"DAILY RESILIENCE": SUSTAINABLE STRATEGIES FOR URBAN FRINGE IN THREE MEDIUM-SIZED INNER SPANISH CITIES

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Urban resilience has evolved in the last time into a wider scope, related to managing the complexity of urban systems and their "metabolism", looking for more sustainable strategies. This paper aims to set a concept of "daily resilience" as a specific and essential strategy for medium-sized cities, through the historical analysis along the last five decades of three medium-sized inner Spanish cities: Vitoria, Zaragoza and Valladolid, which represent the transition from an expansive model, in particular in their respective urban fringe, to the "urban resilience agenda". After a cycle of expansive growth, several Spanish cities have been adopting tailored strategies trying to develop a new vision of their respective urban fringe, where the urban development tensions concentrate. These strategies consist of composing an own profile of action, learning from the history of the city itself and from the natural values of their surrounding territory. This paper concludes that this idea of recovering local identity seems to be resilient, and reveals that in these three cities appear new tools (green infrastructure, urban regeneration and territorial planning) which found a useful topic to articulate a new integrated strategy for the "metabolism" of urban fringe in water systems.

Keywords
daily resilience, urban fringe, medium-sized cities, Spain

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INTRODUCTION

The concept of resilience applied to cities has been usually associated with the ability to cope with large risks or exceptional disasters, whether natural —floods, earthquakes, etc.— or man-made —migrations, population explosion, etc.—, whose effects are obviously more severe in large urban agglomerations, if only by the large number of people who live there. However, the idea of resilience can also be associated with the risks of everyday life, i.e. the smart management of the complexity of any urban system, of its "metabolism" and its growth, through different strategies to ensure sustainability. In this sense, the concept of resilience can be useful for both large cities and smaller ones.

In a world where the urban population continues to grow day by day, medium-sized cities play a key role in order to ensure the resilience and sustainability of the urban system on a global scale, because congestive growth —concentrated only in a few urban areas— is unsustainable in the long term. However, the extension of the urban phenomenon can also be problematic if it endangers the territorial balance, i.e. if urban growth is not managed properly, avoiding risking both the areas of ecological value and those that are intended to obtain natural resources —agriculture, livestock farming, forestry, etc.—.

In this sense, the concept of "low regime", "low intensity" or "daily" resilience defines the entire set of specific strategies that medium-sized cities can use to fulfil their role in the global concert of cities and that aims to manage growth strains in a smart and sustainable way, keeping also in mind that these strains concentrate precisely in peri-urban areas, where the city meets the countryside and its natural and productive spaces.

In order to characterize this concept of "daily resilience", we propose the analysis of the evolution of some planning instruments of three medium-sized inner Spanish cities: Vitoria, Zaragoza and Valladolid, which share a similar territorial context and represent the transition along the last five decades from an expansive model to the urban resilience agenda. Only from this historical viewpoint it is possible to understand how it has been built.

THE URBAN GROWTH MODEL AS MAIN RISK

Among the medium-sized inner Spanish cities, Vitoria, Zaragoza and Valladolid are the most populated and complex ones, and they are also capitals of their respective regions: the Basque Country, Aragon and Castile and León. The last two are two of the largest Spanish regions, and in the last decades have undergone a process of "polarization" of the territory that has also taken place, in a lesser extent, in the inner part of the Basque Country. On the one hand, Spanish population has concentrated around the capital, Madrid, and along coastal areas, where the whole territory is nowadays "urbanised". On the other hand, the population of inner regions —which have lost relative weight, as said— has concentrated in a few cities, while the rest of the territory suffers aging and population loss. The three cases to be analysed are very representative of these processes.

For instance, figure 1 shows that Aragon and Castile and León represented 3.61 and 9.31% of the Spanish population in 1960, but only 2.87 and 5.43% in 2011, respectively. It also shows that in the same period the urban areas of Vitoria, Zaragoza and Valladolid have doubled the relative weight of their population compared to their regions. The case of Zaragoza is particularly striking, as it currently gathers more than half the population of a region with an area of 47,719 km^2.

