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GRETA - “GReen infrastructure: Enhancing biodiversity and ecosysTem services for territoriAl development”

Applied Research

Valencia Metropolitan Area

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Table of contents

List of Maps

List of Tables

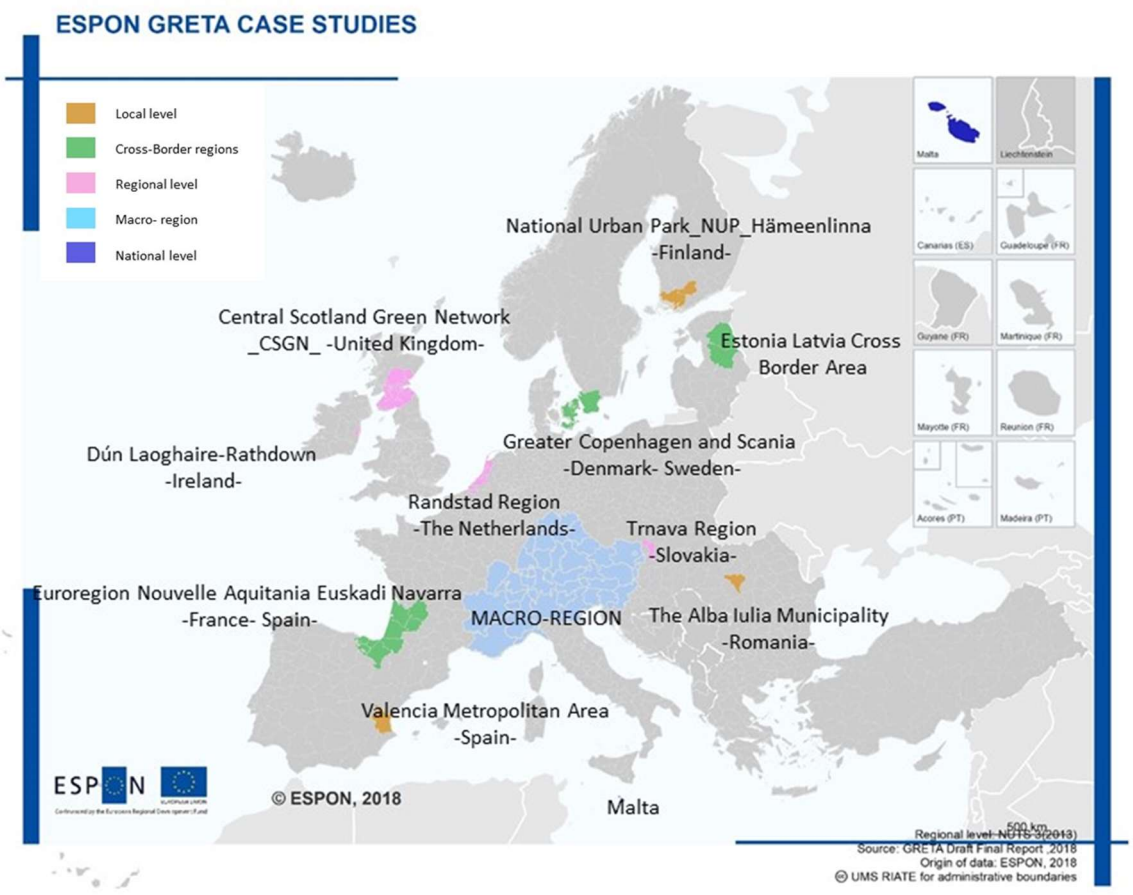
Abbreviations

EC	European Commission
ES	Ecosystem Services
ESPON	European Territorial Observatory Network
EU	European Union
GI	Green Infrastructure
NUTS	Nomenclature of Territorial Units for Statistics
PATEVAL	Territorial Plan of Action of Valencia
PMoMe	Metropolitan Mobility Plan of Valencia
PATIVE	Territorial Action Plan of Coastline green Infrastructure

1 Introduction

GRETA investigated 12 case studies that represented different spatial, institutional and governance settings and that ranged from urban centres to rural countryside. The case studies served to:

i. gain knowledge on implementation factors, drivers and constraints in different planning systems and territorial realities;
ii. gain insights on the use and applicability of economic methods in decision making; and
iii. gather knowledge for policy and practice as input and inspiration for the policy recommendations.



Map 1. ESPON GRETA selected case studies

Method

The activities undertaken at the case study level incorporated a combination of desk-based analysis alongside online questionnaires and pre-structured interviews to key actors in each of the case study areas, including: (i) decision and policy making representatives; and (ii) those involved in designing, planning, implementing and managing green infrastructure (GI).

A series of three consultations were developed to gather relevant information from case studies on different aspects of GI spatial analysis, policies, planning and implementation. The consultation process was seen as a combined approach of an online survey and or a telephone interview (which used the survey questions as the basis) with stakeholders to facilitate getting good engagement and to address any clarifications needed.

Consultation A – Economic Valuation

The questionnaire included 20 questions structured in 2 main parts. The first part aimed at understanding the current use and awareness of valuation methods by respondents while the second part aimed at identifying their perceived barriers and interest of using such methods. We used a mix of open-ended and closed-ended questions to combine comparable results as well as qualitative material; respondents also had the possibility to comment on their responses. Analysis of Consultation A is described in Annex III-C.

Access to Consultation A

https://survey.tecnalia.com/limesurvey/index.php/214247?lang=en

Consultation B – Characterising green infrastructure and ecosystem services characterisation

The objective of this consultation was to identify good practice guidelines, opportunities and challenges that could be useful for a variety of regions and cities. Responses to Consultation B were used to assess the usefulness of the GRETA methodology, a methodology specifically developed to delineate and map the main green infrastructure (GI) elements and their multifunctionality, as well as identifying their capacity to support three main policy domains: Biodiversity, Climate Change and Disaster Risk Reduction, and Water Management. Questions in Consultation B were designed to help us gain further insight into the enabling factors that exist in different regions and cities. We also sought to gather information on the challenges and barriers that may compromise the implementation of GI. The final set of questions focused on identifying the general benefits and potential synergies and trade-offs associated with GI projects.

The maps produced for Consultation B in the GRETA project were intended to provide a starting point for discussion about the applicability of the GRETA methodology from European to local application. As such they did not aim to be a substitute for the maps or other planning material that already exist at local case study level nor were they aiming to characterize the GI on regional or local level. They were not developed to be used as an output from case study levels.

The landscape elements in the maps are produced based on standardized European data sets with a minimum mapping unit of 25ha (i.e. CORINE Land Cover 2012) – smaller geographical features are not depicted. The Consultation B aimed at finding the gaps between datasets produced at the European level and any other data sets produced at regional and local scales.

Access to Consultation B

https://survey.tecnalia.com/limesurvey/index.php/614564?lang=en

Consultation C - Analysis of governance, policy and financial frameworks

The successful implementation of green infrastructure (GI) projects requires a combination of governance structures, integrated policies and financial support. This consultation therefore aimed to investigate the governance systems in place in each case study area in order to determine how policies and policy makers enable the implementation of GI projects in the case study areas.

Responses to Consultation C aimed to help us identify: (i) how much funding (money and personnel) is currently used for GI in the case study regions; (ii) if this funding is sufficient for implementing and maintaining GI; and (iii) the main sources of funding (public tax-based funds, private investments, NGOs or others). Consultation C also examined whether policies compliment or conflict with GI and assesses policy makers' knowledge needs for making full use of GI development potential.

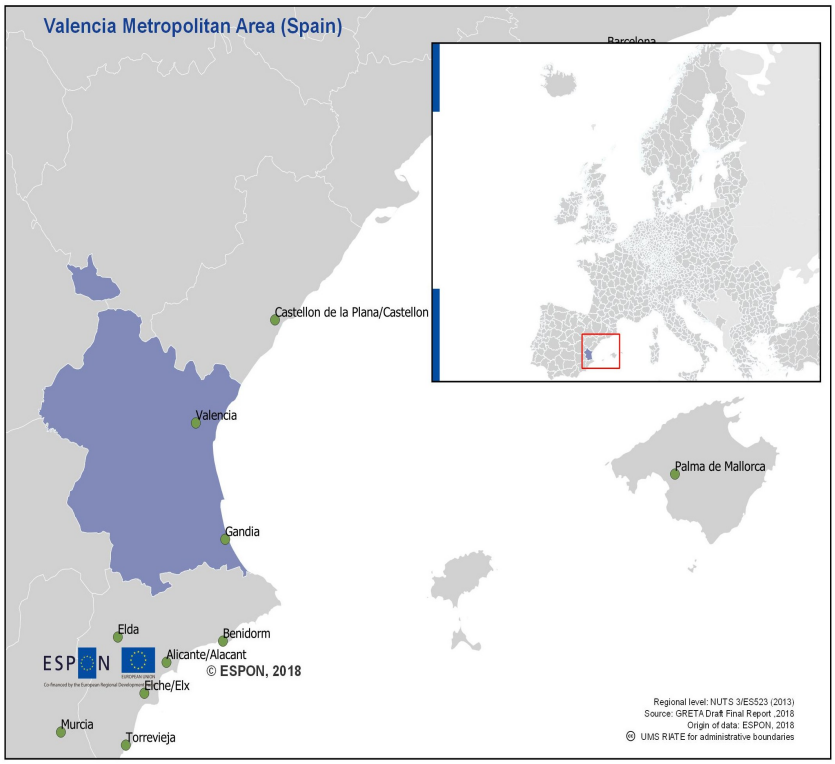
Access to Consultation C

https://survey.tecnalia.com/limesurvey/index.php/129674?lang=en

The content in this report is based on a mixed-method approach. The results presented are interpretations of semi-structured interviews, responses to a questionnaire on national policy and planning, responses to three consultations (Consultation A, B and C) via email, document analysis of plans and strategies (via desk-based analysis), and statistics.and spatial analysis using GIS resulting from the GRETA project. For all case studies, telephone conversations (and for some cases face-to-face meetings i.e. Copenhagen and Scania, Alpine region, Euroregion Aquitania- Euskadi-Navarra) allowed the completion of the consultations B and C.

