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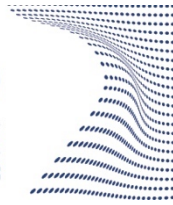
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**UNIVERSITÀ
DEGLI STUDI
DI TORINO**

Doctoral Dissertation
Doctoral Program in Urban and Regional Development (30th Cycle)

Ecological planning strategies for a qualitative land take.

Suggestions from France to Italian approach

Benedetta Giudice

* * * * *

Supervisors

Prof. Angioletta Voghera, Supervisor
Prof. Gilles Novarina, Co-Supervisor

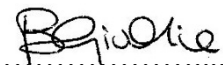
Doctoral Examination Committee:

Prof. Christophe Demazière, Referee, Université de Tours
Prof. Laura Fregolent, Referee, IUAV
Prof. Patrizia Ingallina, Referee, Université Paris-Sorbonne
Prof. Massimo Sargolini, Referee, Università di Camerino
Prof. Gabriella Trotta Brambilla, Referee, ENSAG

Politecnico di Torino
June 26, 2018

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.....
Turin, June 26, 2018

Summary

This research starts from the awareness that land take is continuously spreading and increasing all over Europe. The topics of land take and its containment have also quickly entered into European policies and many European countries followed this path. Land take is often interpreted as a negative element as it subtracts important soil functions and, sometimes, spoils landscape.

Urban and regional planning can play an important and leading role in contrasting land take, as they can address specific orientations for the realization of qualitative urban and landscape projects. One of the aims of this research is then to understand which planning policies are the most suitable in contrasting and containing land take. In order to do this, in a perspective of sustainable development, the chosen approach to planning is the ecological one (Steiner, 2002). Following this approach, the research focuses on the policies of Green Infrastructures (GI), intended as one of the most suitable and effective policies for land take containment.

The study, starting from the analysis of 5 different European countries' planning policies, tools and systems (France, Germany, Great Britain, Italy and the Netherlands), focuses on the countries of France and Italy. The two countries present a varied situation for what concern GI approach and planning policies even if they share some common elements (for example, the high presence of small municipalities and the institutional fragmentation). Since the choice has fallen on GI, the study aims at framing how these two countries are dealing with them by highlighting for each of them the pros and cons. In particular, the research focuses on the policies developed by two Regions: on one side the one of Rhône-Alpes in France (focusing on the two *Métropoles* of Lyon and Grenoble) and on the other side the one of Piedmont in Italy (in particular, the Metropolitan City of Turin).

France represents a fascinating case study in the analysis of environmental and ecological policies; indeed, since the promulgation of Grenelle laws in 2009 and 2010 which stated the creation of *Trames Vertes et Bleues* (TVB), France has been laying great emphasis on these issues. This policy represents one of the greatest examples for what concerns GI. In fact, they are characterized by some important elements: they have to be included in planning tools of different scales (from the regional to the local one) and they include both green and blue infrastructures. French TVB allow also to develop a project approach of GI, while the Italian case study sets up itself as more methodological. In addition to ecological strategies, France has also always led an important process of inter-municipality, leading thus to a more coherent territorial project.

The experiences led by Piedmont Region, principally developed at a local scale, present indeed a less rationalised policy even if the Metropolitan City of Turin has attempted to establish some specific orientations for the creation of a common GI methodology. Each local experimentation shows how these orientations have been interpreted in order to fit different territorial characteristics.

The final aim is the individuation of some operational criteria for a qualitative planning. The main elements of discussion are the integration of GI into planning tools and the necessity to overcome administrative borders in order to promote a more coordinated and shared project of development. The research then opens the path to some other issues: the introduction of an adequate fiscal system, a more operative project action, territorial equalization and a performance-based planning instead of traditional zoning.

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I would like to especially thank my supervisor, professor Angioletta Voghera, who always supported me and my work. She gave me the opportunity to participate actively in many different academic experiences and made me believe in myself and in my skills.

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List of Abbreviations

- AIT – Ambiti d’Integrazione Territoriale
ARPA – Agenzia Regionale per la Protezione dell’Ambiente
CBS – Coefficient de Biotope par Surface
CLC – Corine Land Cover
COS – Coefficient d’Occupation des Sols
CPRE – Campaign to Protect Rural England
CRCS – Centro di Ricerca sui Consumi di Suolo
CREA – Consiglio per la ricerca in agricoltura e l’analisi dell’economia agraria
CRTVB – Comité Régional Trame Verte et Bleue
CU – Code de l’Urbanisme
DATAR – Délégation interministérielle à l'aménagement du territoire et à l'attractivité régionale
DIST – Interuniversity Department of Regional and Urban Studies and Planning
DOO – Documents d’Orientation et d’Objectifs
DTA – Directive Territoriale d’Aménagement
EAP – Environment Action Programme
EC – European Commission
EEA – European Environmental Agency
ENEA – Agenzia nazionale per le nuove tecnologie, l’energia e lo sviluppo sostenibile
EPCI – Établissement Public De Coopération Intercommunale
EU – European Union
FAO – Food and Agriculture Organization
GI – Green Infrastructures
IFLA – International Federation of Landscape Architects
ISPRA – Istituto Superiore per la Protezione e la Ricerca Ambientale
IVB – Infrastructures Vertes et Bleues

LGRE – Linee Guida per le Reti Ecologiche
LGSV – Linee Guida per il Sistema del Verde
Loi ALUR – Loi pour l’Accès au Logement et un urbanisme rénové
Loi NOTRe – Loi portant Nouvelle Organisation Territoriale de la République
Loi SRU – Loi relative à la Solidarité et au Renouvellement urbains
LUCAS - Land Use and Cover Area frame Survey
MATTM – Ministero dell’Ambiente e della Tutela del Territorio e del Mare
MDG – Millennium Development Goals
MEA – Millennium Ecosystem Assessment
MEDDE – Ministère de l’Écologie, du Développement Durable et de l’Énergie
MOLAND - MOnitoring Land Use / Cover Dynamics
NdA – Norme di Attuazione
NEN – National Ecological Network
NPPF – National Planning Policy Framework
OAP – Orientations d’Aménagement et de Programmation
OREAM - Organisme d’Étude et d’aménagement d’Aire Métropolitaine
OSDDT - Occupation des sols et développement durable du territoire sur l’arc méditerranéen
PADD – Projet d’Aménagement du Développement Durable
PEBLDS - Pan-European Biological and Landscape Diversity Strategy
PEEN – Pan-European Ecological Network
PLU – Plan Local d’Urbanisme
PLUi - Plan Local d’Urbanisme Intercommunal
PLU-H - Plan Local d’Urbanisme et de l’Habitat
POS – Plan d’Occupation des Sols
PPG – Planning Policy Guidance
PRGC – Piano Regolatore Generale Comunale
PPR – Piano Paesaggistico Regionale
PTCP – Piano Territoriale di Coordinamento Provinciale
PTR – Piano Territoriale Regionale
RC – River Contract
REDI – Réseau Écologique Départemental de l’Isère
REFINA - Research for Reduction of Land Consumption and for Sustainable Land Management
REM – Rete Ecologica Marche
RERA – Réseaux Écologiques de Rhône-Alpes
RNR – Réserve Naturelle Régionale
RUG – Région Urbaine Grenobloise

SAM4CP – Soil Administration Models 4 Community Profit
SCAG – Southern Californian Association of Government
SCI - Site of Community Importance
SCoT – Schéma de Cohérence Territoriale
SDAL - Schéma Directeur de l'Agglomération lyonnaise
SDAU – Schéma Directeur d'Aménagement et d'Urbanisme
SDG – Sustainable Development Goals
SIVOM - Syndicats Intercommunaux à Vocation Multiple
SIVU – Syndicats Intercommunaux à Vocation Unique
SoBoN - Sozialgerechte Boden Nutzung
SPA – Special Protection Area
SRADDET – Schéma Régional d'Aménagement, de Développement Durable et d'Égalité des Territoires
SRCE – Schéma Régional de Cohérence Écologique
TVB – Trame Verte et Bleue
UN – United Nations
ZAC – Zone d'Aménagement Concerté
ZNIEFF – Zones Naturelles d'Intérêt Écologique, Faunistique et Floristique

Chapter 1

Setting the research context

1.1 Introduction

The city, as we are used to think of (a compact set of buildings surrounded by walls), does not exist anymore and even its imagine has dissolved (the metaphor of the “city as an egg”¹ is emblematic) and is becoming more and more unsettling (Perulli, 2014). In fact, cities, above all in the last decades, have faced an unplanned and continuous growth. We are therefore obliged to think at a new type of cities, less dense and covering a larger physical space; indeed, boundaries and hierarchies (intended as the bodies in charge of controlling territories) have been overcome.

The world is in fact living a changing period characterized by an environmental degradation (climate change and global warming, loss of biodiversity and soil permeability, increase of pollution) and an increasing population. A population that is estimated that, within 30 years, will notably be above all urban (UN, 2014) due mainly to the shift from the countryside to city centres. In this process, cities can play a leading role in addressing specific policies in order to adapt quickly to global changes; some researchers think that there is also some evidence that cities, principally for their compactness, are more ecological than countryside (Owen, 2009).

This new state of cities has then made necessary to establish new ways of planning it and of facing incoming needs (for example, the environmental and energetic ones). In effect, above all since the Brundtland Report (1987) and its overstretched concept of sustainable development, unplanned urban growth has gained even more importance and environmental policies (so also social and economic ones) have started to be included in urban and planning policies. There is then the evidence that the new urban processes claim new energetic equilibria and new relationships with cycles and natural resources (Gambino, 1992).

¹ This metaphor was coined in 1982 by Cedric Price.

Continuous urban growth, and the consequent land take, is considered as one of the major challenges that need a qualitative reconsideration and to be better integrated into planning policies. Since the 90s', in Europe, this topic has indeed invaded the field of urban and regional planning by representing a great turning point; for example, it has emphasized the priority of the environmental matters in plans' choices, it has imposed a long perspective and a particular concern over irreversible phenomena and it has defined the necessity to overcome the urban localism in order to focus on trans-territorial implications of local choices (Camagni, 1999). It's from the consideration of the three elements of sustainable development (economic, social and environmental) applied to urban realities that there has been the necessity to define, during the 90s', new approaches and models of planning, mainly the ones at a territorial scale. The vast scale of planning, which enables the overcome of municipal boundaries, is indeed identified as the most pertinent scale for dealing with land take and environmental issues (Gibelli, 2016).

Nowadays, this topic has re-entered the public debate and has gained a lot of success not only in academic debates but also at a political level and among different stakeholders, including citizens (for example, the experience of the Italian forum "*Salviamo il paesaggio*" and the recent attempts of promulgating a national law on the issue). This is a consequence of the rising awareness of people of some dominant global problems. In fact, land take is always more related to such issues as climate change (with the consequent predisposition of specific climate change adaption plans), food security and resource depletion (the 8th August 2016 all the resources of 2016 have gone out of stock while the ones of 2017 ended even early, the 2nd August). As a response to climate change, cities have understood the importance of greening actions and of introducing nature into the built environment: exemplary are the initiatives led by the municipality of New York City "million trees NYC" and the one of London i-Tree eco project, where trees are intended as essential infrastructures and not only as decorative elements.

International policies (for example, Rio+20 strategy), European ones (such as, the Thematic Strategy for Soil Protection of 2006, the Resource Efficiency Roadmap of 2011 and the Guidelines on best practices to limit, mitigate or compensate soil sealing of 2012, the EU adaptation strategy to climate change) and the related national strategies of each country, have made evident the relevance of this topic in the achievement of a sustainable development. In addition to policies, the significance of land take has also been encountered in other fields, such as the religious one, with the Pope's encyclical "*Laudato si'*" (2015).

Starting from these premises, the research is about the issue of continuous growth of cities with a special consideration for environmental aspects (mainly the loss of fertile soils) and the relationship that exists between urban dispersion, land take and planning strategies (Camagni, 1999; Gibelli, 2002). The analysis of different policies, strategies and approaches for the limitation of land take has led

to focus on the ecological approach to planning (Steiner, 2002); in this perspective a turning point can be identified in the integration of green and blue infrastructures into planning tools. Green and blue infrastructures have indeed been identified as a key element for mitigating and adapting, for example, to climate change (Demuzere et al., 2014) and for halting the loss of biodiversity. On this issue, it is of relevant importance the process led by the French government which since 2009 decided to develop a national policy on green and blue infrastructures, *Trames Vertes et Bleues*, which has fallouts till the local scale as this policy must be also included also in regional and local plans. In this perspective, France has been one of the first European countries that introduced ecological and environmental tools and methods into planning and adopted specific tools (such as the *Schéma Régional de Cohérence Écologique*) for the enhancement of environmental values and potentialities.

In the European panorama, planning in France has always played an important role in the economic and territorial development of the country: in a first moment as an attempt to overcome Paris supremacy and in a second moment as a medium for the conciliation of the economic sphere of development with territorial balance. The continuous national reforms on planning tools and procedures led to a diversified planning system characterized by a wide number of tools.

On the contrary, Italian planning system is still mainly based on the elements identified by the national law of 1942. Even though the many attempts to change and adapt planning tools (both regional and local) to incoming issues (such as the environmental ones) none of them has been successfully completed. Regions, as bodies in charge of promulgating laws, play an important role but this situation can lead to a fragmentation and diversification of planning tools of different Regions. Nonetheless, some of them have attempted to introduce the issue of land take and environmental preservation in planning tools.

1.2 Motivations and objectives of the research

“3 square meters per second, in Italy a surface equivalent to the regions of Campania, Liguria and Molise has been consumed over the last 66 years”. News like these might make people think in which direction and way is going our world. These two simple and synthetic data were the beginning ideas of my research which, starting from quantitative data, intends to identify a suitable strategy for land take containment.

Indeed, after a long period of suburbanisation processes (of which only a few are still partially going on or some of them have changed their structure with the introduction of new relevant elements, such as the ecological one), Europe is facing new challenges (most of which have been caused by our behaviour and so by the anthropic pressure) in which cities play a central role towards a more sustainable development (“A Sustainable Europe for a Better World - A European Union Strategy for Sustainable Development”, 2001; “Europe 2020 – a strategy

for smart, sustainable and inclusive growth”, 2010). This new state is the key starting point of my research which tries to find out new interpretations on one of these new challenges, the phenomenon of land take, and its implications with urban planning policies and tools.

Many studies of recent years (conducted mainly by institutional organizations) have focused their attention on the problem of quantification of the phenomenon of land take, by the identification of specific indicators and indices (ISPRA, 2015). The research does not therefore intend to draft new ones and the data have been taken for granted and used as a background in order to better understand how big and challenging the issue of land take is. Data can also provide relevant evidence that can help European countries to develop efficient policies for both built-up areas and agricultural ones.

The research, in fact, aims at framing the different elements which contribute to the phenomenon of land take and at finding a suitable “planning solution”.

The literature review has therefore been a very useful step useful to understand the different dynamics of land take (especially in European countries²), to outline the elements that are still missing but also to highlight environmental and territorial policies.

The choice of a European case study is then fundamental to relate it with a specific area of Piedmont region. The analysis of the case study is focused on the strategies used to prevent and control urban dispersion and they aim at determining whether some of these strategies can be functional to the implementation of Italian planning system.

The research will then try to give answer to some research questions:

- *Is there a link between urban growth and planning strategies?*
- *Which strategies and planning approaches better support an effective land take management?*
- *Is it possible to rationalize land take through ecological planning approach?*

1.3 Methodology

The first step of the research is a detailed literature survey: it aims at identifying and analysing the state of the art of both European (Benevolo, 1993) and American cities. In fact, it ranges from the most generic topics (such as the definition of the term sprawl and its characteristics) to the cultural, political, institutional, economical specificities of some European countries. Therefore, the literature spans both American and European studies and articles. The topic is

² It is important to underline that the research has its focus on European policies, but it will keep into consideration elements also from the American experience, that has proved to be very exhaustive on the topic.

huge, and it keeps increasing (figure 1); therefore, it has been necessary to skim and select the most pertinent aspects to planning field.

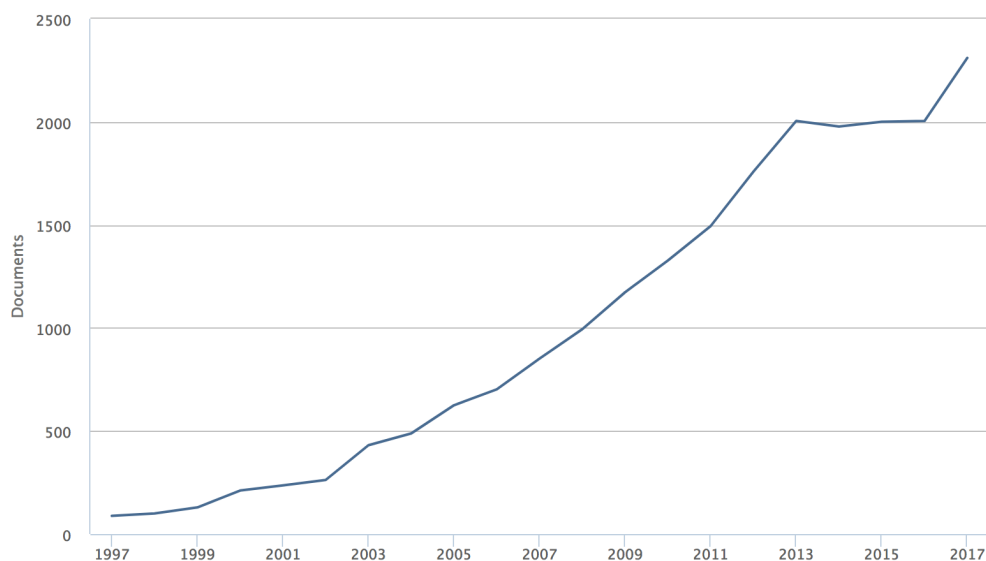


Figure 1: Diffusion in the last 20 years of documents concerning land take and sprawl on SCOPUS

The first part of literature review is an overview on the issue of continuous and unplanned urbanization in Europe and in the United States; given the wide and chaotic variety of definitions and interpretations, this first part aims at giving a unique and systematic definition to the concept of land take. The second part focuses instead on European land-use policies.

After a detailed literature review, the research deepens the connection between urban planning and ecological issues (Steiner, 2008). In this frame, the focus will be on green infrastructures (Landscape Institute, 2009), intended as one of the key strategies to overcome land take. Nevertheless, the relationship between urban planning and green infrastructures is not so direct and present in all European countries.

In this perspective, the selection of case studies has fallen on France and Italy as they share many similarities, but they have a different approach toward sustainable development. This part consists of a deep analysis of French and Italian planning tools.

France, in particular, is one of the European countries which has put great emphasis on green and blue infrastructures. Indeed, it has drawn up a national strategy and approved it by law. The major innovation of this new tool, *Trame verte et bleue*, is the fact that it has to be included in planning tools, starting from the regional scale to the local one. As land take, environmental and ecological issues do not depend on boundaries, the most appropriate scale is wide-area. In this perspective, France has never been really attached to boundaries and its planning tools are often based on the ‘variable geometry’ concept. In addition to this, in France inter-municipal planning tools are spread and diffused in almost

every region. The research focuses on two territories: Lyon and Grenoble. Both belonging to the region of Auvergne-Rhône-Alpes, they both deal with land take issues and ecological ones.

The research on-site, developed at Institut d'Urbanisme de Grenoble, has helped to the collection of data and has enriched the literature framework initially proposed. It has also been the occasion to make interviews to qualified stakeholders (such as the director of the on-going Grenoble's PLUi), with semi-structured questions.

The study on French planning system could then serve as a starting point for an operative introduction of these issues in Italian planning system. In Italy, indeed, planning is still too attached to the model of 'urbanism' which, for its rigidity, does not permit to have an integrated vision on all the different aspects that flow in planning. For example, green infrastructures and land take are not integrated in planning tools by a national law as in the French case. The case study is the Region of Piedmont, with a particular attention to the metropolitan city of Turin which is leading (and has led) specific researches on these topics, such as the European projects LIFE+ SAM4CP (in the process of finalization) and OSDDT (already concluded).

The most relevant elements, coming from these experiences, will serve to shape an operative and conceptual guide that can help the implementation and improvement of Italian planning tools.

Chapter 2

Framing the topic

This chapter is a result of the literature review on the topic of sprawl and land take and it aims at framing the topic. The literature review gathers both American (where the term sprawl was coined) and European books, researches and articles; this overview attempted to find the different meanings given to the issue (with the will to introduce a common definition) and to analyse the different impacts and drivers.

2.1 Different concepts

The literature on the phenomenon of land take is very wide, not only in the field of planning and architecture but it also crosses other academic fields, such as sociological studies (for example the work of Saskia Sassen³) or anthropological ones (in which we can include the work by Marc Augé on *non-lieu*).

Worldwide, this phenomenon has appeared and developed during different periods of time and it has also been attributed diverse terminology, depending on the countries and on the form acquired by this phenomenon.

The most cited is the term “sprawl”, originally used for the first time by the sociologist William Whyte in 1956⁴ to describe the tendency of expansion that changed most of American cities in that period. This phenomenon rapidly diffused also in other countries (nowadays, it is common opinion that it can apply also to European reality), but we can say that it has different acceptations and major dissimilarities between countries.

³ Saskia Sassen is an American sociologist who, in the ‘90s (in her book “Cities in a world economy”), despite sullen previsions on the decline of great cities, underlined the trend of many European cities to start again to rise in terms of demography and economic importance. The main cause of such a trend was, for the author, to be found in the high concentration of tertiary sector in big cities.

⁴ It is contained in his article in Fortune magazine and later resumed in his book “The exploding metropolis”.

Indeed, this new type of landscape took shape as a sort of hybrid one between the countryside and the city. In order to define these new settlement processes many neologisms were coined (above all if we consider the ones coined by European researchers): for example, *città diffusa* (Indovina, 1990) or *diramata* (Detragiache, 2003), *rurbanisation ou ville éparpillée* (Bauer and Roux, 1976) or *ville éclatée* (May et al., 1998), *étalement urbain*, *Zwischenstadt* (Sieverts, 2003). All these neologisms, which contain different acceptations of the process, are the evidence that a sort of sprawl has also come to Europe, but in different ways. They also present the difficulty to translate in other languages the term sprawl (literally, an urbanization laid down on the territory).

This wide variety of terms reflects difficulties encountered in the description of the new forms of urbanization (Baioni, 2006). Indeed, these definitions do not have a stable and unambiguous character but rather they allow to evoke and underline specific aspects, such as the loss of boundaries and identity, the social and landscape fragmentation and economic changes (Baioni, 2006).

The next paragraphs, an outcome of a deep literature review, collect the different interpretations given to this topic.

2.1.1 The American approach to urban sprawl

When talking about urban dispersion and irrational growth, the first word that comes to our mind is sprawl. Since the first time it was used by sociologists and planners in the 50's (primarily Whyte), it has acquired even more importance after the birth of the concept of sustainable development (Brundtland Report, 1987) and within the increasing evidence that there is the need to implement environmental policies into planning ones. Sustainability, being thus a key element of urban policies, has become a cornerstone of both American and European policies for cities.

One of the most challenging issues among researchers involved in this field is the attempt to give a definition to urban sprawl, a definition that could be unambiguous and used in different territorial, cultural and socio-economic contexts. Nevertheless, by reviewing the literature, we can find that there is no common opinion of what sprawl really is; in fact, "sprawl is amorphous and eludes easy description, but everyone seems to recognize his/her own version of it" (Dutton, 2000: 17)

Considering its ambiguity, one of the most exhaustive articles, titled "Wrestling sprawl to the ground. Defining and measuring an elusive concept", published by Galster et al. in 2001, admits the confusion over the topic and tries to find an efficient definition of the word sprawl. Indeed, at the very beginning, they recognize that sprawl ("a metaphor rich in ambiguity") has been used for many conditions. This term, in fact, "has been attached to patterns of residential and non-residential land use, to the process of extending the reach of urbanized areas (UAs), to the causes of particular practices of land use, and to the consequences of those practices. Sprawl has been denounced on aesthetic, efficiency, equity, and

environmental grounds and defended on choice, equality, and economic grounds. Sprawl has become the metaphor of choice for the shortcomings of the suburbs and the frustrations of central cities. It explains everything and nothing.” (Galster et al., 2001: 681). Their research on literature (“lost in a semantic wilderness”) resulted in “no common definition of sprawl and relatively few attempts to operationally define it in a manner that would lead to useful comparisons of areas to determine which had experienced greater or less degrees of sprawl.” (Galster et al., 2001: 682). They grouped all the definitions found in the literature “into 6 categories:

1. Sprawl is defined by an example, which is seen to embody the characteristics of sprawl, such as Los Angeles;
2. Sprawl is used as an aesthetic judgment about a general urban development pattern;
3. Sprawl is a cause of an externality, such as high dependence on the automobile, isolation of the poor in the inner city, the spatial mismatch between jobs and housing, or loss of environmental qualities;
4. Sprawl is the consequence or effect of some independent variable, such as fragmented local government, poor planning, or exclusionary zoning;
5. Sprawl is defined as one or more existing patterns of development. Those most frequently mentioned are low density, leapfrogging, distance to central facilities, dispersion of employment and residential development, and continuous strip development;
6. Sprawl is defined as a process of development that occurs over some period of time as an urban area expands.” (Galster et al., 2001: 682-683).

Starting from these 6 general categories, they identified 8 dimensions that characterize the phenomenon. Basing their assumption on these eight dimensions, they provide a conceptual definition of sprawl: “sprawl is a pattern of land use in an urban area that exhibits low levels of some combination of eight distinct dimensions: density, continuity, concentration, clustering, centrality, nuclearity, mixed uses and proximity” (Galster et al., 2001: 685). In this case, we can assume that sprawl is described as the cause of negative externalities, such as automobile dependence and the loss of farmland.

The book “Sprawl. A compact history” by Robert Bruegmann (2005) tries to draw an exhaustive history of what American sprawl is. His main aims are not restricted to the mere provision of a definition to the term, but he tries to understand the different realities and movements that have made the topic of sprawl so prominent in the public debate. Indeed, he gives a very simple definition of sprawl, “low-density, scattered, urban development without systematic large-scale or regional public land-use planning” (Bruegmann, 2005: 18) which will be better structured while explaining the different crusades against sprawl.

By reading the literature and in addition to Galster's findings, we can assume that there are different approaches used to describe and to give a definition to the term sprawl. The first one is to focus on its physical characteristics as a particular pattern of development. Indeed, as Ewing says, sprawl has always been seen as an undesirable type of development⁵ but for most of the Americans who "have grown up knowing nothing else, the spread of urban areas and the destruction of open space that sprawl brings" this is a normal and inevitable condition of American cities⁶ (Burchell, 2005: 12).

However, writes Ewing, concerns about sprawl are mostly connected to the impacts of land uses not to the specific characteristics of urban development: "(...) it is the impacts of development that render development patterns undesirable not the patterns themselves" (Ewing, 1997: 109).

Burchell defines sprawl as a type of development identified by several key characteristics and these are what make sprawl costly. These traits are unlimited outward extension into undeveloped areas, low density and leapfrog development. He adds that sprawl also includes "strict segregation of housing and commercial development, often through the construction of standardized development types, automobile dependence and fragmented planning and governance" (Burchell, 2005: 12).

There can be also another approach to define sprawl: many studies, in fact, by emphasizing the dynamic aspects of sprawl, view the phenomenon as a process (Galster et al., 2001; Couch, 2007) where we can assume that the key-point is the monitoring (change detection) and indicators (Artmann, 2015).

Critics and solutions to sprawl

This new pattern of development was critiqued above all by the cultural movement of New Urbanism. This movement was indeed born as a response to dispersed settlements built after WWII. The Charter of the New Urbanism (2001) identified an ensemble of 27 guiding principles for public policy, development practice, urban planning and design. These principles are functional for the planning of both vast areas and local projects; indeed, New Urbanist projects spans from the regional scale to the neighbourhood one till the single block. In fact, the principles of the Charter of the New Urbanism are structured upon these three different scales of the project.

One of its fundamental principle is the transect, a method able to classify the overall environment (both urbanised and not urbanised) as a continuous transition

⁵ He compares the compactness of cities (based on a concentration of employment, of a clustering of housing and of a mixing of land use) with the different typologies of sprawl: low density development, leapfrog development, scattered development and commercial strip development.

⁶ This depends also on the so-called phenomenon of the "American dream" and the related residential and life style model.

from the city core to rural and natural environments. Retrofit of the suburbs through strategic plans or infill projects (also of vast scale).

As a starting point for the formulation of a general theory of sprawl, New Urbanists tries then to identify some key elements which contributed to sprawl: lack of regional planning, lack of neighbourhood design, zoning, specialisation and standardisation, the role of cars and highways (Dutton, 2000).

The proposed vision to overcome sprawl was ‘Smart Growth’⁷, from which a group of different stakeholders gave birth to the “smart growth network”. “Smart-growth strategies address regional planning and land-development concerns through market-based incentive programs aimed at increasing development densities and coordinating other land-management priorities” (Mc Cauley and Murphy, 2013: 2852). These processes in the USA have mainly “taken on a particular form within the metropolitan region⁸, which are often constituted by a diverse mix of urban and suburban communities linked to a common regional economic ‘growth machine’ but often ideologically in conflict with each other over issue of taxation, government regulation, collective good provisioning and other concerns” (Mc Cauley and Murphy, 2013: 2852).

It’s opinion of lots of researchers, that the smart growth movement of the 1990s and 2000s has been “more than a ghost of urban policy past” (Burchell et al., 2000) “because it has been able to deliver more tangible results” (Goetz, 2013: 2179) than previous policies to limit urban sprawl and to encourage infill development

Nowadays, environmental issues (in which we can include all the soil sealing and sprawl concerns) have been integrated into territorial decisions and they are an essential element of development strategies; in this perspective, also governance network is involved. In fact, for the USA example, “the smart growth movement has been more effective because a broader coalition, including large segments of governments at all levels, the public-at-large and especially the development community, has embraced and supported the concept” (Goetz, 2013: 2179); for example, Gearin (2004) refers to this broad coalition as a ‘smart growth machine’. Nonetheless there are some cities where smart growth strategies are developed at a regional scale (the Greater Boston), metropolitan (Denver and Portland) and local and neighborhood (Los Angeles).

These examples have an important attention in literature, as they are often indicated as the main references of a smart growth approach for their different attitude to it. The main focus of the Greater Boston region is the network of governance behind smart growth strategy. In this region, in fact “the state of Massachusetts has used incentive programs, new forms of regulation and public-private coalitions to implement a smart-growth agenda that seeks to ameliorate the region’s housing crisis and sustain its pool of knowledge-economy workers, but these programs also challenge the traditional authority of local communities in

⁷ in European literature we can refer to the concept of compact city.

⁸ for example, the Greater Boston Region and the Metro Portland.

governing land-use decisions. Crucial to this assertion of land-management authority at the state scale has been the legacies of past forms of authority and land management, the ability of the state to exploit the positionalities of key actors associated with the smart-growth agenda and the role of crises (in housing and congestion) in making increased state control more palatable” (Mc Cauley and Murphy, 2013: 6852).

In the metropolitan area of Denver, the smart growth approach “has been more effective than previous initiatives because of a broader coalition” (Goetz, 2013)⁹. In particular, “new forms of regional collaboration have contributed to a stronger regional identity, less jurisdictional infighting and greater consensus on issues of regional importance” (Goetz, 2013: 2178). The metropolitan area of Denver (which presents an increase in terms of population) has “an historical legacy as a sprawling “cow town” and at the same time it espouses an eco-friendly vision of new urbanist developments and a growing commitment to rail transit and transit-oriented development” (Goetz, 2013: 2179).

Portland metropolitan area is worldwide recognized to be a model of smart growth while Los Angeles is often associated with urban sprawl even though cities in its metropolitan area have designed some growth management policies. In Portland metropolitan area, the Metropolitan Planning Association (MPO Metro) adopted an urban growth boundary in order to promote orderly land development in peripheral areas. It is within this boundary that a set of policy tools (for example long-term growth concept plan, parking management, etc.) were attempted. So, in this case, smart growth policies were implemented at a regional level while in Los Angeles they were implemented at the local level. Another difference is that the MPO of Los Angeles region (the Southern California Association of Government - SCAG) only “functions as a transportation planning agency and lacks a real power in regional land use planning and growth management” (Dong and Zhu, 2015: 776).

This concept of urban development management can be also applied in different contexts, such as Europe, in which there is a focus on policies and methods to control urban growth and to prevent land take; they both refer to regional scale (such as Brussels) and to local scale (for example Leipzig and Munich in Germany).

Even though the densification of cities can represent one good solution to contrast urban sprawl, some evidence identifies how compactness can lead to a low percentage of green spaces with urban boundaries (Haaland and van den Bosch, 2015) thus leading to a fallacy of the compact city (Neuman, 2005). Smart Growth movement, as a first step provided ten principles useful for the creation of more compact and walkable cities (Smart Growth Network, 2002).

These strategies have merged in the landscape approach of New Urbanism (Waldheim, 2006) with a consequent attention even to the ecological urbanism (Mostafavi, 2010). The landscape approach of New Urbanism (landscape is

⁹ it refers to the above mentioned ‘smart growth machine’ by Gearin (2004).

intended as urbanism) attempts to integrate landscape and social quality of the design, at various scales (both regional and local) by, for example, “articulating multiple roles for landscape in the shaping of contemporary urbanism” (Waldheim, 2006: 45). These new research paths work along the encroachment areas of a renovated transdisciplinarity and help to participate in the rethinking of the contemporary cities.

2.1.2 The concept of sprawl in European literature

The phenomenon of sprawl is considered to be peculiarly American¹⁰ but it is nowadays assumed that some evidence can be found also in other continents in the world, such as in Europe (as the book by Couch, Leontidou and Petschel-Held of 2007 and the EEA Report on sprawl have tried to prove). This new evolving situation of European cities (even though nowadays it is a bit more static) has also been presented as the contemporary city, as the contemporary city of the XXth century (Secchi, 2005).

Generally, European studies on urban sprawl are basically recent (they date back to some decades), but it is argued that it is a phenomenon much older; for example, Couch et al. (2007) set the beginning of continuous urban growth in Europe in the Industrial Revolution by giving the example of the growth of the city of London. From this moment, however, the process has not been linear and has gained speed only in the last 50 years, after World War II (Antrop, 2004). As a result of industrialization and technological progress, population has increased sharply and in recent decades it has been presented as a primary cause of urban sprawl (Glaeser et al., 2001; ESPON, 2010).

As said previously, the topic, differently from the United States, has entered into European literature only in the 70's/80's. In Italy, for example, this is mainly due to the fact that, as a whole, urbanization till the Second World War has proceeded slowly (Dematteis, 1992). In addition, in Italy the topic of urbanization came even after that in other European countries; in fact, the first national research aimed at providing the country an overall perspective on the topic is the report *It. Urb. 80 (Rapporto sullo stato dell'urbanizzazione in Italia)* coordinated by Giovanni Astengo and Camillo Nucci¹¹. This research can be considered as a reaction to the lack of knowledge fundamentals of Italian planning system in the 70's.

¹⁰ There is a whole literature on the case which is identified as the epitome of the sprawled city: Los Angeles. In contrast Bruegmann (2005) proves that Los Angeles density is higher than the one in other American cities (which are mostly thought to be denser) and it didn't decrease over years.

¹¹ This research, conducted between 1982 and 1988, is about the analysis of the process of urbanization between 1951-1981 at a national scale. It represents an important role because it is the only systemic research at a national scale on the effects of intense urbanization in the post-war years. Nevertheless, by looking at the different descriptions of each region, we can realize that the focus is on two main characteristics: soil sealing and urban forms. Elements like infrastructures are instead put aside even though they largely contribute to the loss of agricultural land (they will be considered in other studies, such as the one financed by CNR-IPRA).

Anyway, apart from the different periods of processes (American sprawl vs European urban dispersion), it is useful to underline how much different cities in the two continents are; therefore, some researchers have tried to identify some specific patterns of development that fit more to the European context than sprawl. Traditionally, in fact, European cities have been much more compact than the ones in the United States, with a denser historical core which dates back to ancient times and is still an important part of cities. Despite their different urban structure, also European cities have faced (and are still nowadays facing) the phenomenon of urban dispersion.

Before dealing with the different terms used in the literature to describe the phenomenon, it is interesting and useful to see how the European Environment Agency (EEA) identifies sprawl: as an ignored challenge¹². In this report, then, EEA underlines the fact that “sprawl threatens the very culture of Europe, as it creates environmental, social and economic impacts for both the cities and countryside of Europe. Moreover, it seriously undermines efforts to meet the global challenge of climate change” (EEA, 2006: 5).

One systematic attempt to describe the different patterns attributed to urban dispersion of European cities is the one by Camagni (1999) and it helps us to understand how this phenomenon spread differently all over Europe. He synthesizes this phenomenon with the term of *metropolizzazione*¹³ by referring primarily to the period between the 70's and the 90's. The use of the term *metropolizzazione* (which could be included in the definitions) help us to understand the tendency that the processes of urban expansion are acquiring; the word city is in fact transformed into metropolis, which suggests a wider territory.

Camagni identifies then different processes of urban dispersion (of *metropolizzazione*) that have occurred in Europe. The first one is the process of *metropolizzazione a carattere diffuso* which occurred in France (especially around the city of Paris, in the Rhône-Alpes region, around the cities of Toulouse and Bordeaux) and in Italy (the area between Milan and Venice plus the city of Rome, Naples, Turin and Bari). The second one is the process of *metropolizzazione a carattere concentrato* which showed in Spain, Greece, Portugal and Ireland; while the third one is the process of *diffusione e saldatura delle reti urbane regionali* which arose where there were no big urban agglomerations (especially in Germany).

Some definitions

As said before, European cities are very different one from another and so are their evolution processes which are often very difficult to define in a univocal way; this difference is therefore even more evident when coming to analyse the

¹² European Environment Agency (2006), Urban sprawl in Europe – the ignored challenge (http://www.eea.europa.eu/publications/eea_report_2006_10) – EEA Report n. 10/2006

¹³ it indicates the tendency of integration between different urban aggregate and territories with a diffused urbanization.

many labels and terms that are used in each country and in each research fields. The term sprawl, widely used in American literature, can, therefore, be considered for Europe, apart from inappropriate, quite reducing. European researchers, in order to describe this new urban form, identified then different terminologies that better suited for each territorial peculiarity.

The first terms in literature (60's and 70's) refer principally to the process of urbanisation in relation to its location compared with the city centre; this is mostly evident also from the fact that the word urbanisation is preceded by a suffix, such as *rur*, *sub* and *peri*. These terms have firstly been used in English and French literature and at a later time they have been translated and used also in Italian literature.

The terms of periurbanisation and rurbanisation (firstly coined in France¹⁴) suggest a comparison between the process of urbanisation and agriculture activities, which are the areas concerned in this process. The most evident result of these processes is the proliferation of country houses or small buildings in agriculture zones just outside cities. Suburbanisation and the rise of suburbs come instead from American and English literature as a result of sprawl.

More recently (80's and 90's), in Italian literature, we can often find the word city or town (also countryside but it's rather rare) followed by an adjective: for example, *città diffusa* (Indovina, 1990; 1999; 2009), *città diramata* (Detragiache, 2003), sprawltown (Ingersoll, 2004). Indovina, in the 90's, starting from the context of the region of Veneto, describes the concept of *città diffusa* not as an autonomous and independent form of organization of the settlement but as the transformation of different forms of territorial occupation. Thus, he considers it as a process (so he supposes an evolutionary hypotheses). In this context, city must not be acquired for its physical and morphological elements but rather for its attributes of functionality and social relationships. The concept was also resumed by Bernardo Secchi (1998), which identified the contemporary city as the ensemble of different forms and ages: the old city, the modern and the diffused one. The main characteristic of the contemporary city is not continuity but fragmentation (Secchi, 1998).

A more recent concept of Italian literature (2001) is the one of *città diramata*¹⁵ (Detragiache, 2003); at the bottom of its formation there is an economic and demographic process which is triggered by high social classes which tend to concentrate themselves in the city centre. This shift allows the rise of a process of urban renewal. Middle classes, instead, tend to de-urbanize by leaving city centres and the peripheries are left to a state of neglect (Detragiache, 2003). This process increases social inhomogeneity.