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	1960		1981		2011	
SPAIN	30,582,936	-	37,742,561	-	46,815,916	-
Basque Country	1,371,654	4.49%	2,134,763	5.66%	2,185,393	4.67%
Vitoria	69,849	5.09%	189,533	8.88%	240,754	11.02%
Aragon	1,105,498	3.61%	1,213,099	3.21%	1,344,509	2.87%
Zaragoza	328,164	29.68%	599,289	49.40%	750,728	55.84%
Castile and León	2,848,352	9.31%	2,575,064	6.82%	2,540,188	5.43%
Valladolid	174,390	6.12%	345,238	13.41%	409,010	16.10%

FIGURE 1 Total population and relative weight compared to Spain (regions) and their regions (urban areas)

	1987	2000	2006	1987-2000	1987-2006
Vitoria	2,446.54	2,966.37	3,695.17	1.21	1.51
Zaragoza	9,458.29	12,197.99	16,156.41	1.29	1.71
Valladolid	3,996.49	6,641.53	8,507.27	1.66	2.13

FIGURE 2 Surface of artificial soil in hectares and cumulative rates of increase

However, the concentration of the population in these three urban areas has not occurred according to a steady pace, because population growth was particularly strong in the sixties and seventies. Between 1960 and 1981 the population of Vitoria, Zaragoza and Valladolid multiplied by 2.71, 1.83 and 1.98 respectively, while between 1981 and 2011 these rates went down to 1.27, 1.25 and 1.18.

Despite that, figure 2 shows that in this last period the artificial soil grew well above those rates, due to expansive growth processes —based on the occupation of natural or productive soil— which were especially intense during the end of this period, between 2000 and 2006, when Spain experienced a real estate "boom" and large amount of housing were built. Thus, between 1987 and 2006 the urbanised land in these three urban areas grew much more than the population. For example, the artificial surface in Valladolid doubled, while the population grew by only 20%.

This rapid expansion involved the occupation of a large number of peri-urban soils with environmental or productive value, which were replaced by new residential areas that, after the housing bubble burst in 2007 ended half-empty in many cases, as shown in Figure 3.

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FIGURE 3 Aerial images of Vitoria outskirts —Salburua—, left, and Zaragoza outskirts —Arcosur—, right

Consequently, it was revealed that this "growth machine" —corresponding to a planned process— could get to endanger both the economic viability of these urban areas —forced to support urban spaces with hardly inhabitants— and the balance with its surrounding territory. Therefore, it was realised that it was necessary either to incorporate or to reinforce those strategies aiming at managing urban growth in a more sustainable, more resilient way.

TOWARDS A RESILIENT URBAN FRINGE

VITORIA: THE GREEN BELT AS A GUIDE FOR A SMARTER GROWTH

Vitoria is a municipality composed of the city, which accounts for 95% of its 240,000 inhabitants, and 58 rural councils located in the peri-urban area that gather barely 5,000 inhabitants. In the late eighties, after the intense growth that, as we have seen, Vitoria had experienced, this complex and sparsely populated peripheral crown was in a vulnerable situation.

The areas of ecological value that had survived the urban growth were affected by problems such as erosion or fire, and degraded spaces as landfills or gravel pits abounded, which had generated "a physical and social barrier between the urban environment and the adjoining rural milieu". Accordingly, the Environmental Studies Centre of Vitoria —whose director from its birth until 2008 was Luis Andrés Orive— decided to undertake a comprehensive project for the entire urban fringe of the city, articulated around the idea of creating a network of peri-urban green spaces, following in this regard the proposals of the 1986 General Urban Development Plan. The objectives were the conservation of natural spaces and the ecological restoration of other peripheral areas, the integration of peri-urban parks within the urban layout —improving the physical and ecological accessibility— and the promotion of their use by the inhabitants, to be involved in their conservation.[1]

The project, called "Green Belt", was launched in 1992 with the detection of the main spaces that would integrate the new green infrastructure: the Salburua wetlands and open fields of Olarizu, east, and the mountains of Zabalgana and the forest of Armentia, west. The aim was to connect them along the course of the Zadorra river to the north and along the border with the mountains of Vitoria to the south, through corridors coinciding with watercourses or degraded spaces to be recovered by eco-design mechanisms.