The respondents that have contributed to this study are people working on different institutional levels in public administration and researchers in the Metropolitan Area of Valencia.

2 (Geographic) description of the Valencia Metropolitan Area



Map 2. Valencia NUTS3 area

2.1 Case study outline

Valencia metropolitan area is the largest urban concentration in the Valencian Region (NUTS3 ES52 Comunidad Valenciana) and the third largest metropolitan area in Spain, with an area between 134.65 to 1160.7 km² and population ranging from 1.6 to 2.5 million depending on how the metropolitan area is defined.

The delimitation of this metropolitan area is not formally recognized, and the extension and therefore the number of municipalities included varies depending on the strategy or planning instrument.

The metroplitan area is normally divided in three geographical areas:

- The urban perimeter of Valencia that includes the city and the municipalities delimitated by the sea and the Turia river and the North Road of Valencia.
- The first Metropotitan area: delimitated by A-7 road and includes the most part of the municipalities of the Valencia Orchard- Huerta Valenciana (Huerta is a traditional agriculture recognized as cultural heritage)
- The second Metropolitan area: a more diffused area that is part of the Metroploly regarding the improvement of mobilitie services in the area in the last decades.

For GRETA purposes we will use the delineation recognized in the Territorial Strategy of Valencia Region (ETCV, 2011)[1] that covers an area of 3.897 km^2, has a population of 1.774.550 inhabitants in the year 2015 and encompasses 90 municipalities which belong to the traditional counties of l'Horta, el Camp del Túria, la Hoya de Buñol, los Serranos and some other of the Ribera Alta.

Nowadays, a Metropolitan Territorial Plan of Action of Valencia is under development (PATEVAL)[2] and aims at defining the area of the action plan based on two previous delineations

- The Functional Area of Valencia, as drawn by the Territorial Strategy of the Valencian Region.
- And also the Metropolitan Area of Valencia, defined by the relationships in terms of inter-commuting, and physical continuity. This will incorporate adjustments ofthe Metropolitan Mobility Plan of Valencia (PMoMe).

The scope of this Metropolitan Territorial Plan of Action of Valencia (PATEVAL) is also the coordination with the adjoining functional areas, with explicit recommendations on, settlement system, mobility infrastructures and more important infrastructure green towards a coherent territory.

The recent demographic dynamics, associated with a period of profound economic crisis is seen in Valencia Metropolitan Area, as is the situation in mostly all large Spanish urban areas that are characterized by an atony, when not a population decrease, which coincides with the end of the strong immigratory pulsation (national and foreign), which has been the cause of the great population growth in recent years, given the precariousness of vegetative growth.

This situation would significantly restrict the demands of new land for residential activities or for economic activities. However the Territorial Strategy of Valencia Region foresees an optimistic demographic scenario of moderate population increase in the next decade, and this scenario must not be underestimated in planning decisions.

2.2 Territorial challenges

The Metropolitan Area of Valencia represents a prosperous and competitive territory with potential for sustainable territorial development. The Metropolitan Territorial Plan of Action of Valencia supports a Tertiary-industrial metropolitan model maintaining a competitive agricultural base for Valencia. In order for this model to be really successful, it inevitably requires an integrated supra local vision, a sustainable land use and mobility approach and the enhancement of the natural capital and the agriculture sector where the GI principles are at the core.

[1] http://www.habitatge.gva.es/web/planificacion-territorial-e-infraestructura-verde/infraestructura-verde-del-area-metropolitana-de-valencia-corredor-del-rio-turia-huerta-albufera-y-mar-mediterraneo

[2]http://www.habitatge.gva.es/es/web/planificacion-territorial-e-infraestructura-verde/plan-de-accion-territorial-metropolitano-de-valencia-pateval-

However it also faces the challenges of a dense and highly urbanized area.

Mobility patterns: It exerts a great urban attraction on the interior municipalities with scarce population in terms of forced and voluntary displacement, both for reasons ofwork as for access to public or private facilities or simply for leasure and recreation reasons. This attraction, originated by the high functional size and thethe greater incorporation of peripheral nuclei to the metropolitan area, either urban continuity or by the intensification of mobility work relationsrecurrent, has prevented the creation of urban nodes in the interior of the Valencia Region (NUTS3) with the capacity to develop their own polarities that are sufficiently intense to form a specific functional area. There are several conurbations that together have a large population, such as Benimámet-Burjasot-Godella-Rocafort, Alaquas-Aldaya, Manises-Cuart de Poblet, Sedaví-Alfafar-Benetúser-New Place of the Corona-Massanassa-Catarroja-Albal or Paiporta-Picaña. Due to the urban growth and the improvement of the infrastructures (in particular of the construction of the Ronda Norte and the burial projects of the lines 1 and 3 of MetroValencia), the conurbation of several of these localities will be brought about in a short time. the city of Valencia, like the Benimámet-Burjasot-Godella-Rocafort complex.

Economic specialization in the urban core area: The urban core of Valencia (zone A): It shows a clear economic specialization in the services sector. The population density is very high, around 15,000 inhabitants / km².

Industrial concentration in periphereal area: The first metropolitan crown (zone B). In this area a greater industrial concentration is observed. The primary sector, traditionally very important (especially agriculture), has lost economic presence due to the change in land use, which has been urbanized in its vast majority. The density here is lower, around 1,500 inhabitants / km².

Low density urbanization in periphereal areas: The second metropolitan crown (zone C): here are the populations of the Huerta de Valencia (Valencia Orchards**)** outside the A-7 along with those of the rest of the regions. This area has recently been incorporated into the metropolitan area due to the improvement of accesibilty and gentrification (increase of housing prize near the capital). The growth has been based mainly on low density parameters and townhousing model which dificults a formal delimitation of the metropolitan area.

Ecological and functional connectivity: the main challenge posed by green infrastructure is to order and properly manage the ecological and functional connectivity of the Huerta de Valencia with its hinterlands where, several green areas act as as green corridor: the Natural Park of the Sierra Calderona and the Areas of Special Conservation (ZEC) of the Sierras of Martés and Malacara. To achieve this objective it is essential to strengthen the role of the river channels and canyons/ ravines as connectors, both ecological as well as functional, such as the Calderona, the Carraixet, the Turia and the Rambla del Poyo. Other elements will also play a major role, such as forest or agricultural land of supramunicipal relevance, large part of them related with the Turia Natural Park.

3 The GI network and its potentialities for territorial development in Valencia Metropolitan Area

3.1 What is the approach to GI and Ecosystem Services

The GI is an intrinsic part of the spatial planning and it is recognized by regional legislations. The region of Valencia is one of the most advanced in that connection, having a well-developed methodology for the delineation and mapping of GI with strong spatial analysis to inform decision making and planning.

The green infrastructure is the basic territorial system composed of the following spaces: the areas and places of most relevant environmental, cultural, agricultural and landscape value; the critical areas of the territory whose transformation implies risks or environmental costs for the community; and the territorial framework of ecological corridors and functional connections that relate all the previous elements

The green infrastructure will also extend to urban and developable land, comprising, as a minimum, the cleanest spaces and the most important public green areas, as well as the itineraries that allow their connection.

The identification and characterization of the spaces that make up the green infrastructure of the Valencian Region will be carried out in the territorial and urban planning instruments, at the regional, supramunicipal, municipal and urban levels, with the competent authority in matters of spatial planning and landscape being the responsible for monitoring its coherence and functionality. (...)[3]

In this context the- ES seem to be at the core of the GI concept and approach. The concepts of functionality and connectivity are also present and well reflected in the different planning instruments. Main services provided by the current and/or planned GI in the metropolitan area are: Biodiversity protection, Maintenance of ecosystem services (with stress on climate chane adaptation lately), Cultural, Wellbeing and health.