¹⁴ they can be both dated back to Bauer and Roux's book "Rurbanisation ou la ville éparpillée" (1976).

¹⁵ this concept has first been presented at the conference "Dalla città diffusa alla città diramata", held in Turin in 2001.

The term used by Ingersoll (sprawltown), instead, recalls the American concept of sprawl and he identifies sprawl as a way of being after that the city has disappeared (Ingersoll, 2004).

In German literature, Thomas Sieverts (2003) refers to this phenomenon as the *Zwischenstadt* in order to indicate the “in-between” or intermediate territories. He focuses its attention on the form and the nature of historical European cities and their historical and cultural landscape. He affirms that cities have been subject to such different changes in their structure and their form that they can destroy their image, but these changes can also represent the possibility of new design perspectives. The concept of *Zwischenstadt* is indeed appropriate above all for European cities mainly for the fact that Europe is typically characterized by a high number of municipalities (some of which can have a very small number of inhabitant). Each of these municipalities is therefore spatially defined by an administrative boundary which functions as a limit and has consequences in urban plans.

All these definitions stress the common condition of settlement dispersion which makes unrecognizable what is city and what is countryside. The attempt to give a definition of these peri-urban shapes and urban development models show how these areas do often have a weak planning support and control¹⁶.

2.1.3 Land take and soil sealing

In the last decades, the attention of researchers has shifted from the phenomenon of sprawl, intended here as a process of scattered urban development, to the ones of land take and soil sealing. Indeed, the attention is stressed on soil as a resource, not renewable, which need to be protected in order to avoid the loss of fertile soils and biodiversity.

The loss of fertile soils and biodiversity is one of the major consequences of an excessive exploitation of the resource soil. In this perspective, for example, EEA focuses its attention on environmental and ecological aspects, by giving the list of the functions provided by soils: “a wide range of vital ecosystem functions, playing a crucial role in food production as well as the production of renewable materials such as timber, offering habitats for both below and above-ground biodiversity, filtering and moderating the flow of water to aquifers, removing contaminants and reducing the frequency and risk of flooding and drought; they can help regulate the microclimate in compact urban environments, particularly where they support vegetation; and they can also provide aesthetic functions through the landscape. Agricultural land also provides ecological services for cities such as the recycling of organic wastes and products” (EC, 2011).

This shift is also important because it considers new elements that before this moment were only laterally cited, such as the ecosystem services (ES) and the quality of soils. Ecosystems, indeed, provide a wide range of services and they

¹⁶ This situation is clearly denounced in the case of Grenoble’s *faubourgs* (p. 86)

benefit to humankind (MEA, 2005). This importance is therefore underlined, for example, by the Millennium Ecosystem Assessment (MEA, 2005) which focused its attention on the multiple directly and indirectly benefits on people derived directly and indirectly from ecosystems. Since then, many studies have been focused on classifying, quantifying, mapping and evaluating ecosystem services in order to integrate them in decision-making processes and in land use and landscape planning (Fisher, 2009; de Groot, 2010).

MEA has also identified and grouped ecosystem services into four categories:

- a. “Provisioning services such as food, water, timber, fiber, and genetic resources;
- b. Regulating services such as the regulation of climate, floods, disease and water quality as well as waste treatment;
- c. Cultural services such as recreation, aesthetic enjoyment and spiritual fulfilment;
- d. Supporting services such as soil formation, pollination and nutrient cycling.” (MEA, 2005).

With the introduction of themes like soil erosion and degradation, the general topic of land take has entered also in other academic fields of research, such as: biology, etc. This rising importance is principally connected to increasing population which implies a wider and safer accessibility and availability of food and water.

The ecological and environmental importance of our world has also been recently recalled by the Pope’s encyclical “*Laudato si*” after having witnessed several world catastrophes, mostly caused by human activity. “Since everything is closely interrelated, and today’s problems call for a vision capable of taking into account every aspect of the global crisis” (Pope Francis, 2015) he calls for an “integral ecology”, as it respects human and social dimensions. The added value is that the encyclical tries to relate the environmental crisis with the social situation of suffering of this period (characterized by a high percentage of poverty with little access to food and water).

In this perspective, it is really relevant to put at stake different strategies of landscape design which can ease relationships between the city and the countryside; a key role is therefore played by open, natural, agricultural and peri-urban spaces.

2.1.4 Relationships with countryside landscape

The same topic has also been developed and analysed from a different point of view: instead of focusing on the city and its expansion, it focuses on the territories just outside cities: agricultural lands. The process of urbanisation, in fact, damages above all agricultural lands, in particular the ones next to cities.

Before the spread of cities into agricultural lands, European countries have always given great value to rural environments by proposing strong programs of planning protection. In the United States, instead, this process is less heart-felt, as they consider farmlands only as a transitional use and condition (Beatley, 2000). In addition, American literature takes into account the loss of farmland (above all as one of the consequences caused by land take) less than the European one, where the loss of fertile soils is one of the greatest challenge to face.

One of the most relevant example of such a topic is the one carried out by Pierre Donadieu in his well-known book *Campagnes urbaines*, where he focuses his attention above all on the French situation. This book has been the occasion (in the late Nineties) to view at the agricultural landscape under a different perspective; we can indeed refer to it is a book on landscape and on the importance of its preservation (it is prior to the European Landscape Convention). In speaking on agricultural lands, Donadieu notices how they deserve a privileged position in such a discussion because they are the most damaged territories by land take. The most probable risk is the trivialisation and homogenisation of the landscape (Donadieu, 1998). In addition to this, the *campagnes urbaines* contribute to the redesign of cities in the rethinking of ways and forms of its ecological functioning and of the collective and cultural re-appropriation of natural infrastructures.

From this point of view, the wide availability of open space in peri-urban territories can therefore represent a great opportunity of settlements' redevelopment and of ecological regeneration.

Connected to agricultural lands, there is, without any doubt, all the debate on food access, food security and urban agriculture. These issues, after a long period of silence, are starting to regain importance in international literature and debates. Urban agriculture has been indeed one of the key themes of the 53rd World Congress of IFLA¹⁷. One of the central ideas of the congress were the urban regeneration processes of unused spaces in order to foster a development of agriculture. Agriculture can therefore be interpreted as a fundamental element of landscape which is instead losing its original productive value due to the pressing rising of land take.

It is therefore always more evident that also landscape (Clément, 2005) has entered the general debate on contemporary cities and land take; its damage can be then seen as a consequence of intensive land take. Clément (2005), by coining the expression "third landscape", proposed that green areas in contemporary cities can be found in the recovery and connection of open spaces; the incorporation of these areas in a system can therefore launch a mechanism of ecological regeneration.

¹⁷ The 53rd World Congress of the International Federation of Landscape Architects (IFLA) was held in Turin in April 2016. The main theme was "Tasting the landscape" and it tried to give to landscape a new vision and a new meaning. In order to achieve this goal, IFLA invited as keynote speakers not only well-known landscape architects but also sociologists (Saskia Sassen) and the founder of Slow Food Movement, Carlo Petrini.

Nevertheless, in this specific case, we can say that a new rising landscape culture (considering the year the book was published) tries to give answers to this increasing pressure on agricultural lands caused by the expansion of cities with the consequent creation of peripheries. Peripheral zones, at that time, did not have yet a systematic urban project.

2.2 Drivers and impacts of land take

From all these definitions of the phenomenon, we can attribute several characteristics to urban dispersion. As their very general feature, they can fit, more or less, with each reality before described, thus both American and European:

- low density¹⁸, by taking into account the differences between United States and Europe;
- development in isolated areas (unbounded to the rest of other built areas) with the subsequent creation of a leapfrogging outward;
 - fragmented habitats and land-use patterns;
 - transformed “imageability” (Lynch, 1960) of the landscape;
 - higher rates of energy consumption;
 - almost total reliance on the use of automobile (with a low use of public transit);
- road-transit developments which are partially due to local government policy decisions.

The importance of density is a recurring topic in urban projects and it has been greatly expressed already in 1961 by Jane Jacobs in her well-known book “Death and Life of Great American Cities”¹⁹. In her opinion, the engines that make cities and neighbourhoods work are population density and diversity. She puts in first place the vitality of city life by expressing the advantages of living in highly dense neighbourhoods, mainly in terms of social life (more interaction with people, more available services) but all these aspects could also improve the overall environmental quality and energetic wastes of cities. Thus “placing people and their daily activities close together doesn’t just make the people more interesting; it also makes them greener.” (Owen, 2009: 50). The choice of building highly dense neighbourhoods can, therefore, be considered as an environmental necessity and they are also more efficient, not only in terms of energetic waste but also in terms of accessibility, and liveable (by using the terms of Jane Jacobs).

¹⁸ Bruegmann, at the contrary, supports the idea that “scattered development often results in densities higher than those that would have been achieved with continuous development because it allows for infill at higher densities in the second and third waves of growth”.

¹⁹ In this book, she identifies some key elements and qualities that help to create a better urban life: the compactness, the productive jumble of thriving uses, the deep networks of personal interconnection, the reduced reliance on motorized transportation.

Nevertheless, density cannot be applied at the same way in Europe and in the United States. As is common knowledge, in fact, suburbs in American cities have developed at a lower density than the one in Europe. American suburbs are therefore more extensive and more car-dependent (Pucher and Lefebvre, 1996).

Additionally, in order to better understand the different acceptations that land take takes, it is important to draw and define the drivers that have contributed to the rise of this phenomenon and the consequences (or impacts) that it causes on territories.

2.2.1 Drivers

In order to better analyse the phenomenon of urban growth, it is important to understand which are the drivers that made the shift from compact to dispersed development a reality. However, it's hard to draft an exhaustive list of the drivers (even harder is to determine which of them have had the greatest influence), because they vary between the different countries and because they depend on the political, the social and the economic conditions of cities.

Many studies, in order to define the drivers behind urban sprawl, have chosen to categorize the causes at different levels: macro, meso and micro (for example Couch et al., 2007 and ESPON, 2010). In other cases, they are presented depending on the type of drivers, such as economic, governmental and technological factors (Bruegmann, 2005).

One of the most shared drivers of sprawl is increased mobility (connected to an improvement and a broadening of highways and national infrastructures) and so the increase of individual car owners (Ingersoll, 2004; Secchi, 2005; Couch et al., 2007; Owen, 2009). It is in fact general opinion that car travels have helped to shape sprawl in conjunction with the construction of new infrastructures (or the extension of the existing ones), which in turn have also led to the increase of sealed land. Nevertheless, Bruegmann writes that cars and mobility have not led to sprawl because “the outward dispersal of urban population started centuries before the advent of the automobile” (Bruegmann, 2005: 108).

Other factors considered to have helped sprawl to spread all over the world are more connected to the social and the economic spheres: individual housing preferences²⁰, including the fact that moving to the suburbs for many people means conducting a better way of life²¹ and increasing wealth of population and the economic growth of the post-war years (Bruegmann, 2005; Couch et al., 2007). The economic growth has contributed to the increase of population, which can be in turn considered as a driver of urban sprawl but, nowadays, it's not one of the most decisive (ESPON, 2010). It is even not so rare that citizens appreciate these new types of confused urban development (Donadieu, 1998) because, in a

²⁰ An article by Couch C. and Karecha J. (2006) explains these preferences applied to a specific city: Liverpool.

²¹ For example, Champion (2002) refers to this driver as one the major that led English people to move outwards in the countryside and he refers to it as the “rural idyll”.

certain way, they allow citizens who want to escape from cities to live in the countryside and have more privacy without being so far from work and shops. The social sphere includes some anti-urban attitudes (Bruegmann, 2005).

Another driver behind urban sprawl can be an inadequate management of land development²²: as regard to European countries, they have different planning and administrative systems²³. It is also important to consider the administrative units, their size and their number; in fact, more dispersed and fragmented management systems can be inappropriate to manage land development (PLUREL, 2011). As regard to this, it is necessary to verify the coherence and the effectiveness of land use policies at all levels of administration. Thus, we can include fragmented governance and a lack of integrated land use planning as drivers of urban sprawl.

We can also add a territorial factor; in fact, urbanisation of wide areas can be observed above all in specific geographical areas. For example, (as Owen asserts), the geographical shape of a city like New York City (which arises on a small island) helped planners not to follow a strict planning method (the water, a natural element, worked as a natural barrier to irrational expansion) but to optimize it by building at a very high density. This fact can also be seen in Chicago and Hong Kong (which is both geographically isolated and geopolitically). In contrast, other American cities, such as Atlanta, Phoenix and Kansas City, which have never had important natural barriers, followed the line to build at a very low density. In this case, it is believed that New York City is more ecological and sustainable than less dense American cities and therefore the countryside (Owen, 2009).

2.2.2 Impacts

There is no common agreement also on the defining impacts of urban sprawl. Different changes and impacts anyway occur in a gradual way and therefore they are not perceived negatively at a first glance. Some non-profit organizations, such as The Sierra Club²⁴ (1999), have tried to define them by highlighting the negative ones, such as increased traffic congestion and air pollution (but we need to specify that not all the consequences of sprawl have to be considered as negative).

²² In American literature, it is common opinion that sprawl is mainly caused by government policies like single-use zoning or the mortgage interest deduction on the federal income tax (Bruegmann, 2005, Burchell, 2005).

²³ An overview of the existing planning tools in different European countries has been drafted by the PLUREL project (2010). The PLUREL project focuses its attention on the political structure (relationship between local, regional and national levels) and on the type of spatial planning policies.

²⁴ This association was founded in 1892 by Henry David Thoreau and has always had an important role in contrasting sprawl in United States; the Sierra Club launched a national campaign called "Challenge to sprawl" with the main goal to block the transformation of rural landscape into a built one (both of houses and infrastructures). Despite their well-known activity, David Owen, in his book "Green Metropolis" asserts that Sierra Club has been a "major contributor to sprawl, because the organization's anti-city ethos, ..., has fuelled the yearning for fresh air and elbow room which drives not only the preservation of wilderness areas but also the construction of disconnected residential developments and daily hundred-mile commutes."

Anyway, as for the drivers, also the impacts can be evaluated based on socio-economic and environmental conditions.

Briefly, in the social sphere, we can identify that sprawl is reducing the housing gap between blacks and whites and is increasing the affordability of buying an independent house (Bruegmann, 2005). In this case, sprawl can be seen as a positive phenomenon. Nevertheless, it can generate a greater segregation of residential development according to income with consequent social and economic divisions (EEA, 2006). From an economic perspective, urban sprawl may be considered an expensive urban form due to increased costs of commuting and of extension of already existing infrastructures.

Related to people habits, there is also a whole new literature frame on the connection between sprawl and health (Ewing, 2003; Frumkin et al., 2004). Urban sprawl in fact can produce many adverse environmental impacts that have direct impacts on the quality of life and human health (in particular we can refer to air pollution and high noise levels). These issues are also related to the long-distance house-work-shop to cover and so the increasing use of private cars, which has helped to reduce also the activity of walking (Owen, 2009; Pavia, 2015).

As to the environmental sphere, sprawl has a considerable impact on ecosystems and other natural resources, which provide societal functions and benefits. First of all, it is the case of soil, an irreversible resource which is highly threatened by the phenomenon of sprawl: indeed, once it is sealed it loses all its vital functions (such as the food provision and the water retention). From a land-use perspective, in fact, the loss of farmland, open space, forest and habitats are the most common issues addressed to sprawl in international literature (Hasse and Lathrop, 2003). We have also to remind that the growth of urban lands has primarily occurred on former agricultural land (MOLAND²⁵).

In addition, other great concerns are: air pollution (as a consequence of the increase of mobility by private cars), poor water quality, alteration of micro-climates (including the urban “heat island effect”), loss and fragmentation of wildlife habitats and decreased aesthetic appeal of landscape (Burchell, 2000). Regarding the last two elements, in fact, fragmentation of urban land causes the disruption of migration corridors for wildlife species and can reduce natural habitats thus inflicting damages to biodiversity; this process of degradation of ecological corridors threatens to weaken the efforts made by some nature conservation initiatives (such as the one of Natura 2000). All these factors contribute to the global issue of climate change which has emerged as one of the most significant challenges for urban planning and cities strategies (Heidrich et al., 2016). Connected to this issue, some studies have focused on the phenomenon

²⁵ MOLAND (MONitoring Land Use / Cover Dynamics) project is coordinated by the Institute for Environment and Sustainability of the European Commission’s Joint Research Center and its aim is to provide up-to-date, standardized, comparable information on the past, current and likely future land use development in Europe. It consists of a comprehensive database of 28 urban areas and 6 wider regions (they include cities from EU15 countries except the Netherlands and Luxembourg) and it has four-time windows: mid-1950s, late 1960s, mid 1980s and late 1990s.

of urban “heat island effect” by, for example, studying the connection between sprawl and extreme heat events (Stone et al., 2010). A further consequence of the increasing land take is the growing consumption of energy.

As mentioned before, the detriment and degradation of landscape can be included in the environmental impacts and it results in a landscape fragmentation (EEA, 2011).

The analysis of different impacts, above all the environmental ones, shows how they span local, regional and global geographical scales and they affect different habitat (fauna and flora) and city inhabitants. Their quality of life is then at risk, “with a consequent profound crisis in contemporary living” (Sargolini, 2013: 27).

2.3 Redefinition of the concept

The literature review, both the American and the European one, shows how the topic of land take and sprawl has been specified over the last decades in different literature contexts (both geographical and academic). As highlighted in the literature review, there is no common opinion on what land take and sprawl are and it arises that they can be both a process of development, a pattern of development or a consequence of an externality. Table 1 tries to summarize the main elements that converge in the definition of the concept in the two analysed geographical contexts.

Table 1: Different elements in the definition of land take

	United States	Europe
Time of appearance	‘50s	‘70s / ‘80s
Characteristics of cities	less dense cities, no historical cores	more compact with a historical core
Terms used	Urban sprawl	Italy - <i>Città diffusa</i> , <i>città diramata</i> , sprawltown
		France - <i>Ville éparpillée</i> , <i>ville éclatée</i> , <i>étalement urbain</i>
		Germany - <i>Zwischenstadt</i>

The wide and chaotic variety of definitions of urban sprawl and land take appears to be restrictive, and it rarely refers to its relations and implications with urban planning tools and techniques.

My research attempts then to redefine the concept by taking into account territory and landscape (above all for what concern open spaces and farmland). Indeed, these concepts have entered into the planning debate since many years, but only in the last decades there has been some attempts to integrate them in planning tools. Literature review has indeed showed how the topic of urban

dispersion and sprawl has shifted from being specified as a structural element or process of settlements (the scattered ones) to being analysed in terms of what we are losing in terms of environmental and ecological resources (concepts of land take and soil sealing) if we keep on building new houses and infrastructures in open spaces.

In my research vision, land take containment must become a structural element of regional and urban planning. In this perspective, planning plays therefore a fundamental role in the construction of an ecological approach to territorial development and management, through the enhancement of soil and territory as a common resource (Maddalena, 2014) for a qualitative land take.

Chapter 3

Land take in sustainable development framework

This chapter, starting from an overview on global policies on land take in the framework of sustainable development, focuses on European ones and takes stock of the situation of strategies of some European countries. The selected European countries are France, Germany, Great Britain, Italy and the Netherlands. This choice is the result of specific analysis related to the collection of best practices. Each country is briefly framed within its planning tools and its major and most innovative strategies and initiatives used for land containment.

3.1 An overview on global policies

World population that live in cities was 54% of the entire population in 2014 and it is expected to reach the percentage of 66% by 2050 (UN, 2014). These increasing values make necessary for cities to be able to face new incoming issues with reference to sustainable development without risking hastening global environmental phenomena (such as climate change or resource depletion). This situation has led international bodies to include the issue of land take in international environmental policies. These policies represent the basis to which many countries or supranational agencies (should) refer to in their own national and/or regional policies.

One of latest international initiative is the one held by the Food and Agriculture Organization of the United Nations (FAO): in order to outline the increasing importance of this issue, FAO has fixed 2015 as the International Year of Soils. This initiative has been the occasion to organise worldwide a series of events related to the resource soil (including the national conference held in Milan by ISPRA of 2015). Therefore, it has helped to increase awareness of the

seriousness of the problem, not only among institutional authorities but also among citizens²⁶.

The key messages of the International Year of Soils are:

- Healthy soils are the basis for healthy food production;
- Soils are the foundation for vegetation which is cultivated or managed for feed, fibre, fuel and medicinal products;
- Soils support our planet's biodiversity and they host a quarter of the total;
- Soils help to combat and adapt to climate change by playing a key role in the carbon cycle;
- Soils store and filter water, improving our resilience to floods and droughts;
- Soil is a non-renewable resource; its preservation is essential for food security and our sustainable future²⁷.

Moreover, safeguarding soils is crucial to the UN Post-2015 Development Agenda and the Millennium Development Goals (MDG). The post-2015 development agenda is a United Nations member state-led process aimed at defining a global development framework that will succeed the 8 Millennium Development Goals when they reach their target date at the end of 2015. At the same time, as accelerating efforts to meet MDG targets, FAO has embraced the post-2015 process, identifying 14 thematic areas in which it can support member states in reaching new goals²⁸. This process resulted in September 2015 in the adoption of the 2030 Agenda for Sustainable Development by world leader's representatives.

As a follow-up of the 2030 Agenda for Sustainable Development, the United Nations promoted the identification of 17 new global development goals, Sustainable Development Goals (SDG) with 169 associated targets and indicators. These SDGs intend to embrace the concept of sustainable development with other processes in the economic, social and environmental spheres (such as ending poverty, achieving gender equality, reducing inequality, etc.). In particular, the SDG 11 "Make cities and human settlements inclusive, safe, resilient and sustainable" indicates as a target (11.3) the achievement by 2030, the enhancement of an "inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries". An indicator (11.3.1) of this target is the necessity to understand the "ratio of land consumption rate to population growth rate".

An important role is also led by the International Strategy Rio +20 of 2012 which has set the goal of "land-degradation neutral world" with a value of zero soil sealing by 2030. This target is above all bounded to global trends such as the

²⁶ the final outcome is the report "Status of the World's Soil Resources (SWSR) – Main Report".

²⁷ For further information <http://www.fao.org/soils-2015/about/key-messages/en/>

²⁸ For further information <http://www.fao.org/post-2015-mdg/home/en/>

increase of population and so the higher demand for food, energy and water is expected to increase pressure on land.

The increasing sealing of soils, as we have seen previously, is one of the key factors that occurs in global climate change. The topic has preponderantly re-entered the international debate within the conference COP21, held in Paris in January 2016. The conference has seen the participation of 195 countries who have adopted the Paris agreement, the “first-ever universal, legally binding global climate deal”²⁹.

The guiding principle of these strategies is the attempt to reach a better environmental quality paving the way to an innovative planning approach at different territorial scales.

3.2 Focusing on Europe

European cities were born together with Europe and they are a distinct historical entity of Europe (Benevolo, 1993); in this sense, they have a much more rooted historical background than the ones in the United States. Nevertheless, above all since the 50’s (the post-war years), also European cities have been facing the phenomenon of urban dispersion (as said in paragraph 2.1.2); this process has however different characteristics and motivations of the ones occurred, for example, in the United States. In recent years, concerns about urban sprawl in Europe has increased (as it is showed in the last report of EEA of June 2016) and therefore there is a general necessity to control and monitor it in a univocal way for all countries (this can be achieved through the definition of specific and universal indicators).

Post-war years have been, in fact, a very difficult period for European cities, which were forced to think as soon as possible at a necessary reconstruction phase. It’s indeed during these years that most European countries drew their first planning laws³⁰ and began to think at a suitable planning system.

Nonetheless, the development of European cities is different one from another. For this reason, researchers have tried to characterise the phenomenon, by analysing the different patterns of European cities’ development. In Italy, Camagni (1999) synthetizes this phenomenon with the term of *metropolizzazione* by referring primarily to the period between the 70’s and the 90’s and he identifies different processes of urban dispersion throughout Europe. The first one is the process of *metropolizzazione a carattere diffuso* which occurred in France (especially around the city of Paris, in the Rhône-Alpes region, around the cities of Toulouse and Bordeaux) and in Italy (the area between Milan and Venice plus

²⁹ available at

http://ec.europa.eu/clima/policies/international/negotiations/paris/index_en.htm - it is supposed to enter into force in 2020

³⁰ some deeply damaged countries, as Germany for example, in order to rebuild the most devastated cities, made first a specific policy of reconstruction and, once the process was accomplished, drew a proper planning law.

the city of Rome, Naples, Turin and Bari). The second is the process of *metropolizzazione a carattere concentrato* which showed in Spain, Greece, Portugal and Ireland; the third is the process of *diffusione e saldatura delle reti urbane regionali* which arose where there were no big urban agglomerations (especially in Germany).

We can therefore assume that the problem of urban dispersion spread all over Europe, but the difference is how European Union and each country are dealing with it. With regard to this situation, during the latest years, indeed, many European countries have included the containment of land take into their national policies. This fact is also a direct answer to one of the fundamental objectives of European Union and United Nations, the already mentioned sustainable development strategies.

3.1.1 European policies

The attention of the European Union has increased in the course of time and nowadays the issue of land take is in fact recognized also at a European level. A contributing fact is the latest cultural path oriented towards urban sustainability and city competitiveness in an era of globalization. Indeed, the European Union, for more than 15 years, has developed different policies aimed at creating a common perspective suitable for all countries. European countries and citizens can therefore benefit from all the policies and initiatives in support of sustainable development but, in order to develop good environmental national policies and strategies, there must also be a good coordination between administrative levels of each country. In addition to this, cities have to work on a long term political and sustainable vision which gathers different critical factors (such as mobility and social, cultural and job opportunities).

The increasing concern comes from the verification that almost the 75% of European population lives in urbanized areas and it is evaluated that this value will increase to 80-90% within 2020; such a situation can cause an increasing land use of greenfields near consolidated city centres (EEA, 2006).

One of the first policy proposal made by the European Commission is the European Spatial Development Perspective (1999) which set 60 policy option for a balanced and sustainable development of the territory of European Union. The number 12 fits perfectly with the topic of my research: “Support for effective methods of reducing uncontrolled urban expansion; reduction of excessive settlement pressure, particularly in coastal regions” (EC, 1999: 23).

At this stage of the research, “there is no legislation at the European level that focuses exclusively on soil conservation” (Glæsner et al., 2014: 9538). Nevertheless, there are some specific EU strategies related to soil issue: the Thematic Strategy for Soil Protection (2006), the Resource Efficiency Roadmap (2011) and the Guidelines on best practices to limit, mitigate or compensate soil sealing (2012).

The European Commission in the Thematic Strategy for Soil Protection (2006)³¹ has set the general definition of soil sealing (which will be found in the majority of European strategies and documents): “permanent covering of an area of land and its soil by impermeable artificial material, such as asphalt and concrete”. The Thematic Strategy for Soil Protection is composed of a Communication from the Commission to the other European Institutions, a proposal for a framework Directive and an Impact Assessment. The Communication has set the frame for future actions to undertake in order to ensure a high level of soil protection. The proposal for a framework Directive drafts common principles for the protection of soils across the EU³².

The Resource Efficiency Roadmap proposes ways to increase resource productivity and provides a framework in which future action can be designed and implemented coherently³³. This document³⁴ proposed that by 2020, EU policies take into account their direct and indirect impact on land use in the EU and globally with the aim of no net land take by 2050.

The Guidelines are a collection of policies, legislation, funding schemes, local planning tools and information campaigns³⁵. The overall objective of this document is to provide information on the importance of soil sealing in the European Union, its impact and examples of best practices for its limitation, mitigation and compensation in order to ensure a better land management.

Nowadays, the main societal challenges have been identified at the EU level in Horizon 2020, which is the Common EU Framework for Research and Innovation (2014-2020)³⁶. Horizon 2020 aims at securing Europe’s global competitiveness. The main soil-related challenges to competitiveness are food security, energy security and resource-use efficiency (Glæsner et al., 2014: 9540). Horizon’s societal challenges are:

- “Health, demographic change and wellbeing;
- Food security, sustainable agriculture and forestry, marine and maritime and inland water research, and the Bioeconomy;
- Secure, clean and efficient energy;

³¹ COM(2006) 231: Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions. Thematic Strategy for Soil Protection.

Further information at http://ec.europa.eu/environment/soil/three_en.htm

³² COM(2006) 232: Proposal from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions for a Directive of the European Parliament and of the Council establishing a framework for the protection of soil and amending Directive 2004/35/EC.

³³ For further information

http://ec.europa.eu/environment/resource_efficiency/about/roadmap/index_en.htm

³⁴ COM(2011) 571: Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions.

Roadmap to a Resource Efficient Europe.

³⁵ For further information http://ec.europa.eu/environment/soil/sealing_guidelines.htm

³⁶ For further information <http://ec.europa.eu/programmes/horizon2020/en/what-horizon-2020>

- Smart, green and integrated transport;
- Climate action, environment, resource efficiency and raw materials;
- Europe in a changing world - inclusive, innovative and reflective societies;
- Secure societies - protecting freedom and security of Europe and its citizens³⁷.

One of the most recent actions carried out by European Union is the General Union Environment Action Programme to 2020 (known as 7EAP, as it is the 7th European Action Programme). It sets a series of priority objectives and number 8 “To enhance the sustainability of the Union’s cities” is particularly directed to the issue of soil preservation. 7EAP identifies as a priority the enhancement of urban sustainability and, in order to achieve this, it is important that “a majority of cities in the Union are implementing policies for sustainable urban planning and design, including innovative approaches for urban public transport and mobility, sustainable buildings, energy efficiency and urban biodiversity conservation” (EC, 2013).

With reference primarily to the best practices and guidelines, it is evident that planning can be the key element for the suggested actions of limitation, mitigation and compensation for a better land management.

3.2.2 Quantifying land take in Europe

Generally, Europe is a highly dense and populated continent with a consequent high level of soil occupation. Not all the European countries have built a national policy (and so a method or an indicator to quantify) and therefore data cannot be easily compared. Indeed, land take is not monitored in the same ways and with the same schedule in all European countries.

The best source of information is the already mentioned European Environment Agency (EEA), which carries out specific researches on this topic. EEA, in its reports on land take, identified a specific indicator (weighted urban proliferation³⁸) that could give the opportunity to compare different European values.

The growth of built-up areas in Europe reached its peak in 1950s-1960s (MOLAND) when the average annual growth rate reached 3.3%. Generally speaking, since 2008, global population has been living in cities and this value is intended to keep on increasing; this tendency will probably cause a continuous shift from rural to urban areas causing an increase of land take (UN, 2014).

³⁷ For further information <http://ec.europa.eu/programmes/horizon2020/en/h2020-section/societal-challenges>

³⁸ “... the method of 'weighted urban proliferation' (WUP) quantifies the degree of urban sprawl for any given landscape through a combination of three components: (1) the size of the built-up areas; (2) the spatial configuration (dispersion) of the built-up areas in the landscape; and (3) the uptake of built-up area per inhabitant or job.” (EEA-FOEN, 2016: 14).

Data which result more suitable to evaluate the extent of soil sealing are the Copernicus ones (20 meters of resolution). Nevertheless, EEA³⁹ uses Corine Land Cover data even though their resolution is not so high.

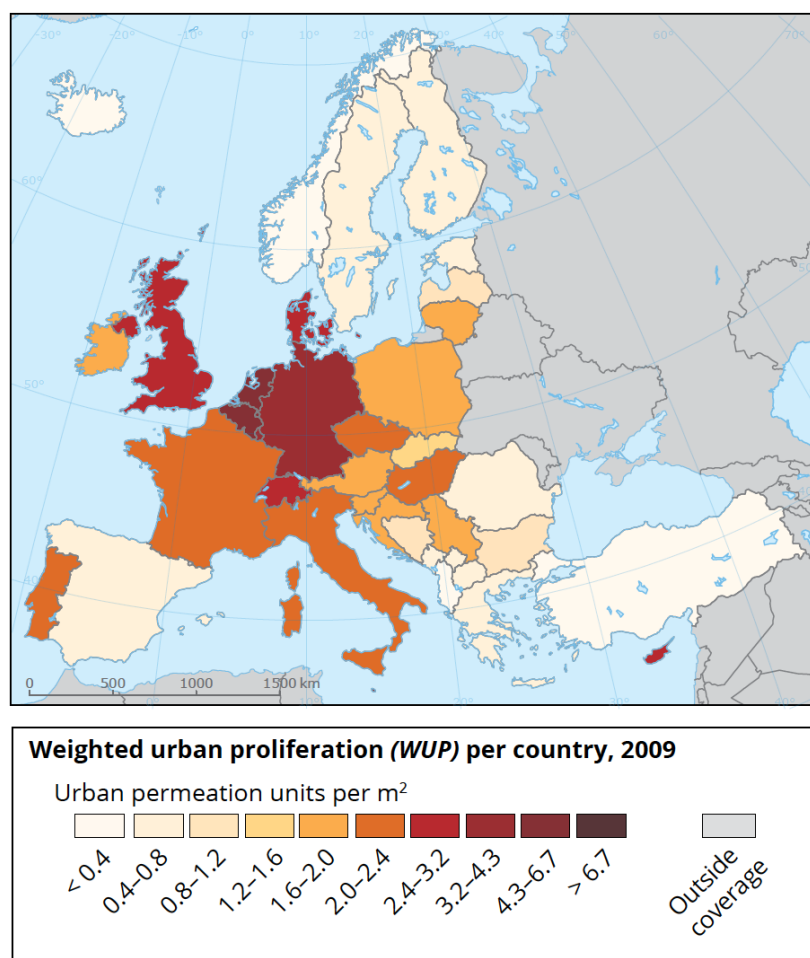


Figure 2: Urban sprawl in Europe
(source: EEA-FOEN, 2016)

Therefore, if we take into account EU27 countries data⁴⁰, in 2006 4,4% of the European Union's territory was classified as artificial surface while 2,3% was actually sealed. If we take into consideration the period between 1990 and 2000 we can assume that land take (intended here as the increase of artificial surfaces) was around 1000 km² per year and artificial surfaces increased by 5,7%. Since then land take has slowed down to 920 km² per year. Nevertheless, between 2000 and 2006, there has been an increase of 7,5% of sealed land in some countries: the Netherlands, Portugal, Ireland, Cyprus and Spain. In 2006, countries with the

³⁹

http://ec.europa.eu/eurostat/statistics-explained/index.php/LUCAS_-_Land_use_and_land_cover_survey

⁴⁰ European data are taken from the final report of European Commission "Overview of best practices for limiting soil sealing or mitigating its effects in EU-27" (<http://ec.europa.eu/environment/soil/sealing.htm>).

highest rate of sealing were: Malta (13%), the Netherlands (8%), Belgium and Luxembourg (5%) and Cyprus and Denmark (3,6%).

The most recent study on urban sprawl⁴¹ provides more updated data and it is a useful tool for a better monitoring of the phenomenon; this is mostly possible with the improvement of available indicators or with the definition of more appropriate ones. The report takes into account 32 European countries⁴² and in all these countries urban sprawl has increased by 5% between 2006 and 2009. Countries with the highest percentage of increase are: Malta (+35%), Sweden (+23%) and Spain (+16%). Also in the Netherlands and in Belgium (two of the countries with, already in 2006, a high percentage of soiled land) urban sprawl has continued increasing (respectively by 3,2% and 1,6%). Other high value of increase (higher than the average) are: Slovakia (+9,4%), Italy (+7%), Serbia (+7,2%), Croatia (+6,6%), Portugal (+5,8%) and Austria (+5,6%).

Another European survey is LUCAS (Land Use and Cover Area frame Survey) and it “provides harmonised and comparable statistics on land use and land cover across the whole of the EU’s territory”⁴³. It includes 28 countries of the EU and it divides land cover into 8 categories: artificial land, cropland, woodland, shrubland, grassland, bare land and lichens/moss, water areas, wetlands.

3.3 Planning approaches to overcome land take

The collection of data on land take well clarifies the need of specific policies led by national governments and adapted at the different scales of government. This necessity is also highlighted by the vast amounts of European and international policies.

Indeed, as a general reaction to EU policies and the awareness of the need to change, many European countries have started to draw up some relevant strategies with the aim to control land take and improve the quality of landscape.

Nevertheless, Europe is characterized by many different countries. This variety reflects different administrative settings and cultural backgrounds and led to a variegated ensemble of planning tools and strategies.

France, Italy, Germany, Great Britain and the Netherlands are characterized by a high level of urbanisation which has led to an increase of land take during the latest years. Indeed, generally speaking, last data on urban sprawl (EEA-FOEN, 2016) show how, between 2006 and 2009, it has increased in all the chosen countries; the highest percentage value is the one regarding Italy (+7%⁴⁴), then

⁴¹ this study “Urban Sprawl” is the Report 11/2016 of the European Environmental Agency (EEA) in collaboration with the Federal Office for the Environmental of Switzerland (FOEN). It is available at <http://www.eea.europa.eu/publications/urban-sprawl-in-europe>

⁴² 28 members of European Union and 4 members of the European Free Trade Association (EFTA).

⁴³http://ec.europa.eu/eurostat/statistics-explained/index.php/LUCAS_-_Land_use_and_land_cover_survey#The_LUCAS_survey

⁴⁴ this percentage is even higher than the average value (+5%).

Great Britain (+3,6%), the Netherlands (+3,2%), France (+2,9%) and Germany (+2,4%).

In order to face this situation, each of the chosen country, has decided to adopt different strategies. Each country is here presented⁴⁵ with regard to the different approaches applied: national strategies and/or policies, brownfield renewal, green belts and green infrastructures, measures for the landscape valorisation and densification/intensification measures.

France

The evolution of irrational urban development in France occurred rather late as to other countries, during the 70's and the 80's, but it had a greater impact than in Spain or even Italy (Pumain, 2002). Nowadays, the artificial surface is around 450 m² per inhabitant.

According to spatial planning, the central government of France sets the laws on the spatial planning system but from the laws of 1982-1983 there has been a significant shift to a logic of decentralisation, which has helped to speed up the process of urban sprawl and has given local authorities central power in dealing with the spatial development of towns. French planning system, through a series of laws, has been recently been adapted to incoming necessity and realities. Nowadays, Regions are in charge of developing some plans with an illustrative character, at a lower level SCoT are developed by some specific bodies in charge of it and PLU or PLUi are generally made up of some municipalities which draw a common territorial project. This type of planning has permitted to a major control of land take, while the previous plans were denounced to be not so restrictive (Guérois and Pumain, 2002). Another element, often denounced as the major institutional obstacle to a more rational regulation of the spatial development of cities, is communal fragmentation (Pumain, 2002). The issue of mastering urban sprawl is therefore linked to the definition of a more legitimate spatial frame; in this perspective, several attempts were made to improve inter-municipal cooperation between 1950 and 1990. In 1992, the release of the law on territorial administration, which reorganised inter-communality by giving it the means to be more effective and efficient, represented a turning point (Guérois and Pumain, 2002).

Regarding the environmental issue, in 2009 France set a new strategy for sustainable development for the period 2010-2013 (in line with the laws *Grenelle*⁴⁶) which puts high emphasis on the reduction of land take. The first issued *Grenelle* law of 2009 was later reviewed and integrated; it aimed at establishing a “comprehensive legal framework for the protection of the environment, the reduction of energy consumption and the improvement of

⁴⁵ France and Italy, as selected case studies, are presented just briefly as they are fully developed in chapter 4 and 5

⁴⁶ The first version of the *Grenelle Environnement* law refers to 2009; all the documents are available online at <http://www.developpement-durable.gouv.fr/La-documentation,29894.html>

economic and social stability” (EC, 2011: 80). The most innovative element of this law is the introduction of a specific planning tool, the *Trame Verte et Bleue* (TVB), as an attempt to better manage and protect biodiversity at different scales.