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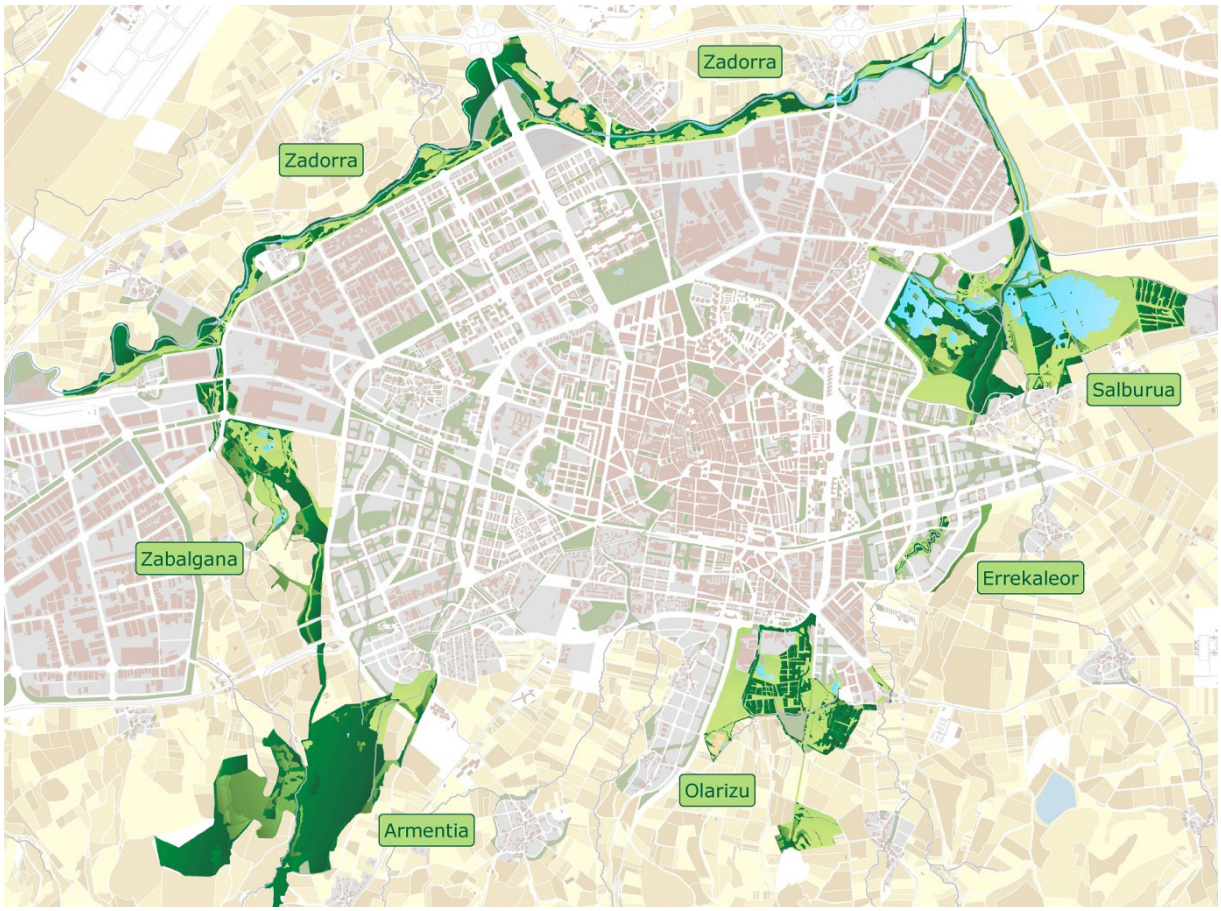

