suspected. The reasons and the time of their frequenting differ according to their facilities and their localization. However, the functions can be more numerous than the assigned ones – example of allotment gardens, which are places to cultivate but also to relax, meet and learn. Belonging to the five identified categories, the UGS are complementary. It is also valid for biodiversity because this one varies according to the land use, to the plant species. The ideal UGS could be a multifunctional UGS.

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## 1. Introduction

In occidental countries, especially in France, the city dwellers express a growing desire of nature, which should be linked to the “greening of the occidental society” [1] (transl. by the authors). From this observation, a research program was launched, funded by the French Region Centre-Val de Loire – SERVEUR (<http://serveur.msh-vdl.fr/>). The purpose was to identify the fallout of urban green spaces for city dwellers as for municipalities. In this framework the following question emerged: What kind of urban green spaces can offer a better quality of life in the future to city dwellers? This article aims to answer. The proposal is based on the study of ecosystem services provided by these spaces.

The concept of “ecosystem services” was popularized in 2005 by the Millenium Ecosystem Assessment [2]. In this reference book, ecosystem services are defined as “the benefits people obtain from ecosystems” [2]. They are classified according to a typology, which we consider here. Four categories are distinguished:

- provisioning services such as food, water, timber and fiber;
- regulating services that affect climate, floods, disease, wastes and water quality;
- cultural services that provide recreational, aesthetic and spiritual benefits;
- supporting services such as soil formation, photosynthesis and nutrient cycling. [2]

We decided to focus on cultural and supporting services. Indeed, the contribution of urban nature to the well-being of city dwellers can first be estimated in terms of recreational benefits, thus cultural services: “Urban green spaces provide important recreational services for urban residents” [3]. But we cannot disregard the supporting services, which are the base of other services and allow them to remain. To study these ecosystem services provided by urban green spaces, some methods were defined. They are set first out, before that the results are detailed then discussed.

## 2. Methods used to study cultural and supporting services of urban green spaces

The first stage of the research was to identify the study spots. We decided to focus on the six medium cities of the French region Centre-Val de Loire – located in the center of France (Fig. 1), because the urban nature is less studied in this kind of cities than in the bigger ones. In these six cities, the most significant green spaces were inventoried, considering public spaces, whose area was higher than 1 ha. 52 urban green spaces were thus identified [4]. They were then classified according to the following criteria:

- area,
- population density in a buffer zone of 250 m,
- diversity of the land use (including the percentage of floral ornamentation / of forest...).

These criteria lead us to distinguish three main categories of urban green spaces:

- Forests or semi-natural spaces;
- Ornamental gardens, including three subcategories: historical gardens, neighborhood parks and large green spaces;
- Allotment gardens (community gardens).

Among the 52 ones, we selected 6 urban green spaces to conduct a more in-depth study (Fig. 2). The criteria were to have one urban green space in each studied city and to select representative sites, belonging to each identified subcategory [4].

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