Germany

The “German federal system offers a model for distributing responsibility between federal and regional levels” (Keenleyside et al., 2009: s16). German territory is divided in 4 planning levels: National government (Bund), 16 Federal States (*Länder*), 114 Regional government and the municipalities (more than 11.000⁴⁷). The framework for land-use planning and management is provided and shaped by the Federal Spatial Planning Act of 1997. The Federal States, in charge of making operational this framework with a Planning Act, consist of different regions in charge of preparing specific regional planning guidelines. Such a system based on Federal states implies that the National government has little power in the regulation of land uses and development. Nonetheless, the municipal level has a considerable important role and its planning powers are regulated by the Building Law of 2004. In addition to this, the Federal Spatial Planning Act gives general orientations and objectives to the local level, which, therefore, still has a quite wide independence in regulation choices and in the valorisation of landscape and open space. This Federal system has led to different approaches in urban growth management, varying from very restrictive policies to flexible ones (Siedentop et al., 2016).

The German local level of planning is constituted by a non-binding preparatory land-use development plan (*Flächennutzungsplan*) which identifies future land uses according to projected needs and a more detailed land-use plan (*Bebauungsplan*) just for specific areas subject to transformation and growth, giving great importance to environmental issues. The *Bebauungsplan* must conform to the *Flächennutzungsplan*.

The issue of soil conservation has entered into the political agenda of both federal state and of municipalities. It was firstly introduced in 1985 and in 1998 the then Environmental Minister Angela Merkel set out for the first time a quantitative objective of land occupation reduction (30 hectares per day by 2020, corresponding to a quarter of the tendency of that period, instead of the values of 2000 of 129 ha/day). This target has been then resumed in 2002 when the National government presented the Strategy for Sustainable Development: its final aim is the zero-growth target by 2050. This necessary reduction is linked to the responsibility for future generations which characterizes the concept of sustainable development.

This national strategy has some important elements: the building of new areas must be sustained by a framework of economic and social costs, and planning

⁴⁷ This number is the result of a strong process of fusion between municipalities, as they were more than 24.000.

tools can be accompanied by economic and fiscal tools. Indeed, the German planning system has a lot of instruments oriented to promote an urban sustainable development. The frugal use of rural and natural land is contained into the building code and it is provided also at the local level; additionally, the law on soil conservation has regulated the reuse of brownfields and the law on environmental valorisation has strengthened landscape planning and it provides some tools to address land use. Beyond planning tools, the government can influence land use with economic and fiscal measures. We can then assume that the issue of soil valorisation is tackled at different scales of planning.

The path toward a zero-land take is then characterized by the quality improvement of urbanised soil (both building and infrastructures) in consideration to ecological necessities. In this sense, as said before, the promotion of brownfield regeneration is connected to an environmental compensation through the naturalisation of other areas.

At a local level, one of the most successful experience is the one conducted by Munich; heavily bombed and destroyed after WWII, the rebuilding process was a mix between the complete reconstruction as it was before the war and a rebuilding totally new. This approach led to the creation of new important public spaces. Indeed, EEA, for example, indicate Munich area for its capacity to have “remained exceptionally compact if compared to many other European cities. It is the only urban area among the 24 urban areas studied where the built-up areas have grown at a clearly slower pace than the population. Another indicator of compactness is the share of continuous residential areas compared with all residential areas built after 1955. In all other Western European cities studied almost all residential areas, built after the 1950s, are discontinuous in character, but in Munich only one third is of this character and two thirds are densely built” (2006: 46).

The city of Munich, indeed, since the ‘90s started to experiment some new and more flexible ways to carry out urban transformations. A well-known example is the initiative of *Sozialgerechte Boden Nutzung* – SoBoN (Socially equitable land use). The main objectives of this initiative are: to oppose the increasing lack of social housing and the constant rise of real estate prices (occurred in Munich since the ‘80s). The development of these new buildings included the duty to compensate the impacts that they could bring to the city; in this sense, the SoBoN initiative is one of the most known experiences for what concern the identification of specific mechanism for the urban development.

This initiative is the starting point for the drawing up in 1998 of the development and strategic plan of the city of Munich, *Perspektive München*. This plan chose to pursue a development based on three keywords - green, compact and urban - and to base itself above all on the regeneration of brownfields and the infill.

With regard to ecological compensation, the most important experience is the *ökokonto* (literally it means ecological account); it is a kind of bank account which contains eco-credits that each municipality can manage (and exchange) in

order to counteract damages and impacts caused by territorial transformations to natural environment. Municipalities are in charge to decide whether ecological compensation is necessary but, generally speaking, areas which need to be implemented with ecological compensation have particular requirements. In general, these compensations can be: renaturalisation of rivers, rewilding, reforestation, etc. Once they have been environmentally compensated, these areas have to be functional for the realization of an ecological network. We can easily assume therefore that this device is not only 'no land take' but it also provides a 'recreation' of nature.

Furthermore, in order to achieve the objective of 30 ha/day, the German Council for Sustainable Development published some recommendations and a specific research (REFINA – Research for Reduction of Land Consumption and for Sustainable Land Management) was launched. This necessity to reduce the artificial surface is mostly due to high density of urban agglomeration, despite the value of sealed surface per capita is about 10% below the EU average with 365 m² per inhabitant.

Great Britain

Probably, Great Britain has been the first country in the world where the phenomenon of urban diffusion and mass urbanization has appeared (Gibelli and Salzano, 2006) mainly because of its early history of industrialization. In fact, it dates back to before the Second World War when the general conditions of congestion and squalor in cities caused huge mass movements outwards. The government reaction to urban sprawl, during the post-war years, was swift and comprehensive. The central principle of the British approach to tackle urban sprawl was urban containment but it aimed also at leading to the improvement of urban life (for example by the clearance of slums and the redevelopment of the land).

In order to tackle urban sprawl, there was the need to restrict the physical growth of cities and towns in such a way that the built-up area of each does not expand for ever outwards and certainly does not merge with that of nearby urban centres (Champion, 2002). The British planning system has then been strongly influenced by Abercrombie's Greater London Plan (1944) which introduced the concept of New Towns (a planned overspill scheme) and of green belts (see 3.4.1), where no new buildings were allowed.

The whole national territory then became subject to development control under the provisions of the 1947 Town and Country Planning Act. The British land-use planning system⁴⁸ (as many other countries) gives local government the lead role.

⁴⁸ The overall approach to land-use planning is set out in the Planning Policy Statement 1 (PPS1)-

The planning act defines the concept of development and required local planning authorities to prepare development plans; they were the key tool for delivering land-use decision-making. “When determining a planning action, a local authority is guided by the development plan” (Keenleyside, 2009: s15), but it is not bound to it because the plan doesn’t confer the automatic right to develop and build. Therefore, it can be considered as a starting point for deciding whether transformations may take or not place. The development plans had to be submitted to the central government department for approval before they could be used for development control purposes (Champion, 2002).

Since the experience of the Greater London Plan, Great Britain has adopted green belts in other cities, including them in the latest National Planning Policy Framework (2012). This document places local plans at the heart of the planning system; they have to set a vision and a framework for the future development of the cities, addressing their policies towards a sustainable development (in relation to housing, economy, infrastructures, environment, etc.) that meets local needs and national priorities.

Related to the increasing relevance given to good soil administration, in 2009 Great Britain has set the new Soil Strategy for England “Safeguarding our Soils”. This document⁴⁹ provides a vision to guide future policy development across a range of areas and identifies some steps necessary to prevent further degradation of soils and to improve people’s awareness of the threats to soil. The English Strategy supports the aims of the EU Thematic Strategy on Soil Protection (2006) but it doesn’t follow all its suggestions, clarifying that the national action is more suitable to protect soils. Instead, the final report of the government’s Urban Task Force (“Towards an urban renaissance” of 1999) gives us some key elements for the regeneration of existing urban areas, especially the conurbations and larger cities. This report, best known as the Rogers Report, identified four key topics (and 105 recommendations) to produce the urban renaissance: recycling land and buildings, improving the urban environment, achieving excellence in leadership and delivering regeneration.

In line with all these policies, it is not surprising that Great Britain has one of the “lowest soil sealing indices in the EU, with only 156 m² per inhabitant, due to intensive (re)use of brownfields” (EC, 2011).

Italy

Italian planning system is still based on the national law n. 1150 of 1942, even though many attempts of renovation occurred since the ‘60s. One of the major changes is the modification in 2001 of Title V of the Constitution which introduced the concept of “*governo del territorio*” (literally territorial management); this discipline has a wider meaning with respect to the one of

⁴⁹ The document is downloadable at <https://www.gov.uk/government/publications/safeguarding-our-soils-a-strategy-for-england>

urbanistica and attempts to include different issues beyond the ones of land-use. This law gives great importance to the municipal level which is in charge of drafting a *Piano Regolatore Comunale* (or, as it happens in some regional contexts, the urban plan can be structured in three different components: *Piano Strutturale*, *Piano Operativo* and *Regolamento urbanistico*). The Italian urban plan (PRG) is structured upon regulation and zoning of land-use.

The topic of limitation of land take and soil valorisation entered in the national political debate in 2012 when the then Government of Monti attempted to approve a specific law on it. In 2014 there has been a new attempt of introducing the topic of land take in national legislation (*Disegno di Legge* n. 2039/2014 “*Contenimento del consumo del suolo e riuso del suolo edificato*” presented by the Environmental and Agricultural departments), but it did not succeed either⁵⁰.

The Netherlands

Compared to the other countries, the Netherlands, due to their morphological configuration and position, have quite a small territorial extension and together with Malta, Cyprus and Belgium, it is one of the most sprawled country in Europe (EEA-FOEN, 2016). The high value of sprawl can be then the direct consequence to the rising necessity to balance the limited territorial extension and the increase of housing needs.

In particular, the area of Randstad is a “polycentric planning concept of the metropolitan region in the western part of The Netherlands, connecting the major cities of Amsterdam and Rotterdam, The Hague and Utrecht. The Randstad consists of a horseshoe-shaped urbanized ring around a central open space, first in 1956 called ‘Green Heart’. In the Randstad, the rim cities form a belt and landscape the core” (Kühn, 2003: 23). This territory is mainly the result of anthropic actions, occurred to save land from water. The Green Heart entered into the tasks defined by the report of the National Spatial Planning of 1966 with the aim to protect it and in the report of 1988 when boundaries were improved. Since 1998, it has become Dutch National Landscape.

The Netherlands have experimented from 1995 to 2005 an intensive housing program, called VINEX, which proposed the building of 825.000 new houses but with a perspective of the compact city. Indeed, a percentage of these new houses had to be built with the urban core and only after reaching the maximum capacity it was allowed to build in the suburbs and in the edge of cities.

A third important element in Dutch initiatives is the ecological compensation, introduced by the Dutch government in 1993; it was addressed principally to contexts of large-scale projects (for example, highway planning). Similar to the German *ökokonto*, this tool aims at enhancing the value of nature through the definition of a set of compensation measures (Cuperus et al., 2001).

⁵⁰ We must also take into consideration the elections for the new Government which occurred the 4th March 2018.

Table 2: Different approaches to the issue of control of land take

	National strategies	Brownfield renewal	Green Belts and GI	Landscape measures	Densification measures
France		<ul style="list-style-type: none"> • Renewal of <i>friches industrielles</i> • <i>Renouvellement urbain</i> (SRU law) 	<i>Trame verte et bleue</i>		Future urbanisations within cities
Germany	Strategy for Sustainable Development (30 ha/day)		Regional green belt policies	ökokonto	
Great Britain	Safeguarding our Soils		National Planning Policy Framework		
Italy	Attempt to draft a national law on land take		Regional experimentations		
The Netherlands			Green Heart NEN	Ecological compensation	VINEX program

3.3.1 Specificities and dissimilarities

The analysis of these countries' policies highlights the presence of some common passages in their evolution processes. As a matter of fact, the planning tools introduced by the first European planning laws, most of which date back to the post-war years, share the common idea of zoning extended to all the municipal territory. Indeed, even though each country with its own specificities, they all had the necessity to rebuild highly bombed and damaged cities as fast as possible.

Great Britain and Germany are characterized by an old industrialization, while a country as the Netherlands has always had the issue to deal with a limited

territorial extension. These differences are also reflected in the type of approach against land take.

The 60's have then been characterised by the rise of the supra-municipal and metropolitan dimension with the creation of new planning tools more appropriate to control urban expansion (for example, SDAU in France and Structure Plan in Great Britain); the main objective of these tools was to soften territorial imbalances caused by urbanisation and socio-economic transformations. Nevertheless, in some cases, as the old French SDAU, for their not restrictive nature, they tended to favour the expansion of cities. This period appeared therefore to be very critical toward urban plans because they seemed to have caused the thoughtless development of cities outside the original core and with different characteristics (for example, the low density).

Major differences can be found in the definition by each country of the concession of the right to build. In fact, it generally depends on municipal decisions and it is contained in local plans. Nevertheless, this is not always true. In fact, local authorities in Great Britain, when deciding to transform and build in an area, are guided by a development plan but the right to build is not automatically given because they have to be first submitted to the central government department and then approved.

We have therefore to consider that the municipal level is not the most suitable one to decide efficient and effective ways to contrast land take; on the contrary, they can be one of the main causes which help urban sprawl (Guérois and Pumain, 2002). Indeed, most of the approaches analysed reflect the need to operate at a local, not municipal, level: green belts, ecological corridors, etc. In this perspective, France, principally due to its high administrative fragmentation, has carried out important actions of inter-municipalities, supported by State's laws and based on the principles of variable geometry and voluntary agreements.

All countries are nowadays dealing with incoming environmental issues and so they have started to draft some policies for a more sustainable development of cities and toward an improvement of the global situation. Following global and European policies, only few countries has established a quantitative goal to limit land take. Among the countries analysed, Germany, already in the 1990s, is the only one who has set a target with regard to limit land take. Despite the fact that the rate of increase has slowed down since 2000, it is common opinion that the target will not be reached (EEA, 2016). Nevertheless, apart from the identification of a quantitative goal, some countries tend not to structure at a national level some adequate strategies able to preserve biodiversity or soils (Italy as a first example).

The experience of English Green Belts represents one of the most known and relevant actions against the spread of sprawl; nevertheless, they weren't supposed to have an ecological and landscape function and, even if nowadays it could be a great opportunity, they seem to still lack this element. Therefore, this lack does not allow to insert them in an ecological approach.

3.4 The rising ecological approach

The different strategies analysed show how in the last periods and researches the attention in European policies has been mainly shifted to an ecological approach, or at least an attempt to integrate some ecological and environmental elements into territorial governance. There is indeed a rising awareness on the importance of preserving biodiversity and recovering old buildings instead of consuming virgin land (both natural, agricultural and forestry). The ecological approach to planning (McHarg, 1969; Steiner, 2008) takes the cue mainly from the American experience which, starting from a more general environmental approach, helps shaping, developing and transforming the landscape and the urban environment by taking into account its biophysical and socio-cultural elements.

In European discourses, ecology enters in a wider discourse about territorial governance; it is considered as “the process of the organisation and co-ordination of actors to develop territorial capital in a non-destructive way in order to improve territorial cohesion at different levels” (ESPON, 2007). In particular, territorial cohesion has become one of the goals of the European Union with the entry in force of the Lisbon Treaty (2009); the definition given by the EC (2008), states that “the concept of territorial cohesion builds bridges between economic effectiveness, social cohesion and ecological balance, putting sustainable development at the heart of policy design”. The concept of territorial cohesion is strictly related to the one on sustainable development and, in order to be better interpreted, they need to be integrated (EC, 2008). However, the Green paper on territorial cohesion does not give the same importance to these three component elements: the ecological dimension, compared to the others two, is less deepened. This dimension will indeed only be further better analysed in a specific report by EEA (2010).

It is in this discourse that green infrastructures (GI), identified in this thesis as one of the mayor strategy for containing land take, can play an important role in shaping future scenarios of sustainability. In order to foresee a good integration, GI are here intended as a planning tool, in the sense that they need to overcome their meaning strongly related to the field of ecology.

Over the past few years, after recognising the importance of sustainable development, also in relationship to urban environments, there has been an increasing necessity to integrate into urban environment also physical, social and ecological elements (Alberti et al., 2003). This integration derived from the need to mitigate some of the impacts generated by the construction of urban settlements at different scales.

Cities are identified as ‘complex ecological identities’ (Alberti et al., 2003) as they are dominated by a single component, the human one, who exchanges fluxes and energy. As we have seen before, human settlements, in the form of scattered or dense, affect land-use which has consequences on biodiversity, soil quality, permeabilisation, etc.

Since the beginning of the century, one of the “greatest challenge for ecology in the coming decades is to fully and productively integrate the complexity and global scale of human activity into ecological research” (Alberti et al., 2003). But what is the role that urban planners can play in such an important dynamic?

Since the end of the 90’s, there has been some attempts to integrate ecological principles into urban planning (Niemelä, 1999) by giving emphasis to a new concept, the urban ecology. Nonetheless, ecology is a concept which goes far beyond municipal boundaries and this condition can bump into how Italian urban plans are structured (with a strong dependence on administrative boundaries). In this sense, some traditional planning strategies appear to be reductive while the topic has to be tackled at a wider scale with the engagement of specific policies.

As said before, in order to reach a more sustainable development, one of the EU goal was territorial cohesion, which is strongly related to ecological issues. In this perspective, we can include the role of green infrastructures in the construction of sustainable policies (EEA, 2011b).

3.4.1 Green Belts

Green Belts are worldwide known for their role in controlling excessive urban expansion; nevertheless, in addition to this factor, in this paragraph, they are intended as a possible and suitable starting point for a general debate on green infrastructures (thus bringing ecological and landscape improvements). They can indeed play a crucial role in enhancing the sustainability of cities by the provision of ecological and environmental benefits (CPRE and Natural England, 2010; CPRE, 2016).

Green Belts have been primarily used to separate the compact city from the countryside in order to safeguard soil functions, agricultural lands and forests (Amati, 2008; Gallent et al., 2006). They are considered as one of the effective tools in environmental preservation and in the rise of new regeneration policies (CPRE, 2005) as in the definition of specific planning decisions with regard to the development of cities (Gallent et al., 2006). Nonetheless, in the last years, they are facing new issues and they are often criticized as a too much restrictive tool which does not allow to fulfil housing needs and the expansion of infrastructures (CPRE, 2005).

Origins and evolution

Green Belts has played a central role in the debate of Great Britain’s planning system; this is even more true if we consider that nowadays 15 English cities have adopted them as their key urban policy and they cover the 13% of English territory (Gallent et al., 2006). Indeed, they were first designed by Ebenezer Howard at the end of XIX century; they were included in the definition of Garden Cities. These cities, which were meant to delineate urban expansion, were thought to be surrounded by an agricultural and recreational area: the Green Belt.

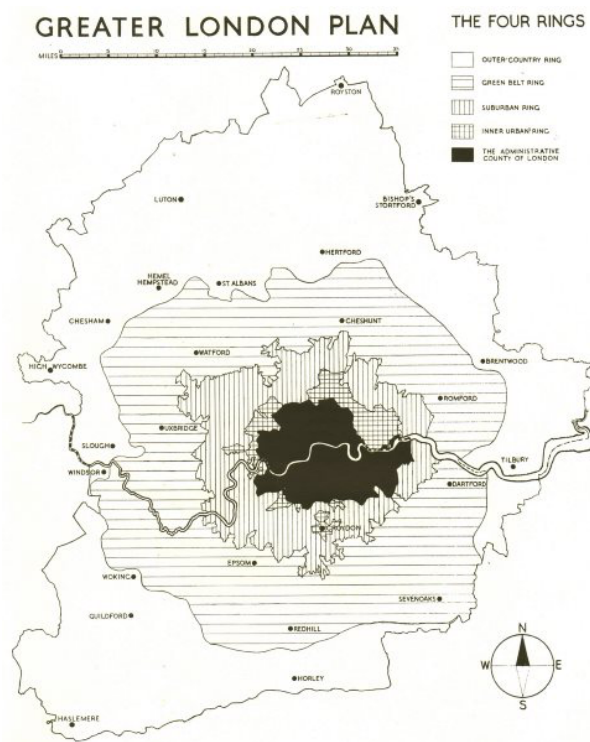


Figure 3: Greater London Plan, 1944
(source: Parsons and Schuyler, 2002)

They have been later recalled by urban planners and by supporters of the necessary separation between cities and countryside. Supporters of this current were Raymond Unwin in the 30's and then Patrick Abercrombie who used this concept in the proposal for the reconstruction plan of London of 1944, the Greater London Plan, (Nucci, 2004). Abercrombie proposed the identification of some open spaces with the goal of preserving the existing beauty of the farmland landscape and of improving the quality of life of the population. This plan has two main policies: the containment of urban development and the recovery of a local and communitarian dimension (Gaeta et al., 2013). In order to achieve these objectives, he elaborated different tools, such as the density control, a green belt and the creation of some satellite cities (the so-called New Towns). This green belt project identifies with its rationality inasmuch it is split in different parts, each of which has its own function.

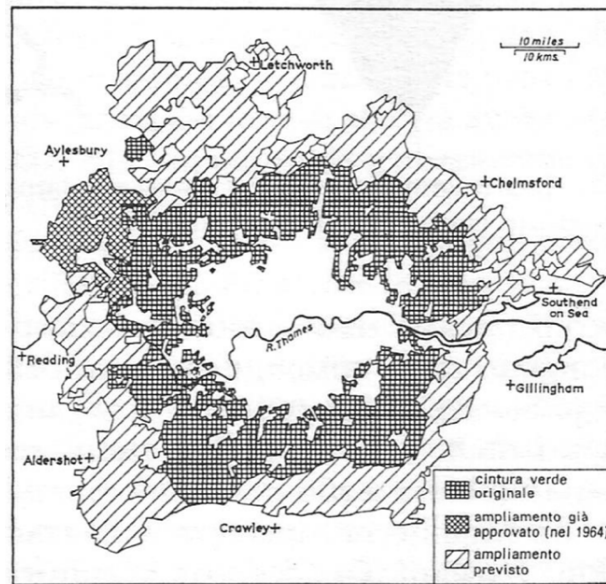


Figure 4: Enlargement of London's Green Belt in 1964
(source: Benevolo, 1993)

Green Belts reached their pick of popularity at the beginning of the 50's till the 70's.

In 1997, the Department of the Environment, Transport and the Regions (DETR) entrusted a commission of experts to draft a report on some European and American urban sustainable regeneration cases in order to identify useful guidelines for the development of English cities. The final report, *Towards an Urban Renaissance* (1999), identified green belts as a key tool in the prevention of urban decline but it also affirmed that there is the need for a more sophisticated and creative approach in the design of urban green areas.

The popularity of green belts in Great Britain has then been demonstrated by their integration first, in 1988, in the Planning Policy Guidance 2 (PPG2) and later replaced by the National Planning Policy Framework (NPPF) of 2012 (paragraphs 79-92). NPPF identifies five purposes:

- “to check the unrestricted sprawl of large built-up areas;
- to prevent neighbouring towns merging into one another;
- to assist in safeguarding the countryside from encroachment;
- to preserve the setting and special character of historic towns;
- to assist in urban regeneration, by encouraging the recycling of derelict and other urban land.” (DCLG, 2012 :19)

The popularity reached by Green Belts has therefore contributed to their diffusion outside Great Britain's boundaries (Amati, 2008). In fact, nowadays, different cities have attempted to design green belts: for example, Barcelona, Budapest and Turin in Europe, Washington DC, Cincinnati and Chicago in the United States, Tokyo, Bangkok and Seoul in Asia and Sidney and Melbourne in Australia. In Germany, as an example, Green Belts are one of the best-known

planning policies to contain land take and to manage urban growth (Siedentop et al., 2016). Indeed, in 1989, shortly after the fall of the Berlin wall, some German conservative associations seized the occasion to create a new green space that crosses the entire country. *Das Grüne Band* (the Green Belt), with a length of 1393 km, covers the area of the old line of the Iron Curtain. In addition to this, since the '70s, Green Belt policy has been integrated in different planning tools, from the regional to the local one. German regional plans⁵¹ usually combine Green Belts with other policies in order to strengthen growth management and control.

Nowadays, Green Belts are facing a period of transition and they are considered by some English researchers in a negative and critical way (Balen, 2006; Gallent et al., 2006). They criticize above all their action in peri-urban areas, where planning has acted with inertia: it attempted to contain urban expansion but without improving or managing better the territory and the landscape (Gallent et al., 2006). It is considered also that this tool has caused the depletion of agricultural soils inside of its territory and a consequent low landscape quality and public access (Barker, 2006). Nonetheless, Green Belts' policy is still strongly supported in urban and regional plans; as a significant example, the new London Plan⁵² includes among its policies the protection from inappropriate development and the enhancement of the already existing London's Green Belt.

Their value and their weaknesses are often associated to the debate on the increasing housing need, which suppose a greater necessity of land to build. Therefore, even though it is a contradiction because green belts were created to contain urban expansion, nowadays researchers and administrative bodies consider this characteristic as an obstacle to the necessary expansion. The most evident result is the development of unsustainable urban forms, based principally on a car-dependent model (Barker, 2006).

Green Belts have been, and still are, a good starting point toward a more sustainable development of European cities. In order to make them more efficient and effective, there is the necessity to rethink at their boundaries and to make them much more feasible than nowadays so that they can include different values (landscape, environmental and socio-economical). There is also the necessity to forecast a much more strategic and integrated policy in favour of landscape improvement and quality of life of citizens. In this perspective, the positive management of Green Belts can be a good starting point for the improvement of quality and for the diffusion of positive benefits.

⁵¹ 59 out of 96 German planning regions have included Green Belts in their planning tools (Siedentop et al., 2016)

⁵² This is the new strategic plan issued by the Mayor of London; in December 2017 the Plan has been made available for consultation.

3.4.2 Green infrastructures

In the last decades, the concept on green infrastructures has spread in different fields, researches and geographical contexts (Boyle et al., 2014) but the term does not have a single definition; the European Commission, in its communication on green infrastructures⁵³, defines GI as “a successfully tested tool for providing ecological, economic and social benefits through natural solutions” which “helps us to understand the value of the benefits that nature provides to human society and to mobilise investments to sustain and enhance them.”. American literature refers instead mainly to greenways (Ahern, 2004; Fàbos, 2004); there is not a shared common description of what GI are. Indeed, Mell identifies GI as “simultaneously a simple yet very complex approach to landscape planning.” (2016: 6) introducing thus the concept of GI in the wider notion of landscape multi-functionality. As a general reference for American literature, the definition given by the President’s Commission on American Outdoors in the USA in 1987 shows how greenways can provide to people living in cities the necessary accessibility to open spaces both through the creation of the link between urban and rural spaces and through the insertion of green spaces into cities.

At a European level, in 1995, at the third ministerial conference “Environment for Europe” held in Sofia, the ministers of the Member States declared the necessity to establish a Pan-European Ecological Network (PEEN). The construction of the PEEN, whose main final outputs are expressed in three different but comparable maps, is one of the objectives defined in the framework of the Pan-European Biological and Landscape Diversity Strategy (PEBLDS); this network aims at preserving European nature and biodiversity (ecosystems, habitats, species and landscape) through the identification of different core areas, corridors and buffer zones. This network, for its European breadth, tries to develop a coherence of European natural habitats and should serve as a general framework and a good starting point for the definition of each national and regional ecological network. Some European countries, in concert with the PEEN and “Natura 2000” network, decided to introduce in their national policy a project of national ecological network; for example, in 1990 the Dutch government decided to introduce the National Ecological Network (NEN), identifying it as a tool able to provide the basis for ecological sustainability and to maintain ecosystems’ functionality. As the Netherlands is a country relatively small and densely populated, habitats are continuously under pressure and are facing a process of ecological fragmentation.

Recently, GI have been entered as a key element of some European strategies and projects, such as the EU Biodiversity Strategy to 2020 and the Italian strategy

⁵³ Communication from the commission to the European parliament, the council, the European economic and social committee and the committee of the regions green infrastructure (GI) — enhancing Europe’s natural capital.

for adaptation to climate change. GI are generally identified as a priority objective for the recovering and maintenance of ecosystems and their related services.

Generally speaking, GI are identified as a network of interconnected green areas which brings benefits to population and permit the exchanges of species and the spread of biodiversity. Nowadays, they have acquired even more importance, with the introduction of the notion of ecosystem services (MEA, 2005). Ecosystem services are defined as the “benefits provided by ecosystems” (MEA, 2005: 39) and they gather four dimensions: provisioning services (such as food, water, timber, fiber and genetic resources), regulating services (climate, floods, disease, water quality and waste treatment), cultural services (recreation, aesthetic enjoyment and spiritual fulfilment) and supporting services (soil formation, pollination and nutrient cycling). They affect well-being at different scales, from the global to the local one (Ingaramo, Salizzoni and Voghera, 2017), and they can be integrated in environmental assessments (Rozas-Vásquez et al., 2018) and in urban plans (Cortinovis and Geneletti, 2018).

The broader concept of green and blue infrastructures (thus including also rivers) were firstly used in the landscape ecology studies (Forman and Godron, 1986; Burel and Baudry, 1999; Clergeau, 2007) and their main goal was to oppose the processes of biodiversity fragmentation. Burel and Baudry, for example, identified the notions of matrix, patch and ecological corridors which highlighted the importance to preserve them in order to protect biodiversity. Nowadays, GI are identified as one of the most adequate strategies for facing the challenge of climate change at different scales (Beatley, 2000; Demuzere et al., 2014) and to control land take (ISPRA, 2017) in terms of a qualitative use of soil (i.e. the experience of *Trame Verte et Blue* and the one of ecological networks of PTC2 of Turin and River Contracts related to them). GI are considered as one the main references for health and social, economic and environmental development (Benedict and McMahon, 2006). They are furthermore conceived to provide multiple benefits (both in urban and territorial contexts) thus providing to GI a character of multi-functionality (Lovell and Taylor, 2013; Hansen and Pauleit, 2014).

In my research vision, GI are considered as a natural backbone of territorial and urban plan's structure able to deliver in a not such strict and regulatory way a qualitative and limited land take. This vision takes the cue above all from the definition of the GI approach to land-use planning given by the Landscape Institute: “A GI approach to land-use planning, design and management enables us to demand and deliver more from the land in a sustainable way. By considering the widest range of functions an asset can perform simultaneously, GI can enhance the primary use of the land and unlock the greatest number of benefits. At its heart, the aim of GI is to manage the many, often conflicting, pressures for housing, industry, transport, energy, agriculture, nature conservation, recreation and aesthetics. It also highlights where it is important to retain single or limited land-use functions” (2009: 6).

The high relevance of green infrastructures in planning practice is also highlighted in the fact that many megacities (for example, London, Paris, New York City, etc.) have started taking into serious consideration the implementation of them in their planning and design policies at different scales.

Germany, as already identified in the paragraph on Green Belts, can be considered as a pioneer experimentation in the field of GI and Green Belts construction, above all at the regional level. An exemplary and well-known German case study is the Ruhr region. Formerly a coal deposit that originated in one of the largest and most productive steel and coal industries of Europe, in the '70s, after the industrial crisis of the '60s, its remediation has constituted a huge environmental and landscape matter.

Despite its industrial vocation, the Ruhr region is characterized by a long history of GI and green space management; the idea of GI dates indeed back to 1912 (Zepp, 2018). In the design of the Ruhr Region, the river Emscher has always played an important role, first as a source of water and energy provision and as a communication route and after as an ecological corridor to be valorized and reinforced. In 1989, politicians decided to launch an *Internationale Bauausstellung* – IBA (International Building Exhibition) in the Ruhr area. The result was the organization of the IBA Emscher Park, an area of 800 sq.km. which involved 17 municipalities and 120 different projects; its main strength point was to invest in ecological elements (such as green infrastructures) in order to improve environmental quality of the area but also to relaunch its economic performance. The final Emscher Park project integrated seven green corridors in order to create a new green backbone, a new metropolitan park connecting the entire Region. The general idea of the project was the realization of a plan that permitted the penetration of rural and green elements in the urbanized tissue. New strategic plans are underway, and their main aim is to make more attractive the Region in terms of sustainable design and development.

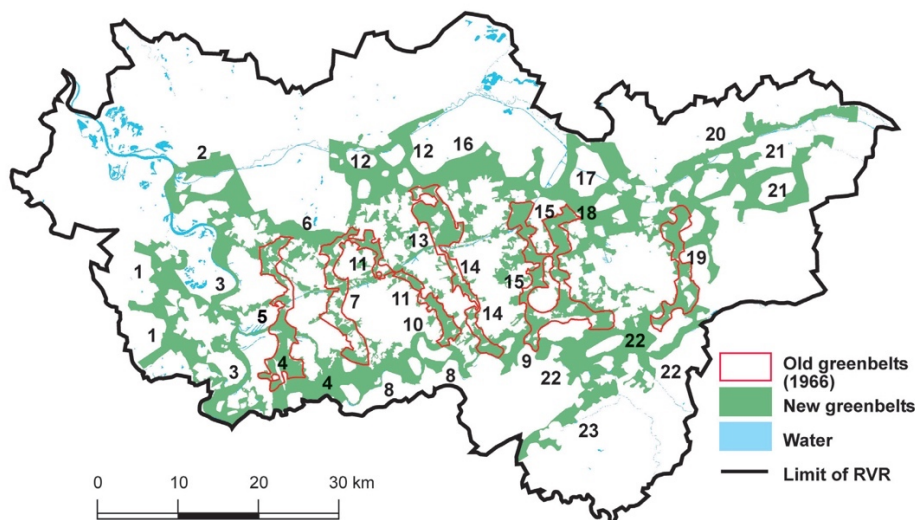


Figure 5: Green corridors of the Ruhr region
(source: Zepp, 2018)

In Italy, an important pioneering experience is the project of the *Rete Ecologica Marche* (REM – ecological network of the Marche Region). The regional law of Marche n. 2 of 2013 declared the institution and the regulation of a regional ecological network as a recognition of the importance of natural biodiversity, ecological processes and landscape preservation. The REM is a tool of analysis, interpretation and management of the ecological regional context which contributes to the process of construction of regional plans (territorial and landscape). Its main aims, adapting to European Union dispositions, are the valorization and preservation of ecological processes' integrity and its related ecosystem services, the mitigation of territorial and landscape fragmentation and the conservation of plant and animal species.

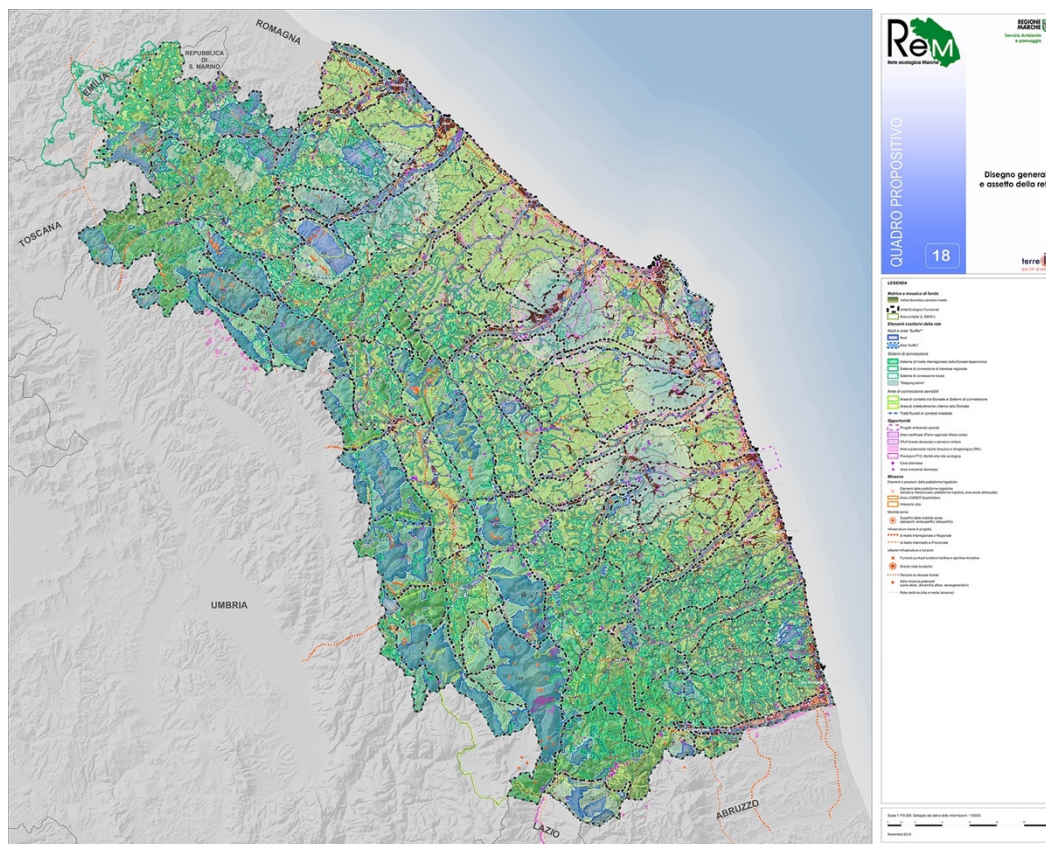


Figure 6: The general layout of the ecological network of Marche Region

The construction of the project of REM (2010) aimed mainly at “defining a complete framework for regional ecological systems and the relationships that govern them” and “providing tools to “contaminate”, with appropriate structural directions, the territorial policies that different entities (region, province, city, and so on) implement in their own skill areas, intervening on the tools used to plan vast and communal areas.” (Sargolini, 2013: 69). Due to the dispersed characteristics of Adriatic cities, the REM attempts to give a strategic territorial vision through the valorization of relationships between cities and peri-urban, ex-urban and open spaces (in a sort of territorial and ecological regeneration project). In this perspective, it can be considered both as a strategic tool and as the starting

point on which to redefine functionality and ecological elements of the Adriatic city.

The two cases presented, quite emblematic in the international context, show how ecological networks are designed at a large scale (thus, overcoming the limitation of municipal administrative borders) but they have relevant repercussions also at the local level.

3.5 Selection of case studies

The analysed countries show how the concept of land take and its limitation has entered, even if in different ways, in their national agenda. The wide range of elements analysed (national policies, brownfield renewal, GI policies, landscape measures, etc.) has been useful for understanding which of them could be better compared with Italy.

The selected country is France. The choice has fallen on it because it shares with Italy some common policy objectives and institutional design, but they also present some elements of discordance. Indeed, both countries are characterized by a highly fragmented administrative setting, even though with different ‘weights’; in particular both countries have a high number of municipalities (in particular the small ones) with respect to their territorial surface; France has in fact more than 35.000 municipalities while Italy more than 8.000.

The greatest difference is that in France the role and the willingness to cooperate into inter-municipalities is really strong whilst in Italy there is a strong sense of “individualism” felt by each municipality. This French cooperation includes planning activities and, as a first consequence, plans are not made by the different institutional levels on their own but by agglomerations (i.e. municipalities do not necessarily make a plan by itself but in collaboration with other municipalities which share a common objective). Both countries are administratively divided into 3 levels (Regions, Departments/Provinces and Municipalities) but French Departments do not have planning competences, while Italian Provinces carry out an important action of coordination between Regions and municipalities. French Regions do not have the same powers as Italian ones; only recently they have acquired some planning competences (above all in terms of sustainable development) but they still make little use of them. In addition to this, the process of regionalisation in Italy in the 70s’ was very massive and Italian regions, differently from the French ones, have the possibility to legislate. In this sense, almost every Italian Regions (p. 78) have promulgated specific laws on planning and land take; this factor has led to a diversified situation in each Region.

Since the latest changes in 2014, Italian Provinces and new Metropolitan Cities had to redefine their competences. Instead, wide-area planning in France (mainly represented by the tool of SCoT) is much more efficient and present than in Italy; indeed, since 1967, wide-area planning in France has led an important role in territorial and economic transformations.

France has recognized, among the main principles of planning, the necessity to limit land take and to use the land in an adequate way. In this sense, their continuous legislations on this topic offer a wide range of tools in favour of an environmental and ecological approach. Strongly connected to this, France recognized the importance of safeguarding biodiversity by introducing operational ecological elements, such as green and blue infrastructures, into the planning process at different scales.

Both countries are carrying out specific studies at a national level on the quantification and evolution of land take. On one side, ISPRA in Italy (subordinated to the surveillance of the Ministry of Environment) draws up every year a report and on the other side the French Ministry of Agriculture, food farming and forestry has created a specific national observatory for monitoring land take.