FIGURE 4 Plan of Vitoria Green Belt, with the names of its main spaces

Thus, in 1998 the Arkaute pond was restored as part of the diversion project of St. Thomas and Errekaleor rivers, and in 2002 the environmental restoration of the Zadorra river began and the Salburua Park was declared as Wetlands of International Importance by the Ramsar Agreement, while in 2004 these two areas were designated as Community Interest Areas within the Natura 2000 Network.

This strategy, which was incorporated into the General Urban Development Plan approved in 2000, was selected the same year as "Best Practice" at the Third International Practices Competition in Dubai, and it was one of the keys so as to Vitoria was declared as European Green Capital in 2012. Today, the Green Belt connects six major parks: Armentia —165 ha—, Salburua —218 ha—, Zabalgana —61 ha—, Olarizu —93 ha—, Zadorra —155 ha— y Errekaleor —12 ha—, as shown in figure 4. This surface of 704 ha corresponds to 70% of the 960 ha covered by the project.[2]

However, this model of sustainable management of the urban fringe designed by the Environmental Studies Centre came into conflict with the revision of the General Urban Development Plan itself, as it opted for an expansive growth. This plan proposed six new residential sectors for the west expansion of the city, towards Zabalgana, and another nine sectors for the east expansion, in the area near Salburua —see figure 3—, which together represented 607.97 ha to be occupied by 21.742 dwellings, i.e. with a very low density —just 35.76 dwellings per hectare— and a large consumption of soil, "endangering so in practice the concept of belt, both in terms of its continuity along its perimeter and of the possibility of completing it with natural corridors that penetrate into the inner city"[3].

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According to the Plan, 346.75 hectares of land with capacity for 15,120 homes were urbanised, but their occupation remained uncompleted, with the risk of rebuilding in the urban fringe those degraded spaces that the Green Belt project intended precisely to restore. Therefore, from the year 2009 it was decided to try to redirect the situation as far as possible. Thus, a modification of the development conditions of these sectors that had already been urbanised was processed, in order to increase their density and their capacity to host new population in the future to avoid transforming more soil. After that, the number of dwellings has finally reached the quantity of 26,132, providing a density of 75.36 dwellings per hectare, which corresponds in a better way to a model based on the compactness and the responsible use of peri-urban land.[4]

In short, and despite the fact that the real estate "boom" also affected Vitoria, the existence of this model did mitigate its effects. The Green Belt project has helped establish "physical constraints for managing urban growth" so "in this sense Vitoria has a clear advantage over other cities" [5].

ZARAGOZA: URBAN REGENERATION ALONG WATERCOURSES IN THE POST-EXPO STRATEGY

Zaragoza is currently the most populous urban area in the inner regions of Spain excepting Madrid, with 90% of its 750,000 inhabitants concentrated in the homonymous municipality. The city is crossed by the Ebro river, the largest one in Spain, and also by other waterways such as Gállego and Huerva rivers and the Imperial Canal of Aragon. However, the city had turned its back on these waterways until the celebration in 2008 of an International Exhibition whose theme was "Water and sustainable development", which promoted to rely on them to rethink the model of expansive growth in which the city had embarked itself.