Main services provided by your current and/or planned Green Infrastructure. Please select multiple options	Main current and/or anticipated threats for both Green Infrastructure development and maintenance. Please select multiple options if needed.	Main current and/or anticipated opportunities for Green Infrastructure development. Please select multiple options if needed.
x Biodiversity protection x Maintenance of ecosystem services x Cultural ☐ Economical x Wellbeing and health ☐ Others:	☐ Infrastructures (i.e transport, energy) x Economic development X Territorial planning ☐ Absence of community ☐ Financial limitations ☐ Others	☐ Economic investment x Territorial planning ☐ Local community x Agriculture, sustainable forest

[3] Ley 5/2014, de 25 de julio, de Ordenación del Territorio, Urbanismo y. Paisaje, de la Comunitat *Valenciana* https://www.boe.es/buscar/pdf/2014/BOE-A-2014-9625-consolidado.pdf *(only available in Spanish)*

		management, organic farming ☐ Others
Spatial data requirements (GIS data)		
x Ecosystem services ☐ Land cover/land use data ☐ Green urban areas inventories x Protected areas/nature parks/areas of special ecological value	Please specify what you have available. Infraestructura valenciana de datos espaciales http://www.idev.gva.es/es Cartografía que expresamente recoge la cartografía de IV	

The evolution of land uses in the Functional Area of Valencia during the last years registers a pattern quite similar to that of the territory as a whole:

- Loss of agricultural land irrigated by urbanization that is evident in the region de l'Horta, but also in the agricultural areas of the Camp del Túria region or the Hoya de Buñol
- Abandonment of unirrigated agricultural land in the inland regions that has favoured development of forest stands, especially conifers, and grazing areas, which have favored the imbalance in the production of biomass.
- Loss of the diversity of the agroforestry pattern, homogenization of the rural landscape and increased risk of forest fires.
- Urbanization models more dispersed and of lower density that have increased the fragmentation of green infrastructure and environmental impacts in the territory.Barrier effect of mobility infrastructures that hinder exchanges of matter, energy and information among ecosystems.
- Abandonment of irrigated crops that pose a serious threat to the sustainability of the territory, a waste of economic resources and an impact on the landscape and health vegetable.This situation is aggravated by the reduction of the functionality of the biological connection and between the coastal and inland ecosystems, where the agricultural landscapes of the dry land have been reduced its capacity to complement and reinforce natural spaces protected from the functional area, and fulfill their role of transition and continuity of irrigated landscapes of the coastal regions.

On the other hand, and from the point of view of the articulation of the green infrastructure of the Area Metropolitan of Valencia, the coexistence of four ecosystems such as Valencia Orchards, the sea Mediterranean, the Turia river and the Albufera in a single metropolitan area confers Valencia and its environment a territorial excellence unparalleled in other urban regions of the EU. However, these ecosystems, due to the proximity to strongly inhabited spaces, present a great fragility, both intrinsic and from the point of view of its continuity environmental and territorial

As already pointed out the main challenge posed by green infrastructure is to order and properly manage the ecological and functional connectivity of the Huerta de Valencia with its hinterlands where, several green areas act as as green corridor: the Natural Park of the Sierra Calderona

and the Areas of Special Conservation (ZEC) of the Sierras of Martés and Malacara. To achieve this objective it is essential to strengthen the role of the river channels and canyons/ ravines as connectors, both ecological as well as functional, such as the Calderona, the Carraixet, the river Turia and the Rambla del Poyo. Other elements will also play a major role, such as forest or agricultural land of supramunicipal relevance, large part of them related with the Turia Natural Park.

This proposal implies a careful regulation of uses and activities in the environment of these fluvial corridors, the maintenance or regeneration of its river vegetation, and its articulation with adjacent agricultural spaces or, where appropriate, with spaces systems green and open of the nearest urban fabrics.

The Metropolitan Action Plan uses a muli scale approach:

Figure 1 From left to right: Regional, Municipal and Urban Green Infraestructue in Valencia. Source: p. 28 Metropolitan Action Plan of Valencia- Draft Report[4]*.*

This basic scheme of supra-municipal green infrastructure must be completed with other elements that provide permeability and visual continuity to the territory, so that later the municipalities of the functional area incorporate their elements of local scale, both rural and urban, to configure a complete territorial system, which must become the basic instrument of territory design.

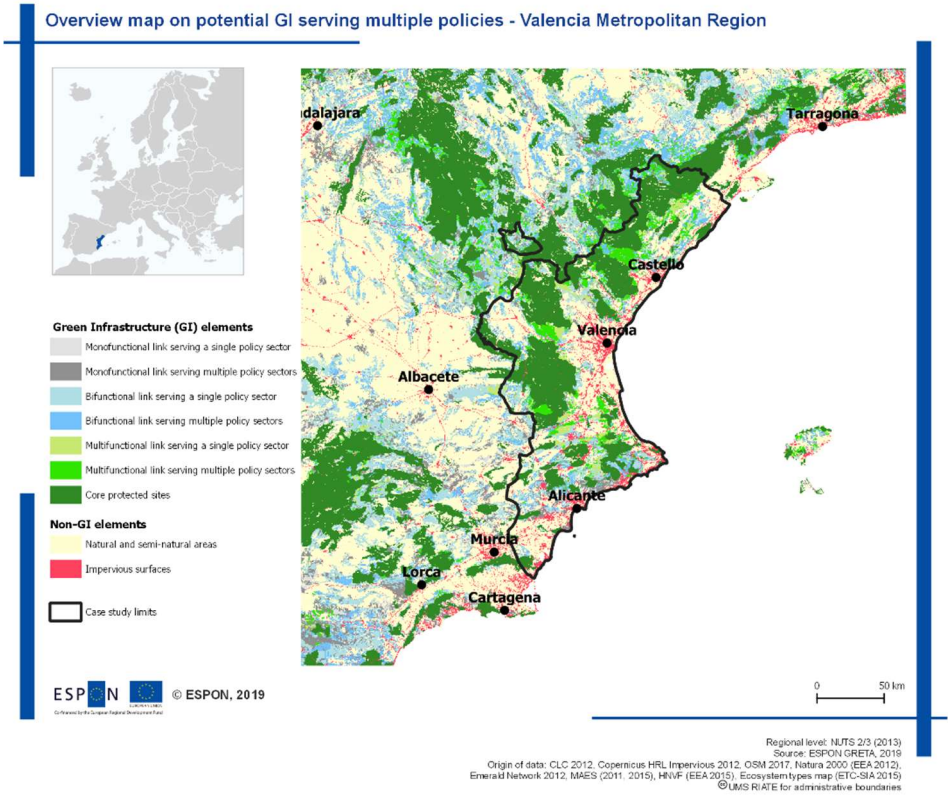
4 http://www.habitatge.gva.es/documents/20551069/163487143/01.2+Borrador+del+Plan+y+Documento+Inicial+Estrat%C3%A9gico+%28castellano%29/44eb1395-117a-430b-a8f1-b91b3bcec467

This ordering and characterization of the green infrastructure of the functional area should have as main objectives:

- The promotion of environmental services of green infrastructure: fight against climate change, food production, improvement of air pollution, flood prevention, etc. That is, the reinforcement of the green infrastructure in its role as "infrastructure" providing services.
- The territorial connectivity of it as a basis for citizen use and enjoyment of landscapes of more value of the territory. That is, the role of green infrastructure as a public endowment.

3.2 Benefits of GI and ecosystem services for smart, sustainable and inclusive territorial development;

Valencia Metropolitan Area is included in the NUTS3 ES52 Comunidad Valenciana. This section describes the potential GI network as delineated by the GRETA, analyses the identied synergies and trade-offs between the ES provided by the GI network and its potential for serving several policy objectives, and provides a relative analysis of the region with the general EU patterns.



Map 3. Valencia metropolitan region of GRETA case study. Overview map on potential GI serving multiple policies.

Potential GI covers about 30% of the region, with a clear concentration on the Western part of the region, in the less flat area.

- The strong pressure of Valencia metropolitan region could isolate the potential GI in big patches, disconnected from the plains. Better links with the peri-urban area could improve the GI network and reduce its fragmentation. Integration of blue infrastructure could also facilitate these connections.

In terms of the integration of protected areas in the GI, all hubs (protected areas) are included in the GI. Moreover, most of the GI is also covered by protected areas.

- The structure of the GI is characterised by large-continuous hubs. Therefore, ensuring the connectors is important to avoid isolation of the large hubs.

The Valencia region provides a balanced provision of services in relation to biodiversity and climate change policies. However, the capacity to provide support to water management is limited.

- In terms of multifunctionality, all the area is capable to support at least two of the three policy objectives. It is of special concern the limited capacity to support water policies, in particular low provision of water retention capacity and soil erosion control. This clearly highlights the need for additional information, at local scale, to better understand these limitations, and to identify needed actions.

Most of the ES have a synergistic relationship or neutral.

- There is potential for improvement of multifunctionality with a (limited) multiplier effect, i.e. improving one ES can enhance other ES at the same time.

At the City level, About 63% of Valencia city is covered by green urban areas, with high share of Natura 2000 areas (about 35%). Potential GI on the peri-urban area is similar (66%). Green urban areas remained stable between 2006 and 2012.

- The major challenge is the connectivity between the city, the peri-urban areas and the rural areas.

In summary, Valencia Region has good conditions for the implementation of a multifunctional GI network on the basis of existing large hubs (protected areas). However, there is a clear geographic divide, with an intensive land use on the plains (agriculture and urban development) which challenges the connectivity between the city, the peri-urban area, and beyond. The potential GI could support biodiversity and climate change policies. Regional and local knowledge is required to understand the limitations on the lower performance to support water policies.

4 Capacity of GI network to meet the demand of ES in Valencia Metropolitan Area

Cost-Benefit Analyses have been used in the decision-making process when deciding about best ways to manage or invest in GI- particularly as ex-ante evaluation. Not fully clear which benefits have been analyzed.

4.1 What do GRETA analysis on ES supply and demand reveal?

GRETA have explored the capacity of GI network to meet the demand of ES where:

ES supply is defined as the capacity of ecosystems to provide ES, irrespective of them being used.

ES demand can be defined as the amount of a service required or desired by society in a given location and time. This demand depends on several factors such as socio-economic conditions, cultural/behavioural norms, technological innovations, availability of alternatives, among others.