Chapter 4

France and Italy: strategies for land take containment

The two chosen countries as case studies are France and Italy, with a specific focus on the then region of Rhône-Alpes and the one of Piedmont. According to Nadin and Stead, indeed, “the form and operation of planning systems are embedded in their historical context, the socio-economic, political and cultural patterns that have given rise to particular forms of government and law” (2008: 35). In this perspective, the two case studies are defined within their morphological context and their planning tools.

This chapter provides a comparison of different elements of both countries; first under a quantitative perspective with the quantification of land take (par. 4.1) and then a brief analysis on each planning system in relation to the European context (par. 4.2). Successively, the two countries are analysed with regard to their administrative and institutional setting (par. 4.3) and the structure of their planning systems (par. 4.4), as they are closely connected.

This chapter gets then into the description of the two case studies (the regions of Rhône-Alpes and Piedmont), framing them with respect to two different factors: the morphological and administrative context of each of them and the different planning tools which insist on the two territorial contexts, analysing the main challenges they attempt to face and overcome. The analysis of the different geographical and morphological contexts is important as environmental impacts of land take depend also on these factors. It is indeed relevant to focus not only on the quantitative dimension of land take but also on the typology of land which has

been taken. The aim of the first analysis is then to understand the main characteristics which specify each territory and the second analysis tries to put in relation these specificities within each planning tools.

4.1 The spread of land take in France and Italy

Land take, as seen in paragraph 2.1.2, is a phenomenon widely spread all over Europe. In particular, France and Italy, even though with a different approach, have started developing some specific indicators and researches able to quantify the extension of this phenomenon.

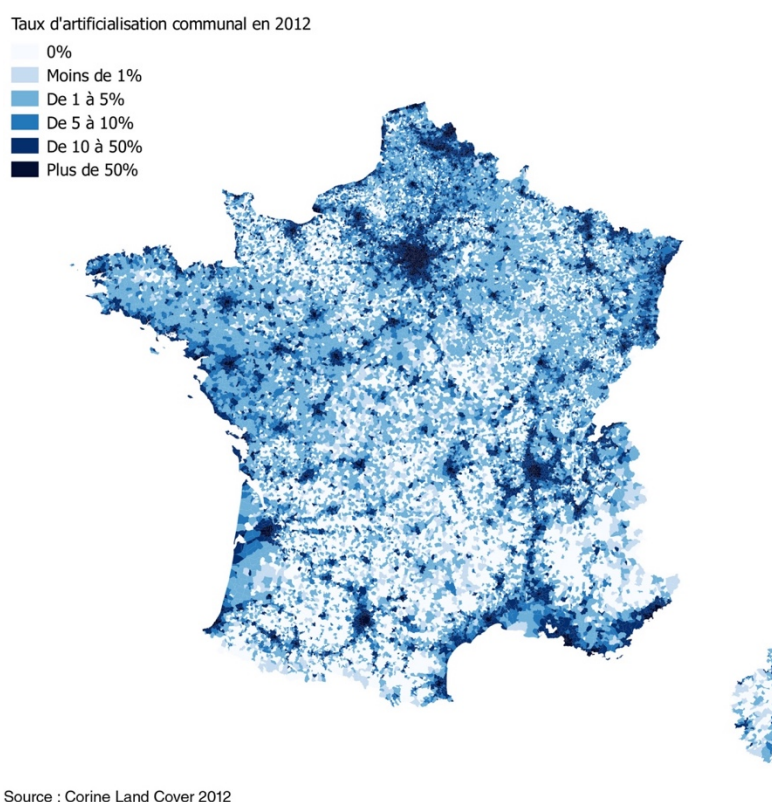


Figure 7: Municipal land take in France
(source: SEEIDD, 2017)

France, in its report “Théma – Artificialisation. De la mesure à l’action” of 2017, bases its analysis on CLC 2012 data and this decision of methodology can facilitate the comparison with other European countries. French situation is very diversified within the continental territory (thus excluding overseas territories); the highest level of sealing is indeed more developed along the coastal zone, in

particular on the Mediterranean and the Atlantic coast. A similar situation can be found around some major urban agglomerations, such as Paris, Toulouse, Lille, Bordeaux and Nice. The evolution of the phenomenon between 1990 and 2012 (figure 8) shows how it has mainly concerned the Côte d'Azur and the area near the Spanish border.

This report can be a good starting point for future researches and for the realization of urban planning, but it comes up to be just a recipient of heterogeneous information. In this sense, it cannot be already identified as a tool for monitoring every year land take in France.

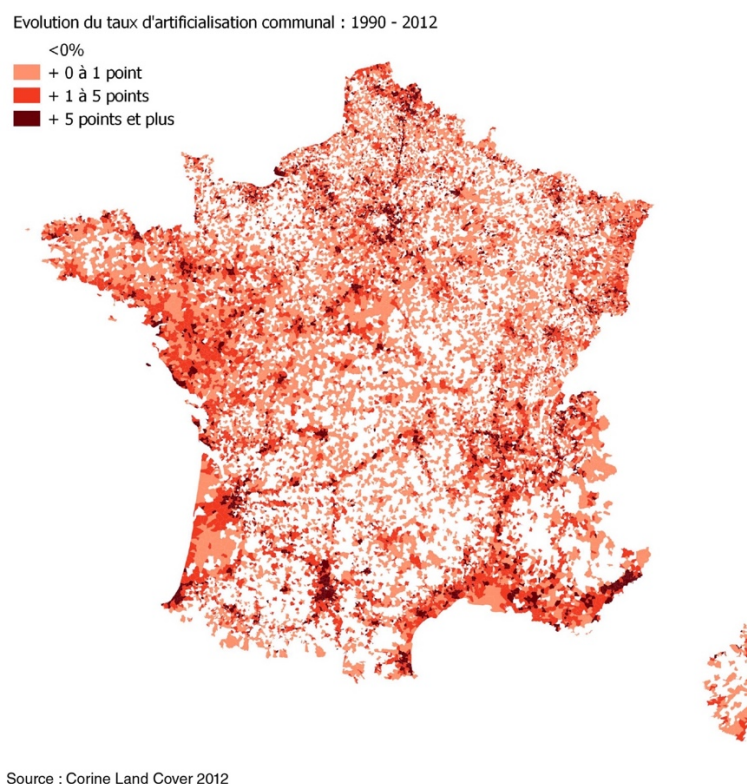


Figure 8: Evolution of land between 1990-2012
(source: SEEIDD, 2017)

In Italy, the research institute who leads and keeps up-to-date the database on land take is ISPRA⁵⁴. The 2015 report offers an overview of the major issues

⁵⁴ ISPRA (Istituto Superiore per la Protezione e la Ricerca Ambientale) has presented its 2015 report (Report 218/2015) during the national conference "Recuperiamo terreno".

The report is available to download online at <http://www.isprambiente.gov.it/it/events/recuperiamo-terreno>

caused by soil sealing in Italy, giving a wide range of quantitative values and indicators. Soil sealing keeps increasing, even though it has shown a sort of slowdown: between 2008 and 2013 the phenomenon has concerned on average 55 hectares per day. National values (as it can be seen in table 3) show how land take has passed from 2,7% in the 50's to an evaluated 7% in 2014.

Table 3: Estimated values of soil sealing
(source: ISPRA, Rapporto 218/2015)

	50's	1989	1996	1998	2006	2008	2013	2014
Land take (%)	2,7%	5,1%	5,7%	5,8%	6,4%	6,6%	6,9%	7%
Land take (sq.km.)	8.100	15.300	17.100	17.600	19.400	19.800	20.800	21.000

The increase of land take in Italy and the differences between all the regions is even more evident if we compare the map of 1950 and the one of 2015 (figure 9).

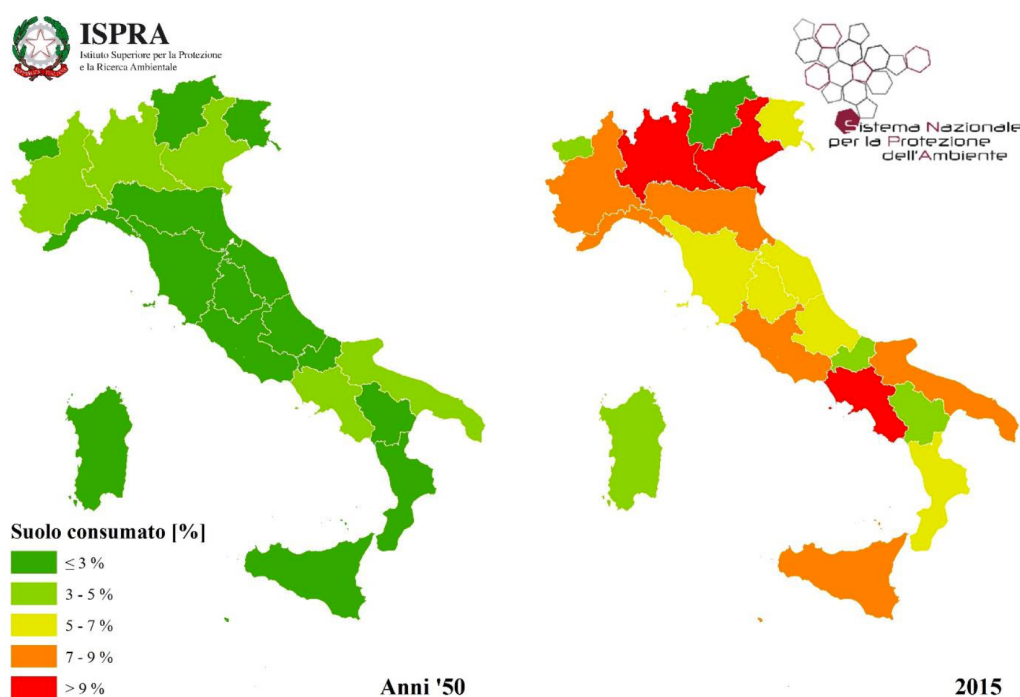


Figure 9: Evaluation of soil sealing at a regional level in 1950 and 2015
(source: ISPRA, 2016)

These data are confirmed also in the latest report by ISPRA⁵⁵. In June 2016, the total amount of land take is 23.039 sq.km. (corresponding to a 7,64%); this value confirms the slowing down of the process that started since 2013.

The most recent maps (figure 10) show how the most interested areas are the northern ones, the axes between the cities of Florence and Pisa, the region of Lazio, Campania and the southern part of Puglia and the coastal ones (ISPRA, 2017).

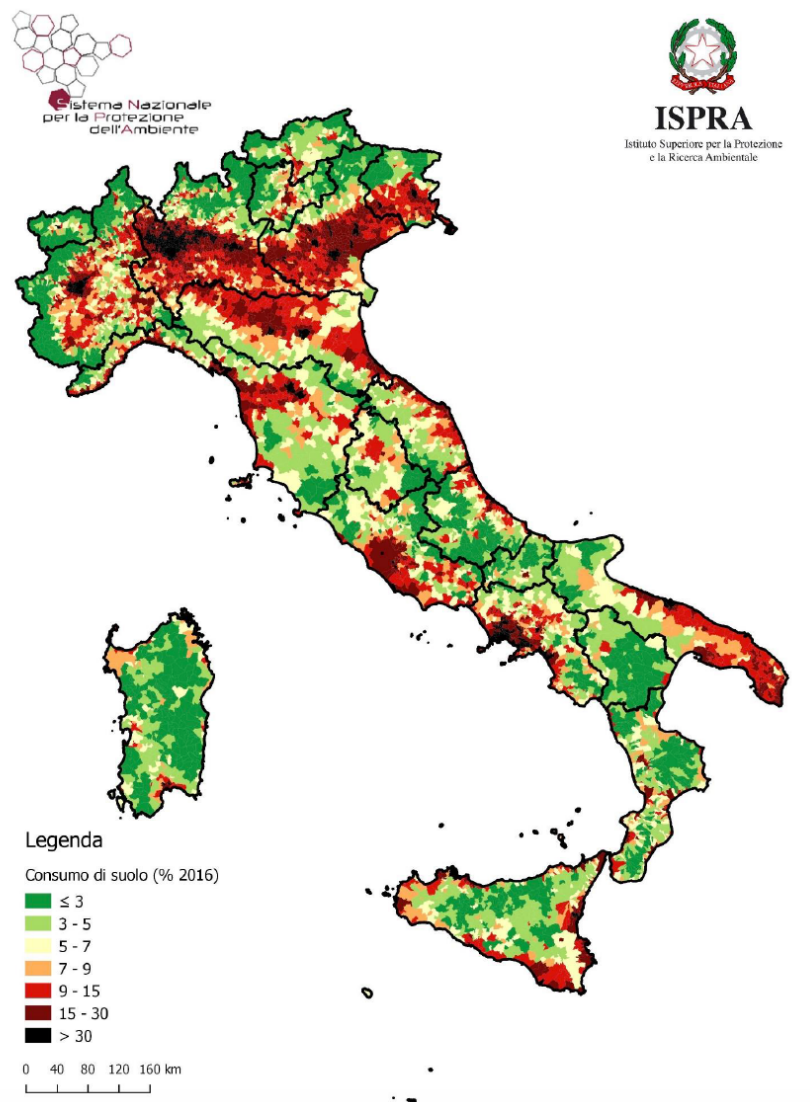


Figure 10: Land take at a communal level
(source: ISPRA, 2017)

⁵⁵ Rapporto 266/2017 “Consumo di suolo, dinamiche territoriali e servizi ecosistemici”

4.2 The two countries in the international context

Since the variety of European administrative settings, which affect the planning systems (Nadin & Stead, 2008), the first step is to understand how the planning systems of the chosen countries place themselves in the European framework. In this sense, it is useful to provide a short overview on different classifications (Davies et al., 1989; Newman and Thornley, 1996; CEC, 1997; ESPON, 2007) of European spatial planning approaches.

The concept of spatial planning is relatively new, and it doesn't have a precise definition; on the contrary, it has been used as a "generic term to describe the ensemble of territorial governance arrangements that seek to shape patterns of spatial development in particular places" (Nadin and Stead, 2008: 35). Comparative studies on European planning systems helped to aggregate them in similar families.

The first two studies, in order to compare different planning structures, took into consideration only an element of analysis: the legal and administrative framework of each country. This analysis led to the subdivision of planning systems based on their legal families or models of legal frameworks. While the study by Davies et al. (1989) identified only two legal families with few countries analysed (and Italy was not included in the selection of countries)⁵⁶, the analysis by Newman and Thornley (1996) extended both the families (becoming five) and the countries analysed (also Italy is included). The five families are: Germanic, Scandinavian, Napoleonic, British and Eastern Europe (with no countries). In this case, both France and Italy have been included in the Napoleonic family⁵⁷. Although it can be considered as the first great work on comparison of planning system, the choice of just one criteria of comparison tends to be their strongest limit (Gaeta et al., 2013).

Very different are the approaches used in comparative studies led by supranational bodies; the first one is the EU Compendium of Spatial Planning Systems and Policies of 1997. This study took in consideration a wider selection of countries (15 EU Member States) and proposed seven factors of comparison: the scope of the system, the extent and type of planning at national and regional levels, the locus of power, the relative roles of public and private sectors, the nature of the system of law, the constitutional provisions and administrative traditions, the maturity or completeness of the system, the distance between

⁵⁶ This study mainly compared England with some other European countries.

⁵⁷ France can be considered as the perfect prototype of this tradition.

expressed objectives and outcomes (CEC, 1997). This ensemble of factors has led to the identification of four major spatial planning approaches or four “ideal types” of planning tradition: a regional economic approach, a comprehensive-integrated approach, land use management and urbanism. The two countries place themselves in two different classes: France has a regional economic approach while Italian planning system is listed under the fourth approach, urbanism. The first approach, the regional economic one, is characterized by a strong role of the central government which leads important functions in “managing development pressures across the country” (CEC, 1997: 36). Another country belonging to this approach is Portugal (and in some parts also Germany).

Table 4: European spatial planning systems comparison

(source: Nadin V. and Stead D. (2008), “European spatial planning systems, social models and learning”, *disP – The Planning Review*, vol. 172, no. 1, p.)

Davies et al. (1989)		Common law England		Napoleonic codes DK, DE, FR, NL		
Newman, Thornley (1996)	Nordic DK, FI, SE	British IE, UK	Germanic AT, DE	Napoleonic BE, FR, IT, LU, NL, PT, ES		East European
CEC (1997)	Comprehensive integrated AT, DK, FI, DE, NL, SE	Land-use regulation IE, UK (and BE)		Regional economic FR, PT (and DE)	Urbanism GR, IT, ES (and PT)	
ESPON (2007)	Comprehensive integrated AT, DK, FI, NL, SE, DE (and BE, FR, IE, LU, UK) BG, EE, HU, LV, LT, PL, RO, SL, SV	Land-use regulation BE, IE, LU, UK (and PT, ES) CY, CZ, MT		Regional economic FR, DE, PT (and IE, SE, UK) HU, LV, LT, SK	Urbanism GR, IT, ES CY, MT	

The approach of urbanism, instead, is typical of southern European countries (Greece, Italy and Spain) and “has a strong architectural flavour and concern with urban design, townscape and building control” (CEC, 1997: 37). Regulation in this category “has been undertaken through rigid zoning and codes” (CEC, 1997: 37).

In 2007, a European research (ESPON – Governance of Territorial and Urban Policies from EU to Local Level) tried to update and implement with new EU Member States (29 countries in total) the EU Compendium of 1997. There is a general shift toward the comprehensive integrated approach; France, for example, is one of these countries which is moving toward this approach. Another movement is the one toward the regional economic approach (United Kingdom, Ireland, Sweden and Germany).

4.3 The administrative and planning structure

4.3.1 French institutional setting

In order to better analyse a planning system, it is fundamental to study how the administrative structure of a country is built. France, differently from Italy, has always had a strong and efficient action led by the central government; indeed, it “determines the scope, the goals, the amount of money involved, and the matters (in broad terms) for the plan conventions to be passed within the regions for five-year periods, as provided by the Planning Reform Act 1982” (CEC 2000a: 19). Nevertheless, even though this process for decentralization occurred since the beginning of the ‘80s, the central State has not decreased the importance of its role but actually, in the opinion of some analysts, it has even reinforced it (ESPON, 2007). Nonetheless, the process of decentralization had important impacts on spatial planning and on vertical relations among different administrative levels. The aim of the decentralization process was to increase the power of regional and local (and inter-municipal) bodies but the role of central State was always important. In this sense, decentralization process gave the possibility to local and regional bodies to interact actively with the central State.

In fact, apart from the central State, France is characterized by a huge number of municipalities (35.357) which are often very small realities in terms of population and territorial extension. The intermediate level is represented by

Departments⁵⁸ (101), the oldest level since its creation during the French revolution's period, and then the regional level by Regions⁵⁹ (18⁶⁰ till 2016). These data explain why the necessity and the will to cooperate between each other is high; the different local initiatives (mostly the inter-municipal ones) influenced a lot the framework of French planning system.

Regions are the administrative level which have been mostly interested by territorial reorganization of the last years. Despite this, French Regions, differently from the Italian ones, do not have great power in planning processes and policy making as they do not legislate.

The creation of the first metropolitan areas was mainly made necessary to counterbalance the economic and cultural predominance of the Parisian region (Gravier, 1947; de Bujadoux, 2015). The concept of metropolitan areas came back in 2014 when France started carrying out a deep change in territorial reorganization, by creating *Métropoles* and, in 2015, redefining Regions. These changes led to a general redistribution and reorganization of competences between the different levels.

Métropoles has been constituted by the *Loi de Modernisation de l'Action Publique Territoriale et d’Affirmation des Métropoles* of 27th January 2014. The *Métropole* comes under the group of EPCI⁶¹ which gathers a group of municipalities with similar characteristics (art. L5217-1 of the *Code général des collectivités territoriales*). On the 1st January of 2015 a set of new *Métropoles* was created: Rennes, Bordeaux, Toulouse, Nantes, Brest, Lille, Rouen, Grenoble, Strasbourg, Montpellier and Lyon⁶². Instead, the *Métropoles* of Grand Paris and Aix-Marseille-Provence have been created one year later (1st January 2016). The perimeter of *Métropoles* is not fixed and it can be changed, confirming thus the variable geometry of French planning policies (Gibelli, 2016), which has always been important in the creation of inter-municipalities.

The creation of *Métropoles* can be considered as the beginning of the clarification of local competences; in fact, this new body has the task to enhance

⁵⁸ Departments were created by the Revolution (law of 22th December 1789) and are an administrative district of the State. The prefect represents the different State administrations at a territorial level (INSEE).

⁵⁹ Regions are the most recent structure of French administration; they have become a territorial community (*collectivité territoriale*) since the law on decentralization.

⁶⁰ 12 Regions in metropolitan France, Corsica with a special statute and 5 Regions overseas.

⁶¹ *Établissement public de coopération intercommunale*, this term gathers all forms of inter-municipalities (in accordance with the law Chevènement of 1999: *Communautés Urbaines, Communautés d’Agglomération and Communautés de Communes*).

⁶² the Metropole of Lyon has a special statute as it assumes the competences usually conferred to the Department.

the competitiveness and the cohesion of the territory. This can be done by developing a common planning project of the territory involved with a regard on economic, ecological, educational, social and cultural issues.

2015 has then been the year where most of territorial changes were made. In January, a specific law on the new delimitation of Regions was promulgated. They have been gathered and the number of metropolitan Regions passed from 22 to 12, to which it is necessary to add the territorial community of Corsica.

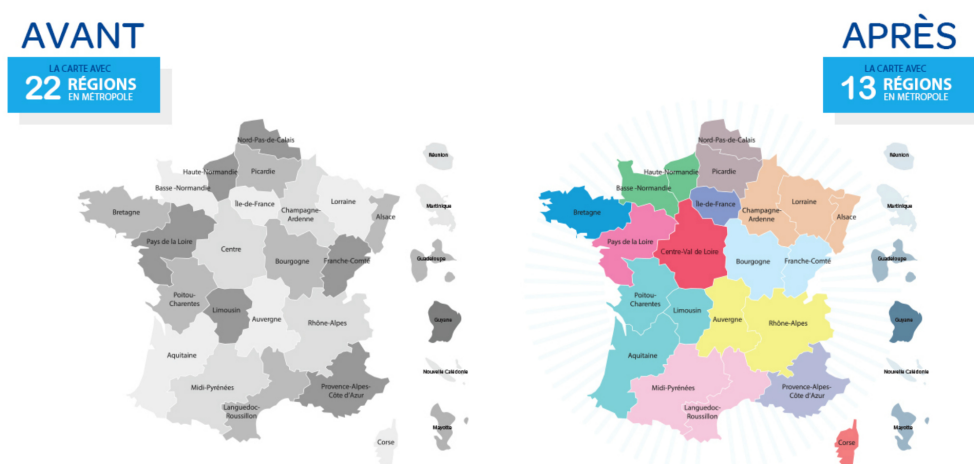


Figure 11: French Regions before and after the promulgation of the law NOTRe (source: <http://www.gouvernement.fr/de-22-a-13-regions>)

After that, the promulgation of the *Loi n. 2015-991 portant nouvelle organisation territoriale de la République* (also known as *Loi NOTRe*) sets a series of deep changes in the French territorial organization. This law has redefined and clarified competences between administrative levels and has added new competences to Regions.

The role of inter-municipality

The level of municipalities in France plays an important role in planning strategies. Due to the high number of them, many of which have very small demographic dimensions, France, since the 22nd March 1890⁶³ created different types of municipal associations. This law established the first type of cooperation between municipalities, the *syndicats intercommunaux à vocation unique* (SIVU),

⁶³ Law of 22nd March 1890 which established the *syndicats intercommunaux à vocation unique* (SIVU).

followed by the *syndicats mixtes* in 1955 and *syndicats intercommunaux à vocation multiple* (SIVOM) in 1959.

In this perspective, French inter-municipalities present themselves as a rational tool of territorial organization. They are often created upon voluntary agreements, which must be done on the basis of a common project of territorial development and not only for financial purposes. The procedure was formalized within the framework of the *Loi n. 99-586 relative au renforcement et à la simplification de la coopération intercommunale* (also known as “*loi Chevènement*”) of 12th July 1999. This law reformed quite deeply the inter-municipal organizational modes by abolishing some forms (as districts and *communautés de ville* created in 1992) and creating new ones, *communautés d’agglomération*⁶⁴, *communautés urbaines*⁶⁵ and *communautés de communes*.

These forms of associations come under the name of EPCI (*établissement public de coopération intercommunale*) and they are differentiated depending on their type of funding, with or without an autonomous tax system – *fiscalité propre*. EPCI with an autonomous tax system fix and collect taxes must carry out two specific and mandatory competences: the economic development and the *aménagement de l’espace*. After the promulgation of the *Loi de Modernisation de l’Action Publique Territoriale et d’Affirmation des Métropoles*, the EPCIs with an autonomous tax system are: *communautés de communes*, *communautés d’agglomération*, *communautés urbaines*, *syndicats d’agglomération nouvelle* and *métropoles*. EPCIs without an autonomous tax system are *syndicats de communes* (SIVU and SIVOM) and *syndicats mixtes*. On 1st January 2017, the total amount of EPCIs was 1266⁶⁶, a decreasing value with respect to 2016 due to the high percentage of communal fusions. Indeed, even if it represents a different process, communal fusion, in the last two years, had a great impact on territorial organization, above all in the North-Western area of France.

4.3.2 Italian administrative organization

Italian *comuni* have a long history, since their birth can be dated back to year 1000 when the feudal crisis started. The creation of *comuni* arises from the willingness of a public organization of the city and of a rural land control (*contado*) in order to

⁶⁴ They are an EPCI which gathers many municipalities with an overall population of more than 50.000 inhabitants. They gravitate on one or more municipalities with more than 15.000 inhabitants (INSEE).

⁶⁵ They extend on a territorial portion with a population of more than 500.000 inhabitants.

⁶⁶ <https://www.interieur.gouv.fr/Archives/Archives-des-actualites/2017-Actualites/Situation-de-l-intercommunalite-au-1er-janvier-2017>

include it into the city's boundaries. This policy has caused, with regard to the territory and in line with the previous feudal politics, a fragmentation of the land, intended as the source of food and raw materials.

In this perspective, since the beginning, Italian administrative structure represents a particular model based mainly on a vision from the bottom; municipalities are indeed the bodies which ruled relationships among citizens. From this highly fragmented system (in geographical terms but also historic and economic ones), it was instituted the Italy of 8.000 municipalities (that still exist) and this situation will not be weakened by the following birth of other administrative bodies (Provinces and Regions).

Nowadays, Italy is still characterized by a high number of municipalities (8.092) and it is divided in 20 Regions (16 ordinary and 4 with a special statute), 10 Metropolitan cities and 97 Provinces (2 of which, Trento and Bolzano, are autonomous). Italian regions are distinguished between regions with a special statute and ordinary ones. On the one hand, Italian regions with a special statute and the two autonomous provinces of Trento and Bolzano were already present in the post-war years (late '40s) and they already had competences in the field of urban and regional planning. On the other hand, Italian ordinary regions were instead instituted in 1970 and since 1972 they acquired competences in regional and urban planning through a series of national decrees. Differently to French regions, the Italian ones have legislative power as well as the two autonomous provinces of Trento and Bolzano.

In the definition of local autonomies, an important step has been the law n. 142 of 1990, which defines the organisation of them in a unique legislative text. This law renovates the structure and the competences of local bodies in an organic and coordinated way. It establishes new bodies – metropolitan cities⁶⁷ – and by doing this it redefines the administrative subdivision of Italian territory.

The main topic of this law is the redistribution of competences (including planning) with particular attention to municipal and provincial ones. Indeed, provinces are no longer simply intended as an intermediate level between regions and municipalities, but they acquire new functions with regard to territories and environment. Intermediate bodies, provinces and metropolitan cities, are in charge of drawing up a *Piano Territoriale di Coordinamento Provinciale* (PTCP).

Great emphasis is also put on possible collaborative forms between local bodies: associations, unions and even fusion. Generally speaking, the law

⁶⁷ Metropolitan areas, identified at article 17, are Turin, Milan, Genova, Bologna, Florence, Rome, Bari and Naples.

encourages municipalities, above all the small ones, to a progressive merger in order to reach the creation of unions and fusions. Unions are a new typology of local bodies and they concerned mainly small municipalities, as only a municipality with a population within 5.000 and 10.000 inhabitants could join a Union. The constitution of a Union was totally a voluntary choice made by municipalities; only regions play a coordination, promotion and incentive role. Nonetheless, the major obstacle to constitute Unions was the subsequent duty to fuse into a single municipality; this duty was mainly seen by small municipalities as a loose of individual powers.

The following laws⁶⁸ will be focused on the principle of subsidiarity, in order to move closer to the concept of individual autonomy, so strongly wanted by Italian municipalities.

In 2000, there has been a complete revision and integration of the unique text on administrative bodies⁶⁹. The main intention was to clarify and organize a subject of such vast competence which was delineated by a series of different legislative norms. This law gathers, in a systematic framework, dispositions in the field of institutional organization, electoral system, juridical state of administrators, financial system and organization of municipalities, provinces and associations.

Successive laws⁷⁰ on this subject have one main element in common: through the institution of unions, they pursue the objective of decrease spending. In 2011, under the technical government of Monti, there is an important review of the role of provinces and their conformation (it has been forecasted a suppression of some of them, resulted by the union between each other).

Since 2014, Italy is experiencing a legislative revision process through the institutional rearrangement and with a correspondent redistribution of competences between different levels. Hinged on the logic of costs reduction, (“spending review”), the Delrio law⁷¹ pursues two important objectives: the reduction of the number of territorial entities and the definition of appropriate

⁶⁸ legge 15 marzo 1997, n. 59 “Delega al Governo per il conferimento di funzioni e compiti alle regioni ed enti locali, per la riforma della Pubblica Amministrazione e per la semplificazione amministrativa” and its following implementing decrees.

⁶⁹ decreto legislativo 18 agosto 2000, n. 267 “Testo unico delle leggi sull’ordinamento degli enti locali”.

⁷⁰ 5 maggio 2009, n. 42 “Delega al Governo in materia di federalismo fiscale, in attuazione dell’articolo 119 della Costituzione”.

Decreto legge 13 agosto 2011, n. 138 “Ulteriori misure urgenti per la stabilizzazione finanziaria e per lo sviluppo” converted into law the 14 settembre 2011, n. 148.

⁷¹ Law April 7th 2014, n. 56 “Disposizioni sulle città metropolitane, sulle province, sulle unioni e fusioni di comuni”.

tools able to manage the growth of cities in a more cohesive way. These objectives can be identified as an attempt to overcome municipal's boundaries which too often lead to an incoherent and negative planning system. The Delrio law identified 10 Metropolitan Cities (Torino, Milano, Genova, Venezia, Bologna, Firenze, Roma, Napoli, Bari and Reggio Calabria) and their boundaries correspond to the ones of the pre-existing Provinces and, more or less, they have the same functions; this choice led to additional complications instead of simplifications. The old Provinces have become entities elected by the municipal council (indirect election) and small municipalities (less than 10.000 inhabitants) have the obligation to aggregate in a union.

4.4 Urban planning, territorial and landscape governance

4.4.1 French planning laws and tools

The first operations in territorial management and planning date back to the years after the Second World War, when the necessity to rebuild and to define the future expansions of French cities was great. Different methods were applied first to counterbalance the weight of Paris and the spatial imbalances that this situation provoked, above all in economic terms (Gravier, 1947; Faludi and Waterhout, 2002; de Bujadoux, 2015). In this case, even though policies were centralized, their main aim was to counterbalance the effect of centralization (ESPON, 2007). The central State provided itself with some means of economical intervention⁷² and proposed a national plan⁷³. An important achievement to pilot spatial planning at a national level was the creation in 1963 of the DATAR⁷⁴, placed under the responsibility of the Prime Minister, an Inter-ministerial organ in charge of promoting and coordinating the actions of State in the field of *aménagement du territoire*. According to Faludi and Waterhout (2002), this concept does not have an equivalent in English as, differently from spatial and regional planning, it includes also an economic emphasis. *Aménagement du territoire* is then identified

⁷² particularly, in order to steer the necessary expansion, starting from 1946, the State directly controlled energy and transports with the support of some national institutes (as the National Institute of Statistics - INSEE).

⁷³ in 1950, the then Minister of Reconstruction and Urbanism, Eugène Claudius-Petit, presented some recommendations *pour un plan national d'aménagement du territoire*; he proposed for example the decentralized industrialization of penalized regions, the renovation of agriculture and a better organization of cultural activities throughout the country (de Bujadoux, 2015).

⁷⁴ *Délégation interministérielle à l'aménagement du territoire et à l'action régionale*

as one of the four approaches (the regional economic one) to spatial planning by the European Compendium (1997).

Since the first law of 1967 urban and territorial planning has played a central role in France. Planning in France is not always related to fixed boundaries such as the municipal and the departmental ones; indeed, France has always developed planning strategies and tools with reference to a variable geometry made up by different municipalities with similar objectives.

New planning tools were introduced in the *Loi n° 67-1253 du 30 décembre 1967 d'orientation foncière*. This law set up two planning tools at different scales: the *Schéma Directeur d'Aménagement et d'Urbanisme* (SDAU) and the *Plan d'Occupation des Sols* (POS). These tools were first made in collaboration between the State and municipalities and only with the laws on decentralisation of the '80s they were entirely devolved to municipalities. The POS, developed by municipalities, was conceived mainly for land use regulation (Guérois and Pumain, 2002), as it established each parcel assignment and the related building rights. The density of future urbanisations was identified by a coefficient, the COS (*Coefficient d'Occupation des Sols*). The POS has been widely adopted: in 1997, almost half of municipalities (15.180 out of 35.000), covering almost 90% of the entire population, had drawn it up (Guérois and Pumain, 2002). The POS was divided into communal areas, where it was forbidden to build, urban areas which could be immediately built since they foresaw public facilities and areas for future urbanisations (they include natural zones): this distinction, a merely action of zoning, was the only mean for a real control of land use. The tool of POS turns out to have a rigid structure and a technocratic conception which does not permit to include project proposals, as it is not a "sketched" tool (Ingallina, 2004). Project proposals and large building operations, which should have a more inclusive and democratic approach, were instead permitted and included in particular zones, the ZAC (*Zone d'Aménagement Concerté*) where, in order to build, municipalities and private actors had to make negotiating processes and stipulate a contract.

Both POS and ZAC had to be compatible with the objectives of SDAU which had to establish the orientations of planning at a medium and long term (for example protection of natural spaces and maintenance of agricultural activities). They also defined the localisation of large scale infrastructures and the maximum expansion of urban areas (Guérois and Pumain, 2002). Nevertheless, the *Schémas Directeurs*, due to their orientation character, did not impose significant restrictions to urbanisation and they had the difficult task to harmonise policies on infrastructures between the main municipalities and its peripheries, which were

not always covered by a POS while the city centre did. Therefore, municipalities appeared to be particularly unsuited to manage urban sprawl (Guérois and Pumain, 2002), above all in a country where communal fragmentation is very high. Fragmentation which is often denounced as one of the major institutional obstacles to a more rational development of cities (May et al., 1998).

The process of decentralization held in the '80s shifted many competences to municipalities, including the planning ones. This law helped in some senses the growth of cities as it gave large fiscal autonomy to municipalities which self-approved their own plans (Gibelli, 2016).

The '90s have been a fruitful period for urban, territorial and landscape planning. In 1993, France adopted the *Loi n. 93-24 sur la protection et la mise en valeur des paysages et modifiant certaines dispositions législatives en matière d'enquêtes publiques* which constitutes an official and complete statute of landscape, also considering that it has not been modified after the successive European Convention on Landscape. It contains some relevant factors which affect also planning at different scales as it introduces some tools for landscape protection and valorisation: for example, the creation of *Directives de protection et de mise en valeur des paysages* and regional natural parks must draft a *Charte paysagère*. Indeed, it completes the code on urban planning for what concerns, for example, building permits by demanding a special analysis on the landscape integration of new buildings and their visual impact. This prescription is functional for the preservation of landscape quality:

“Les plans d’occupation des sols doivent, (...), en prenant en compte la préservation de la qualité des paysages et la maîtrise de leur évolution” (art. 3).

In this perspective, urban plans (yet POS) and building permits must be accompanied by a *volet paysager*. This law is a completion on protection issues with the creation of specific zones of protection for architectural, urban and landscape heritage (art. 5-II).

In 1995, the *Loi d’Orientation sur le Développement et l’Aménagement du Territoire* set the basis for territorial management and it will be later resumed, in 1999, by the *Loi n. 99-553 d’Orientation sur l’Aménagement et le Développement Durable du Territoire* (also known as Loi Voynet or LOADDT). It created two new territorial entities⁷⁵: the *pays* and the *agglomération*. Their main task is to carry out a project which gives orientations for economic development and urban management. This law created and defined also the *Projet d’Agglomération*, a not binding document draft within an inter-municipal framework; it can be considered

⁷⁵ They are not considered as administrative levels or bodies.

as a “list of projects to be carried out in the future and their location” (ESPON, 2007).

The year after, a new law, *Loi n. 2000-1208 Solidarité et Renouvellement urbain*, constituted the relaunch of French territorial planning. It introduced some new planning tools: the *Schéma de Cohérence Territoriale* (SCoT), the *Plan Local d'Urbanisme* (PLU) and the *Carte Communale* (as an alternative to municipalities which do not have a PLU). The introduction of new types of plan is mainly due to the necessity to overcome the rigidity of the previous ones, in favour of more flexible tools, which can provide shared choices of future urban development. The SCoT, a sort of a strategic master-planning document, is an intercommunal plan which substitutes the *Schéma directeur*. The PLU substitutes the POS and it is a global project of urban planning and management (in the sense that it must take into account and manage different aspects) and it fixes the general rules of land use. The territorial strategy is contained in a new document, the *Projet d'Aménagement et de Développement Durable* (PADD), which constitutes the structural and strategic part of both PLU and SCoT. This document must define the general orientations of planning and management with a special regard on open space protection and ecological preservation; the final aim is to translate these objectives into territorialized projects. Another important role of PLU is to define the relationships which must occur between urban planning policies and mobility ones.

The SCoT (title IV of book I of CU), as its name clearly denounces, shows the willingness to guarantee a stronger coherence between different objectives and the development of a strategy for a certain territory. Indeed, it must define the main objectives of planning by co-ordinating different policies (housing, mobility, environment, etc.) and are more restrictive than the SD were (Guérois and Pumain, 2002). Without an approved SCoT, in fact, municipalities could not start building, even though they were covered by a PLU which identified spaces for new urbanisation. The perimeter of each SCoT is not fixed, and it can correspond to an already existing EPCI (or a group of them) or not; the second case leads to the generation of a new inter-municipal boundary. It is constituted by three documents: a survey (*rapport de présentation*) which contains a diagnostic and the environmental evaluation, the PADD and the document of orientations and of objectives (*document d'orientation et d'objectifs* - DOO).

The PLU (title V of book I of CU) is constituted by a *rapport de présentation*, the PADD, the orientations of management and planning (*orientations d'aménagement et de programmation* - OAP) and a regulatory part (*règlement*).

General regulations are addressed to the specifications of land use on the basis of different issues (urban and architectural quality, roads, etc.).

The laws Voynet, Chevènement and SRU have set the basis for the new French planning structure and they share some common elements of discussion. Since the law Chevènement, inter-municipalities are set as a base for French planning structure and tools (principally SCoT as created by the law SRU), which have to be framed into the more general concept of sustainable development. The high presence of periurban municipalities, which have competences in urban planning, are considered as an urgent problem of French territory (Charmes, 2011); in this sense, the law SRU tried to make periurban municipalities lose part of their competences if they were not included in a SCoT⁷⁶ and they were not allowed to grant building permits or to urbanise open space areas.

The need for a renovated plan at the local scale, the PLU, can be motivated for the reason that the POS was poorly effective in the battle against land take as it had no restrictive and cogent rules in terms of building. On the contrary, the PLU can be considered a more global tool as it is not anymore intended to exclusively assign building rights to each parcel but is oriented toward a general urban renewal (*renouveau urbain*) and to the development of a project. Indeed, also the law SRU has its motto in the sentence “*reconstruire la ville sur la ville*” (literally, rebuild the city within the city). The PLU attempts to fulfil this concern through the already mentioned tool of PADD which has to draft an urban project oriented toward a perspective of sustainability. The attempt to overcome land take is the major link between the law SRU and the *Loi n. 2010-788 portant engagement national pour l’environnement* (or Loi Grenelle II)⁷⁷. One of the objectives⁷⁸ that urban planning must take into consideration is the battle against the regression of agricultural and natural surfaces and against land take. It also invites local bodies to realize eco-districts (such as the Caserne de Bonne of Grenoble) in favour of an adaptation to social cohesion and environmental sustainability.