The revision of the General Urban Development Plan that was approved in 2001 envisaged the development of 3,810.23 ha of new residential sectors, with a capacity for more than 100,000 dwellings. Then several Plans developing these estimates were approved, such as Valdespartera —182.69 ha and 9,687 dwellings— or Arcosur —364.89 ha and 21,148 dwellings—, both located southwest of the city, next to the outer motorway belt and far away from the city centre.[6]

The first on, with public management, was designed with bioclimatic criteria and 95% of the housing stock was allocated to social housing. The development works were completed quickly and many buildings were built, but the outbreak of the economic crisis in 2007 left many empty lots, a situation that is much more dramatic in the case of Arcosur, a huge urbanised area than today remains mostly empty, as observed in figure 3.

In this sense, the celebration in 2008 of the Expo, just when this model was in crisis, fostered a reflection about how to manage the future of Zaragoza, finding the best argument to guide a change of course —towards a new model based on regeneration— in water. In fact, some voices were already advocating for some time ago that "watercourses can also positively shape a new kind of city closely tied to the peri-urban landscape"[7], while the Strategic Plan itself that the city had approved in 1994 was called precisely "Ebrópolis", i.e. the city of Ebro.

First, the Expo involved the transformation of the so-called "Ranillas" meander, an often flooded area, located west of the city, where the Expo site was located and where the so-called Water Park was created, whose aim was to "rediscover the memory of the place in order to project a better future", strengthening the relationship between the city and the territory while a riparian ecosystem was generated[8]. This new river park had also to integrate into a new network of metropolitan parks associated both with rivers —such as the Gállego and Huerva— and with forest areas, a green belt proposal that received a decisive boost from the Expo.

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FIGURE 5 Scheme of actions included in Expo Zaragoza 2008 Accompanying Plan

Nevertheless, in this case we want to describe especially the Accompanying Plan that from an urban perspective was designed for the Expo, oriented to implement various urban regeneration operations, in order to recover underused spaces in the city using water as a leitmotif. In this sense, "Expo Zaragoza 2008 is the cause of a considerable quantitative and qualitative step forward regarding the city's infrastructures and public spaces"[9].

The Plan combines structuring actions with others of "urban acupuncture", becoming a global strategy for urban improvement, as summarized in figure 5. First, the Plan promoted the recovery of the river banks, but not only the Ebro ones, but also those of the other three major watercourses of the city, so over 60 km. were intervened to incorporate walk- and cycle-ways, build new bridges and create new facilities for leisure. Some former railways were also recovered as green corridors, which has also helped improve environmental conditions in neighbourhoods such as Oliver and Valdefierro. In addition, the Expo served to launch the "Digital Mile" project, a new centrality space built on 107 ha of old railway use.

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In short, following the Expo 2008 Zaragoza benefited from a major investment effort —more than 1,500 million Euros— that has allowed to recover some deprived spaces within or adjacent to the existing city, pointing a way forward that, instead of an uncontrolled expansion in the urban fringe, defends a structured territory through the waterways and the regeneration as a priority against the occupation of new soil. It would be hoped that these positive impacts pave the way for the future, through smart strategies that, on the other hand, will have to face the shortage of economic resources or the need to address the social aspect of urban regeneration processes, which in the context of Expo remained in the background.

VALLADOLID: A GREEN NETWORK FOR A SUSTAINABLE MANAGEMENT OF URBAN FRINGE

The last case we will refer to is Valladolid, an urban area of over 400,000 inhabitants where administrative divisions have played a key role so as to understand the phenomena that have taken place there in the last decades. First, it has to be noted that the municipality of Valladolid reached its peak population in 1991, with 330,000 inhabitants, while 16 surrounding municipalities, functionally dependent on the central city, had just fewer than 35,000. However, in 2011, the city of Valladolid had lost population, down to about 312,000 inhabitants, while the population of these surrounding municipalities soared, almost touching 100,000, i.e. they experienced a growth of 285% in just 20 years. There is therefore a dynamic growing urban area, but where there has been a redistribution of population from the central city to the surrounding municipalities.