	ES Supply – benefits provided	ES Demand -specific definitions	Approaches to quantify Demand
Regulating services	Benefits are provided by maintaining desirable environmental conditions	Amount of regulation needed to meet target conditions	Reduction of risk
Cultural services	Benefits are provided by experiencing the natural environment	Desired total use (if rival service) or individual use (if nonrival service)	Preference and values // direct use
Provisioning services	Benefits are derived from consumption of final goods	Amount of goods obtained per unit of space and time or per capita	Direct use // Consumption

Table 1 Relation between benefits provided by ES supply and the corresponding ES demand definitions and operationalisation approaches. Adapted from: Villamagna et al., 2013 and Wolff et al., 2015.

Demand for **regulating services** can be defined as the amount of those environmental conditions that ensure the provision of a desired regulation level. A reduction of risk approach has been usually applied to quantify demands for these services. Vulnerability to potential changes in regulating services may provide valuable insight into society's needs capturing main linkages from the socio-ecological system.

Demand for **cultural services** has been mostly assessed by preferences and values for attributes of certain landscapes, ecosystems or heritage sites. Preferences may be either quantified through stated preferences that relate to the desired level of services, or through revealed preferences (a proxy for the actual use of the service). Demand for cultural services has also been assessed by the direct use of a specific ecosystem, e.g. for recreation. This can be quantified by total visitor days per year or the number of fishing/hunting licenses, the presence of tourists or accounting the accessibility or proximity to recreational areas.

Demand for **provisioning services** has been quantified based on direct use and consumption of final. It is worthy to note that there is normally a spatial mismatch between the area where the service is provided and the area where the service is consumed, especially true for provisioning services. For this reason, interregional linkages have to be considered in order to properly identify faraway dependencies and assess magnitude of potential impacts

Following the proposed conceptual framework, we have combined demand and supply for each of the selected ES. The focus of this approach was to highlight those areas where there is a high demand and a low supply, i.e. those areas where GI is unable to cover the ES demand. It should be noted that these results are of a more exploratory nature in the whole GRETA project considering the following limitations:

- This is a research area still under development;
- There is need for a higher resolution of the data sources given the nature of the phenomena analysed;
- Balance between supply and demand is semiquantitative; and
- In some cases, a more sophisticated modelling would be required to have an appropriate quantitative balance.

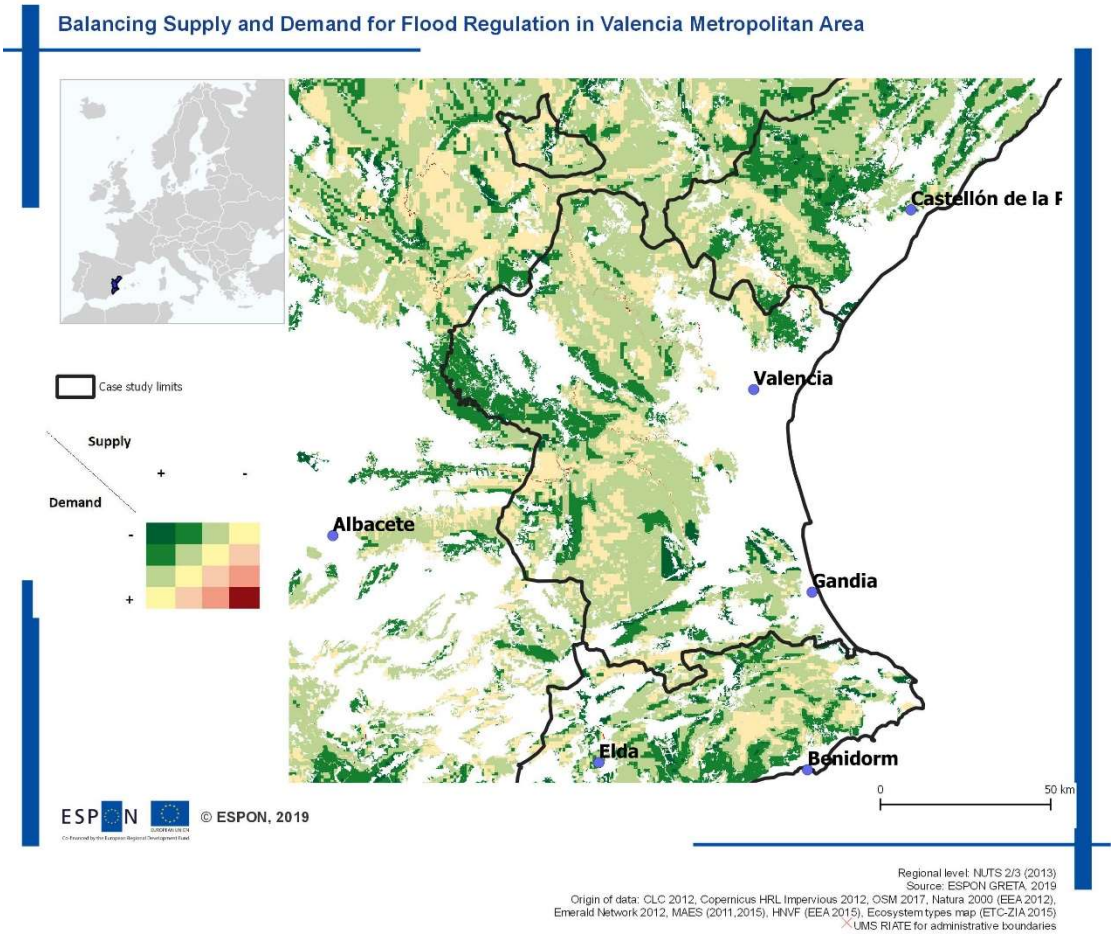
Therefore, these results should be seen as illustration on how this demand and balance could be approached.

4.1.1 Analysis of supply and demand for Flood Regulation in Valencia Metropolitan Area

We have quantified demand for flood regulation based on the potential flood hazard. Exposure is described by the projected potential flooding risk[5]. On the other hand, benefits are provided by the water storage capacity of land to regulate floods. The supply for flood regulation is quantified by the Water Retention Index, which assesses the capacity of landscape to retain and regulate water passing through. This index is dimensionless and considers the role of interception by vegetation, the water-holding capacity of the soil, and the relative capacity of both the soil and the bedrock to allow percolation of water. The influence of soil sealing and slope gradient are additionally considered.

Map 4 presents a semi-quantitative analysis of the balance between supply and demand for flood regulation in Valencia Metropolitan Area. Dark green areas are those with maximum capacity of supply and demand is very low. These conditions are met in core protected areas and very relevant in the north and west part of the metropolitan area where natural and semi-natural areas (i.e. agricultural land) are more prominent. The other parts of the study area that are still green could be considered areas where the balance tend to be positive, in the sense that the supply is slightly higher than the demand. In practical terms it would mean that improving or reinforcing GI with the objective of water retention will have a substantial benefit.

[5] for the period 2011-2044 that results after applying the LISFLOOD model from the ENSEMBLES project



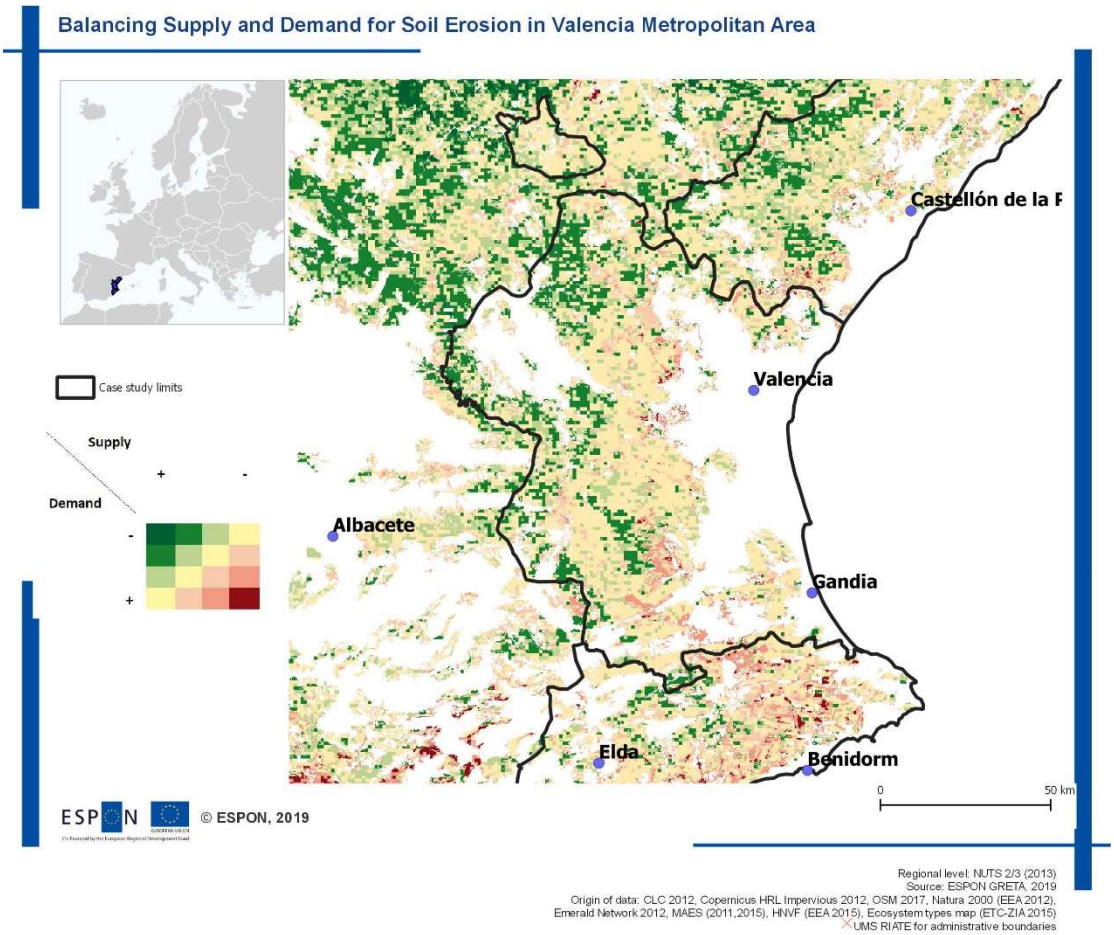
Map 4 Balancing Supply and Demand for Flood Regulation in Valencia Metropolitan Area.