⁷⁶ This rule applies to municipalities located within 15 kilometers from towns of at least 15.000 inhabitants.

⁷⁷ Grenelle laws are two: the first one was promulgated in 2009 (*Loi n. 2009-967 de programmation relative à la mise en œuvre du Grenelle de l’environnement*) and set the general objectives of environmental protection and enhancement which will be resumed by the second Grenelle law of 2010.

⁷⁸ the objectives were already defined in the first Grenelle of 2009 (art. 7).

The turning point of Grenelle laws

Grenelle laws implement and modify the Code of Urbanism and the Environmental Code in line with the principles of sustainable development; it introduces issues as environmental protection in urban planning tools and tries to specify and complete the objectives of urban planning (for example the battle against climate change, the reduction of gasses, the battle against land take and the preservation and renovation of biodiversity and ecological continuity). Even if it is not clearly explicated among law's objectives, previous experiences have shown that the most appropriate level to respect these objectives is the supra-municipal one. Making inter-municipal plans was therefore a strong suggestion, still an optional decision, but it was not compulsory.

Grenelle law introduces and defines a new planning tool: *Trame verte et bleue* (TVB). This expression refers to the concept of ecological network (the literal translation is green and blue weave). This principle was firstly discussed only in relation to the concept of landscape ecology (Burel and Baudry, 1999; Clergeau, 2007), but it was later reintroduced in the planning debate in order to answer to the challenges that territories have to face.

Grenelle law does not give a precise definition of what TVB are. It will be better specified in a following decree on the topic⁷⁹ which states that TVB is

“un réseau formé de continuités écologiques terrestres et aquatiques identifiées par les schémas régionaux de cohérence écologique ainsi que par les documents de l'État, des collectivités territoriales et de leurs groupements auxquels des dispositions législatives reconnaissent cette compétence et, le cas échéant, celle de délimiter ou de localiser ces continuités. Elle constitue un outil d'aménagement durable du territoire.” (Art. R. 371-16)

In this sense, TVB are a network made by terrestrial and aquatic continuities which are identified both by *schémas régionaux de cohérence écologique* and by the State's or communities' documents. It constitutes a tool of territorial sustainable development.

The Ministry of ecology, sustainable development and energy (MEDDE), nevertheless, tried to define the concept of TVB⁸⁰. These weaves represent the legislative response to biodiversity loss and therefore they have an ecological approach, done by endorsing above all the ecological functions of TVB. The main

⁷⁹ Décret n° 2012-1492 du 27 décembre 2012 relatif à la trame verte et bleue

⁸⁰ MEDDE (2013), Trame verte et bleue et documents d'urbanisme. Guide méthodologique

aims are the reduction of habitats' fragmentation and vulnerability and the preservation of biodiversity through ecological networks.

It can be considered as the first attempt to integrate into national legislation the concepts of landscape ecology. It is indeed a tool imposed by a national law, but it must be better specified and integrated at the other levels. The State has defined and approved in 2014 the “*Orientations nationales pour la préservation et la remise en bon état des continuités écologiques*” (orientations for the preservation and the renovation of ecological continuities). This document identifies the challenges of ecological continuity to which the subordinated tools must refer.

At a regional level, TVB is indeed contained in a *Schéma régional de cohérence écologique* (SRCE). This tool overarches the SCoT and the local plans (PLU and PLUi). This new regional plan is juridically fragile and has no prescriptive value as it must only be take into account – *prise en compte* – by SCoT (art. L131-2 of CU). Nevertheless, since the institution of SRCE, the role of Regions in planning process seems to be somehow reinforced.

The introduction of TVB in a planning tool can be considered as a key element in the integration of biodiversity into the planning process. Nevertheless, the degree of the relationship between the different elements and levels of planning is not always so clear.

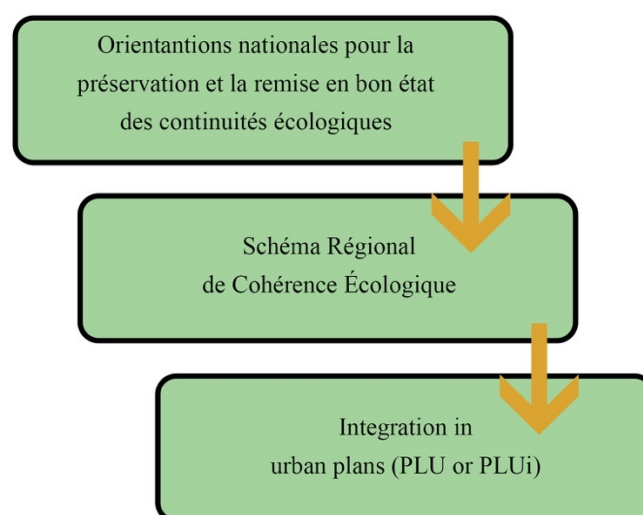


Figure 12: The strategy of TVB at different scales

Related to the tool of PADD, the Grenelle law fixes the tool's objectives for SCoT:

“les objectifs des politiques publiques d'urbanisme, du logement, des transports et des déplacements, d'implantation commerciale, d'équipements structurants, de développement économique, touristique et culturel, de développement des communications électroniques, de qualité paysagère, de protection et de mise en valeur des espaces naturels, agricoles et forestiers, de préservation et de mise en valeur des ressources naturelles, de lutte contre l'étalement urbain, de préservation et de remise en bon état des continuités écologiques. En matière de déplacements, ces objectifs intègrent une approche qualitative prenant en compte les temps de déplacement.” (Art. L141-4 of CU)

and defines orientations for PLU:

“1° Les orientations générales des politiques d'aménagement, d'équipement, d'urbanisme, de paysage, de protection des espaces naturels, agricoles et forestiers, et de préservation ou de remise en bon état des continuités écologiques ;

2° Les orientations générales concernant l'habitat, les transports et les déplacements, les réseaux d'énergie, le développement des communications numériques, l'équipement commercial, le développement économique et les loisirs, retenues pour l'ensemble de l'établissement public de coopération intercommunale ou de la commune.

Il fixe des objectifs chiffrés de modération de la consommation de l'espace et de lutte contre l'étalement urbain.

Il peut prendre en compte les spécificités des anciennes communes, notamment paysagères, architecturales, patrimoniales et environnementales, lorsqu'il existe une ou plusieurs communes nouvelles.” (Art. 151-5 of CU)

The role of SCoT, with the Grenelle law promulgation, has been reinforced. It is given high relevance to the management of space; indeed, the presentation report must include an analysis of natural and agricultural lands take, starting from 10 years before the realisation of SCoT. Related to this, the SCoT must give priority to densification, with the possibility to fix some minimal values of density (it imposes therefore itself over the tool of PLU). It must also take into account new issues, such as the preservation of ecological continuity (by taking into consideration the already mentioned SRCE), the reduction of gas emissions and

the control of energy consumption with the respect of some energy performances for new building urbanisations.

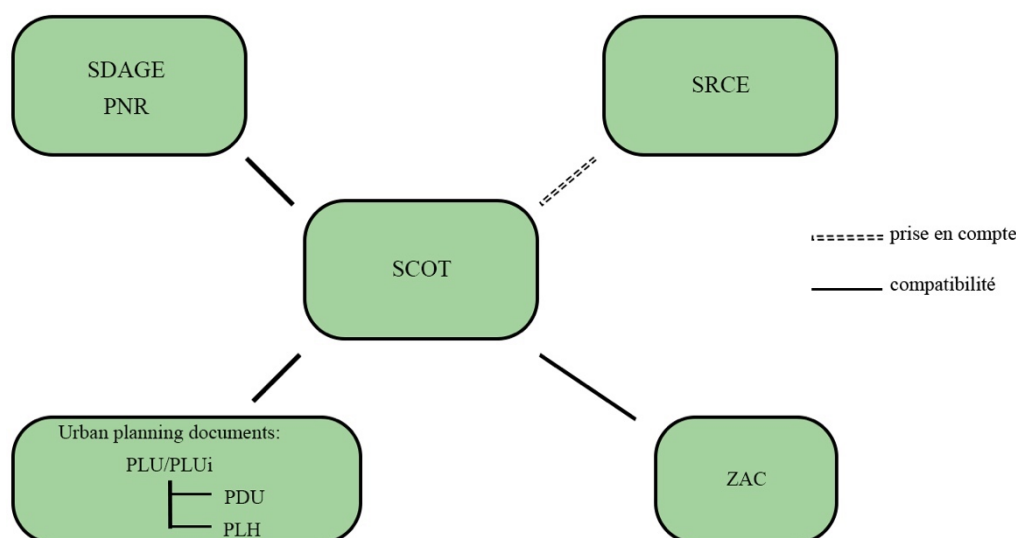


Figure 13: French plans

The SCoT, for its strategic nature, appears therefore to play a central role in the French planning system. Urban planning documents, PLU and PLUi, can contain also some specific policies and plans as the one on urban transportation (PDU) and the one on habitat (PLH).

The latest changes

In 2010, the *Loi n. 2010-874 du 27 juillet 2010 de Modernisation de l'Agriculture et de la Pêche* pointed out the objective for 2020 of halving the rhythm of agricultural land take. A specially-made observatory (*Observatoire National de la Consommation des Espaces Agricoles* - ONCEA) is in charge of developing applicable tools for measuring agricultural transformations and of identifying some indicators (art. L112-1 of *Code rural et de la pêche maritime*)⁸¹. This law introduced a fiscal tool, a tax, for pursuing the limitation of artificialisation; this tax is applicable on the added value realized from the trade-offs of agricultural lands which were transformed into buildable.

⁸¹ In 2016, this observatory has been substituted by the *Observatoire des espaces naturels, agricoles et forestiers* (OENAF), which carries out more missions by taking into account also natural and forest lands.

The topic of inter-municipalities has been resumed with the promulgation of *Loi n. 2014-366 du 24 mars 2014 pour l'accès au logement et un urbanisme rénové* (also known as Loi ALUR) which definitively and obligatorily transferred to inter-municipalities the competence of urban planning. The new tool is the so-called PLUi (*Plan Local d'Urbanisme Intercommunal*) and it is drafted by a single EPCI.

This law strengthens the importance of the battle against land take by imposing to SCoT to present an analysis of land take occurred within the previous 10 years and to justify the quantified objectives for its limitation:

“Il présente une analyse de la consommation d'espaces naturels, agricoles et forestiers au cours des dix années précédant l'approbation du schéma et justifie les objectifs chiffrés de limitation de cette consommation compris dans le document d'orientation et d'objectifs.” (Art. L141-3 of CU)

Even PLU are in charge of presenting the situation of previous land take and they must also set out regulations which favour the densification of spaces and limit land take:

“Il analyse la consommation d'espaces naturels, agricoles et forestiers au cours des dix années précédant l'approbation du plan ou depuis la dernière révision du document d'urbanisme et la capacité de densification et de mutation de l'ensemble des espaces bâtis, en tenant compte des formes urbaines et architecturales. Il expose les dispositions qui favorisent la densification de ces espaces ainsi que la limitation de la consommation des espaces naturels, agricoles ou forestiers. Il justifie les objectifs chiffrés de modération de la consommation de l'espace et de lutte contre l'étalement urbain compris dans le projet d'aménagement et de développement durables au regard des objectifs de consommation de l'espace fixés, le cas échéant, par le schéma de cohérence territoriale et au regard des dynamiques économiques et démographiques.” (Art. 151-4 of CU)

Another important element of this law is the suppression of the COS⁸² in PLU and the limitation of the possibility to fix minimum sizes of parcels. This disposition sought to foster housing construction with a consistent limitation of

⁸² The COS is “le rapport exprimant le nombre de mètres carrés de plancher hors oeuvre nette susceptibles d'être construits par mètre carré de sol” (art. R123-10 of CU). It is different depending on the zones of PLU and its value can be increased for special housing programs.

land take⁸³. It has been abandoned in favour of other building and design rules: “*emprise au sol*”, the maximum height of buildings, rules for future settlements, etc.

In addition, this law introduced a new concept of greening into cities – the *Coefficient de Biotope par Surface* (CBS)⁸⁴ – which obliges new PLU to preserve or create some non-urbanized and permeable surfaces. This coefficient is a modernised version of “*coefficient d’emprise au sol*” which exists since XIXth century. CBS contributes to standardise and put into effect some principles of environmental quality, such as the guarantee and improvement of the microclimate, the guarantee and development of soil functionality and the management of water resources, the creation of an optimal and living space for the fauna and the flora, etc.

The Loi NOTRe (already mentioned in the part of institutional structure) has also introduced a new planning tool: the *Schéma Régional d’Aménagement, de Développement durable et d’Égalité des Territoires* (SRADDET). This regional plan must be drawn up by the new Regions within July 2019. It can include the old SRADDT⁸⁵ and integrate the existing plan, but most importantly it must resume some essential elements of SRADDT; for example, the battle against climate change and air pollution and the control of energy consumption (which were defined in the *Schéma régional climat air énergie*), the protection and restoration of biodiversity and the construction of infrastructures of regional interest.

In 2015, France adopted the *Stratégie nationale de transition écologique vers un développement durable 2015-2020* (the national strategy of ecological transition for a sustainable development). This strategy promotes a new reflection for the limitation of agricultural land take in the first of its 9 priorities - *préserver et renforcer la capacité des territoires à fournir et à bénéficier des services écosystémiques* (preserve and reinforce the capacity of territories to supply ecosystem services).

In 2016, a new law, the *loi pour la reconquête de la biodiversité, de la nature et des paysages* has recalled some elements of landscape and nature protection (previously introduced by the law of 1993). This law has introduced a dynamic and renovated vision of biodiversity and its main aim is to protect and valorise the natural heritage of France. The law strengthens some juridical principles, such as

⁸³ This disposition can be considered as a continuity from the law SRU which suppressed the zones NB which let a badly disorganized zoning of natural sectors.

⁸⁴ This concept was already used since 1998 in the city of Berlin.

⁸⁵ *Schéma régional d’aménagement et de développement durable du territoire*

the institution of a principle of ecological solidarity which defines the relevance of links between biodiversity preservation and human activities. This principle is useful for the definition of preservation and restoration actions of green and blue infrastructures, through biodiversity reservoirs and ecological continuities.

Table 5: Elements of French planning tools

	Planning tools	Territorial coverage	Key elements	Control of land take	Ecological value	Landscape value
Tools not in effect any more	SDAU	Wide-area	Variable geometry	Not so restrictive		
	POS	Municipal		Not so restrictive		
Tools in effect	SCoT	1 or more EPCI	Priority to densification	Evaluation and quantification of already taken land	X	X
	PLU(i)	Municipal or inter-municipal	Oriented to an urban renewal and intensification, densification	X	X	X
	SRCE	Region	<i>Trame Verte et Bleue</i>	X	X	X
	SRADDET	Region			X	X

This table helps summarize all the main elements of each French planning tool. The plans introduced by the first law in 1967 did not give restrictive rules in terms of building permits and therefore they did not help in the prevention of land take. The great turning point in French planning structure was the promulgation of the Grenelle law, which obliged urban and territorial plans to take into serious

account the new challenges that cities and territories have to face (biodiversity, climate change, land take, etc.).

Compared to POS, the tool of PLU ensures a better systematization of the urban and societal challenges into planning, such as the battle against land take, the integration of ecological objectives and the willingness to increase social housing in order to favour functional *mixité*. In the perspective of densifying the city, the logic of PLU permits the requalification and re-development of public spaces. PLU appears then to be a more operational and flexible tool than POS. The subsequent obligation of drawing PLU at an inter-municipal level has further strengthened the role of this tool in a systemic perspective, which fits perfectly for new urban and societal challenges.

The status of French plans

The continuous legislation, with a radical change in the typology of planning tools, has led to a “vibrant” realisation, integration and adaptation to changes. Indeed, the latest data on the state of PLU realisation (2015), show how they are experiencing an active period, even though not all the POS have been adapted and changed into PLU. Table 6 well identifies this situation.

Table 6: The status of urban plans

(source: <http://www.cohesion-territoires.gouv.fr/plan-local-d-urbanisme-intercommunal-plui-et-plan-local-d-urbanisme-plu>)

State of procedure	Number of municipalities	Territorial surface (sq. km)	Population in 2012
PLU approved	10.323	213.154	31.697.880
PLU approved with CC in elaboration	2	18	11.847
PLU in revision	2.691	51.614	16.862.614
Total	13.016	264.787	48.572.341

For what concerns SCoT, latest data (2015) show how they involve 25.137 municipalities (almost 70%) and 50,5 million inhabitants (77% of the entire population) and they counted as follows:

Table 7: The status of territorial plans

(source: <http://www.cohesion-territoires.gouv.fr/schema-de-coherence-territoriale-scot>)

State of procedure	Number of SCoT	Number of municipalities	Number of inhabitants
SCoT approved	271	14.587	36,1 million
SCoT blocked	28	1.347	2,64 million
Projects of SCoT, currently underway	98	5.955	7,3 million
SCoT in project	51	3.248	4,4 million
Total	448	25.137	50,5 million

4.4.2 The Italian planning debate

Although many attempts of promulgating a new national law on urban and regional planning⁸⁶, Italian planning system is still anchored to the national law n. 1150 of 1942⁸⁷. An important step is represented by modifications to Title V of the Constitution (2001) which have introduced a sort of a wider and new discipline: the *governo del territorio* replaces the term *urbanistica* (urban planning, merely attached to land-use regulations) and includes different issues other than land-use policies. *Governo del territorio*, literally “territorial government”, is identified as a legislative concurrent subject between the State and Regions (art. 117). This constitutional change occurred in 2001 underlines then both the relevance of land-use in accordance to public development and the necessity to define appropriate and efficient planning tools towards a policy of territorial cohesion (Janin Rivolin, 2011).

The original text of law n. 1150/1942 stated that the State was in charge of drawing up territorial coordination plans, in order to orient and address the lower levels. Nonetheless, Italy lacks such a national strategic framework which sets the basis for a coherent planning system at the different scales and it keeps placing great emphasis on local bodies and planning. Due therefore to the “urbanism tradition”, Italy has no national spatial planning (Faludi and Waterhout, 2002). This is also underlined by the European Compendium on Italy (2000b), which states that “territorial planning is practically non-existent at the national level,

⁸⁶ The first attempts of reform date back to the ‘60s.

⁸⁷ The Italian planning law has represented the reference to which many of other European first planning laws have referred to.

merely illustrative at the regional level and implemented at the local level” (CEC 2000b; 97). This affirmation states mainly the lack of a strategic role of planning and the levels mostly in charge of the planning process are regions.

Regions derive their power from the Constitution, including urban planning (art. 117). Italian Regions and the two autonomous Provinces of Trento and Bolzano, differently from the French ones, can legislate and each of them (with the exception of Molise region) have promulgated a specific law on planning. Generally speaking, Regions are in charge of drafting a territorial plan (*Piano Territoriale Regionale* - PTR), which can also have a landscape value, and a landscape plan (*Piano Paesaggistico Regionale* - PPR) while Provinces and Metropolitan cities must draft a provincial (or metropolitan) plan of territorial coordination. Municipalities, either alone or gathered in an inter-municipality, have to draft an urban plan. The lack of a national general framework has led to many different realities, due to the approbation of different regional laws on urban planning.

Even though a varied planning system, Italy has always been very attached to the local level (the sense of belonging to a specific municipality, the so-called “*campanilismo*”, is very high) and to the “urbanism” tradition (CEC, 1997). The high number of municipalities and the sense of belonging have often created over years some tensions between municipalities and uncoordinated processes of planning. Urban plans (*piani regolatori comunali* – PRG) are the most cogent ones as they set rules on land-use through a rigid zoning plan and the allocation of specific uses to all these zones. They are also legally binding. In the latest years, in order to achieve a more sustainable land take and to overcome the stiffness of urban plans, some Regions have structured urban plans into three different plans: *piano operativo*, *piano strutturale* and *regolamento edilizio*.

Nowadays, many Italian Regions have provided for the update or the approbation of new planning laws (the so-called laws of second and third generation). These new laws highlight a new concept of territorial planning, due mainly to the introduction of the already mentioned concept of *governo del territorio*. It has a wide meaning, including both all the subjects with the territory’s resources as the main object and the set of programming and planning tools as well as the guarantee of the necessary coherences between different policies and sectorial plans (Minucci, 2005). These new laws (see table 8) integrate some substantial elements; they are both a consequence of new national

laws⁸⁸ which affects local bodies and the need to interpret new dispositions for the territory, the landscape and the environment.

The relevance of landscape and environment in Italy is highlighted by the presence of numerous national laws on this topic. The law which set important changes for the protection of areas with significant environmental interest and created landscape plans was the so-called Galasso law, n. 431 of 1985. Since the first years of 2000, when the European Landscape Convention was signed, landscape planning entered the main debate of regional planning. Later, also the realisation of ecological infrastructures has been identified as one of the key objectives of the national strategy on sustainability and biodiversity conservation (MATTM, 2010).

In the 70's, throughout Europe it was evident the "incapacity of planning systems to foresee and manage the process of urban growth (...) but in Italy there has been no concrete outcome, due to the inertia and rigidity of the planning system." (CEC, 2000b: 17). Many European countries have attempted to face this issue by distinguishing strategic policies from operative ones, more related to the regulation of land-use while Italian PRG included both these objectives till some latest changes of some regions which divided the PRG into two plans.

Land take and Italian policies

In this perspective, the issue of irrational urbanization has entered into national researches only with the draft of the Report It. Urb. 80 ("*Rapporto sullo stato dell'urbanizzazione in Italia*"). This research was conducted between 1982 and 1988 by a group coordinated by Giovanni Astengo and it analysed the process of urbanization between 1951-1981 at a national scale.

It carried out an important role because it is the only systemic research at a national scale on the effects of intense urbanization in the post-war years. Nevertheless, by looking at the different descriptions of each region, we can realize that the focus is on two main characteristics: land take and urban forms. Elements like infrastructures are instead put aside even though they largely contribute to the loss of agricultural land (they will be considered in other studies, such as the one financed by CNR-IPRA⁸⁹).

⁸⁸ In 1990, the promulgation of the law n. 142 set up new bodies in charge of planning: provinces and metropolitan cities. Metropolitan cities won't be formally constituted until the law n. 56/2014.

⁸⁹ *Interazione e competizione dei sistemi urbani con l'agricoltura per l'uso della risorsa suolo* (1988).

Nowadays, soil valorisation is not yet one of the key issues of Italian government, even though European Union has fixed zero land take within 2050. Since 2012, latest Italian government(s) have attempted to draft a national policy and law on land take. The latest one, the *Disegno di Legge* n. 2039/2014 “*Contenimento del consumo del suolo e riuso del suolo edificato*”⁹⁰, was presented in 2014 by the two departments of Environment and Agriculture. This law proposal is strictly and solely connected to soil sealing and urban regeneration, but the whole text focuses on agricultural lands (and not, for example, natural ones) and it doesn’t widen the view on Italian planning system (indeed, it is not intended to be a reform of the Italian planning law of 1942). The text could therefore result contradictory (Gibelli, 2016) and counter-productive as it proposes some technical measures (for example, *compendi urbani neorurali*) which could put at risk agricultural lands. This particular measure is intended to foster the sustainable economic development of the territory (art. 6) by renovating specific rural settlements. Nonetheless, the law proposal does not give to municipalities precise indications on how to transform a rural settlement in a *compendio urbano neorurale* and therefore they cannot be considered as an operative guideline for local planning.

This law proposal is a generic law of principles which aims at identifying a maximum quantity of soil sealing and at giving priority to the assessment of other possible ways before consuming soil. Other articles focus on urban renewal but, as this law is not about planning, there are some problems for what concerns authorities and institutions. Great importance is above all given to the management of the monitoring of land take in order to realise a cognitive framework easily updatable (ISPRA, Crea, CRCS, etc).

The status of Italian plans

The new *Rapporto dal Territorio* (INU, 2016) allows to have a general overview on the renovation process of urban plans of each Italian region (the previous report dates back to 2010). At a national level, the average percentage of renovation is 26,1%. By analysing each Region, the highest averages are the ones of Lombardy (71,9%), the autonomous Province of Trento (83,3%) and Veneto (41,8%). All other Regions (including Piedmont with a percentage of 10,6%) have a much lower value.

⁹⁰ Some of the considerations on this law take the cue from the conference “Recuperiamo terreno”, held in Milano (6th May 2015), where on. Chiara Braga, one of the proposers of the law, presented it.

The status of large-scale plans is varied; till nowadays, only 3 Regions have indeed approved a PPR - Piedmont, Toscana and Sardegna (only for coastal zones) - and Puglia has approved an integrated PPTR. The Region of Friuli Venezia Giulia is instead in the process of finalisation and approbation.

Given the relevance of the role led by Italian Regions (in charge of promulgating laws), it is important to give an overview on regional laws concerning urban planning and land take.

Table 8: The status of Italian regional laws

Region	Planning	Land take
Valle d'Aosta	Regional law n. 11/1998	
Piemonte	Regional law n. 56/1977, modified by n. 3/2013	
Lombardia	Regional law n. 12/2005	Regional law n. 31/2014
Liguria	Regional law n. 36/1997, modified by n. 11/2015, n. 1/2017	
Trento (autonomous province)	Provincial law n. 15/2015	Specific article (n. 18) in the planning law
Bolzano (autonomous province)	Provincial law n. 13/1997	
Veneto	Regional law n. 11/2004	Regional law n. 14/2017
Friuli Venezia Giulia	Regional law n. 5/2007	
Emilia-Romagna	Regional law n. 24/2017	Integrated in the planning law
Toscana	Regional law n. 65/2014	Integrated in the planning law
Umbria	Regional law n. 1/2015	Integrated in the planning law
Marche	Regional law n. 34/1992	
Lazio	Regional law n. 38/1999	
Abruzzo	Regional law n. 18/1983 ⁹¹	
Molise	-	
Campania	Regional law n. 16/2004	
Puglia	Regional law n. 20/2001, modified by n. 28/2016	
Basilicata	Regional law n. 23/1999	
Calabria	Regional law n. 19/2002, modified by n. 40/2015	Art. 27 quater in the latest modification of the planning law
Sicilia	Regional law n. 71/1978	
Sardegna	Regional law n. 45/1989, modified by 8/2015	

⁹¹ in 2017, the regional *Giunta* approved a new law proposal oriented toward a containment of land take.

The table shows how all the Regions, except Molise, have approved a law on urban and regional planning, even though some of these laws have more than 40 years.

Regarding land take, two Regions have decided to draft a specific law on it (Lombardy and Veneto) while some other Regions identified in their planning laws the containment of land take as one of the main guiding principles for a sustainable urban development (Piedmont, Umbria, Emilia-Romagna and Toscana).

The Region of Emilia Romagna has integrated specific articles on land take in its recent planning law (regional law n. 24/2017); it identifies a goal of zero land take within 2050 by basing planning choices above all on regeneration actions. Even the Region of Tuscany has opted for an integration of some principles against land take in its planning law (regional law n. 65/2014), which is mainly devoted to sustainable development. This law identified some specific articles on urban regeneration (art. 125-129), constituted by a systematic group of interventions, which are addressed in favour of a limitation of land take (with a specificity on agricultural land). This systematic group includes interventions such as the “reorganization of the existing built heritage, the requalification of degraded areas, the functional reorganization of abandoned areas, the recovery and requalification of large abandoned buildings and the requalification of the connections with the urban context”. The latest law on planning of the autonomous Province of Trento sets as guiding principles for a new planning landscape valorisation, the minimisation of land take (included in a specific article, n. 18), the sustainability of territorial development, the optimal use of territorial resources, the valorisation of agricultural areas, etc. It gives a definition of land take (thus increasing the already messy situation on the topic) and includes a specific article (n. 18) on the limitation of it. This article specifies the objectives that planning tools must take into consideration; for example, they must favor urban regeneration actions, including the ones of densification, and they can include requalification interventions of collective facilities able to promote the increase of the level of urban quality. New buildings are permitted only in case of needing to satisfy housing requirements and in case of a certified lack of better alternatives. The latest modification of the regional law on planning of Calabria (n. 40/2015) includes a new article (art. 27 quater) on “planning with zero land take” which sets that urban plans cannot allocate additional land to urban expansions.

4.5 Case studies

4.5.1 The Region of Rhône-Alpes

The chosen case study is the region of Rhône-Alpes⁹² with a particular focus on the cities of Grenoble and Lyon and their planning tools. They have different territorial characteristics but both cities are putting great emphasis on ecological strategies and regeneration projects in a perspective of limiting land take. Their recent institutionalization as Métropole has led to the renovation of their local plans (PLUi and PLU-H) at a metropolitan scale. Both cities have been included in recent studies on Europe urban system and on the resulting metropolisation process which Europe is facing (Halbert, Cicille and Rozenblat, 2012). This specific research has categorized the cities of Grenoble and Lyon as a *Métropole*, but they are included in two different typologies: Grenoble is identified as an academic metropole (the only one in France) while Lyon is an economic metropole⁹³ (together with Marseille, Nice, Strasbourg and Toulouse).

The ecological approach, included above all in the SCoT of each city, takes the cue from the one of Montpellier (2006)⁹⁴, which have set the basis for the inclusion of precise predispositions against land take through the realization of urban and environmental projects. The tool of SCoT is a consolidated experience in French planning process and, in a perspective of limiting land take and introducing nature into cities, they represent the most suitable scale for addressing adequate orientations.

The sample of cities analysed is very small and therefore it cannot be judged as an exhaustive selection but, even though located in the same region, these two different approaches can help to extract some important elements of analysis.

Morphological and socio-economic situation

The region of Rhône-Alpes is the one in which the cities of Grenoble and Lyon are located. It is the second region in terms of territorial surface (43.700 sq.km.) and of population (6 million inhabitants). It borders with other French regions (Provence-Alpes-Côte d'Azur, Languedoc-Roussillon, Auvergne, Bourgogne and

⁹² Even though, with the promulgation of Loi NOTRe, it has been aggregated with the Region of Auvergne, in this thesis only the old region of Rhône-Alpes will be taken into consideration, also due to the fact that SRCE are differentiated between the two regions.

⁹³ In this category there is also the city of Turin.

⁹⁴ This SCoT is shortly presented in a specific box.

Franche-Comté), with the Italian regions of Piedmont and Valle d'Aosta and with some Swiss cantons. The Region is divided into 8 Departments: Loire, Rhône, Ain, Haute-Savoie, Savoie, Isère, Drôme and Ardèche. The city of Grenoble is head city of the Isère Department while Lyon is located in the Rhône Department.

Grenoble and Lyon have been moreover identified as Métropole: the Grenoble-Alpes Métropole (METRO) and the Lyon Métropole (Grand Lyon). The first one is constituted by 49 municipalities while the other gathers 59 municipalities.

The regional territory is characterized by a great variety of landscapes⁹⁵: the chain of Alps, the Central Massive and the Rhône valley which crosses from north to south all 8 departments. Water, in different forms, is also a key element of regional landscape: the region is indeed crossed by two of the main French rivers (Rhône and Loire) and the total length of all rivers is approximately 49.929 km and it is covered by 3 out of 5 big French lakes.

Urbanisation and urban development (figure 14) are concentrated in two main areas: the urban region of Lyon and the *Sillon Alpin*, the area which extends from Geneva to Valence. This area is constituted by the alpine agglomerations of Valence, Grenoble Chambéry and Annecy⁹⁶.

Corine Land Cover (2006) has shown that between 2000 and 2006, land take in this region has been extensive with almost 7.500 ha of urbanised areas to the detriment of agricultural lands.

⁹⁵ The Region has identified 302 geomorphological landscape units, gathered in 7 families which corresponds to the increasing degree of human occupation in the territory, but they don't have a hierarchical value. These families are: natural landscapes, natural landscapes for free time and leisure, agricultural landscapes, rural and heritage landscapes, emerging landscapes, landscapes marked by great settlements, urban and peri-urban landscapes (DIREN, 2005).

The document is available online (http://www.rdbrmc-travaux.com/spge/site_v2/IMG/pdf/pays7fam.pdf)

⁹⁶ In 2011, at the initiative of Grenoble-Alpes Métropole, all the agglomerations committed themselves to create a metropolitan pole for the area of the Sillon Alpin.

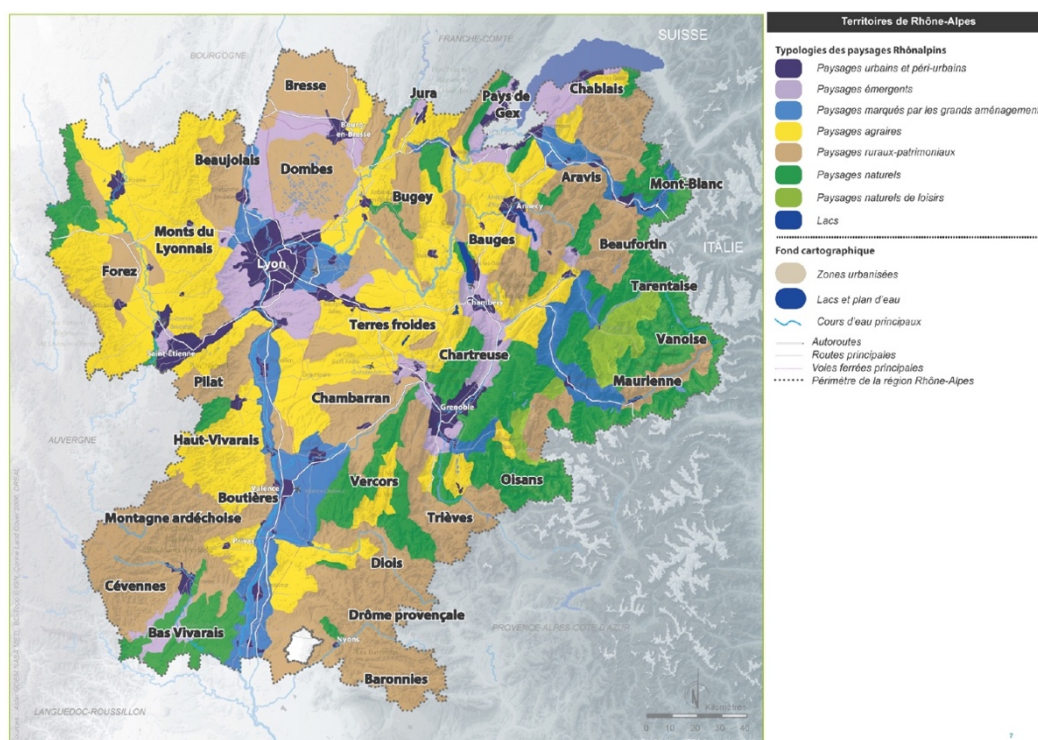


Figure 14: Land cover of Rhône-Alpes
(source: livret cartographique du SRCE)

The city of Grenoble in the latest years is facing a process of revitalisation, above all in the academic field, and it is founding its development upon sustainable strategies (Bobroff, 2011). Between 2008 and 2013, the population increased from 159.307 inhabitants to 162.780⁹⁷.

The city of Grenoble is located at the place of an ancient lake and it has been built in a plain at the confluence of two rivers, the Isère and the Drac, by forming the so-known “Y” of Grenoble. Grenoble and its agglomeration are furthermore surrounded by three mountain massifs which constitute two regional natural parks: Chartreuse and Vercors (Belledonne Massive is about to become a regional natural park too). In 1968, the city of Grenoble hosted the X edition of Winter Olympic Games which gave popularity to the zone.

The great variety of landscapes and heritage is primarily revealing the force of its metropolitan diversity (at the level, above all, of *Métropole*). A *Métropole* which sets its major strengths in its mountain peculiarity. In this sense, the main challenge for such a metropolitan area is therefore the necessity to confront itself

⁹⁷ INSEE, *Populations légales 2013* (data available online <https://www.insee.fr/fr/statistiques/2119504?geo=COM-69123#consulter-sommaire>).

with territorial elements very different between each other and to find some common strategic objectives, which is the main goal of local planning (SCoT and PLUi).

This territory has also to face some important affecting natural risks, in particular the ones related to torrential floods of Isère and Drac; they are mainly caused by climate change and they are accentuated when exceptional events occur. In this perspective, planning tools have to include these eventualities, by reconciling the territory with its geography through a resilient approach.

Apart from its natural vocation, the city of Grenoble since the end of XIX century has also reached great importance in the industrial field (with the invention of the white charcoal) and as a scientific and academic pole. An important event in Grenoble's development is the inauguration of the Winter Olympic Games in 1968. This event brought some great transformations and renewal actions in the city. Due mainly to its restricted geographical context and its particular climate conditions, the city of Grenoble, together with the nearby municipalities (the so-called *Région Urbaine Grenobloise* - RUG), has built a strong policy based on urban sustainable development.

North-west Grenoble, the city of Lyon is located in the northern part of the Rhône valley (which extends from Lyon to Marseille) and between the Central Massive and the alpine one. It is connected with Italian territory through the high-speed train line, which connects Milan-Turin-Lyon-Paris. As Grenoble, Lyon is characterized by the intersection of two rivers, Saône and Rhone; this area is known as Confluence and it has been place of a huge renewal project.

Lyon, born as an industrialized city, preserves also an important architectural and historical heritage which has been worth the inscription of some historical quarters (Vieux Lyon, Fourvière hill, Presqu'île and Croix-Rousse) in the World Heritage List of UNESCO. Since the 90's, the city of Lyon has invested many efforts to relaunch itself at an international level and to improve its attractiveness for both residents and visitors (Carpenter and Verhage, 2014).

The city of Lyon itself, divided into 9 districts, is not a big one (509.233 inhabitants in 2013⁹⁸ with an increase of 5% compared to 2008), but including its metropolitan area it reaches 2 million inhabitants. In this sense, the city of Lyon is the third one, after Paris and Marseille, while the metropolitan area is the second one.

In the logic of renewal into the built city, both cities have, and are still experiencing, important actions of urban renewal and regeneration which have led

⁹⁸ ibidem

to a general relaunch (tourism, economy, university, etc.). In this perspective, urban projects in France led an important role in the definition of new policies on public spaces, transportation, eco-districts.

Planning tools

At a regional level, in order to meet Grenelle's dispositions, the Region of Rhône-Alpes has provided itself with a *Schéma Régional de Cohérence Écologique* (SRCE) which, starting from a past experience, identified a scheme of the regional TVB.

An important passed experience, developed in the 70's, is represented by the work made by the OREAM⁹⁹ of Lyon – St-Étienne – Grenoble. This experience has the merit to include three different cities in an urban network in order to share a common perspective. This has been the first time that planning in Lyon's agglomeration was connected to its urban region and the near ones.

At a lower level, the region is covered by 40 SCoTs (figure 15).