This phenomenon was possible because the municipalities around the city, administratively and politically autonomous with respect to Valladolid, arranged an almost total freedom to classify land for residential uses. From the late nineties, the entire metropolitan area undertook a logic of competition with each other and with the central city in order to attract population, which consisted of developing new residential sectors as quickly as possible. The own city of Valladolid eventually joined this process, since the revision of the General Urban Development Plan approved in 2003 incorporated 3,413.36 ha of new land for development, overflowing the radio-concentric scheme that the city had set in the eighties as a mechanism to control the urban growth. In the end, some municipalities experienced an authentic demographic explosion, such as Arroyo de la Encomienda, southwest of Valladolid, which went from 1,406 inhabitants in 1991 to 15,528 in 2011, i.e. it grew 1,100%.

This model of expansive growth, which clearly compromised the sustainability of the urban area and even got to threaten some soils with high ecological or productive values, had only two obstacles. Ultimately, the economic crisis, which again forced to rethink the path, but during that period of expansive growth there were only the Land Planning Guidelines for Valladolid and its surrounding area, a valuable instrument of territorial planning that, as happened with Vitoria and its Green Belt, was not able to prevent the excesses but did mitigate its effects.

These Land Planning Guidelines had their origin in the adoption in 1998 of the Territorial Planning Act of Castile and León, which defines them as an homogeneous spatial framework of guidelines for sectoral and municipal planning whose main objective was to introduce criteria of rationality, balance and efficiency to be incorporated in the General Plans of the respective municipalities, while respecting their autonomy.

The Advancement Document was approved in 1998, accompanied by an explanatory publication[10], and final approval came in 2001, just when the urbanizing process was entering its most intense phase. The Guidelines, which contemplated a total of 23 municipalities, proposed a catalog of full, basic and guidance determinations, applying principles of protection and control and trying to "give the greatest possible emphasis to the specific identity of the territory of Valladolid"[11], although they had to face distrust or even outright opposition of certain municipalities, who saw in them a brake on its development and were reluctant to give up its expansion plans.

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FIGURE 6 Land Planning Guidelines for Valladolid and its surrounding area: project-program of green corridors and metropolitan system of parks

The Guidelines conducted a thorough diagnosis of the territory of Valladolid, defined as a crossroads of five rivers —Duero, Pisuerga Esgueva, Adaja and Cega— along with an extensive network of canals and ditches —Castilla and Duero Canals are the most important ones— that run between a rich mosaic of pine forests and both irrigated and unirrigated farms. Therefore, they promoted their conservation and protection through three mechanisms: the delimitation of "Singular Ecological Value Areas" —with active protection measures—, the definition of the most valuable agricultural landscapes —linked to historical territorial infrastructures— and the proposal of a metropolitan system of parks and green corridors as a territorial articulation mechanism —supported largely on the various fluvial networks— that is shown in figure 6.

In short, "the Guidelines have largely met only a protective function, because its potential on strategic coordination was not deployed" [12]. In this regard, since a model based on competition and on an uncontrolled growth is negative for the whole urban area, it would be hoped a turn towards a logic of cooperation and comprehensive perspective, and the Guidelines are a good base to move forward on.

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FIGURE 7 Revision of General Urban Development Plan: Scheme of Valladolid Outer and Inner Green Belt

In fact, the current revision of the General Urban Development Plan of the municipality of Valladolid has proposed a green infrastructure to articulate urban fringe, composed of a double, inner and outer green belt, both connected through three main corridors that run along three major watercourses: north Pisuerga —and Castilla Canal—, south Pisuerga —just before joining Duero— and Esgueva, as it is represented in figure 7, and which adapts the ideas that the Land Planning Guidelines had proposed 15 years ago. However, as we have observed, Spanish Urban Law gives to municipal authorities a broad flexibility to modify and to implement —or not— the measures contained in General Urban Development Plans, so it is much more important to assume a real compromise to foster a new urban development model, not only on paper but in daily administration of the urban territory.