4.1.2 Analysis of supply and demand for Reducing Soil Erosion in Valencia Metropolitan Area

We have assessed the demand for the reduction of soil erosion by water producing a negative impact on several ES; in particular to the ones related to crop production, drinking water and carbon stocks. Soil erosion by water is mainly affected by precipitation, soil type, topography, land use and land management. Exposure is described by the soil loss rate[6] (t ha^{-1} yr^{-1}). Benefits are provided by the capacity of vegetation to control or reduce erosion rates. The supply is quantified by the Soil Erosion Control dataset (JRC) that describes the capacity of ecosystems to avoid soil erosion.

From the resulting Map 5 we can observe a positive balance (supply higher than the demand) in the western area associated with core green areas. There is still a prominent coverage of the GI network in deficit (high demand and low supply) where efforts for soil erosion control would be very beneficial.

[6] as estimated by the modified version of the Revised Universal Soil Loss Equation (RUSLE) model



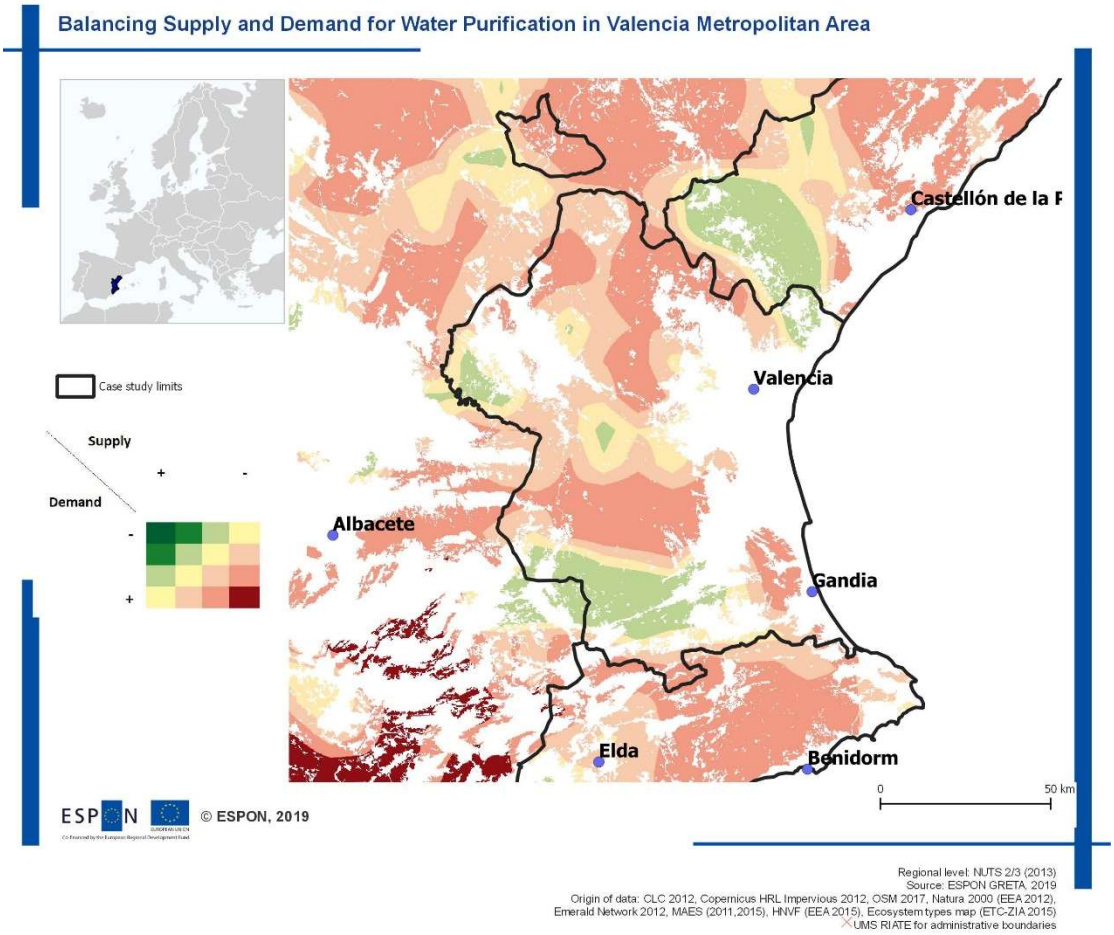
Map 5. Balancing Supply and Demand for Soil Erosion in Valencia Metropolitan Area

4.1.3 Analysis of supply and demand for Water Purification in Valencia Metropolitan Area

We have quantified demand for water purification based on the level of pollutants emitted to freshwater ecosystems by polluting sectors, primarily agriculture and waste water treatment discharges from industry and households. Exposure is described by mean annual concentration of nitrates in water [7](. The supply is quantified by the Water Purification dataset (JRC) that assesses the in-stream retention efficiency of ecosystems to dilute or degrade nutrients.

Resulting **¡Error! No se encuentra el origen de la referencia.** shows that water pollution represents a big challenge in most of the GI network and substantial increase on the provision of water purification is still required under current status in most of the northern and western part of the metropolitan area. A positive balance (low demand and high supply) is, on the other hand, found in the Southern Orchards.

[7] tonne per year) captured in monitoring stations and aggregated by rivers (the WISE-WFD database)



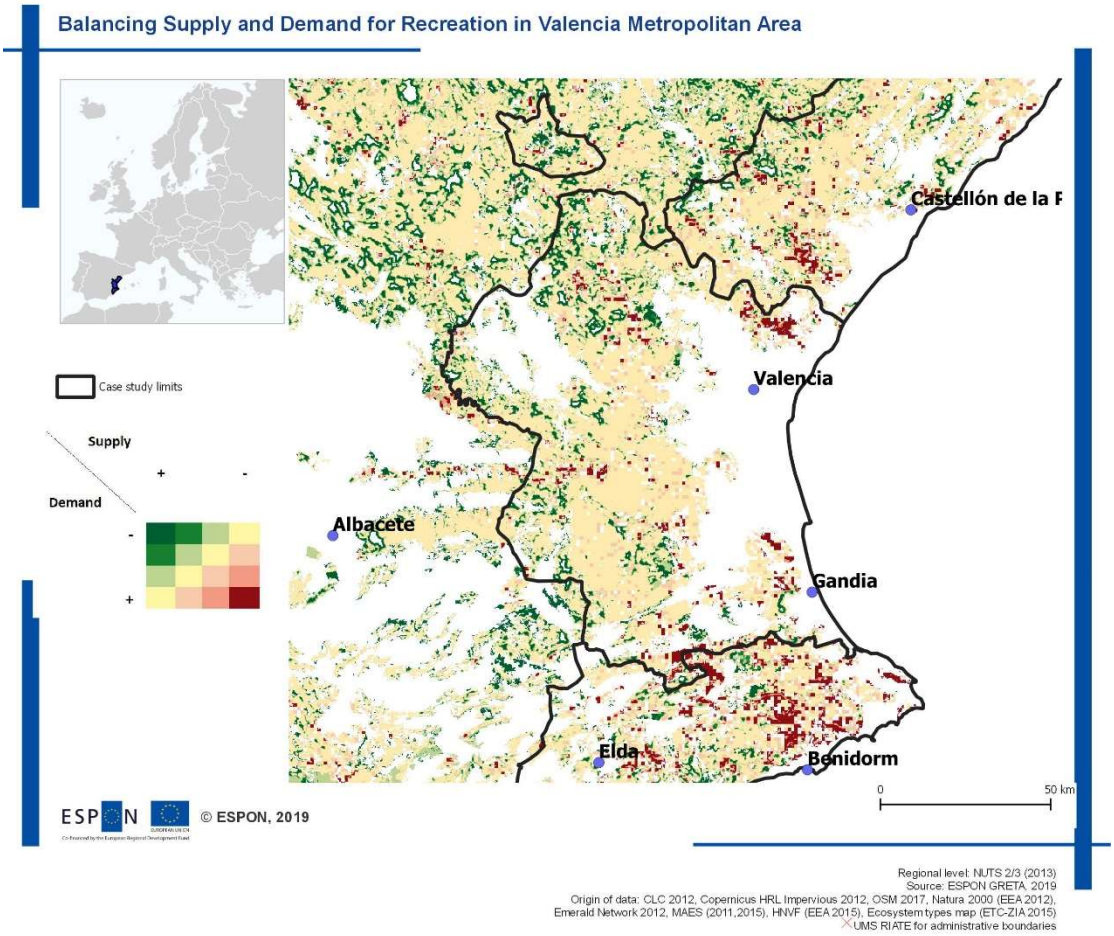
Map 6. Balancing Supply and Demand for Water Purification in Valencia Metropolitan Area

4.1.4 Analysis of supply and demand for Recreation in Valencia Metropolitan Area

We have described demand for recreation by means of a proxy for visitation. Recreation and tourism are important elements for national and local economies, that also contribute to other intangible benefits. Recreation directly depends on environmental attributes like species richness, diversity of habitats, and climate. The usability of crowd-sourced information by means of location photographs has already been shown to be as a reliable proxy for visitation rates to recreational sites. We have used the location of photographs in Panoramio as a proxy for landscape attractiveness for visitors. Demand is quantified by the number of pictures per square km. On the other hand, supply is described by the Recreation Potential dataset (JRC) that quantifies the potential for citizens for outdoor recreation.