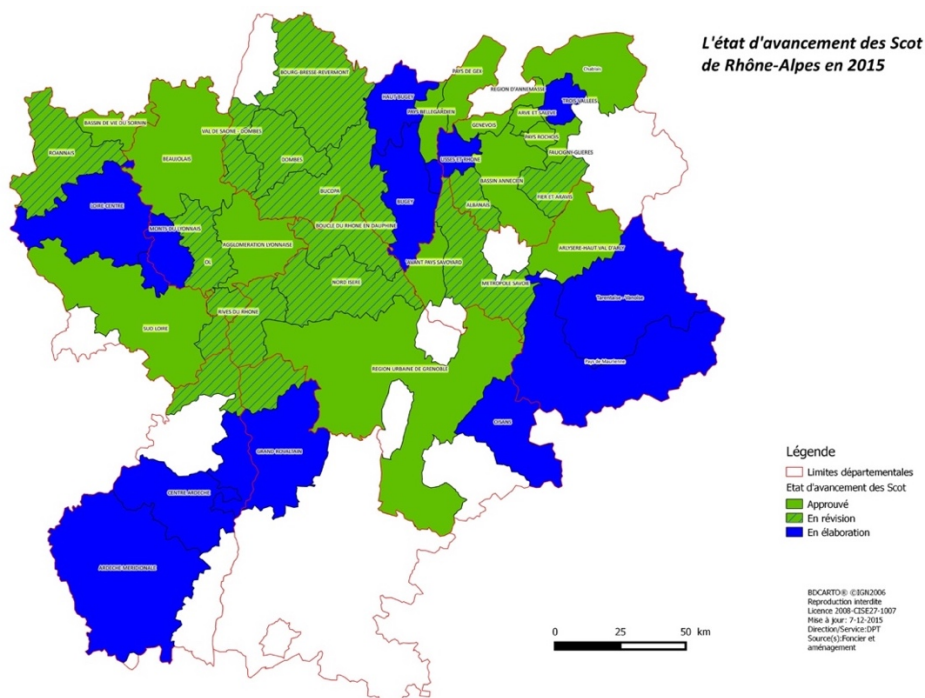


Figure 15: SCoT in Rhône-Alpes

(source:

<http://www.territoires.rhonealpes.fr/IMG/pdf/AvancementSCOTRhôneAlpes.pdf>)

⁹⁹ *Organisme d'Étude et d'aménagement d'Aire Métropolitaine*

Wide-area planning in the *Région Grenobloise* has seen the start with the first SDAU of 1973 with the participation of 115 municipalities (figure 16).

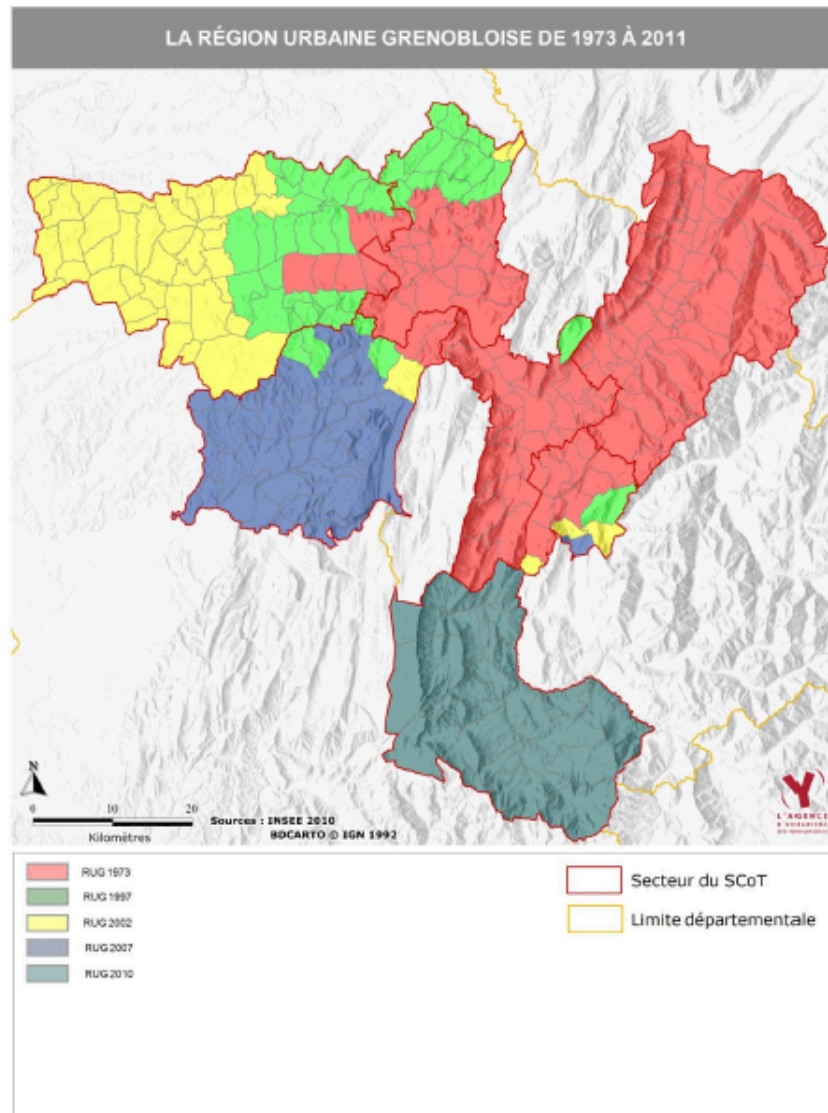


Figure 16: The evolution of the Urban Region of Grenoble since the first SDAU of 1973 (source: SCoT 2030 Grenoble)

SCoT was approved on 21st December 2012 and it is the first SCoT of the Region Rhône-Alpes drawn with the Grenelle principles of sustainable development. These principles can furthermore be found in all the different planning tools which insist on the area of Grenoble.

Starting from the previous SD, the new SCoT has identified new challenges that the territory needs to face; these changes gave the opportunity to verify the

feasibility of the application of some rules of SCoT and to precise the prescriptive maps. For example:

- the preservation of biodiversity, the protection of natural space and damp areas which led to the map of TVB;
- the valorisation of landscape resources (with the verification of landscape map);
- the reduction of agricultural and natural lands permeabilisation (map for the preservation of natural and agricultural spaces);
- the optimisation of urban spaces in order to redistribute housing;
- the localisation of economic development spaces;
- transport policies (RdP SCoT Grenoble, 2012: 25).

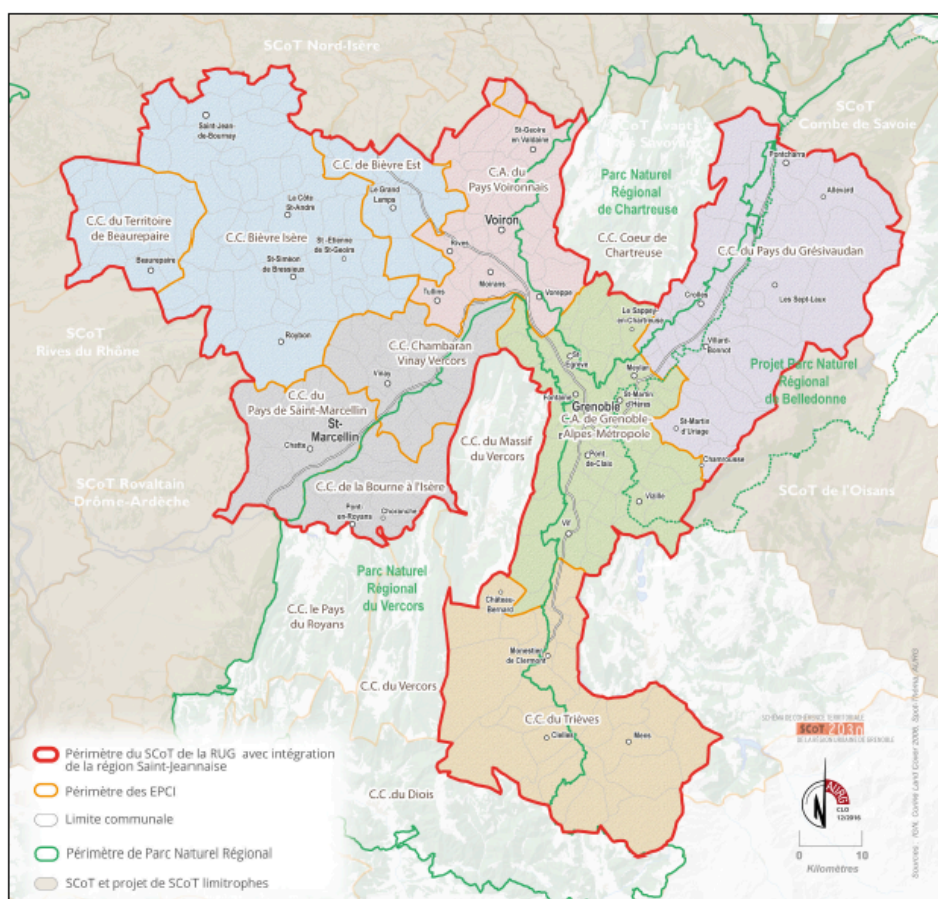


Figure 17: SCoT of Grenoble
(source: SCoT 2030 Grenoble)

As for many realities all over France, also the territory of Grenoble's SCoT is characterized by a large number of small municipalities; indeed, $\frac{3}{4}$ of them (205 out of 273) has a population lower than 2.000 inhabitants, 157 municipalities less than 1.000 inhabitants and 93 less than 500 (AURG, 2012). Instead, in terms of extension, this SCoT is the second one of France.

At a more local level, Grenoble has drawn up a PLU in 2005 (later modified in 2007) in substitution of the previous POS. It gave two main orientations: densification in already urbanised areas which were served by public transport and the increase of offer of social housing with the aim to reinforce social mixture (Novarina and Seigneuret, 2015). This plan decayed after the promulgation of the law on *Métropoles*; these new bodies have indeed acquired new competences in planning and they are in charge of the elaboration of the PLUi. The PLUi of Grenoble-Alpes is expected to be delivered in 2019 and it involves 49 municipalities.

The on-going PLUi identifies three major and prior challenges: 1. the battle against climate change and the commitment in the energetic transition; 2. Sustain the economic dynamism in favour of employment; 3. To reinforce the social and territorial cohesion.

A first step toward the realisation of the PLUi has been the individuation of some key elements to pursue in order to reach a good sustainable development. One of these elements is the necessity to pursue the reduction of land take as the metropolitan territory have faced, between 2005 and 2015, an increase of 465 ha of urbanised spaces and a decrease of 567 ha of agricultural surfaces (Grenoble-Alpes 2016); in addition to this, a percentage of 22% of houses are single-detached and represent 70% of Metropole's urbanized surface.

Figure 18 shows the state of planning tools in the Metro region: 32 municipalities have approved a PLU (14 of which have already been integrated with the Grenelle's objectives) while 16 municipalities still have a POS.

The first step has been the draft of the PADD which highlights the key elements of PLUi's strategy and recalls some of the orientations given by the SCoT. Its main goals in the construction of a common policy for 49 municipalities are: the control of land take, the insertion of nature in the city, the battle against the banalisation of landscape (one exemplary case is the one of *faubourgs*¹⁰⁰, literally suburbs). All the actions are conducted toward a principle of quality

¹⁰⁰ *Faubourgs* are a predominant and particular landscape of Grenoble's environment; they are spontaneous housing zones 'built' with no rules and which leads to a banalisation of landscape. With regard to *faubourgs*, PLUi is providing some specific orientations and principles for improving the project quality of these areas. For example, they intend to privilege a discontinuous settlement for assuring green porosity and they give specific guidelines for trees' planting.

instead of quantity. This principle is also resumed in the on-going predisposition of a thematic OAP on the topic of *Paysage et biodiversité*¹⁰¹. The PLUi is indeed also accompanied by some thematic OAP (“air quality”, “resilience” and the already mentioned, “landscape and biodiversity”) and sectorial OAP on specific geographical areas (the expected final number amounts to 115). The OAP on landscape and biodiversity are a brief document in charge of reinforcing PLUi’s rules in order to pursue a “harmonious integration of projects in a territory of common goods”. One of the objectives of this tool is the reconsideration of landscape as a territorial resource in its entirety and also ordinary nature has to be considered as a landscape and a productive space (the recall to European Landscape Convention is here evident).

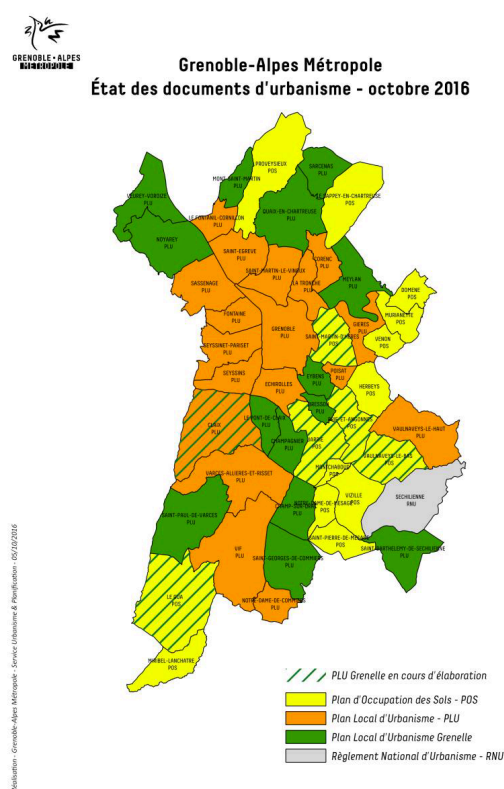


Figure 18: The state of plans in the Grenoble-Alpes Métropole (source: PADD of Grenoble-Alpes Métropole PLUi)

The agglomeration of Lyon provided itself with a SCoT in 2010. Its previous wide area plans date back to 1978 when the approbation of a SDAU conferred to

¹⁰¹ On 28th June 2017, the committee of PLUi organised a concertation day, a *débat public*, on the topic of landscape and biodiversity.

each zone a function (zoning) while the following *SD de l'agglomération Lyonnaise* (SDAL) date 1992. This plan was characterized by some undeniable qualities and innovations (RdP Grand Lyon, 2010) but they were not anymore applicable to the most recent territorial challenges.

The SCoT, whose process lasted almost 6 years, was initially made up by 72 municipalities of the *Métropole* of Lyon, the *Communauté de communes de l'Est lyonnais* (CCEL) and the *Communauté de communes du Pays de l'Ozon* (CCPO). This SCoT is a necessary revision of the previous plan and it mainly takes the cue from the *Directive Territoriale d'Aménagement (DTA) de l'Aire Métropolitaine Lyonnaise* (2006), with which it must be compatible. In May 2017, the SCoT was modified in order to be integrated with legislative evolutions (for example, the dispositions set by Grenelle law), the SRCE and the increase of the municipalities involved (74). Indeed, when the SCoT was firstly approved, in December 2010, even though some elements of ecological continuity can be found, it was not yet adapted to the concept of TVB.

Due to the many vocations of the territory of the Lyonnaise agglomeration, the SCoT sets many challenges to be taken into consideration within the temporal perspective of 2030. In addition, this territory has faced, and is still facing, a consistent increase of population; indeed, between 1954 and 2007 the rate of population has passed from 930.000 to 1.757.180 inhabitants, mainly due to a natural (birth increase) and a positive migrant balance (RdP Grand Lyon, 2017). This value corresponds to a third of the regional population in only 8% of the territory. It has also resulted in a higher demand of housing with consequences on land take, above all damaging agricultural lands.

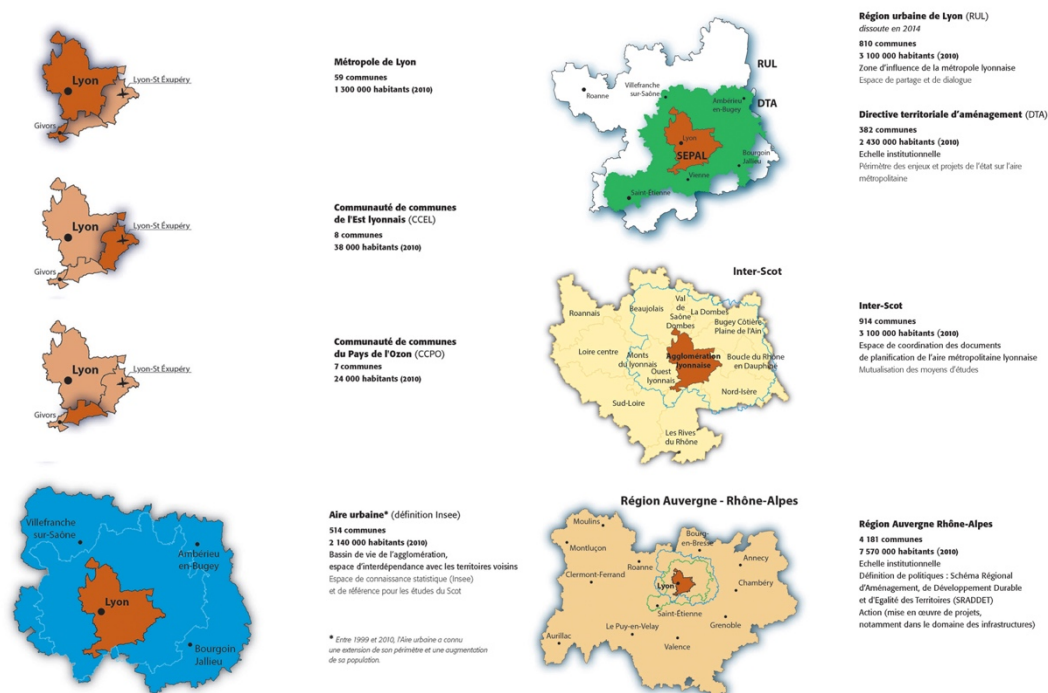


Figure 19: The different geographies of Lyon
(source: SCoT Lyon 2030, 2017)

Another planning process is the one constituted by the project of inter-SCOT. This plan was made necessary after the decision of not creating a SCoT of the entire *aire urbaine*¹⁰² of Lyon (Boino, 2007). The inter-SCOT process is constituted by 914 municipalities, 11 different SCoTs with a population of 3.100.000 inhabitants.

At a local level, Lyon and its agglomeration in 2012 has started to redraw its inter-municipal plan, by engaging itself for the first time with the habitat policy (PLH)¹⁰³. This new plan, *Plan Local d'Urbanisme et de l'Habitat* (PLU-H), expected to be delivered within 2018, is organized in 3 different scales: the scale of *Métropole*, 9 “life buckets” (*bassins de vie*) and 59 municipalities with the 9 districts of Lyon. The plan, whose concertation evaluation and revision project have been closed in September 2017, is set to be approved within the end of 2018.

¹⁰² An *aire urbaine* is a group of municipalities constituted by a urban pole (*unité urbaine*) of more than 10.000 jobs and by rural municipalities (*couronne périurbaine*) whose 40% population works in the urban pole (INSEE).

¹⁰³ Due to the presence of a site Natura 2000 (Miribel Jonage) this PLU-H is subject to environmental evaluation. This evaluation allowed to limit, or even abolish, the negatives impacts through specific adaptations and therefore to optimize the positive effects.





Its strategy aims at pursuing a balanced development of the territory through 4 main challenges:

- a “metropolitan challenge” in order to make the agglomeration more attractive;
- an economic challenge useful to make the agglomeration more active and able to create new jobs opportunities;
- a “supportive challenge” able to answer to everyone’s necessities;
- an environmental challenge in order to improve and preserve citizens’ well-being.

The “life bucket” of the municipalities of Lyon and Villeurbanne, characterized by a highly urbanised territory (92%), is heading toward a renovation within the two cities’ boundary. This process is carried out through the regeneration of some abandoned lands, both industrial and military (*friches*) and of some neighbourhoods (for example, La Duchère) with the aim of reaching a balance of functional heterogeneity and of assuring a proper quality of life to all citizens. With reference to the environmental challenge, one of the main issue to face is the realization of ecological continuities (according to SRCE orientations) in order to favour the movement of wild fauna.

By referring mainly to SCoT objectives, it adapts them to a more local reality, even though the number of municipalities involved in the two processes differs only of 13 units. Some of the key policies proposed by the PLU-H are: urban agriculture, ecological continuities, nature in the city, the offer of old and new housing, PADD, urban renewal and intensification.

Table 9: Applicable planning tools of Lyon and Grenoble

	LYON	
		
Year of approbation	2010	to be expected in 2018
Number of municipalities	74 (review of 2017)	59
Number of inhabitants	1.310.000	1.281.971
Territorial surface	730 sq. km.	538 sq. km.
	GRENOBLE	
		
Year of approbation	2012	to be expected in 2019
Number of municipalities	273	49
Number of inhabitants	751.3000	451.752
Territorial surface	3.720 sq. km.	550 sq. km.

This table well summarizes the current situation of planning tools of the two cities. Both Grenoble and Lyon have approved a SCoT with a timeline of 20 years, but they differ quite a lot for what concerns the number of municipalities involved. Indeed, on one side the SCoT of Grenoble gathers 273 municipalities, while on the other side the SCoT of Lyon only 74. The main motivation is that they present two different territorial situations: Lyon is a metropole with a strong impact and its development is based on a multipolar system. Even though Lyon itself has not a huge population, together with its metropolitan area, it is the third French area per number of inhabitants. Grenoble, smaller in dimension, was born as an industrial city and then connected this specificity with high education and university. Nowadays, together with its territory, it is trying to rebuild and relaunch the attractiveness of the territory.

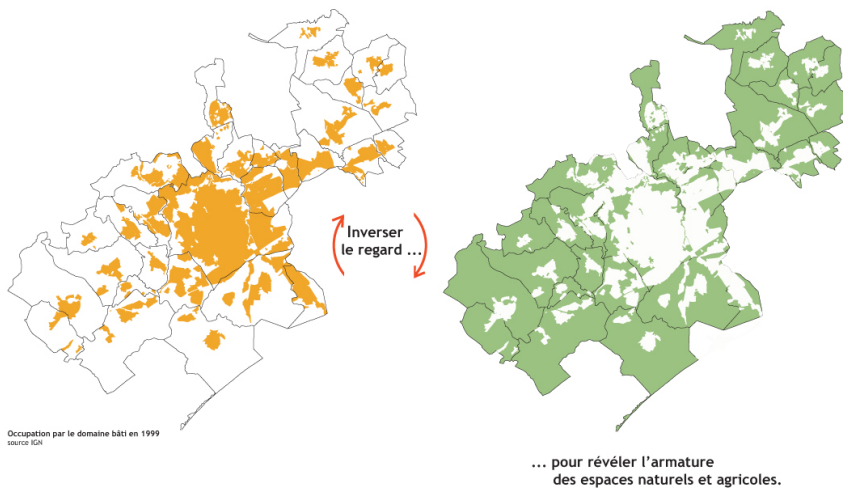
Nonetheless, all these tools share some common objectives: the control of land take in favor of intensification actions (both through the integration of TVB and with the introduction of some specific rules as, for example, the downgrading of zones), landscape and ecological valorization.

BOX - A glance at Montpellier SCoT

The SCoT drafted by the territory of Montpellier, even though it refers to not such a big territory, is remarkable from many different points of view. Approbated in 2006, it gathers a group of 31 municipalities and a population of 400.000 inhabitants. In 2015, the new Montpellier Méditerranée Métropole decided to review the SCoT.

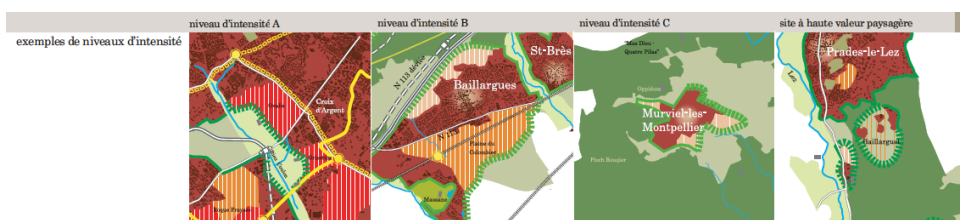
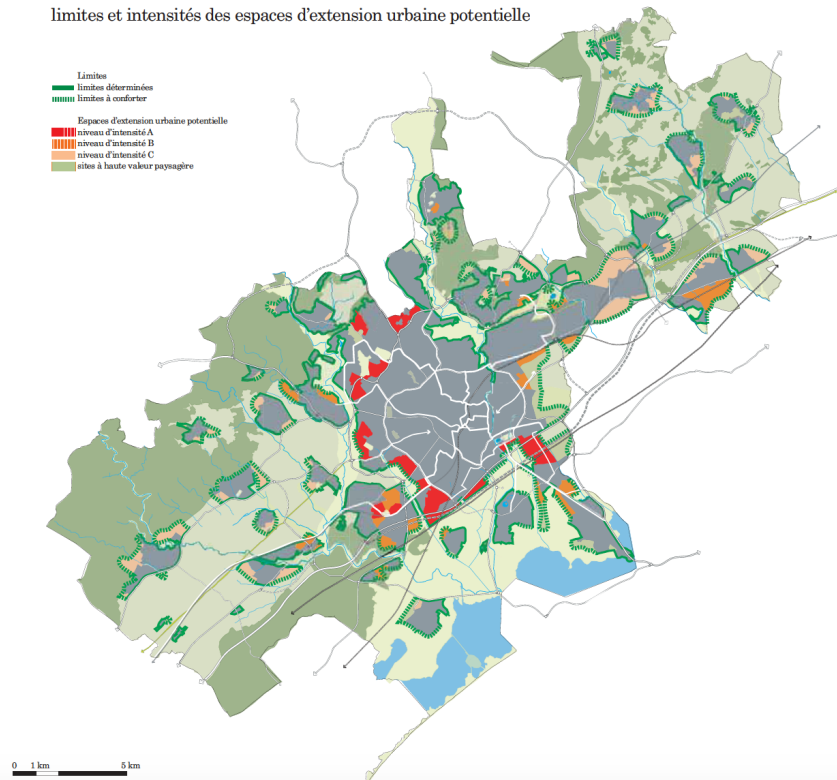
Since the 70's the agglomeration community of Montpellier has witnessed a consistent growth of population (doubling its value), due mainly to the a very strong territorial attractiveness. In the same period, there has been an intense land permeabilisation (not only for new dwellings, but also infrastructures, leisure and commercial space, etc.).

In this perspective, this SCoT has been the first one in France to understand the importance to control urban growth in favour of agricultural and natural lands by introducing the maxim "*inverser le regard*" (it intends privileging the green armature which is the "box" -or the empty spaces- instead of the "content" of development projects). Both Grenoble and Lyon's SCoT have taken the cue from this strategy and have reused it to build territorial projects.



Urban projects must take into consideration some factors: reinvest in already urbanised areas and intensify depending on the context. In this perspective, SCoT identifies two specific limits for urban expansion: “fixed limits” and “limits to enhance” and a level of density for each area of expansion.

limites et intensités des espaces d'extension urbaine potentielle



In the perspective of the strategy of “*inverser le regard*” (invert the gaze), the PADD identified three types of value suitable for the realization of qualitative projects: environmental, social and economic value. The first value refers to the preservation of nature, the second to the construction of a city of proximity, and the third to the intensification of urban development.

4.5.2 The Region of Piedmont

The Italian case study is the region of Piedmont with a special focus on the city of Turin and its territory; the region is subdivided into 1 Metropolitan city (Turin), 7 Provinces and 1.206 municipalities. The region of Piedmont is the second largest of Italian regions and it is one of the most administratively fragmented Italian regions: it is constituted indeed by 1.206 municipalities, many of which have very few inhabitants. Morphologically speaking, its territory is well differentiated: it is mainly mountainous with the Alpine landscape (including two national parks, the one of Gran Paradiso and the one of Valgrande), the area of Langhe and Roero (in the province of Cuneo) which recently became UNESCO heritage for its wine landscape and production and vast rice fields (provinces of Vercelli and Novara).

The planning system in Piedmont is still mainly referred to the urban planning law n. 56/1977, “*Tutela e uso del suolo*”, strongly wanted by Giovanni Astengo. Even though it was promulgated more than 40 years ago, this law introduced some important elements that moved up the concept of sustainable development into territorial planning. Even only the chosen title makes one think of the relevance given to the preservation of the resource soil. This law, once it was promulgated, gave great importance to inter-municipal planning, but, in this sense, little has been done. Some of the most innovative elements were:

- introduction of supra-communal regulatory plans carried out by Mountain communities and later abandoned;
- a new approach to the interpretation of the territory, by introducing a set of analysis with a perspective on social, economic and environmental aspects;
- the concept of homogeneous areas is replaced in favour of a territorial subdivision upon settings with specific characteristics;
- the openness to discussion with all the stakeholders through the predisposition of a “*delibera programmatica*”.

The original version of this law identified only two planning levels: the region and municipalities. The issue of intermediate body arose after the promulgation of the national law n. 140 of 1990. Nonetheless, some attempts of territorial organization in supra-local bodies has been done even before the approbation of the law. Indeed, since the end of the ‘60s, the region of Piedmont elaborated some territorial subdivisions and carried out some regional organization: first, the “ecological areas” in 1966/67, and after, in 1975, the experience of the *Comprensori* (15 in total). The definition of ecological areas took particular

account of the transformation of the territorial structure and the socio-economic one. Differently from other Italian regions, the Piedmont one decided to establish a body, *Comprensori*, not only dedicated to urban planning aspects but also socio-economic and financial. The territorial plan of *Comprensori* had the duty to identify “*sub-comprensoriali*” areas, named geographical units, which functioned as an optimal scale for inter-municipal plan. *Comprensori* were finally abolished in 1986.

The first big revision of this law dates 1984 with the introduction of a new planning tool: the territorial operative project (PTO). This tool showed the necessity to intervene at a local scale directly on regional issues. Since this moment, the Region launches some local experiences of intervention (for example the PTO of river Po in 1995). From these first experiences, it is possible to catch the need for an operational mode towards the fulfilment of complex planning tools. In 2001, another big revision to regional law n. 56/1977 occurred; the regional law n. 1 of 2001 introduced experimentations of new procedures for the approbation of plans’ variants. This law was later abrogated by a successive modification of the regional law; this latest modification is the regional law n. 3 of 2013 which introduced relevant changes in procedures of plans’ approbation (art. 14 bis) and reinforced one of the law’s objectives (art. 1), the limitation of land take with an expected final zero land take.

With regard to ecological network, the region of Piedmont in 2009 has promulgated the law n. 19 “*Testo Unico delle aree naturali e della biodiversità*” which establishes the regional ecological network. A successive regional deliberation¹⁰⁴ has approved the methodology for the individuation of the elements of the regional ecological network. The proposed methodology is the one defined by ARPA, the regional agency of environmental protection, which will also be resumed by some experimentations made by provinces (for example, the one led by the province of Novara).

Nowadays, planning in Piedmont is made up of various tools at different scales: regional, provincial and metropolitan and municipal. Regional planning is composed by a Regional Territorial Plan (PTR) and a Regional Landscape Plan (PPR). The first one was approved in July 2011 and replaced the previous one of 1997; the PPR has been instead adopted later, in October 2017. The PTR is composed of three interacting components:

¹⁰⁴ D.G.R. 31 luglio 2015, n. 52-1979, *Legge regionale del 29 giugno 2009, n. 19 "Testo unico sulla tutela delle aree naturali e della biodiversità". Approvazione della metodologia tecnico-scientifica di riferimento per l'individuazione degli elementi della rete ecologica regionale e la sua implementazione. Bollettino Ufficiale n. 36 del 10/09/2015*

-
- a cognitive-structural framework, aimed at reading critically the regional territory, the system of networks;
 - a strategic part, composed by the different policies on which to identify the main strategic axes of development;
 - a statutory part, the regulatory component, intended to define roles and functions of the different contexts of territorial government.

Along with some strategic project, the PPR establishes some guidelines and implements the elements of the regional ecological network in order to create a network of landscape connection. This network (figure 20) is constituted by the integration of the elements of the ecological network, of the cultural and historic network and the amenity one. The integration of these three networks is the starting point for strategic projects to be developed by a provincial or sectorial planning.

The two regional plans stress the attention on the necessity to overcome the fragmentation of territorial problems (even before the municipal fragmentation); indeed, they both identified specific geographical contexts which nevertheless are not coherent between each other. On the one hand, PTR identifies 33 “*Ambiti di Integrazione Territoriali*” (AIT) which are subdivided, in a first proposal, in 198 “*sub-ambiti*”; these “*sub-ambiti*” are the main reference for inter-municipal plans. AIT are identified as territorial functional systems which favor an integrated vision at a local scale of PTR’s objectives and strategies. The scale of AIT allows to highlight proximity relations (environmental, landscape, cultural goods, etc.) between facts, actions and projects which coexist and interact in a specific territory. They are identified as gravitational areas constructed upon people’s movements to reach urban services and later verified by different institutional levels.

On the other hand, the PPR defines on the basis of landscape and morphological characteristics 76 “*ambiti di paesaggio*” (landscape character areas), distributed into 535 “*unità di paesaggio*”. The PTR envisages the possibility to realize municipal aggregations, thus attempting to launch inter-municipal planning; in particular art. 12 affirms that municipalities, on the basis of predominant morphologies, structural homogeneities and perceptive relations within the framework of AITs, can aggregate for a better and efficient territorial governance.

Due to its vast territorial surface and a high level of administrative fragmentation (315 municipalities), the metropolitan territory has been subdivided in 11 homogeneous areas on the basis of specific functions. They are characterized by a territorial proximity and a population of more than 80.000 inhabitants. These contexts can become optimal settings for the organization in an associated form of municipal services (for example, planning) and they can function as a decentralized location for the administrative functions of the metropolitan city.

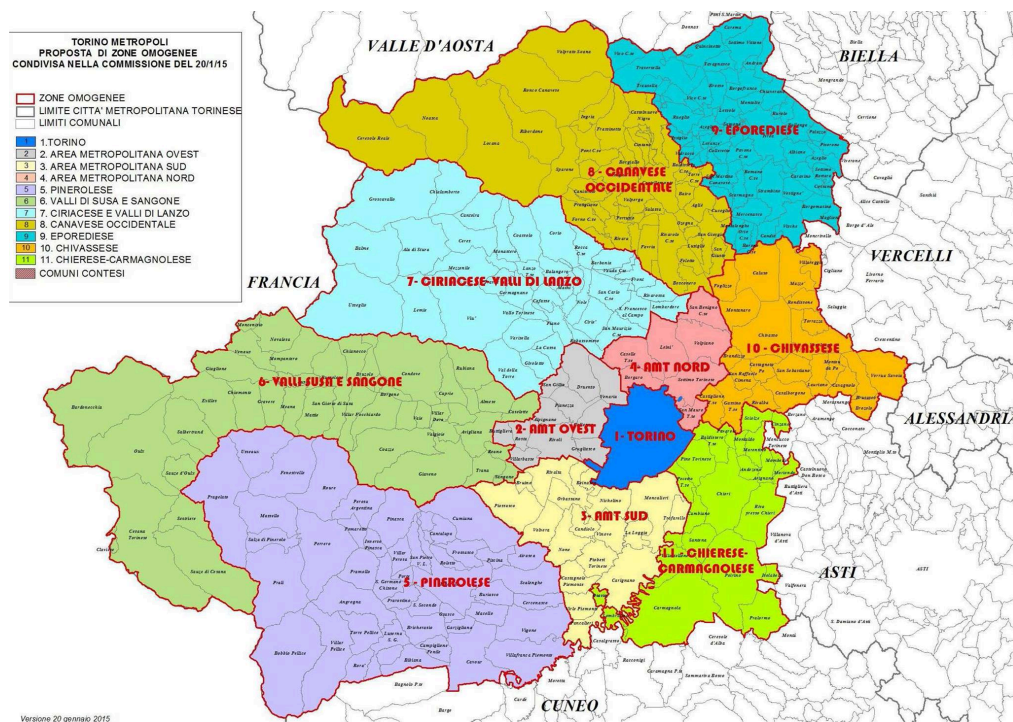


Figure 21: Homogeneous areas proposed by the Metropolitan City of Turin

An important project led by the Piedmont Region is the Corona Verde one; this project was launched by the Region in 1997 and it involved a territory of 93 municipalities of the metropolitan area of Turin. The Corona Verde project consisted in the realization of a green infrastructure which connects the system of “*Corona di Delitiae delle Residenze Reali*”¹⁰⁵ with a green belt. The general aim was the requalification of the metropolitan territory of Turin and the improvement of quality of life. The main outputs were: the creation of bicycle and pedestrian paths, the requalification of rivers environment, and the rearrangement of green areas and urban borders. This project is therefore both aimed at reaching a good

¹⁰⁵ This is a system of royal residences of Savoy in the neighborhoods of the city of Turin built between the XVI and the XVIII century.

ecological connection (with the creation of an interconnected system of green areas) and at relaunching the territory through the restoration of historical heritage.

Both the two regional plans, PPR and PTR, recognize the great value of the resource soil and they promote the containment of land take. Both plans put great emphasis on the “*Monitoraggio del consumo di suolo*” (monitoring on land take), the main tool for measuring and quantifying regional land take, as they consider it as the starting point for the realization of policies able to contrast urban dispersion. This tool has been published into two editions: the first one of 2013 and the second one in 2015. The second edition, differently from the first one, has been approved by the Regional Council with the aim of being a reference for local planning. The values identified in the monitoring have to be considered as the starting point for local planning and for the evaluation of territorial transformations, in the case urban plans forecast new areas to be built.

Nevertheless, by adopting a specific but generic methodology (in the sense that it is indiscriminately applied to all the regional territory), the monitoring gives only quantitative values which are not contextualized with the municipality and the territory to which they refer. In this perspective, the document does not provide a correct and functional interpretation of the phenomenon, as municipalities and provinces are evaluated with the same methodology (Giudice, 2017). To reinforce the importance given to the quantitative value and the role of the monitoring, also the PTR establishes that each provincial plan must define a maximum threshold of land take for each municipality.

In addition to this, in the latest years, the regional departments of Agriculture and Territory had arranged some law proposals on land take, but they never reached the final approbation. On the 1st June 2018, the regional *Giunta* approved a law proposal on the reuse and the requalification of obsolete building heritage and integrated some norms of the PTR. These new norms refer to and complete the issue of land take; the main aim is to pursue a progressive and continuous reduction of land take in order to reach zero-land take in 2040.

Chapter 5

Ecological planning strategies

This chapter examines in depth the ecological strategies and policies adopted by the two countries. France is analysed with regard of the experience of *Trames Vertes et Bleues* led by the Region of Rhône-Alpes at the different planning scales (5.1.1) and by some of the main urban projects developed in the cities of Lyon and Grenoble (5.2). This part, the project approach, aims at explaining the importance of the role played by urban projects in the construction of sustainable and attractive cities. It is also shown how they can be integral elements of an ecological system of green and blue connections.

Italy has instead a different approach with respect to ecological network; the detailed analysis on Piedmont's experimentations show indeed how they are mainly built upon a methodological approach (5.3).

The last paragraph (5.4) wraps up the key elements of the previous ones and drafts some operational criteria able to deliver a better ecological integration into planning and a general improvement of our cities.

5.1 Trames Vertes et Bleues

The strategy of *Trames Vertes et Bleues* constitutes a great challenge in the French context, as it tries to integrate ecological and environmental elements into the planning process at different scales. Indeed, since its introduction in 2010, many Regions have started to draft and approve the SRCE, the new planning tool in charge of laying the foundations for the construction of the regional TVB and some pioneer cities (such as Rennes) have begun including the notion of ecological connection in their local plans. The growing relevance of TVB is also traceable in some policies recently approved. For example, the municipality of Paris approved the 20th March 2018 the new *Plan Biodiversité de Paris 2018-2022*. This plan integrates TVB and urban resilience in synergy and coherence with other local and regional plans (for example, SRCE), strategies (such as *Plan Pluie* and *Stratégie de Résilience*) and projects (such as the one of the *Petite*

Ceinture ferroviaire). This document identifies 30 actions, some of which are strictly related to the topic of TVB; in particular, action 16, “*Renforcer le réseau de la nature sur le territoire parisien*” and action 20 “*Renforcer la végétalisation de la Ville*”. In a perspective of a more integrated sustainable action, the municipality of Paris has drafted, with other institutional actors, a scheme of local TVB; this study will also be extended to two new realities, the *trame noire* (all the shaded places) and the *trame brune* (soil).

Even though each Region can decide how to draft its own SRCE, at a national level, through a specific decree, some general guidelines and orientations are given. As already mentioned, the priority objective, from the national to the local level, is the preservation and renovation of ecological continuities and biodiversity. TVB constitute indeed a tool of sustainable territorial management; in this sense, TVB approach must make possible to include planning decisions (projects, planning documents, etc.) in a logic of ecological coherence, integrating both biodiversity reservoirs and ecological corridors (two of the TVB components).

Despite this ecological predominance, TVB are not only an ecological issue, but they take into account human activities and integrate socio-economic challenges. In this sense, TVB must identify which human activities contribute in a positive (or negative) way in ecological and biodiversity-friendly dynamics. TVB implementation must be analyzed through the strengths and the weaknesses of each territorial context, by ensuring and preserving, in a logic of sustainable development, a balance and an economic potential. Such a systemic and multi-scale approach can strengthen the comprehension, awareness and acceptability of TVB by different territorial stakeholders and it can also legitimate interventions of ecological continuities' renovation.