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TOC

CONCLUSIONS

Vitoria, Zaragoza and Valladolid, as medium-sized cities, represent a context where large risks are limited —just floods have caused some troubles, especially in Zaragoza—, so the main risks have come from a planned growth model whose crisis has raised a new perspective on these cities. A perspective defined by the necessity of strengthening its long-term sustainability, which has introduced a new awareness of their own "urbanity" —in a positive way—. This is what we have defined through the idea of "daily resilience".

"Daily resilience" has its key space, as we have seen, in the urban fringe of cities, in the management of the coexistence between the city and its territory, between urban and rural areas that have in peri-urban areas a space which can be of conflict but also of mutual benefit, if the different land uses are made compatible.

In addition, it has been shown that "daily resilience" is built through tools that can be very different —green infrastructure, urban regeneration projects, urban region planning—, but all of them have just one thing in common: respect for the identity of the territory and its values, as a result of understanding of both the historical processes of formation and the need to reconcile the different human actions that take place in it, from a sustainability perspective. In this sense, the main strategy of "daily resilience" consists of linking the "urban artefacts" to their "genius loci" in a projective way, but, as Nuno Portas has said, not anticipating the future, but managing uncertainty[13].

From this point of view, water in its various urban and territorial manifestations —rivers, wetlands, ponds, canals, ditches, etc.— is a very valuable leitmotif thanks to its ability to connect the city and the countryside, and all those watercourses also represent genuine spatial connection axes of the territory. However, there are also other mechanisms, such as public transport networks, which for instance Vitoria and Zaragoza have also started to put into practice[14], while Valladolid has delay as it continues waiting for a large project —a tunnel to bury urban railways—. This tunnel requires a huge investment that had to be paid through the sale of the land occupied by the railways and its maintenance installations, but after the housing bubble burst this plan has become nonviable. Nevertheless, the municipality has not decided yet to renounce to it, which has made postpone smaller improvements —this is in fact the risk of major projects—.

Faced with expansive growth patterns —ignoring their historical and spatial context— that generate undifferentiated urban spaces, with poor quality and very expensive to maintain, the reflection on the terms that have been exposed here can certainly help design a better, more resilient urban fringe, through smart and low-cost actions but able to provide a good quality of life to those living there.

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Figure 1: 1960, 1981 and 2001 Population Census (Instituto Nacional de Estadística, accessed April 1, 2016, http://www.ine.es), and own elaboration.
Figure 2: Corine Land Cover (Atlas Digital de las Áreas Urbanas, accessed April 1, 2016, http://atlas.vivienda.es), and own elaboration.
Figure 3: Spanish National Plan for Aerial Orthophoto (Instituto Geográfico Nacional, accessed April 1, 2016, http://www.ign.es/wms-inspire/pnoa-ma?request=GetCapabilities&service=WMS).
Figure 4: Ayuntamiento de Vitoria-Gasteiz, accessed April 1, 2016, http://www.vitoria-gasteiz.org/wb021/http/contenidosEstaticos/adjuntos/es/74/44/37444.pdf
Figure 5: Ricardo Marco Fraile and Carlos Buil Guallar, ed., Zaragoza 1908-2008: Arquitectura y urbanismo (Zaragoza: IFC-Ayuntamiento de Zaragoza-Cajalón, 2009).
Figure 6: Juan Luis de las Rivas Sanz, dir., DOTVAENT: avance de directrices de ordenación territorial de Valladolid y su entorno (Valladolid: Consejería de Medio Ambiente y Ordenación del Territorio de la Junta de Castilla y León, 1998), CD-ROM.
Figure 7: "Revisión del Plan General de Ordenación Urbana de Valladolid: Documento para Aprobación Inicial: V. Memoria vinculante", 41, Ayuntamiento de Valladolid, accessed April 1, 2016, http://www.valladolid.es/es/ciudad/urbanismo-vivienda/servicios/aprobacion-inicial-plan-general-ordenacion-urbana-2015.

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