The resulting Map 7 reveals that recreation constitutes a big challenge in the metropolitan area of Valencia with some dispersed spots showing a high deficit (in red) in the Orchards in the northern part of Valencia municipality for instance. This general pattern could be partially

explained as direct link with population density. In practical terms it would mean that improving or reinforcing GI with the objective of recreation will have a substantial benefit.



Map 7. Balancing Supply and Demand for Recreation in Valencia Metropolitan Area

5 Governance practices, policy and planning instruments to implement GI and enhance ecosystem services in Valencia Metropolitan Area

Although there is not a specific strategy for GI on national level in Spain, GI is incorporated in existing national legislation. For instance, the law on Natural Heritage and Biodiversity (42/2007) is stated to impose a general obligation for the autonomous regions to take measures aimed at ensuring environmental connectivity, while various regional laws focus on connectivity of natural areas

In that connection in the Region of Valencia (where Valencia is the capital city), the GI is an intrinsic part of the spatial planning and it is recognized by regional legislations.

The region of Valencia is one of the most advanced in the spanish context in that connection, having a well-developed methodology for the delineation and mapping of GI with strong spatial analysis to inform decision making and planning. There is a mature and well developed

georeferenced information on GI and ES available and accessible although not always readable for the general public[8].

The governance framework is quite complex and many policies and instruments could be identified that do have provisons for GI delivery. (see Table 2)

In the Metropolitan Area of Valencia there are three main planning instruments which have guidelines for GI planning and management:

- Metropolitan Territorial Plan of Action of Valencia the integrated territorial plan at supramunicipal level (PATEVAL) which draw the GI, incorporating the municipal GI whenever possible.

The metropolitan system of open spaces are composed by Protected soils, Natura 2000 network, Catalog of wetlands, public forest, forest land, public domain, spaces of environmental value that maintain the functionality of ecosystems and reduce climate change effects

- Territorial Action Plan of Coastline green Infrastructure.

The Territorial Action Plan of Coastline green Infrastructure (PATIVEL18[9]) includes: Coastal soils of strategic value, soils over 25% slope, high agricultural capacity soils, cultural and visual landscapes, and areas affected by natural or induced risks Peripheral agricultural spaces that prevent unwanted conurbations, and the elements of connection that endow the system with a functional nature, permeabilizing the territory and connecting the rural iv with the urban one. The ecological and functional connectors that allow exchanges of energy and information between ecosystems, as well as physical terrestrial ones that guarantee visual, physical permeability and contain urban development, preventing conurbation and contributing to the identity of urban nuclei. Urban elements of GI of supramunicpal scope, includes green zones, open spaces and their itineraries of connection between the same and with the rural GI.

- Territorial Action Plan of the Valencia Orchards (PAT d´Horta) (Horta is a traditional agriculture recognized as cultural heritage)

Territorial Plan for the Orchards will define the green infrastructure in order to protect and recover the environmental, landscape and cultural values of the Horta, its agrosystems and ecological patterns, mitigate the effects of climate change and natural and induced risks, as well as how to procure sustainable public use that is compatible with agricultural activity.The green infrastructure will be composed, at least, by the spaces of environmental value, the zones

[8] There are spatial data develop for GI http://www.idev.gva.es/es

[9] http://www.habitatge.gva.es/es/web/planificacion-territorial-e-infraestructura-verde/plan-de-accion-territorial-de-la-infraestructura-verde-del-litoral/-/documentos/anUUjLQ4KlRZ/folder/164268704;jsessionid=B02615B9C05C354B9D7DB943B819E630?p_auth=6zwtPGzu

of protected garden and the areas and elements of territorial and functional connection with the green infrastructure of the outside area of the Valencia Orchards. It will also include those urban public spaces that facilitate the connectivity of green infrastructure.

- The general structural plans of the municipalities should integrate this green infrastructure of supra-municipal scale and complete it with the elements of the local scale, always maintaining its coherence and facilitating its ecological and functional connectivity. No new reclassifications of land that affect the elements of the green infrastructure defined in the territorial action plan will be accepted, and in accordance with its determinations.
- The territorial action plan may delimit the areas where the traditional irrigation system must be maintained by gravity, either furrow or flood, without prejudice to the introduction of improvements in water quality and distribution. The actions carried out in this area will be compatible with the preservation of the economic, environmental, patrimonial and cultural values of this irrigation system.

It is worth to mentioned that other sector policies relted to climate change and enviroemnt also consider GI proinciples: Valencia Climate Change Strategy 2020 (2011 2ª Ed) and the Enviroemental Action Plan 2011.

So in terms of governance framework and decision-making process there is a top-down approach for Green Infrastructure implementation in Valencia Metroplitan Area. The GI is projected from the territorial planning. The supra-municipal plans such as PATEVAL draw it, incorporating determination for the municipal level. Other sector plan such the Territorial Plan for the Horta and the Territorial Action Plan of Green Infrastructure for the Litoral also define GI with a supramunicipal and sector approach. There are differnte stakeholders that facilitate the conservation and manteanance of the GI network. The poor readability of the GI makes it unknown to more interested parties though.

Table 2 Policies, strategies and planning instruments and their provisions for Green Infrastructure delivery. Adapted from GrowGreen H2020 Projec[10]t.

Document name	Approved by (admin level), date, legal status	Actors it applies to	Summary of key provisions related to GI delivery
National Climate Change Adaptation Plan (*Plan nacional de adaptación al cambio climático*)	Ministry of Agriculture, Fisheries, Food and Environment (2006)	Responsible: Oficina Española de Cambio Climático (OECC); Public administrations and other interested public or private parties depending on the sector	The plan aims to integrate climate change adaptation into the planning system of different sectors, such as biodiversity, forests, water resources, mountains, soil, and urban areas with a focus to protect these sectors. It mentions sensitivity of green urban areas to climate change impacts. The actual use of NBS for climate and water resilience is, however, not mentioned. The third work programme of the plan 2014-2020 is in place. Actions include the development of methods and guidance to adapt urban areas, but do not mention any green infrastructure or nature-based solutions
Royal Decree 903/2010 on Flood risk evaluation and management	National, 2010, binding	Public administrations and wider public	Incorporates the requirements of the EU Floods Directive into the national regulatory framework, aiming at evaluating flood risks and improving coordination among public administrations and the society to reduce potential flood consequences[11]
National Heritage and Biodiversity Law (42/2007), updated in 2015 (33/2015)	Spanish Ministry of Agriculture, Food and Environment, in collaboration with the autonomous communities of Spain		Requires the Spanish Ministry of Agriculture, Food and Environment, in collaboration with the autonomous communities of Spain and other ministries, to develop a national Green Infrastructure Strategy by 2018. It also requires the autonomous communities to develop their own Green Infrastructure Strategies by 2018 building on the national Strategy.[12]

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[11] Oddy et al., 2018, GrowGreen Work Package 1 Demonstration Projects in the Front Runner Cities, D1.1 Diagnosis and Baseline of Frontrunner Cities, Horizon 2020.

[12] European Commission, 2017, Green Infrastructure in Spain, Biodiversity Information System for Europe. Available at: https://biodiversity.europa.eu/countries/gi/spain (accessed June 21 2018).

Document name	Approved by (admin level), date, legal status	Actors it applies to	Summary of key provisions related to GI delivery
	and other ministries, 2015		
National Strategy for the Restoration of Rivers	The Ministry of the Environment and Rural and Marine Affairs, 2012		In line with the Water Framework Directive and Flood Directives, it includes a set of actions to preserve and recover the good state of Spanish waters, to minimise the risks of flooding, preserve cultural heritage, promote rational use of river space and promote sustainable development of the rural environment.[13]
The Strategic Plan for the conservation and rational use of wetlands	Spanish National Commission for the Protection of Nature (The Wetlands Committee/ Comité de Humedales)		Promotes the restoration of wetlands that have been destroyed or degraded. Focus has also been given to the restoration of dunes and coastal habitats.[14]
Regional level			
The Territorial Action Plan for Flood Risk Prevention in the Valencian Community (PATRICOVA) (reviewed by Decree 201/2015) (*PATRICOVA Plan de Acción Territorial de carácter sectorial sobre prevención del Riesgo de Inundación en la C.V.*)[15]	Regional, 2015, binding		PATRICOVA represents the planning, coordination and protection tool at regional scale to reduce flood risk with focus on decreasing the potential economic impact in flood prone areas. Action line 6 focusses on the use of green infrastructure to mitigate flood risks by using areas as retention areas. The rivers themselves should develop into green corridors that connect species and ecosystems and should be kept free of construction to provide room to the river in the event of floods. Furthermore, traditional practices of water management (heritage) and the multi-functionality of the landscape should be maintained. Finally, it recommends the use of green infrastructure inside cities, such as public and private gardens, parks, unpaved areas, green walls, to mitigate flood risk. It mentions explicitly Sustainable urban drainage systems (SUDS) to cope with the impacts of pluvial floods.