TVB implementation must be done with respect to the principle of subsidiarity, by offering a shared territorial governance which is able to successfully construct a good public policy. Starting from the national orientations, local territories have a broad margin of adaptation and implementation depending on their local context and on available information and knowledge. Different public policies must be coherent with TVB, above all the ones concerning water management, energy and climate, transportation, agricultural and forestry. With regard to these last two elements, the tool of TVB constitutes an opportunity of agricultural and forestry promotion.

The most challenging element of TVB is represented by its translation into local plans (PLU or PLUi). This translation can be achieved through both a cartographic identification and the inclusion of orientations or natural and environmental prescriptions aimed at preserving ecological continuities. The ensemble of dispositions contained in the regulatory part of PLU can be activated in such a sense and with such an objective. The maintenance and restoration of the TVB elements can thus be based on their inscription in urban planning documents

avoiding changes of land assignment which can lead to a fragmentation of environments.

The national decree on TVB provides also a methodological guide for the construction and integration of them. Some spaces (identified by previous laws and codes of the Grenelle ones) are automatically integrated as either biodiversity reservoirs or ecological corridors of the TVB. For example, as biodiversity reservoirs, the “heart” of national parks, national and regional natural reserves, spaces for the conservation of specific biotope, etc. Instead, concerning ecological corridors, an element automatically included is the permanent greenery along water courses which are intended to constitute riparian corridors, contributing both to the guarantee of quality of the aquatic environment and to the establishment of ecological corridors which allow the movement of certain species from an environment to another (by aquatic, terrestrial or aerial means). Water courses are instead integrated as both biodiversity reservoirs and ecological corridors.

Wetlands represent an important element for the preservation of biodiversity and for the fulfillment of some objectives of water framework directive; in this perspective wetlands of environmental interest are integrated as either biodiversity reservoirs or ecological corridors (or even both in some cases).

It is also recommended to include some other elements (for example, riverbeds) derived by some sectoral plans, such as water courses of SDAGE and SAGE. Other protected elements, already contained in some specific inventories, must be examined from time to time; some examples are Natura 2000 sites, regional natural parks, agricultural protected zones, protected woods and forests, breeding grounds of species, fishing reservoirs, typical cultural mountain landscapes, etc.

The national decree provides also some guidelines for the realization of SRCE, in order to create a coherence among different Regions in terms of objectives and contents.

5.1.1 Trames Vertes et Bleues in the Rhône-Alpes Region

The realization of Rhône-Alpes’ SRCE is the outcome of a collaborative activity between the State, the Region and a specific regional committee of *Trame Verte et Bleue* (CRTVB). In Rhône-Alpes region, the evidence and the awareness of an increasing land take and ecological fragmentation dates back to the ‘90s. In this sense, some key experiences are the construction in 2001 of a *Réseau Écologique Départemental de l’Isère* (REDI)¹⁰⁶ which takes the cue from the Swiss ecological network and, at a regional scale, the implementation of the *Directive Territoriale*

¹⁰⁶ The methodology relies on a theoretical modeling of landscape structure, remarkable habitats and corridors. The collection on-site of data has been useful to develop a map of ecological networks of the Isère department which identifies localization of fauna and information on possible obstacles.

d'Aménagement (DTA) of the Lyonnaise area¹⁰⁷ with the concept of *Infrastructures Vertes et Bleues* (IVB)¹⁰⁸. In 2006, the region has expressed its willingness to build a regional network of protected natural spaces (RERA) by relying on regional natural reserves (RNR), on sites characterized by a high biodiversity and biological corridors: the result was the realization of an Atlas of ecological networks of the Region.

The main difference between these first attempts and the SRCE is its operational value which goes beyond the simple knowledge, diagnosis and analysis. The atlas of RERA is only the starting point of SRCE which has then been necessary to be implemented (also because SRCE is made by a State-Region collaboration).

One of the regional challenges identified by the SRCE is urban dispersion and land take which constitute irreversible consequences on functionality of ecological network and natural spaces. SRCE acknowledges the importance of planning tools which must translate into their projects the need of ecological continuities (identified and mapped by the regional TVB). In order to do this, it proposes to local plans and projects to integrate these continuities and it suggests a methodology to implement into local plans the tool of TVB.

Rhône-Alpes' SRCE has been adopted in 2014 which identified 4 main elements¹⁰⁹ as integral parts of the regional TVB system:

- biodiversity reservoirs (including protection zones), they cover almost 25% of the regional territory;
- permeable spaces, differentiated depending on the level of permeability, strong (45% of regional territory) or medium (20%);
- 268 ecological corridors which are hierarchically divided into regional ones for a global connexion (219) and regional ones aimed at facing local challenges (49);
- blue weave, constituted by 14.820 km of rivers and 155.350 ha of damp areas.

¹⁰⁷ Despite the decentralization process brought many powers to local authorities, the central State, through the *Directives Territoriales d'Aménagement*, expresses its priorities for specific territories, considered strategic at a national level.

¹⁰⁸ This experience wanted to integrate the objectives of biodiversity preservation, landscape quality and livability into planning tools.

¹⁰⁹ There is also a fifth element, aerial weave (paths of circulation of birds), which here has not been included

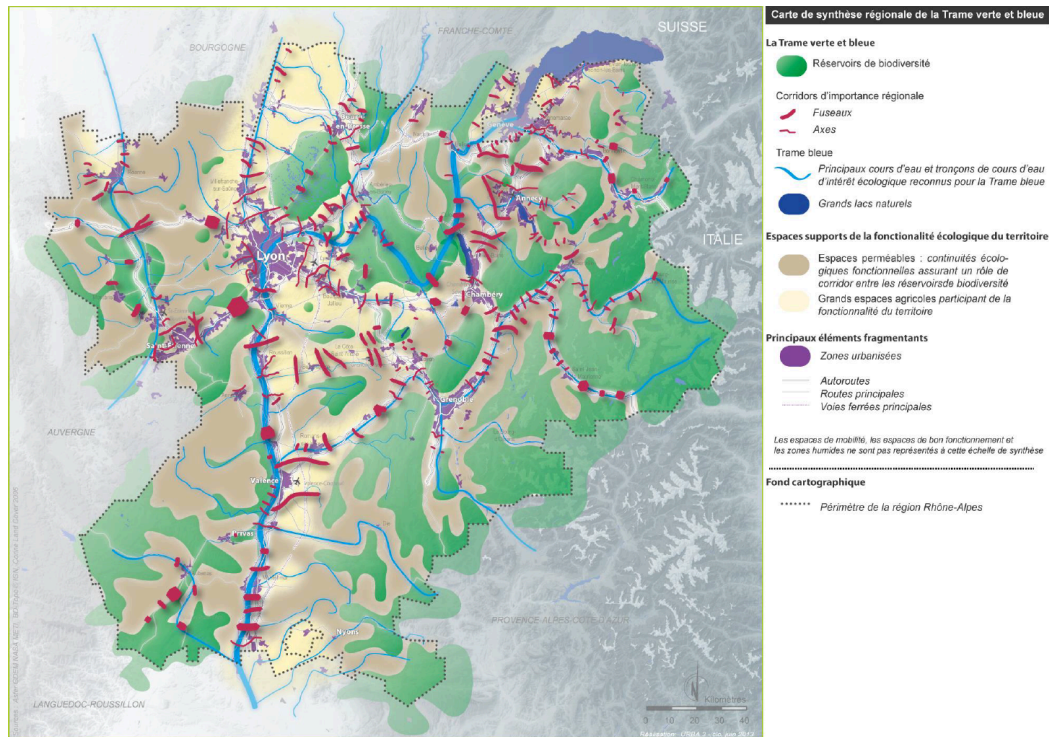


Figure 22: TVB of Rhône-Alpes SRCE
(source: DOO of SCoT 2030 Grenoble)

The realization of regional TVB is the result of a participatory process with some groups of experts. The selected method for modelling the different elements of TVB is the “eco-landscape” one. The goal was to include in an easy and appropriate way the ecological functionality of the regional territory. The “eco-landscape” method integrates a certain number of already existing and identified perimeters for their environmental and biodiversity relevance. In particular, the reserves of biodiversity are recognized for their great ecological abundance while the notion of permeable spaces (identified by the SRCE as complementary elements in support of the realization of TVB) permits to integrate the “ordinary” nature (spaces with an agricultural, natural and forestry predominance but characterized by a high level of ecological functionality). The principle on which the identification of regional ecological corridors is based is the connectivity one (not the zoning one) and its main aim is to contrast land take and maintain a certain level of permeability. In order to reach an acceptable level of permeability, it is necessary to maintain a specific level of heterogeneity among the different environments and to preserve the remaining axes between them. After a first step of diagnosis on the regional territory and the already identified ecological corridors, they have been hierarchized and divided into two types: corridors represented by *fuseaux* and corridors represented by *axes*. The first ones represent a global principle of connection which must be specified at a local scale, while the second ones refer to a more localised and vulnerable connection. The blue wave is represented by watercourses with a high ecological value, which serve both as reserves of biodiversity and as water corridors.

Roads (also known as grey infrastructures) represent a remarkable element of the Rhône-Alpes Region landscape, above all the railway ones. In the logic of building a coherent TVB, they are identified negatively, as they have relevant impacts of fragmentation on natural environments and ecological continuities; nevertheless, in some cases they can be considered as ecological corridors for the presence of green facilities along their paths.

For the metropolitan agglomeration of Grenoble, the SRCE identifies different stakes for the preservation of ecological corridors and biodiversity in different urban and rural contexts. In addition to this, the SRCE identifies 4 sectors which include ecological corridors labelled as overriding.

In the logic of the Grenelle laws and starting from the *prise en compte* of SRCE, the strategy of TVB can be included and specified at a more local level within the tools of SCoT and PLU or PLUi. SCoT represent one of the most consolidated practice in France and it is one of the most appropriate scale of planning to contain urban sprawl (Gibelli, 2016). Since the institution of *Métropoles* and the related transfer of many municipal's competencies to them, the tool of PLUi has become to get a foothold in the French planning process but there are still few evidences on their role and implications. PLUi, together with PLU, represent the nearest planning scale to citizens but concerning green and blue infrastructures, some researches highlight the difficulty to integrate them at this scale (Cormier and Kenderesy, 2013).

The system of green and blue infrastructures is strongly related to the issue of limiting land take; both SCoT of Grenoble and Lyon include indeed some orientations for the control of land take. The two SCoT, in relation to TVB and land take, can be analysed under different perspectives, such as:

- control of land take;
- landscape and ecological valorisation;
- identification of specific boundaries;
- urbanization type;
- relationship with blue infrastructures;
- agricultural territory.

Table 10: elements of analysis of Grenoble and Lyon SCOT

	Elements of analysis					
SCoT	Control of land take	Landscape and ecological valorisation	Identification of boundaries	Urbanization type	Relationship with blue infra-structures	Agricultural territory
Grenoble 2030	Reduction of SD <i>enveloppe urbaine</i>	TVB <i>Vues emblématiques</i>		<i>Armature urbaine hiérarchisée</i>	<i>Trame bleue</i>	General orientations on agricultural areas' preservation
Lyon 2030	Sustainable urban model through the green armour	Orientations for landscape preservation for specific areas (Natura 2000 sites) <i>Grande Trame paysagère</i> , valorisation of view sheds	3 <i>réseaux</i>	Multipolar development	Included in the <i>armature verte</i>	Included in the <i>armature verte</i>

The SCoT of Grenoble puts great emphasis on the reduction of land take as, for this challenge, it takes the cue from Montpellier SCoT which introduced the motto “*inverser le regard*”. By doing this, Grenoble SCoT chose to start from the preservation of natural elements and then in a second time to identify the possible urban development (*espaces potentiels de développement*).

In the perspective of a frugal land take, one of the first big steps is the reduction and the redefinition of the “*enveloppe urbaine*” introduced by the Schéma Directeur of 2000. In particular, SCoT localises some limits in order to preserve natural and agricultural spaces and to limit the diffusion of building with a long-time term (50 years). These limits are of two types: strategic limits and limits of principles (DOO SCoT Grenoble, 2012: 104). The first ones are defined into local planning tools and become everlasting, while the second type can evolve and change during time.

In favour of landscape improvement, the SCoT identifies some precise guidelines for a better landscape insertion of the projects. Despite the variety of landscape, indeed, the urban region of Grenoble (RUG) is mainly characterized by compact cities and small villages, with a strong attachment to mining and has little

place for public spaces (squares, parks, etc.). The general trend, at different scales, is to avoid the banalisation of landscape. Some of these ‘guidelines’ are (part 2.2 of DOO):

- redevelop the existing urban patterns and take into account the spatial structure of urbanisation when defining a development project;
- adapt new constructions to topography and landscape context;
- control the quality of urban borders;
- preserve and improve landscape quality of axes of entrance into cities;
- reinforce vegetalisation and urban and water weave.

The tool of TVB in Grenoble SCoT has above all ecological values; some of the main objectives are: to decrease biodiversity fragmentation and vulnerability; to ease the genetic exchanges and to improve the quality and the diversity of landscapes.

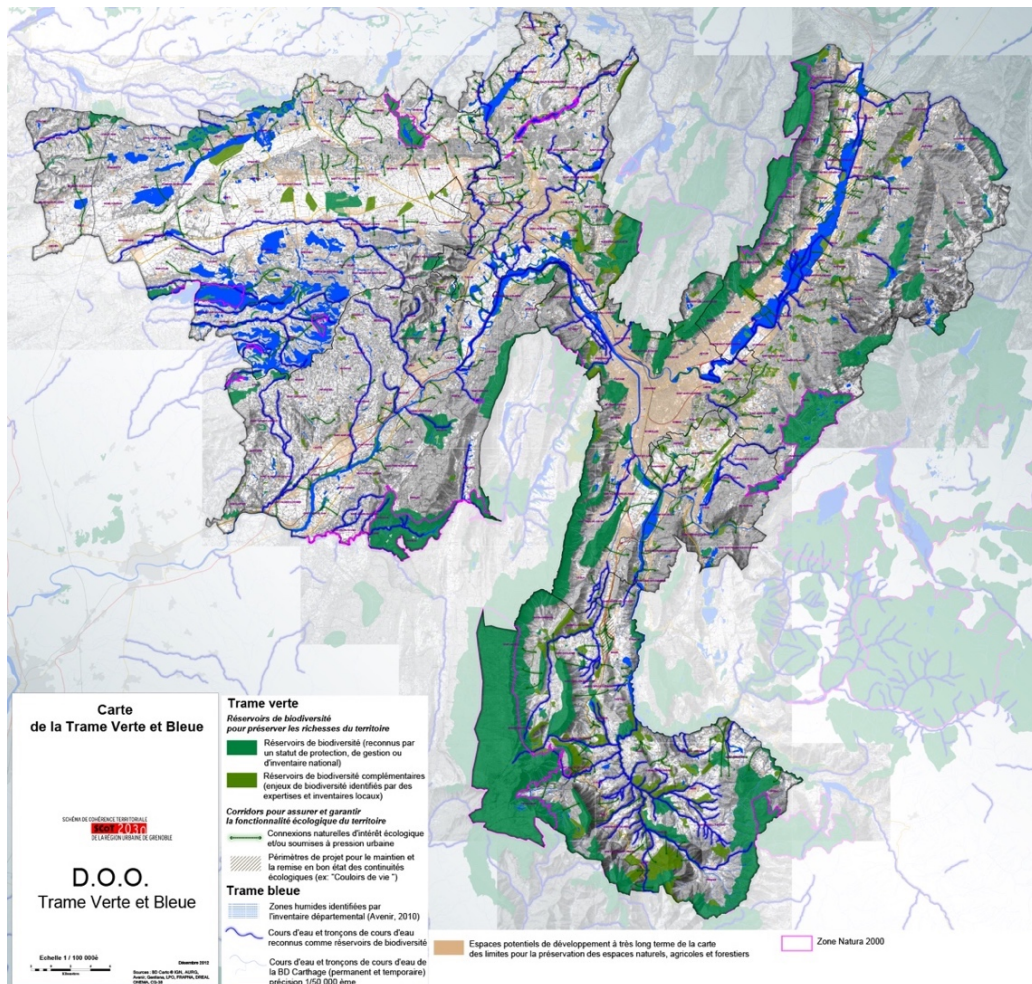


Figure 23: TVB of SCoT 2030 Grenoble (source: DOO of SCoT 2030 Grenoble)

The elements which compose the TVB of Grenoble SCoT are:

- biodiversity reserves;
- complementary biodiversity reserves;
- ecological corridors;
- blue weave;
- buffer zones along watercourses;
- damp zones;
- biodiversity into cities, green interruptions¹¹⁰.

SCoT's orientations on TVB are recalled in the PADD of the on-going PLUi of Grenoble-Alpes Métropole; the starting point is a former study for the definition of TVB of Grenoble-Alpes Métropole¹¹¹. These orientations and their objectives are specified and integrated into some specific OAP, "*Paysage et biodiversité*".

Recently, in line with the regional policy, the metropolitan agglomeration of Grenoble has signed with the Region a *Contrat Vert et Bleu*, with a temporal horizon of 5 years (2017-2022). This contract is a tool for the actualization of TVB and it is addressed to priority zones (as they are identified in the SRCE). This contract in particular has identified 56 actions (both tangible and intangible) developed by 14 different contracting authorities (Grenoble-Alpes Métropole is one of them). One of the most relevant lines of actions is the specification of TVB policy into cities; some cities of the agglomeration have already started to develop some initial projects in favour of biodiversity preservation. In order to pursue a coherent development of TVB and an increasing knowledge on the topic, the Métropole intends to create an observatory of biodiversity at the metropolitan scale.

The first issued SCoT of Grand Lyon did not directly contain the notion of TVB, but it recognized a system of natural, agricultural and forestry areas as "full spaces" and not only as "empty spaces" for possible future urbanisations. This system is considered as a natural keystone infrastructure which shape the territory, just like the other ones. The logic behind this choice is the one of "*inverser le regard*". The "*armature verte*" (green armour), the name chosen by the SCoT to identify this system, constitutes almost half of the agglomeration territory. The territory of Grand Lyon is built upon three different networks (figure 24): the network of agricultural and natural spaces, the network of rivers and their tributaries, and the network of metropolitan public transportation.

¹¹⁰ These elements are not identified in the map of TVB

¹¹¹ *Étude de définition de la Trame Verte et Bleue de Grenoble-Alpes Métropole* (March 2015)

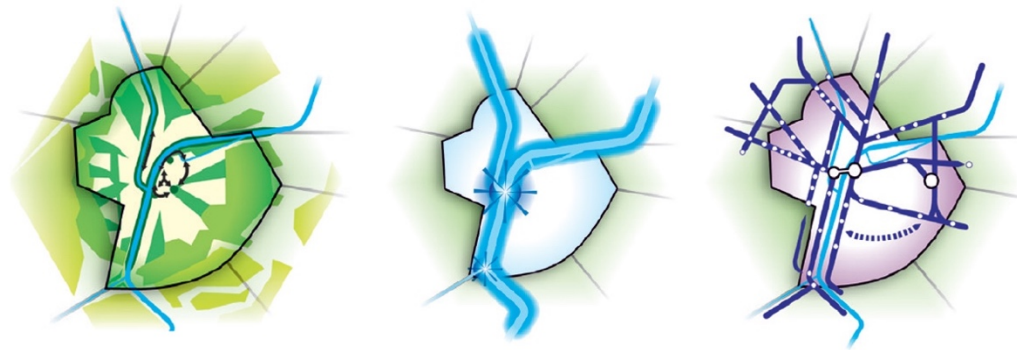


Figure 24: The three networks of Grand Lyon SCoT
(source: DOO of SCoT 2030 Lyon)

This armour is divided into some main elements: “*cœurs verts*” (green hearts), “*couronne verte*” (green crown) and “*trame verte*” (green weave) which take their cue from the DTA¹¹². These elements are not isolated, but they are linked between each other through some complementary green connections (*liaisons vertes*) which have ecological and landscape functions in natural and agricultural territories and are connected to parks (figure 25). This system can easily be identified as a forerunner tool of TVB (as the *trame verte* is an element of the green armour).

The document of orientations and objectives (DOO) deepens the main elements of the green armour and integrates the orientations of DTA. Green hearts have effects at regional scale and they are identified by DTA as the big natural spaces to safeguard. In these areas, DOO recommends “the maintenance of agricultural and forestry activities, the development of tourism and leisure activities and biodiversity preservation” (DOO Grand Lyon, 2017: 83). The main goal of green crown is to structure and limit the urbanised territory and the DOO recommends the creation of specific policies for the maintenance and the valorisation of agricultural activities. DTA calls then for a green weave, which is located nearby the urban area; this weave is identified as a “set of mostly unbuilt, natural, agricultural and forestry spaces which are related to urban public parks” (DOO Grand Lyon, 2010: 83). These spaces can therefore be considered as “green lungs” closed to cities which are easily reachable by citizens. For these areas, recommendations are: “the management and valorisation of agricultural activities, landscape planning, actions of citizens’ consciousness toward nature protection and the drawing up of projects with local bodies, environmentalists and farmers” (DOO Grand Lyon, 2010: 83).

All these elements gain their value for the fact that they are connected through green connections in order to create a coherent system. These connections gather many functions (ecological, landscape, agricultural, leisure) and between these the SCoT of Grand Lyon recognises two types: the ones which contribute to ecological functions of the agglomeration (*corridors écologiques*) and those

¹¹² This document is at a scale of urban area (*aire urbaine*). The SCoT has adapted the three elements at the scale of agglomeration.

destined to leisure activities and to slow mobility (*cheminements de loisirs et de découverte*). The limits of ecological corridors, identified in the SCoT, are then specified at a local scale by each PLU. Local communities (*collectivités*) adopt regulatory tools suitable for the preservation and the restoration of ecological corridors: for example, specific classifications, locations reserved to necessary areas for ecological continuity, etc. In addition to this, they can also constitute green interruptions (*coupures vertes*) between two urbanised areas, in terms of landscape and as a support for slow mobility. These interruptions are natural and agricultural areas which are threatened by urban pressure and must be resumed by PLU.

Generally, in the territories contained in the green armour building is not permitted and their land assignment is identified and classified by each PLU. Compatibly to local conditions and propensity, PLU can approve constructions and solutions necessary for ecological and environmental functionality. Nevertheless, DOO can determine the delimitations for the maintenance and protection of some specific areas (art. 141-10 of CU).

By nature, it integrates almost all the “unalterable sites” identified by the previous SD and the sites of landscape interest. By doing this, it increases the level of protection of some areas which were not yet identified in the previous plans. In addition, it includes the zones with high biodiversity value (Znieff¹¹³) for example, agricultural spaces, as identified by the SCoT, and the blue network.

All these actions are related to the more general orientation of a frugal land take. Indeed, the concept of green weave, apart from its environmental value, emerges as a tool able to limit cities’ expansion and favour intensification within cities’ cores.

¹¹³ *Zones Naturelles d’Intérêt Écologique, Faunistique et Floristique*, they are constituted by terrestrial, river and marine spaces with particularly important ecological issues. They are divided into 2 categories: type 1 and type 2. The first type includes generally limited areas which are characterised by the presence of species and remarkable environments which are very sensitive to transformations; instead, type 2 are constituted by large natural environments which have been poorly subjected to modifications and which offer significant biological potential.

In the Region of Rhône-Alpes there: 2.386 Znieff type 1 (17,7% of the whole territory) and 215 of type 2 (62%) (source: SRCE).

In order to maintain biodiversity into cities and to prevent the creation of heating islands, the SCoT Lyon 2030 urges to develop greening into city centre. In this sense, cities can create green areas, green terraces, plant new trees, etc.

The SCoT defines some principles for the management and the valorisation of natural and agricultural spaces: realisation of concerted programs depending on territories' specificities, creation of a local agricultural policy, discovery paths compatible with ecological values and agricultural uses.

The SCoT identifies this valorisation as useful to implement the offer of nature into the agglomeration of Grand Lyon which comes from an increasing social demand (RdP Grand Lyon, 2010: 413) A demand which is causing an increasing pressure on some highly frequented spaces.

At a more local level, the revision of PLU-H of Grand Lyon has included among its main objectives the realization of a more sustainable and liveable agglomeration. The PLU-H has envisaged some tools able to answer to the challenges proposed by TVB¹¹⁴. One of the main element introduced for the construction of the PLU-H is the sequence ERC - *Éviter-Réduire-Compenser* (avoid-reduce-compensate). The principle of "avoid" corresponds to the choice of at least a continuous axe (identified in the SRCE or in other plans) where building is prohibited. Another tool used by PLU-H is zoning; some specific zones are indeed designed for the protection of natural and not urbanised contexts and can therefore permit the maintenance of ecological corridors. Additionally, the PLU-H envisages some specific tool for the preservation of TVB: *espace boisé classé* (classified wooded areas - EBC), *espace végétalisé à valoriser* (green space to enhance - EVV), *délimitation de l'emprise de pleine terre* (delimitation of the ecological footprint - DEPT), *terrains urbains cultivés et terrains non bâtis pour le maintien de continuités écologiques* (urban cultivated terrains and unbuilt terrains for the maintenance of ecological continuities - TUCCE), *emplacement réservé pour continuité écologique* (location reserved to ecological continuity - ERCE) and flood risk prevention. For each of these tools, the PLU-H indicates the general objectives and their possible utilisation within the framework of TVB. All these tools permit either a general preservation or a construction ex-novo of ecological continuities, both in urban (for example, for the enhancement of the project "*nature en ville*"¹¹⁵) and extra-urban environments.

Generally speaking, the local TVB of Lyon's agglomeration contributes to urban development as a comprehensive project which is composed by a number of

¹¹⁴ The study was entrusted to the office of ECOSPHERE; the territory involved is the one of Lyon's Métropole, except the territory of SAGE of Est Lyonnais (as it was already involved in a project of *Contrat vert et bleu*) and the municipality of Givors (already integrated in the contract "corridors" of Grand Pilat)

¹¹⁵ In 2015 the city of Lyon launched a study for the development of a "*Plan de développement des Espaces Naturels de la Ville de Lyon*" which aims at defining a strategy with regard to the use and the management of green spaces in the urban environment of the city of Lyon.

In 2011, instead, a similar project was launched by the municipality of Villeurbanne (part of Lyon's agglomeration): the "Plan Paysage et Environnement de Villeurbanne".

urban projects, identified as constitutive nodes and elements of the local TVB (for example, the project of Rue Garibaldi or Rives de Saône). A great attention is therefore mainly paid to public spaces and to the connection of existing and expected parks.

As recalled many times in the thesis, the most difficult level in which to build a project of TVB is the local and urban one. In this perspective, local and urban TVB can find a reference in ZAC (*Zones d'Aménagement Concerté*). They can indeed provide an adequate operative scale through which it is possible to realize urban regeneration projects with different characterizations: ecological, landscape, limitation of land take. The logic of ZAC fits perfectly within the frame of new urban plans, PLU and PLUi, which are oriented toward a *renouvellement urbain* and they have to take into account possible available parcels into the already built environment before forecasting new building permits in the outskirts.

5.2 The project approach

As said before, the most relevant regeneration projects are included in specific designated areas, ZAC, which are:

“les zones à l'intérieur desquelles une collectivité publique ou un établissement public y ayant vocation décide d'intervenir pour réaliser ou faire réaliser l'aménagement et l'équipement des terrains, notamment de ceux que cette collectivité ou cet établissement a acquis ou acquerra en vue de les céder ou de les concéder ultérieurement à des utilisateurs publics ou privés.” (Art. L311-1 of *Code de l'Urbanisme*).

In this sense, ZAC are areas where public and/or private actors can contribute to develop a project of urban regeneration. Since the first experiences of *friches industrielles*, the concept of urban project has evolved toward a more comprehensive dimension in terms of sustainable design and project as a decisional and operational process. The concept of urban project in France was born as a response to the technocratic character of regional and urban planning (Ingallina, 2004). Urban projects have indeed the duty to draft a global strategy, able to gather different aspects of development (economic, social and environmental) and to make different types of actions more coherent between each other. The recurring reference to urban and territorial projects (instead of plans) shows a shift of vision toward a more operative way to allocate investments and resources.

The cities of Grenoble and Lyon are carrying out some important actions of urban renewal. In particular Lyon, since the launch of SCoT Lyon 2010, has put great emphasis on public spaces projects (Novarina and Seigneuret, 2016). In 1995, indeed, under Raymond Barre presidency, the then urban community of Lyon (nowadays *Métropole*) started a huge process of urban renewal in order to enhance the international role of Lyon, to improve its attractiveness for both citizens and tourists (by promoting also international events, such as the *Fête des*

Lumières) and to promote sustainable development. Some of the main projects are: Lyon Confluence, Lyon Part-Dieu, Gerland, La Duchère and Rives de Saône (improvement of quality of public space). The area of the project of Lyon Part-Dieu is intended to be a new active centre of the city with the creation of a tertiary headquarter of international relevance. This project aims at becoming a liveable neighbourhood with a general re-adaptation of transportation means in favour of slow mobility. In order to perceive these objectives, the project envisages to increase the presence of nature into the city (with the insertion of new trees) and to enhance the quality of life.



Figure 26: The renovation of Part Dieu
(photo: Benedetta Giudice)

In this perspective, the reconfiguration of a big route, Rue Garibaldi, which connects north-south two urban parks, Parc de la Tête d'or and parc Blandan, is a key step towards a more sustainable quality of this area of urban renewal. Rue Garibaldi, with a total length of 3,8 km, was conceived in the '60s as an urban highway to facilitate the transit of cars. The reconfiguration of this route is an output of an extensive concertation with citizens and it is subdivided in three different stages (2 of which have been concluded in the end of 2017). The project consists of converting it into a new green artery with the creation of new public spaces for pedestrians, cycle paths and adequate lanes for public transportation. In this sense, this reconfiguration limits and reduces the speed of private cars, once predominant.

This route, as it was conceived originally, constituted an obstacle for ecological continuity; the general re-adjustment can help the route to become a key linear element of environmental and ecological continuity to be integrated in the local TVB of Lyon.



Figure 27: Green connection before (left) and after the project (right)
(source: <https://www.grandlyon.com/projets/lyon-rue-garibaldi.html>)

At this moment, the project has concluded its second phase and has permitted the installation of 165 new trees.



Figure 28: Rue Garibaldi and its new public spaces
(photo: Benedetta Giudice)

The southern extremity of this street, Parc Blandan, was an old military zone. Since 2014, this area of 17 hectares is under renovation and once finished, approximately in mid 2019, it will become a new green node of the local TVB



Figure 31: New artistic and landscape installations of Rives de Saône project
(photo: Benedetta Giudice)

In the southern area of Lyon's city centre, a worldwide known project is Lyon Confluence, an area of 150 hectares located at the confluence of the two rivers Saône and Rhône. It consists of one of the largest city centre urban regeneration projects in Europe. Half of the area was formerly occupied by industries and logistic poles and the other half hosted a residential neighbourhood (more or less 7.000 inhabitants). Due to its location and the crossing of the railway (with the presence of Perrache station¹¹⁶) and the highway, it has always appeared to be detached from the rest of the city, even though it is very close to the historical city centre (it is the southern area of the Presqu'île neighbourhood, part of the UNESCO heritage).

The urban project intends to transform an old industrial zone into an ecological reservoir with the creation of green areas which allow the ecological continuity of local TVB and favour the maintenance of local biodiversity along the Saône river. Indeed, 35 hectares of the total 150 have been dedicated to green spaces, 13 hectares of basins have been managed next to the Saône river and 3.000 local trees have been planted.

¹¹⁶ Perrache station is currently undergoing a project of general retrofitting with a final delivery date of 2020. This renovation will provide a sense of continuity between public spaces.



Figure 32: The Confluence plan
(source: WWF France, 2014)

The project has been subdivided in two different phases (figure 32). The first phase, represented by ZAC 1, was planned in 2003 with a timeline of 12 years. ZAC 1 is the one located on the side of Saône river (with a surface of 41 hectares) and it comprises mainly the realization of the neighbourhood of Sainte-Blandine, the banks of the Saône river, the hotel de la Région Auvergne-Rhône-Alpes (designed by the architect Christian de Portzamparc) and the new museum of the Confluence. The second phase, ZAC 2, is located on the side of Rhône river (with a surface of 24 hectares) and was planned in 2012. This temporal and geographical subdivision allows to develop the project on a precise area of the territory avoiding scattering projects and investments. The project is expected to be completed in 2025, with a population of 16.000 inhabitants and 25.000 activities.

Both areas foresee a mixed-use neighbourhood: not only housing (including a first percentage of 23% for social housing to be increased to 34% for the accomplished project), but also commercial activities, leisure facilities (such as the museum) and offices.

The first phase of the project has been realized with a strong connection to the abovementioned project of Rives de Saône with the revitalization of its banks and

the creation of new public spaces, sport facilities, community gardens, an aquatic garden, a marina (Place Nautique) and cycle paths. Instead, the proposed masterplan of the second phase was drafted by the group of architects of Herzog & de Meuron and Michel Desvigne.



Figure 33: The project of Confluence Lyon
(photo: Benedetta Giudice)

In the framework of the program “*Climat, énergie et infrastructures durables*”, the association of WWF France has engaged itself at a local scale in order to accompany cities in the transition to a more sustainable future. In this perspective, the Métropole of Lyon and WWF France decided to collaborate with the signature of an agreement of partnership for 5 years and with the realization of a *Plan d’action durabilité* (PAD) of the Confluence (as a pilot case study). This plan is based on the 10 principles of sustainability of WWF “One Planet Living”,

with the aim of reinventing cities in a current framework of limited natural resources.

In this perspective, in 2010, the Confluence neighbourhood has been certified as the first WWF sustainable district in France. The project of La Confluence has acquired this recognition for its peculiar attention for the safeguard of its natural and cultural heritage, for the inclusion of specific environmental, ecological and energetic requirements and for its mixed use of social and functional uses.



Figure 34: The project of Confluence Lyon
(source: <https://www.wwf.fr/champs-daction/climat-energie/reinventer-villes>)

The Metropole of Grenoble, compared to Lyon's one, did not, and still does not, carry out an intense policy on public spaces. Despite this, some relevant examples can be found. Since the 2000's, the city of Grenoble has nevertheless conducted wide processes of concertation for the re-development and requalification of some parts of the city, particularly the southern one (La Villeneuve, the Olympic district). One of the most known projects of the city of Grenoble is the ZAC Caserne de Bonne, an abandoned military barracks and its surroundings, awarded of the *Grand Prix national ÉcoQuartier* in 2009.

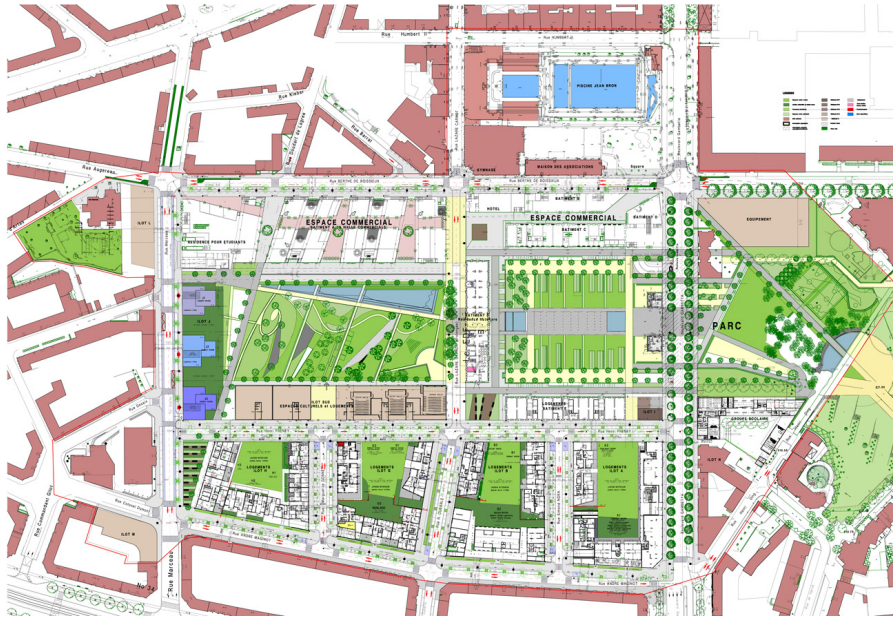


Figure 35: ZAC Caserne de Bonne

(source: <http://www.agencedevillers.com/wp-content/uploads/42-02.jpg>)

This project, designed by Christian Devillers (Grand Prix de l'urbanisme 1998), can be considered as one of the phases of the process of ecological development (Bobroff, 2011) and, due to its close location to the city centre, it can be considered as a hinge between the city centre and the southern peripheries.

Indeed, it aims at establishing an urban continuity, preserving the military buildings by assigning them new uses and constituting a new and mixed public space (figure 36).



Figure 36: The project of Caserne de Bonne
(photo: Benedetta Giudice)

With an extension of 8,5 ha, this project expected 850 new residential accommodations 35% of which has to be of social housing, 15.000 sq. m. of commercial units, 5.000 sq. m. of offices, a 4-star hotel, a residence for students, a residence for elder people, a school and 5 ha of public urban park. These data prefigure the intention of creating a new pole which combines a social, generational and functional heterogeneity and emphasises sustainable (both environmental and energetic) development. The project is indeed accompanied by an imposing environmental program which combines actions of slow mobility, sustainable development and alternative energies (all buildings have a very high heat performance¹¹⁷). The park (figure 37) is a complementary and integral element and it can be considered as an element of environmental continuity between the already existing Hoche gardens (east of the area) and the barracks.



Figure 37: The project of Caserne de Bonne's park
(photo: Benedetta Giudice)

A majestic project is the one of Presqu'île, in the northern part of Grenoble, in the intersection between the two rivers, Isère and Drac. This area (265 ha) gathers a number of functions, since the installation in 1956 of the Commissariat à l'Énergie Atomique and a first atomic battery followed in 1971 by the Institut européen Laue-Langevin (ILL) and a second experimental reactor. In the

¹¹⁷ This project was conceived within the framework of the European program CONCERTO, which proposed a new way of considering urban planning, by including environmental and energetic elements (SESAC: Sustainable Energy Systems in Advanced Cities in «Concerto-Sesac 2005-2010, *Énergies renouvelables et habitat durable pour la ville de demain*»).

following years, it has become an enclave dedicated to high technological research. Due its location, this area appears to be isolated from the rest of the city (mainly due to the presence of the two rivers and the railway lines). In the first years of 2000, in the framework of city's renovation actions toward a sustainable development, Grenoble decided to bet on this area for the creation of an innovative and more connected neighborhood, by proposing an urban project with a development model based upon three main components: university, research and industry. This urban project, firstly assigned to Claude Vasconi and after to Christian de Portzamparc, can be considered as the first step of the *écocité grenobloise* and a demonstrator of the post-carbon city (Novarina and Seigneuret, 2015). It indeed includes such concepts as social cohesion and innovation, conciliation of density and quality of life, integrated and smart mobility, reduction of energy consumption, etc. One of its strategic ambition is the construction of a “ville nature” by strengthening the continuity of green and blue spaces.

