Integrating periurban agrarian ecosystem services into spatial planning to cope with urban pressure

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Zusammenfassung

Nach Corine Land Cover-Datenbanken wurden in Europa zwischen 1990 und 2000 77% der neuen bebauten Oberflächen auf früheren landwirtschaftlichen Flächen erbaut. Die Zersiedelung der Landschaft ist bei weitem noch nicht unter Kontrolle, so ist zwischen 2000 und 2006 der Anteil an bebauten Flächen stärker gewachsen als in den zehn Jahren zuvor. In Spanien, wie in den meisten Ländern, sind die Auswirkungen der Zersiedelung in den letzten Jahren besonders in den stadtnahen Gebieten und Agrarflächen zu spüren: zwischen 2000 und 2006 wurden 73% der neuen Überbauungen auf früheren landwirtschaftlichen Flächen errichtet. Dieser Beitrag untersucht durch einen Vergleich der vier Fallstudienstädte Valladolild, Montpellier, Florenz und Den Haag, ob Stadt- und Raumplanung dazu beitragen können, den städtischen Druck auf das Hinterland zu reduzieren. Der systematische Vergleich und die Analyse von erfolgreichen Ansätzen liefern einige Hinweise, wie Stadtplanung zu überdenken ist, um landwirtschaftliche Flächen zu erhalten.

Abstract

According to Corine Land Cover databases, in Europe between 1990 and 2000, 77% of new artificial surfaces were built on previous agrarian areas. Urban sprawl is far from being under control, between 2000 and 2006 new artificial land has grown in larger proportion than the decade before. In Spain, like in most countries, the impact of urban sprawl during the last decades has been especially significant in periurban agrarian spaces: between 2000 and 2006, 73% of new artificial surfaces were built on previous agrarian areas. The indirect impact of this trend has been even more relevant, as the expectations of appreciation in the value of land after new urban developments reinforce the ongoing trend of abandonment of agricultural land. In Madrid between 1980 and 2000 the loss of agricultural land due to abandonment of exploitation was 2-fold that due to transformation into urban areas.

By comparing four case studies: Valladolild, Montpellier, Florence and Den Haag, this paper explores if urban and territorial planning may contribute to reduce urban pressure on the hinterland. In spite of their diversity, these regions have in common a relative prosperity arising from their territorial endowments, though their landscapes are still under pressure. The three last ones have been working for years on mainstream concepts like multifunctional agriculture. The systematic comparison and the analysis of successful approaches provide some clues on how to reconsider urban planning in order to preserve agricultural land. The final remarks highlight the context in which public commitment, legal protection instruments and financial strategies may contribute to the goals of urban, peri-urban or regional planning about fostering agrarian ecosystem services.

1. Urban planning in a context of urban pressure and agricultural abandonment

The impact of urban sprawl that has taken place in Spain during the last decades has been especially significant on periurban agrarian spaces. According to Corine Land Cover databases, between 2000 and 2006, 73% of new artificial surfaces were built on previous agrarian areas. The indirect impact of this trend has been even more relevant, as the expectations of appreciation in the value of land after new urban developments reinforce the ongoing trend of abandonment of agricultural land. In Madrid between 1980 and 2000 the loss of agricultural land due to abandonment of exploitation was 2-fold that due to transformation into urban areas.

This paper explores the potential of integrating agrarian ecosystem services in urban planning to contribute to halt the loss of periurban agrarian land. The systematic comparison of four European cities provides some clues on how to reconsider urban planning to integrate agrarian landscapes surrounding metropolitan areas. The “ecosystem services approach” is not explicitly mentioned in the different plans analyzed. Indeed much of what happened is the result of more general cultural or institutional attitudes towards periurban agrarian land. They are part of an ever-important mainstream policy that aim to reconsider the way in which periurban agrarian areas are dealt with in urban and territorial plans, seeking out opportunities for synergies between the different ecosystem services provided by those areas.

2. Methodology of research

2.1 Selection of cases

The research focuses on Valladolid, the main city of an agrarian and relatively prosperous area, the middle stretch of River Duero in Spain. Regional’s economy is partially based on its local production, on the exploitation of endogenous resources, mainly viticulture. It is therefore an example of the sort of strategies that are being promoted in Europe in its quest to combine territorial cohesion and competitiveness in a globalized world. In this paper we review four case studies to understand how urban and territorial planning initiatives are coping with periurban areas development.