[13] European Commission, 2017, Green Infrastructure in Spain, Biodiversity Information System for Europe. Available at: https://biodiversity.europa.eu/countries/gi/spain (accessed June 21 2018).

[14] European Commission, 2017, Green Infrastructure in Spain, Biodiversity Information System for Europe. Available at: https://biodiversity.europa.eu/countries/gi/spain (accessed June 21 2018).

[15] http://www.habitatge.gva.es/es/web/planificacion-territorial-e-infraestructura-verde/patricova-plan-de-accion-territorial-de-caracter-sectorial-sobre-prevencion-del-riesgo-de-inundacion-en-la-comunitat-valenciana

Document name	Approved by (admin level), date, legal status	Actors it applies to	Summary of key provisions related to GI delivery
			The third work programme of the plan 2014-2020 is in place. Actions include the development of methods and guidance to adapt urban areas, but do not mention any green infrastructure or nature-based solutions
Territorial Action Plan of Coastline green Infrastructure (PATIVEL) (Plan de Acción Territorial de la Infraestructura Verde del Litoral)[16]	2015 (Generalitat Valenciana)		The plan defines litoral areas and corridors of ecological functions and provides a zoning concept.
Territorial Action Plan of the Valencia Orchards (PAT d´Horta)	Generalitat Valenciana		
Metropolitan Territorial Plan of Action of Valencia (PATEVAL)[17] – initial document	Regional Government (Generalitat Valenciana), 2016 (partially a draft)		This plan defines the guidelines to the territorial definition in the whole Valencian region. It mentions the potential of green infrastructure and its ecosystem services such as those relevant for adaptation to climate change impacts (chapter A 1.7). In its objectives it requires to create a network of green areas and to maintain and improve its delivery of ecosystem services, among others, services relevant to adapt to climate change impacts (chapter A 2). Chapter A 3.1 requires creating a GI system and establishing management practices, that -, among other purposes like biodiversity - respect the delivery of different ecosystem services. Plan de Movilidad Metropolitano Sostenible del Área de Valencia (PMoMe Valencia) en redacción coordinado con el Plan de Acción Metropolitano de València (PATEVAL)
The Territorial Action Plan of the Gardens (Vegetable gardens)[18]	Regional Government (Generalitat Valenciana), 2016		The plan defines different interventions to increase the link between the city and orchards. It aims to create a (physical) network / corridors of orchards; to increase connectivity and sustainable practices including water management. The plan includes also actions and incentives to increase the

[16] http://www.habitatge.gva.es/es/web/planificacion-territorial-e-infraestructura-verde/plan-de-accion-territorial-de-la-infraestructura-verde-del-litoral

[17] http://www.habitatge.gva.es/es/web/planificacion-territorial-e-infraestructura-verde/plan-de-accion-territorial-metropolitano-de-valencia-pateval-

[18] http://www.habitatge.gva.es/documents/20551069/163286955/03.+Objetivos%2C%20estrategias+y+acciones+dinamizadoras/287745be-6d09-4cee-8083-4f8c77b8abcb

Document name	Approved by (admin level), date, legal status	Actors it applies to	Summary of key provisions related to GI delivery
			sustainability of the orchards (design of contracts, compensation for environmental services, soil bank) – actions 04.01 and 04.02. [*N.B. Interesting approaches to explore for business model / financing*]
Territorial Forest Plan of Action of Valencia (*Plan de Acción Territorial Forestal de la Comunitat Valenciana*)[19]	Regional Government (Generalitat Valenciana), 2012		Includes technical recommendations for forest management and a programme of actions to develop in the coming years. Looks for innovative solutions to improve the forests situations.
Decree 1/2011, Territory strategy in Valencian Region (ETCV)	2011		
LEY 5/2018, de 6 de marzo, de la Generalitat, de la Huerta de València	2018		
Valencia's Landscape Policy	LEY 16/2005, de 30 de diciembre, de la Generalitat Valencia, Urbanística Valenciana (DOGV 31/12/2005) DECRETO 120/2006, de 11 de agosto, del Consell, por el que se aprueba el Reglamento de Paisaje de la Comunitat Valenciana		Valencia´s landscape policy has as one of its main objectives to define the Green Infrastructure of the Comunitat Valenciana, an interconnected network made up of landscapes with greater environmental, cultural and visual value that will become the basic ecological structure of the region. This definition goes along with a realisation that the maintenance of quality of life, biodiversity and basic ecological processes are the pillars on which the sustainability of the Valencian territory must be based in the long term. To address this challenge, it is necessary to adopt measures of integration between the different strategies that, over the last years, have been developed with these and other specific objectives in mind. To this end the city has announced a resolution in 2015 introducing an Action Plan for GI in the Comunitat Valenciana (Generalitat Valenciana, 2015b). GI will be consolidated from initiatives such as the Valencian network of protected natural areas or the Natura 2000 network, incorporation of other landscapes of cultural and visual value and critical areas of the territory with restrictions for urbanization, such as flood zones, areas with high risk of erosion, recharge areas of aquifers, etc. The set of these spaces will be bound together territorially by means of ecological

[19] http://www.agroambient.gva.es/documents/20551003/161980710/MEMORIA+PATFOR/e359be7b-bdfc-44d9-b6d7-68a92aabdbd6?version=1.0

Document name	Approved by (admin level), date, legal status	Actors it applies to	Summary of key provisions related to GI delivery
			corridors and functional connections. The proper management of Valencia's GI will enhance the conservation of habitats, species and key natural elements, promote the strategy to combat climate change, contribute to risk prevention, reinforce the attractiveness of the region and preserve the cultural identity of Valencia (Generalitat Valenciana, 2015a).
Local level			
General Urban Masterplan (1988) (PGOU) new draft in 2008?	1998		The plan proposes to extend the network of green areas and increase space per inhabitant and revitalisation of brownfields
Simplified Revision of Valencia's General Urban Masterplan (2014) (RPGV)	2014		
Strategy Valencia 2020	Local Government: Ajuntament de València 2014	Public and private universities, business organizations, research and technology, investors, public administration	The strategy gathers key research, innovation and local ecosystem actors in order to develop a working platform. Partially focused on reducing the impacts of climate change (adaptation and mitigation). Page 55 addresses NBSs as solution to Climate problems.
Smart City Strategic Plan for Valencia (VLCi Strategy)	Local Government: Ajuntament de València 2012	Public services of the City council	Smart objectives associated to: Mobility, urban and energy infrastructure, urban planning and quality of life. Improves the city management and the decision making processes.
Strategy Against Climate Change. Valencia 2020[20]	Environmental quality, renewable energies, climate change and integral water cycle Area.		Valencian regional strategy on climate change in line with European targets for 2020 and the regional Strategy on Climate Change. The strategy acknowledges the importance of green space to mitigate climate impacts, in particular, heat waves and stresses the need to protect and increase them to 16m^2 per inhabitant. It promotes green walls to complement the horizontal green areas and proposes to

[20] http://www.valencia.es/ayuntamiento/Energias.nsf/0/CE8EE97FB3B56072C1257ED7002BE1CE/$FILE/Estrategia%20Valencia%202020.pdf?OpenElement&lang=1

Document name	Approved by (admin level), date, legal status	Actors it applies to	Summary of key provisions related to GI delivery
	Valencia City Council, 2011		plant more trees and shrubs, in particular, with species that can cope with dryness. In addition, more water-saving green area management techniques should be applied.
Action Plans for sustainable energy SEAP (Spanish acronym: PAES) (2010) and Monitoring reports action plan for sustainable energy of the city of Valencia (2012)[21]	Local Government. Ajuntament de València 2009		Action U5.1 of the SEAP includes different sub-actions aiming to increase the green space including orchards and create new parks. In the planned new urban area of Grao, innovative green solutions shall be included like green walls and roofs. It is obligatoryc that green roofs over at least 50% of the roofs in Grao. Further green roofs in other areas are planned. Promotion of redevelopment of brownfields into green space. Action U5.2 aims to increase the area that is covered by trees. A focus is on planting species that are better adapted to the projected hotter and dryer climate.
Action Plan for Adaptation to Climate Change	Local Government- Ajuntament de València- **Draft**.	City council Industry actors	
Local Agenda 21 for sustainable development	Provincial Government (Diputació Valenciana), 1992, non binding		Action plan at the municipal level in order to achieve sustainable development (economic, social and environmental). Addresses multi-stakeholder collaboration to achieve NBSs and thus environmental improvement.[22]
Action plan for environment (*Plan de Acción Medioambiental del Municipio de Valencia*)[23]	Local Government. Ajuntament de València – climate change Area. 2012		This plan defines strategy and progress towards a model of sustainable development. Action lines 7 (optimisation of the management of biodiversity and natural systems) and 8 (sustainable urban development) are relevant for NBS. They include actions to better protect and manage green areas and increase their area and connectivity as well as improve their quality. It includes also the development of a strategy to promote orchards for these purposes. Action 8.3 aims to include bioclimatic criteria in building design.
Action plan for citizen participation in the environment decisions	Local Government- Ajuntament de València, 2014		Sets the framework for citizen participation in decision-making related to environment and sustainable development

[21] https://www.valencia.es/ayuntamiento/tablon_anuncios.nsf/vDocumentosWebTablon/5B0FAB7F3D24452FC125784900300279?OpenDocument&lang=1&nivel=5_2

[22] Oddy et al., 2018, GrowGreen Work Package 1 Demonstration Projects in the Front Runner Cities, D1.1 Diagnosis and Baseline of Frontrunner Cities, Horizon 2020.