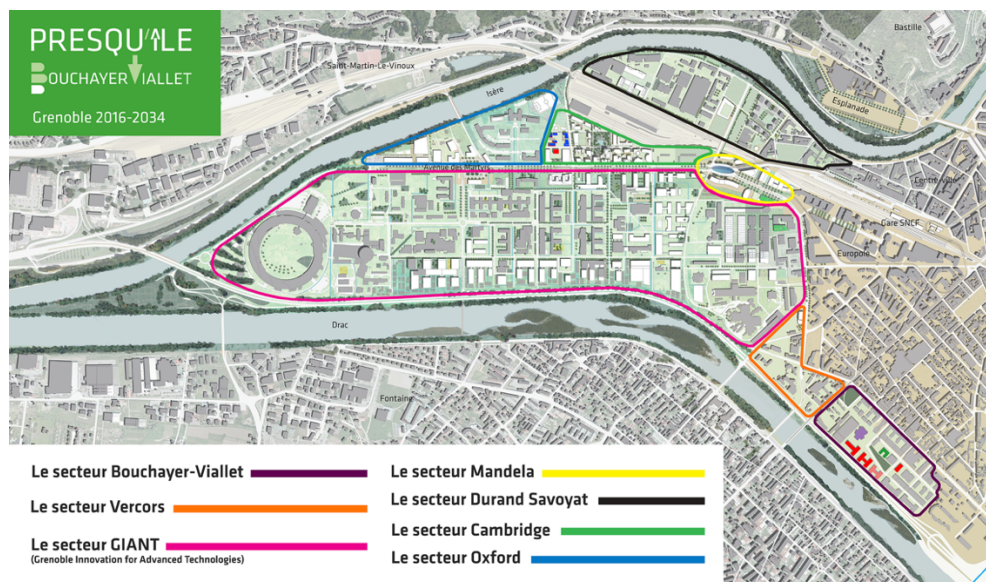


Figure 38: ZAC Presqu'île
(source: <http://www.grenoble.fr/545-presqu-ile.htm>)

Preparatory studies for the new urban plan of Grenoble included the area of Caserne de Bonne as a potential element of biodiversity in favor of the strategy of nature into cities. Moreover, the Presqu'île project, with the identification of the necessary reinforcement of the local TVB, has set environmental protection as a major challenge.

In this perspective, as these projects have been conceived, they can all become key elements, in the form of reserves or ecological corridors, of each local TVB.

5.3 Methodological innovations in GI construction

Since the first *Piano Territoriale di Coordinamento Provinciale* (PTCP – Provincial Territorial Coordination Plan) of 1999, Turin and its metropolitan area have always identified the importance of safeguarding soils and limiting land take. In this perspective, in 2010 the then Province of Turin took part in the OSDDT-MED¹¹⁸ project, in partnership with other 5 institutional bodies, each of which represents a different specific context of the Mediterranean area: the Province of Terni, the department of Hérault (France), the region of Murcia (Spain), the region of Crete (Greece) and the city of Pembroke (Malta). The main objective of this project, to be developed within 3 years, was merely quantitative as it attempted to elaborate a common methodology, through a set of different indicators (for example, intensity of land take, annual medium rate of land take increase, indicator of environmental preservation, etc.), for the monitoring and the evaluation of land take. This project also permitted to carry out practices of concertation and consciousness among citizens in order to raise awareness on the importance of the topic of land take.

The principle of limiting land take has been resumed and reinforced in the preparation of the new provincial plan, the PTC2, finally approved in 2011. The supporting objectives of this plan are a limited land take, an increased biodiversity, a renovated system of material and immaterial connection, reduced environmental pressures and a socio-economic development of the territory.

PTC2 organized the provincial territory upon 3 different areas:

- dense areas, constituted by "*porzioni di territorio urbanizzato, anche poste in prossimità del Centro Storico (o dei nuclei storici), aventi un impianto urbanistico significativo, caratterizzate dalla presenza di un tessuto edilizio consolidato e dalle funzioni di servizio qualificato per la collettività*";

- areas of transition, constituted by "*porzioni di territorio poste ai margini degli ambiti urbanizzati, caratterizzate dalla limitata estensione e dalla possibile presenza delle infrastrutture primarie*";

- free areas, constituted by "*porzioni di territorio esterne al tessuto urbano consolidato o ai nuclei edificati, caratterizzate dalla prevalente funzione agricola e forestale anche in presenza di insediamenti minori o sparsi, quali elementi identitari e distintivi del paesaggio che si intende preservare*" (art. 16, NdA of PTC2).

These areas are characterized by a different level of admitted construction; in the first ones it is permitted to build while in the second one it is allowed to

¹¹⁸ *Occupation des sols et développement durable du territoire sur l'arc méditerranéen*

activate actions of urban restoration and densification. In free areas, instead, it is not permitted to build.

These areas have been initially determined on the basis of a “geometrical processing” through the identification of the ratio of density of the territorial context. This technical proposition of boundaries is then examined and reviewed by single municipalities and with regard to existing environmental and landscape restrictions and it will serve, in co-planning processes of variants, as the qualitative model on which the choices of localisation of new interventions will have to orient to.

In this sense, it is important to notice that PTC2 attempted to overcome a merely quantitative approach to the limitation of land take, even though there is still the presence of some quantitative elements.

The qualitative approach of PTC2 is above all resumed in the construction of the green system of the Province. This system is constituted by free areas, sites of Natura 2000 and other areas with high landscape quality. In this system, free areas represent landlocked territories which, if recovered and preserved, can represent an important landscape and environmental resource.

In order to realise a strategic policy for green spaces and to enhance the quality of natural and built environment, the PTC process identified and followed two different principles:

- provincial ecological network;
- limitation of land take as soil is intended as a fundamental resource for the safeguard of the natural ecosystem.

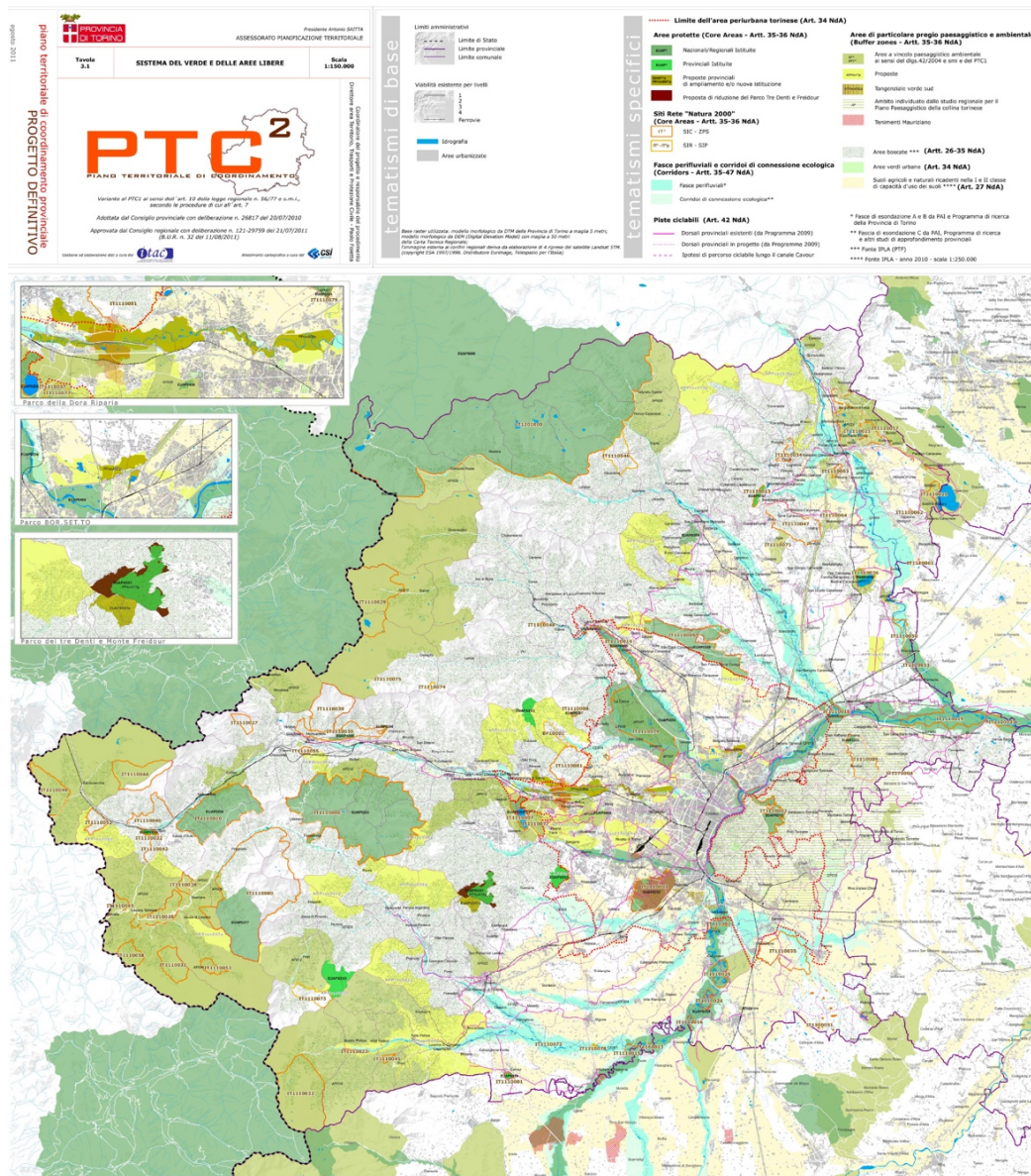


Figure 39: Provincial ecological network (PTC2)

The Provincial ecological network (figure 39) is constituted by different elements:

- parks and natural reserves;
- locations of Natura 2000 network (SCI, SPA; etc.);
- landscape assets and areas of high landscape and environmental value;
- zones of ecological connection (such as rivers);
- damp zones;
- wooded areas.

These elements constitute the other side of the coin and they are the key elements in the construction of an ecological approach to planning.

In 2014, in fact, the metropolitan city of Turin, together with ENEA¹¹⁹, approved a methodology for the construction of the provincial ecological network. In particular, it developed the guidelines for the green system (LGSV)¹²⁰ and the guidelines for the ecological network (LGRE)¹²¹. The methodology specified by LGRE allows to identify the ecological function of territories through a set of five indicators: “naturalness”, relevance for the conservation, “extroversion”, fragility and irreversibility (Voghera et al., 2017b). The combination of these indicators allows the realization of the so-called “*Carta della strutturabilità della rete ecologica*” (map of the ecological network structure). This map is constituted by three main elements: structural elements of the network (primary ecological network), areas of priority expansion and areas of possible expansion. The structural elements are the most relevant ones for their high (or moderate) level of ecological functionality; the areas of priority expansion, with a residual ecological functionality, have to be taken into consideration for interventions necessary to increase the ecological functionality and for the maintenance of the primary ecological network. The areas of possible expansion are the ones in which it is possible to realize interventions functional for the safeguard of natural habitats and for the preservation of biodiversity.

Starting from these elements, a group of research of the Interuniversity Department of Regional and Urban Studies and Planning (DIST) of Politecnico of Turin has led, with the support of local authorities, different practical experimentations. The pilot municipalities are Bruino, Ivrea together with Bollengo, and Chieri. These experiences were built starting from an analytical process of framework of the supra-local ecological system and, in some cases, with an active participatory process and public consultation. By adapting from time to time the guidelines of LGRE, each experience defines methodological and operational orientations which can be directly included into urban plans’ legislation. This integration expects some specific actualization mechanisms, such as regional and urban equalization, mitigation and compensation actions. These mechanisms are fundamental for the maintenance and the project of an adequate level of ecological functionality.

The experience of Bruino was conceived in the strategic framework of the projects’ actions of River Contract (RC) of Sangone stream. Starting from the provincial network, the main goal is to define a network of local ecological and landscape connections through the definition of interventions for the enhancement of landscape quality. The network is also connected to the rural and peri-urban landscape as it plays an important role in relationship with the town of Bruino and the other neighbouring municipalities. Other elements that enter in the construction of the network are urban parks, cycle and pedestrian paths, private gardens as they can help increasing the level of biodiversity. The management of

¹¹⁹ Agenzia Nazionale per le nuove tecnologie, l’energia e lo sviluppo economico sostenibile

¹²⁰ Linee Guida per il Sistema del Verde (LGSV)

¹²¹ Linee Guida per la Rete Ecologica (LGRE)

green areas is accompanied by some parameters which combine plant species suitable for local weather and soil conditions and the resistance to urban pollution. In the legislative part, some specific measures of mitigation of negative impacts (after new settlements and infrastructures) have been included; these measures, and their correspondent interventions, are directed to the acquisition and the reforestation of areas along the Sangone stream as they are functional for the realisation of the supra-local ecological network.

The territory of the Morainic Amphitheatre of Ivrea (represented by the two municipalities of Ivrea and Bollengo) was identified through a process of public concertation (with both institutional and non-institutional stakeholders). This experience led to the provision of a normative approach with the translation of provincial orientations into rules suitable for both urban plans. These rules are functional for some specific strategies, such as the safeguard of prestigious natural elements, the valorisation of water courses, the de-sealing, the mitigation of negative impacts, etc. This experience emphasizes also the topic of landscape valorisation and urban green spaces.

The most recent experience (2017) is the one of Chieri's ecological network. For the construction of this ecological network, many different geometries have been considered, both top-down (such as the one identified in supra-local plans) and bottom-up of voluntary collaboration. The most recent geometry is the one identified by the Metropolitan city of Turin, the so-called *zone omogenee* (homogeneous areas); the municipality of Chieri is included in the homogeneous area of Chierese-Carmagnolese, made up of 22 municipalities. Beyond this geometry, a voluntary aggregation, the *Tavolo di identità territoriale*, recently constituted by 30 municipalities of Chieri's hinterland, has shared the main objectives for the construction of the ecological network.

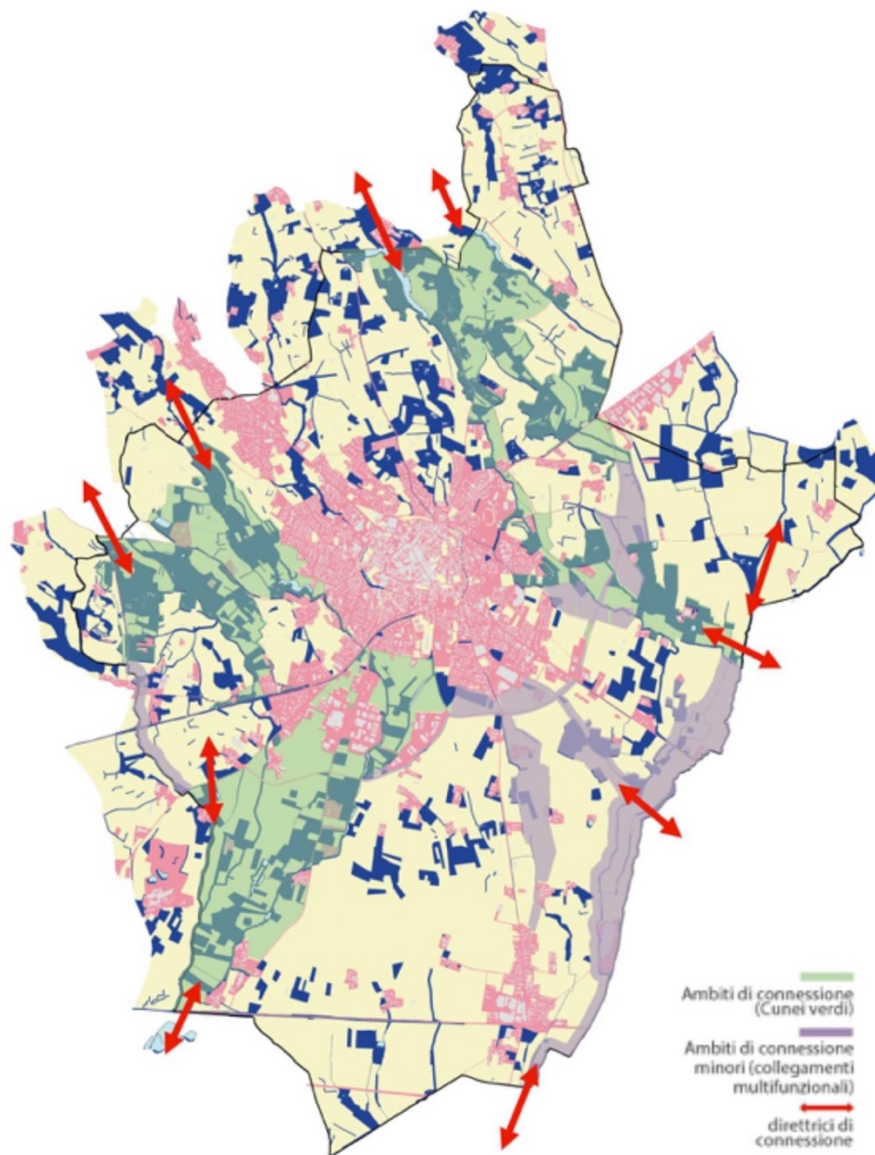


Figure 40: Connection's settings and multifunctional connections of Chieri ecological networks

This territory is mainly rural and is characterized by a relevant historical and landscape heritage. The structural construction of the ecological network of Chieri municipality runs parallel to the project of implementation of existing cycle paths (the so-called “Biciplan” project) which takes into account both landscape and fruition aspects. The reference strategies are indeed diversified but connected between each other and aim at both realizing the ecological network and implementing the cycling system. Great emphasis is given to the landscape value which is integrated in the ecological network through the analysis of the visual relationships between the different structural landscape elements. Due to its peculiar rural environment, Chieri municipality does not present areas of high ecological value next to the city center but only of residual value. In this perspective, the elements which constitute the ecological network are the green wedges and the multifunctional connections (figure 40).

In 2014, the Metropolitan city of Turin, together with DIST, ISPRA and the Council for the research in agriculture and the analysis of agrarian economy (Crea) started working on a European project, the LIFE+ project Soil Administration Model for Community Profit (SAM4CP). The aim of this project is the development of a digital simulator which can foster qualitative urban choices and therefore, can provide a better management of soils. This project attempts to highlight how tools and the mapping of ecosystem services can foster more efficacy in the decision processes of territorial transformations. Starting from a pilot project in the municipality of Bruino, the project promotes, through a public announcement, activities of co-planning in the development of variants of the PRG to other 3 interested municipalities. The selected municipalities (None, Settimo Torinese and Chieri) represent a good record upon their morphological characteristics.

5.4 Operative and conceptual guide for planning

The two experiences present different approaches with reference to the issue of building suitable green infrastructures (table 11).

Table 11: French TVB and Italian green networks

	Implementation levels	Functions	Approaches
France	From the national (orientations) to the local (PLU and PLUi)	Preserve biodiversity Control of land take	Methodological Project
Italy	Regional experimentations (such as Piedmont Region)	Preserve biodiversity Landscape valorisation	Methodological

The French experience is directly oriented by the national orientations and it integrates not only green infrastructures but also the blue ones. The “waterfall process” allows to integrate the concept of ecological network with the one of nature into cities, with the individuation of specific projects aimed at introducing natural elements into the built environment.

The experiences developed by Piedmont Region provide specific methodological recommendations and operative modes for the project of the local ecological network. Nevertheless, the Italian case study confronts itself with the difficult passage from the network as a strategic scenario to concrete projects of territorial and landscape valorization (Giudice et al., 2017).

Both the experiences can help orienting the definition of some operational criteria that need to be taken into account for a qualitative planning and land take.

5.4.1 Operational criteria for a qualitative planning

Latest changes related mostly to climate, energy consumptions and land take are obliging cities to adapt quickly to them. In this perspective, planning can assume an important role in accomplishing parts of these duties, but it requires to be developed with a new approach and practicality. These global rising changes make indeed necessary to change the paradigm and the perspective: from planning new expansions of cities, to regenerating the consolidated area. Moreover, this change includes also new elements which have nowadays overwhelmingly permeated into cities' policies and public debates: green spaces, green infrastructures, biodiversity and landscape quality, climate change and healthy solutions, etc.

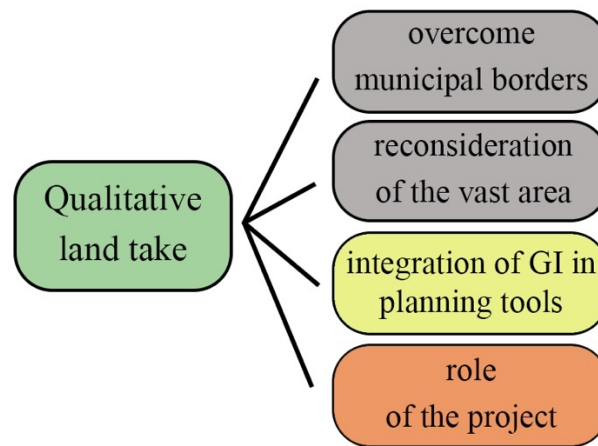


Figure 41: Operational criteria for a qualitative land take

Generally speaking, the criteria that should be implemented in planning practices belong to 3 different areas of discussion: the first (the grey one in the diagram, figure 41) is bounded to institutional issues, the second (the yellow one) includes environmental and ecological elements while the third one (the orange one) is the role of the project and the design approach in territorial and urban development.

The main elements here discussed are:

- crossing of municipal administrative boundaries towards inter-municipalities (achievement of a cross-scaling and multiscale approach);
- reconsideration of the vast area and its planning tools;
- integration of ecological infrastructures in plans able to deliver a stronger operative efficacy, specified in project guidelines and a normative framework;
- design approach.

With a general aim of pursuing adequate perspectives of sustainability, it is necessary to improve social sensibility on the topic of introducing natural and ecological elements into cities' policies and planning processes. Cities which must, nevertheless, cooperate and interact between each other in order to obtain a more coherent territorial project and a sustainable development. In planning practice, such a vision cannot be strictly tied to municipal boundaries, but there is the necessity to overcome them through an inter-municipal planning logic. With reference to territorial governance, in fact, the key-point of a territorial reorganization should be inter-municipal cooperation. Such a procedure is made necessary for costs rationalization, but it can also help improving the efficacy of public action. Inter-municipal cooperation could give rise to the creation of new municipalities, in terms of unions or fusions (as the Delrio law reported); nevertheless, this mechanism, in order to work properly, should be made with a bottom-up approach, based upon municipalities' voluntariness. The French reform on *Métropoles* shows how a redefinition of competences can lead to a general improvement while the Italian experience of Delrio law seems to be mainly shaped upon a change of name (from Province to Metropolitan city) without making major economic or territorial improvements (even though it was mainly aimed at saving expenses). The Delrio law imposes then to rethink the vast area and all the issue connected to it.

Nonetheless, the intermediate level could play an important role in developing planning strategies focused on environment and landscape. In fact, with a general aim of reforming planning according to land take containment, planning should be developed within a framework of a common and shared territorial project made by a group of municipalities with similar characteristics. The municipal scale, to which Italy is closely attached, appears nowadays to be not anymore economic for the activity of territorial planning, soil protection, water and waste cycle and transportation system (Borghi, 2017). Planning in Italy is indeed closely related to the single municipality's boundary and therefore urban plans' choices appear to be not synergetic but in contrast between each other. Even the structure of ecological infrastructures recalls to an open system of relationships which cannot be enclosed in a single municipality plan.

Italian case studies, developed at a municipal level, show indeed that, taken individually, they work at this level, but practically which repercussions do they have on nearby municipalities? There is then the necessity to promote an active collaboration on the construction of GI across institutional boundaries. The articulation of planning choices at different scales seems then to be essential for the realization and the support of a policy based on sustainable development. Some imposing projects, such as La Confluence and La Caserne de Bonne, have indeed been possible only thanks to this cross-scaling action and to the participation of different actors.

Inter-municipal planning in Piedmont Region, since the promulgation of regional law 56 of 1977, has always been a reference objective of planning but it remained (and still remains) a conceptual idea with limited practical

experimentations. The territorial settings proposed by PTR and PPR (AIT and landscape character areas) are diversified in the delimitation and individuation of their boundaries but they can represent a good starting point for the creation of new inter-municipal plans. The relaunch of inter-municipal planning is above all explicitly included in the *sub-ambiti* of PTR, but they rarely had reflections in planning practices. The experience of homogeneous areas of the metropolitan area of Turin follows a top-down administrative criterion for the identification of boundaries and this factor does not allow to have a significant applicability in planning practices. Another critical element of homogeneous areas for the operative realization of inter-municipal plans is the fact that some of them are constituted by a too high number of municipalities (they can reach a value of 59).

Ecology, and thus the ecological approach to planning, is here interpreted as a key element for the (re)launch of inter-municipal planning. In particular, such policies as ecological infrastructures should be intended as an integral element of urban plans and not only as an add-on. The case of French TVB can be considered as one of the most suitable in transferring the principles of GI (social, environmental, ecological, etc.) into praxis; they have had indeed an extended approval and integration in French planning tools. The status of *prise en compte* makes them not compulsory, even though after the promulgation of law NOTRe, the SRCE should be integrated in the new tool of SRADDET. In this case, SCoT will have to be compatible with regional orientations on TVB. The integration of ecological infrastructures into plans is connected to the national strategy of introducing and enhancing nature into cities through also the realization of specific urban projects, as in the case of Grand Lyon Métropole and Grenoble-Alpes Métropole. The integration of such a strategy at an urban level requires nevertheless the promotion of new planning and urban development practices; these practices could indeed allow to reach a new multi-functional approach in building and regenerating the city. Urban plans, represented by PLUi, can include the element of TVB and guarantee a minimum level of land take through some operational devices reinforced by and in some specific projects. French experience is an example on how GI can become a proactive tool, instead of being just a merely ex-post protection tool.

Italian case studies analyzed appear to be limited within their own experience; they are often independent from the plan's process and they do not interact with plan's choices. Another strong limit is the fact that they refer to a single municipality: for example, the experimentation carried out by Bruino municipality is related to Sangone river project, but other municipalities have not contributed to it. Therefore, there is a strong necessity to foresee project actions and/or a project approach in plan processes, better if inter-municipal ones. Another obstacle in Italian planning system is indeed the already mentioned strong reliance on municipal boundaries. French planning experience relies a lot on inter-municipal aggregations which, upon voluntary agreements, intend to develop a strategic and common policy for their own territory. The most important development policies

(land take, energy consumption, climate change, etc.) are carried out at a supra-local level, by Regions (in charge of developing a SRADDET) or EPCI.

This voluntariness of cooperation guarantees an increased efficacy in the realization of inter-municipalities and of a shared territorial project. This is mainly connected to the identification of a common identity of landscape, as in the French cases led in the '90s of *pays* and *agglomérations* and in the case of the initiative led by the municipality of Chieri, the *Tavolo di identità territoriale*, which attempted to activate territorial and landscape valorization policies at an inter-municipal scale. This panel of many stakeholders (30 municipalities) can be considered as an initiative of territorial governance.

An important innovation of French territorial planning is represented by the recent adoption of *Orientations d'aménagement et de programmation*. These orientations have both a pedagogical and prescriptive character and therefore they permit to define the necessary actions and operations. They, differently from rigid rules, can play an important role in cities' development and they can be applied only to specific themes or specific geographical areas (also city neighborhoods not necessarily the entire city).

They can be referred, indeed, for instance, to areas of urban expansions, to areas of urban renewal, to some natural sectors (specific elements of landscape for example) or to agricultural sectors. In this perspective, OAP can serve for defining the necessary conditions in the case of future expansions, projects of urban renewal and construction or preservation of ecological corridors. The on-going PLUi of Grenoble, with the undertaken experience of realizing specific OAP on the topic of *Paysage et biodiversité*, represents a good example of how some development orientations could be integrated into plans. This document allows indeed to reinforce the role of PLUi and of urban projects, by giving specific orientations at different scales: from the metropolitan territory to the single parcel of the project.

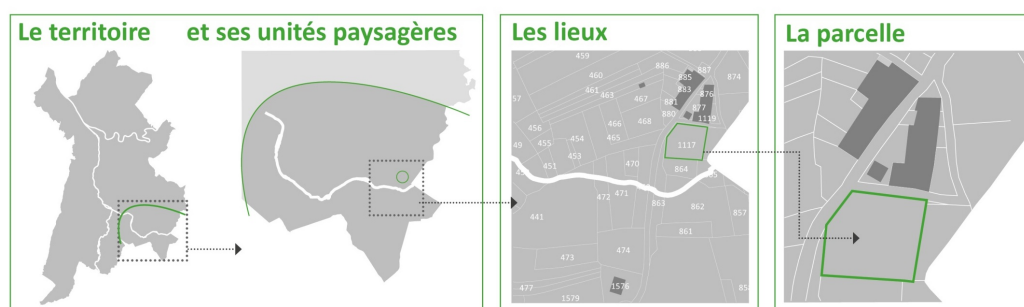


Figure 42: The different scales of PLUi's landscape approach to projects
(source: *feuille de route de l'élaboration du volet Paysage dans le cadre du PLUi de Grenoble-Alpes Métropole*)

OAP play an important role as they can be considered as a tool for coherence, in the sense that they aim at guaranteeing the systematization of all planning and management tools and at providing to stakeholders the necessary framework in

which they can build their projects, in compliance with the geographical, cultural and ecological environment. Differently from rules, they are opposable in terms of compatibility; in this sense, all building permits and urban planning actions cannot call into question the orientations.

For the specificity attributed to some OAP, as they are not so restrictive in terms of regulation, they appear to be a flexible tool, easily adaptable to urban projects' temporality and their successive modifications. A tool as OAP could therefore be the basis for qualitative urban projects able to contain land take and to foster an enhancement of quality of life.

5.4.2 Design approaches

Contemporary cities have imposed to urban planners to answer to new project requirements, different from the old ones, both concerning places' characteristics and scales and materials. Indeed, in the latest years, a fundamental step in urban planning processes has been the discovery of the topic of continuity and reticular dimension of ecological components. This new vision has implemented the meaning and the relevance of urban projects, in terms of ecological and landscape elements. In particular, urban regeneration projects have acquired a very important role in French cities' sustainable development. Since the introduction of the "*inverser le regard*" strategy, nature and landscape have indeed acquired even more importance by becoming structural elements of urban projects. The presented French urban projects show indeed how they tried to conciliate the construction of landscapes equipped with a strong ecological awareness with a renovated idea of habitability and of productive regeneration.

The example of Grand Lyon Métropole is considered one of the most successful in the European context for what concerns urban revitalization through the development of urban projects of public space. These projects have indeed helped the city in the relaunch of the attractiveness at an international level. One of the guiding cornerstones of all these urban projects is nature. Nature in urban projects can be considered as a catalyst for the regeneration of the dense city.

Urban projects share some common elements on the basis of different challenges, such as the environmental one, the integration within the local context and the enhancement of quality of life. The key elements for building qualitative urban projects must be:

- an adequate integration within the nearby landscape;
- the integration of ecological functionality, guaranteed by the presence of ecological networks – this element is strictly connected to the increasing role of water (the blue network) in shaping landscapes;
 - social inclusion;
 - functional mixing;
 - coherent integration of different infrastructures systems (public transportation, cycle paths, etc.).

The constitution of a weft of new public spaces starting from the structure of their natural elements can lead to the creation of spaces characterized by many functions: ecological, agricultural, landscape quality, etc. A territorial project must then be created through the integration of many contents and with the participation of different stakeholders. In this case, a well-designed project could then lead to a more successful practice of planning and programs.

Italian experimentations provide specific methodological indications and operative modalities for the construction of a local ecological network. Nevertheless, difficulties arise when it occurs to move from the network conceived as a strategic scenario to tangible territorial valorization projects, as it happens in French experimentations. The REM experience, for example, shows how there is a strong necessity, apart from reducing biological fragmentation, of providing cities of a new and improved project, above all in the cases where cities have lost their identity, in terms of form and functionality. This project also attempted to define the notion of connections between ecological networks and cities, thus introducing the element of nature into cities (redesign of residual areas, make greener neighborhoods, valorization of peri-urban and rural landscapes).

In general, therefore, how can such a project and design approach find reference in Italian planning structure? A tool, or a method, already mentioned in this final part, which proves to be suitable to guide the realization of these projects, also in separate parts, is the River Contract. Rivers, in this framework (as it happens in the French experience of TVB), act as natural corridors, that, jointly with green corridors, can help to the preservation of biodiversity.

The method of RCs has been adopted in some experiences of Piedmont Region (for example, the first one on Sangone river and another on Stura di Lanzo river). The Sangone River Contract is also connected to the aforementioned project of *Corona Verde* and this synergy led to the realization of several projects.

In the definition of a design approach, RCs represent an “opportunity for building the territorial project with the contribution of the communities, to launch that environmental and landscape regeneration, with the transformation of systems of actions, some of which small and molecular, sustained by local actors” (Ingaramo and Voghera, 2016: 22). A project like this demands for “interconnection in an overall strategy, capable of building up through environmental reclamation and regeneration processes and actions which might even be minimal” (Ingaramo and Voghera, 2016: 22).

Urban projects in this sense can play an important role in territorial and ecological development through a widely cooperative process and in the increase of cities’ attractiveness. In addition to this, new urban developments are also an active part in the preservation of biodiversity and they can indeed act as green transformers of cities. In this sense, they make a great contribution in the construction of a systemic vision of green and blue infrastructures. This double vision envisages both an aesthetic purpose and an overall positive environmental impact.

Chapter 6

Final considerations

In such a changing world, what are then the new challenges for planners and planning? The thesis proposes a new way of thinking urban and regional planning, through the combined interpretation of the components of ecology, landscape and environment. In this framework, urban planning must be above all viewed as a cooperative and collaborative practice with the aim of building a shared vision and project of development.

The French approach shows how it is possible to integrate these components in urban and regional plans, but some additional steps still need to be done. Planners, above all the ones working for the future of Italian cities, are invited to develop new forms of plans, much more flexible and adaptable to different contexts of land use. Such a claim for change in Italian urban and regional planning was already expressed at the end of the 90s' by some researchers; this was mainly due to the fact that the political system in more than fifty years has not been able to offer stable rules over time to planning at different scales (Benevolo, 1996).

The concepts of green infrastructure and ecological network, here intended as one of the best tools to contain and limit land take, still need an adequate conceptualization which could help in implementing them into planning tools. The construction of an ecological network, through both the preservation and restoration, cannot be based on a single and isolated approach; it requires the articulation of different policies able to lead to the implementation of complementary actions. In this multiple approach, the intermediate level (Provinces and Metropolitan cities for Italy and *Métropoles* for France) can play an important role of coordination between the different scales, administrative levels and stakeholders. In this sense, green and blue infrastructures should be fully integrated in metropolitan policies; it appears to be fundamental (while nowadays it is not present) the necessity to disseminate this theme to all stakeholders involved in the process of planning and development and to design some mechanisms able to avoid, reduce and compensate (as in the case of the

upcoming PLU-H of Lyon) the impacts of urban projects on ecological connectivity.

In order to contain land take and to face incoming challenges, nevertheless, the general strategy has to be articulated with policies not only specifically dedicated to green and blue infrastructures; indeed, for example, complementary actions can include a new implemented and adequate fiscal system, a climate protection program (oriented toward a project of resilient city), nature-based urban projects, etc.

A very important role is the one made by voluntary actions of cooperation, oriented toward a common project of sustainable development of a specific territory or a city. The landscape and the environment are two reference dimensions for an integrated and operative policy of land take containment. In this perspective, some new tools can be singled out: the environmental compensation plan and PES (payment for ecosystem services).

The process of realization of a TVB could encounter many kinds of obstacles (technical, sociological, institutional or financial) which could lead to a miscomprehension and difficulty in realizing the expected actions. It is then necessary to undertake some specific actions; for example, some interventions could result to be ineffective as they are conceived at a local scale with no relations with the surroundings. The realization of a TVB could also encounter some issues in terms of relationship with private interests (strong pressure on land, water consumption, etc.).

Next to the ecological approach to planning, it is also relevant to research the synergies with other functions of green spaces. Green and blue infrastructures can assure indeed other functions for collectivities: a better quality of life, slow mobility, regulation of floods, carbon stock, decrease of local temperatures, etc.

6.1 Open issues

In some Italian contexts, the path toward a renovated regional and urban planning which is oriented to a landscape valorisation and a qualitative land take is still long and arduous. Indeed, planning is no longer only aimed at reaching sustainability, but the focus has shifted toward the concept of resilience (Davoudi, 2012). Even in this case one of the most used and approved strategies is the one of green infrastructures (Meerow, and Newell, 2017), above all in American cities. Nevertheless, in order to reach a resilient approach, the landscape and environmental project (Ingaramo and Voghera, 2016) should represent, above all at the local scale, the starting point for a territorial safety and a good climatic quality. But there is still the need to include some other open issues, some steps that need to be further analysed.

Some of these open issues are the introduction of an adequate fiscal system, a more operative project action, territorial equalization and a performance-based planning instead of traditional zoning.

Our economic behaviors have resulted to be irremediably unjust with respect to ecological issues and this global ecological modification appears to be a product of these unfair behaviors (Perulli, 2014).

Tax system, as seen in the German case of *ökokonto*, is not a separate element from urban planning. Italian planning fees (*oneri di urbanizzazione*) cannot be identified as an adequate tool for controlling land take; indeed, in many contexts, it can represent a tool of concurrency between two neighboring municipalities in terms of reckoning businesses. Latest Italian regional planning laws have introduced the limitation of land take as a guiding principle for a sustainable development, but in these times of crisis, in order to regenerate parts of the cities (as an alternative to the consumption of new land), there is the necessity for public institutions to gather financial resources. This can be mainly made possible thanks to construction grants and therefore, at the end, this mechanism results to be somehow contradictory. In this sense, there is the necessity to overcome the dependence of municipalities on their building stock. Since their definition at the end of the '70s, they have changed their original purpose and, 20 years after, they served to fill municipal resources for current expenses. Nowadays, starting from the 1st January 2018, Italian planning fees have returned to their original purpose aimed at new urbanizations. This change can be considered a starting point for a new and adequate system, which must be aimed at reducing land take should therefore be based on a rationalization of values of planning fees and on a system that favors the virtuous experiences and disadvantages squandering.

Equalization in Italy is more often interpreted at a municipal scale, but in a policy for land take containment the most pertinent scale is the supra-municipal one. Some Italian Regions who recently promulgated new planning laws (Tuscany, Lombardy and Umbria for example) have introduced the concept of territorial equalization. It is mainly transferred to Provinces and Metropolitan Cities in charge of the identification, in their coordination plans, of suitable territorial contexts which need the definition of actions of coordination aimed at the implementation of territorial equalization.

In a general reconsideration of the vast area, the coordination plan (as a developer tool of a shared scenario for the sustainable development of different municipalities) can play an important role in the definition of adequate strategies and tools; among these a key element is represented by the activation of practices of territorial equalization. It can be interpreted as an exchange of building grants at a supra-local level, through the definition of a territorial agreement. Plans fix maximal thresholds in terms of new urbanizations and requalification actions and they must deliver qualitative performances (more than quantitative) in charge of entailing general improvements of the system in the definition of sustainable criteria and compensations. These performances can be based on principles of ecosystem equilibrium and compensation principles for specific conditions or bound to impacts' monetization.

Environmental compensation plans, mentioned previously, can be considered a "good starting point for the integration of environmentally qualitative elements

in urban and local plans” (Voghera et al., 2017a: 892) and they can be considered as an opportunity to change from quantitative urban standards to performative ones able to deal with all the project’s aspects.

Prescriptive urban plans and traditional zoning appear indeed to be a rigid process, above all in the Italian planning framework. In order to contain land take, another open issue is the necessity to overcome this rigidity in favor of a performance-based planning. Performance-based planning, initially used in Anglo-Saxon countries (United States, Great Britain and Australia) and in Nordic countries, can improve the process of decision-making in planning choices. These approaches “allow better land use integration as long as performance criteria are met.” (Baker et al., 2006) In this perspective, urban projects and plans are no longer decided only upon a set of quantitative standards but upon combined criteria that permit to have more flexible tools.

The achievement of more operative projects passes through the design of a suitable method and approach that need to be flexible and strategic in order to adapt to different contexts and, for example, to different kinds of green infrastructures. In a perspective of a GI approach, the aforementioned design approach appears then to be less complex, rigid and difficult to approve than plans. This approach also allows to have a more comprehensive look at territories, from the vast scale to the urban one. Therefore, the creation of these new urban scenarios, built upon an integrated design approach of ecological networks, can also open up and contribute to a renovated season of the so-called “*progetto di suolo*” (Secchi, 1986).

In a design approach of GI, they can function as a natural boundary or backbone (resuming somehow the “*inverser le regard*” approach) on which to start sketching urban projects.

The sum of all these elements, combined with the operational criteria deducted by the case studies, can contribute to the achievement of a more qualitative land take. Nevertheless, this sum must not be made up of sectorial actions, but it is necessary to build and activate “arenas” for sharing policies and decision within different territorial stakeholders (planners, citizens, landowners, developers and local authorities) for a more sustainable future of our cities and territories and a renovated activity of planning. These places can help in raising awareness of how GI, thanks to the multiple benefits they provide, can help in mitigating the effects of new global challenges, such as climate change and fertile soil loss.

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