[23] https://www.valencia.es/ayuntamiento/Energias.nsf/0/7ABD14C45FA34ECAC1257ED7002C2A96/$FILE/Plan%20de%20accion%20ambiental.pdf?OpenElement&lang=1

Document name	Approved by (admin level), date, legal status	Actors it applies to	Summary of key provisions related to GI delivery
(*Informe Plan de Participación Ciudadana para el Área de Medio Ambiente y Desarrollo Sostenible del Ayuntamiento de la Ciudad de Valencia*)[24]			
Municipal Ordinance for parks and gardens	Valencia City Council, and published in the Official Gazette of the Province of Valencia, 2003		Regulates the creation, conservation, use and enjoyment of the landscaped spaces, the different elements that are proper to it and the trees without agricultural interest existing in the municipality of Valencia, in order to better preserve them as essential areas for the ecological balance of the urban and natural environment and improvement of the quality of life of citizens.
Municipal Ordinance for the management of urban orchards	DRAFT		
Drainage regulation			In charge of developing local rules about sewers and drainage (including sustainable drainage systems (SuDS)).

24 https://www.valencia.es/ayuntamiento/Energias.nsf/0/72E30ABCDA87DD6FC1257EDD00256042/$FILE/Plan%20de%20participación%20ciudadana.pdf?OpenElement&lang=1

6 Lessons learned and good practice examples

In the framework of a previous study on GI (Trinomics et al., 2016)[25], national experts identified the following needs and challenges with regards to GI implementation in the country:

- A polarised approach to territorial planning has often resulted in social conflicts between conservation authorities and resource users, with largely negative consequences for biodiversity and ecosystem services. Natural areas under strict conservation programs are embedded in a broader matrix of intensively managed land uses (mostly for food production).
- Further integration of industrial and nature conservation policies.
- Integration of biodiversity into economic sectors, e.g., tourism, to promote the development of multifunctional Green Infrastructure areas.
- Integration of sustainable agriculture and a network of protected areas within broader production landscapes to promote the development of multifunctional Green Infrastructure areas.
- Further integration of the Green Infrastructure approach into landscape and urban planning processes.
- Promotion of commitment for Green Infrastructure in regions where commitment is currently low.
- Incorporation of conclusions and recommendations from MAES/MA into decision making.
- Further development of sub-regional plans (still lacking in some regions).

EU Level

Regarding funding, there are divergent interpretations on the importance of EU-funds for the implementation of GI in Spain. Although no European funds were stated to be used for implementing GI, a number of European funding mechanisms could be indicated as important for contributing to the implementation of GI measures. The European Regional Development fund (ERDF) and the NCFF - the Natural Capital Financing Fund is stated to be very important in this regard. The European Agricultural Fund for Rural Development (EAFRD) is considered as important for the implementation of GI in Spain.

[25] Trinomics, ALTERRA, Arcadis, Risk & Policy Analysis, STELLA Consulting, and Regional Environmental Centre (2016) 'Green Infrastructure in Spain', in Supporting the Implementation of Green Infrastructure, Final Report to the European Commission under Service Contract ENV.B.2/SER/2014/0012, Annex I. http://ec.europa.eu/environment/nature/ecosystems/pdf/Green%20Infrastructure/GI_ES.pdf

- European Structural and Investment Funds
- LIFE
- Horizon 2020

National Level

In order to ensure adequate funding for the Spanish Natura 2000 network, the Priority Action Framework for the financing of Natura 2000 for the period 2014-2020 has been developed, which defines the strategic priorities, the necessary measures and the possible sources of funding to ensure the conservation of natural habitats and species covered by this network. In this context, work has begun on designing a system for applying innovative financial mechanisms for Natura 2000 in Spain with special emphasis on payment for ecosystem services (BISE, 2015).

In the period 2009-2012, the Ministry of Agriculture, Food and Environment already promoted actions in the Natura 2000 network in several autonomous communities, for a total amount of about 55 million Euros financed via the European Regional Development Fund (ERDF) (BISE, 2015).

In Spain, following the initiative of the United Nations, the project "Millennium Ecosystem Assessment of Spain" has been carried out, an interdisciplinary project promoted by the Autonomous University of Madrid with the Foundation Biodiversity of the Ministry of Agriculture, Food and Environment. The project provides validated scientific information on the state and trends of services delivered by Spanish ecosystems and their relevance for the welfare of Spanish society. The second phase of this project is addressing the economic valuation of selected ecosystem services (BISE, 2015).

Regional Level

- "New legal framework on regional and urban planning: funding green infrastructure projects through the economic value of development rights of the Strategic Regional Projects (5% of development rights)"[26]

City Level

- Funding for GI measures under the General Urban Masterplan
- Valencia demonstration project within H2020 project GrowGreen: GrowGreen aims to create climate and water resilient, healthy and livable cities by investing in nature-based solutions (NBS). Making nature part of the urban living environment improves quality of life for all citizens and will help business to prosper. High quality green spaces and waterways provide innovative and inspiring solutions to major urban

[26] Generalitat Valencia, 2013, Green Infrastructure: engaging regions, cities and civil society. Available at https://www.eesc.europa.eu/resources/docs/domenech-green-infrastructure-in-the-region-of-valencia.pdf (Accessed June 21 2018)

challenges, such as flooding, heat stress, drought, poor air quality and unemployment and will help biodiversity to flourish.

- By embedding NBS in long term city planning, development and management, accessible green and blue spaces are a permanent feature of all urban areas around the world, creating harmony between people, economy and the environment, for the benefit of all.
- A good practice example at the city level has been included in Annex IV of the Draft Final ReportCharacterised criteria:

7 Policy messages and recomendations in Valencia Metropolitan Area

It is being highlighted as a potential challenge in the case study that the complex readability of the GI makes it unknown to other/ more interested stakeholders besides the ones directly involved in GI implementation.

Tentative reflections on challenges and opportunities for GI implementation in Spain

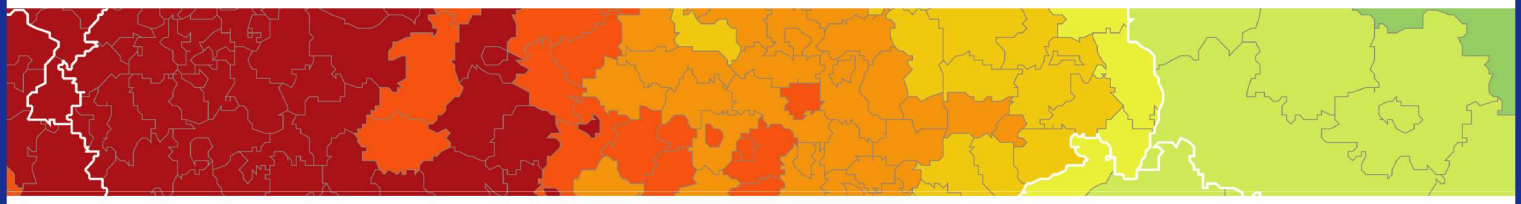
It could be argued that one of the main challenges for developing a GI in Spain, is the lack of political commitment. This challenge is also indicated elsewhere in Europe, and show that although georeferenced information on protected areas and their environmental qualities is provided on national levels, the decisions on where to invest in socio-economic developments (e.g. build new housing, commercial areas or industries) is not always based on this information. This mean that the spatial planning on municipal and city level does not always consider the strategically defined green infrastructure. Sometimes other interests are prioritised.

A solution for further enhancement of GI in Spain would be to place more mandate on the regional planning level. This could indeed enhance the connectivity of green areas beyond municipal administrative boarders and territories, as the regional planning have a broader spatial perspective. Such a development must however be balanced with the possibilities for the public to be engaged in the processes of spatial planning. As reported by researchers such as Slätmo (2017) spatial planning and land use governance within Europe builds on the subsidiarity principle. This means that decision making should be as close to citizens as possible with respect to the capacity to conduct it satisfactorily. The principle as such aims to ensure participation and acknowledgement of local contexts. However, on another scale of decision making, it is important to acknowledge that the sum of local decisions can be degrading for life supporting resources, such as green areas for biodiversity, climate change adaptation and mitigation, water and air regulations, and recreation.

Apendix

The below table give an overview of the stakeholder engagement.

Type of stakeholder	**Workplace**	**Type of interaction**	**Date**
Technical expert	Researcher/academia	Baseline information on case study	20/03/2018
Technical expert	Pubic administration	Responses to Consultation A	28/08/18
Technical expert	Pubic administration	Responses to Consultation A	30/08/18
Technical expert	Researcher/academia	Responses to Consultation B	01/08/18
Technical expert	Pubic administration	Responses to Consultation B	28/08/18



ESPON 2020 – More information

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