The evolution of the metropolitan area of Valladolid is compared to other European regions with historically strong agrarian linkages: Toscana, Montpellier and Zuid-Holland. In spite of their diversity, these regions have in common a relative prosperity arising from their territorial endowments, though their landscapes are still under pressure.

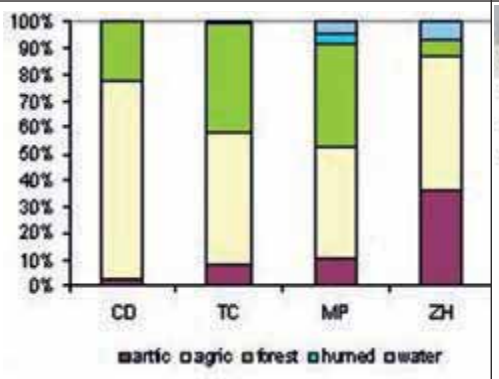
The selection of cases was based on a research developed by the GIAUS[1)] about "Agricultural space between the city and the countryside" (VAZQUEZ & VERDAGUER 2010). Montpellier, Tuscany and Zuid-Holland were considered "good" practices that deserved closer inspection. All three have been part of European research projects: PLUREL and GreenLink, therefore it was expected to have detailed information available online.

2.2 Context analysis

To understand the evolution of periurban agrarian ecosystems, first their spatial configuration together with the demographic evolution is analyzed. The spatial analysis is confined in each region to the hinterland within 30 km of the city (Valladolid, Firenze, Montpellier and Den Hag) and is based on the CORINE land cover database (1990, 2000 and 2006) at level 3 that provides rough but comparable information on the distribution of ecosystems. Beyond this spatial evolution, each case has been studied, applying the Context Analysis approach (de JONG 2004).

Most of the urban and territorial plans aimed to preserve periurban agriculture were implemented after the period analyzed or at its very late stages. The evolution of urban pressure on agricultural land has to be understood by considering the different cultural, economic and social conditions. The analysis of economic and cultural evolution has taken into account urban-rural relationships, local markets, short-chain production and consumption, interest groups and networks as well as value of agrarian land, social recognition, local identity and protection plans.

Tab. 1: Distribution of land surfaces (%) 2000



Tab. 2: Ecological layer. Population and ecosystems distribution

Case		CD	TC	MP	ZH
Ecological layer					
Population	1.000	360	200	400	1000
Artif area/capita	m^2 /inhab	200	462	605	618
Ecosystems (2000)	km^2				
Arable land		1915	479	60	379
Vineyards		45	150	608	0
Pastures		0	16	1	430
Mixed with natural areas		138	431	245	52
Broad-leaved forests		104	766	98	32
Coniferous forests		299	70	27	2
Mixed forests		15	284	49	5
Seminatural areas		220	60	899	59

Exploitation of CLC data from European Environmental Agency
http://www.eea.europa.eu/data-and-maps, last visited June 2011

3. Case studies

3.1 Four European metropolitan areas

• **CD. Douro Valley. Valladolid and its hinterland.** The area analyzed faces the challenge of an acute polarization process. Although there is a relative prosperity, the population in the countryside is declining and increases its dependency from the main cities that concentrate growth, power and functions.

• **TC Toscana. Firenze´s hinterland.** Firenze concentrates the more dense populated areas in the region Toscana. Its hinterland is subject to the highest urban pressure. Until some decades ago, the plain, la Piana, was a rural area devoted to agriculture. Nevertheless the residential boom in the 60s, the construction of huge infrastructures like the airport or the highways and the sprawl of industry and malls have broken the traditional structure of settlements and transformed completely the landscape and their functions.

• **MP Montpellier Agglomération. Montpellier´s hinterland.** The city of Montpellier, within the Mediterranean region Languedoc-Rousillon, is since the 60s a pole of demographic attraction. The constant demographic growth is accompanied by a strong urban sprawl that affects municipalities at a greater distance from the city. Urban sprawl occupies territories traditionally linked to agriculture, mainly to wine production and transform landscapes and socioeconomic dynamics.

• **ZH Zuid-Holland. The Hague´s hinterland.** The area is one of the most densely urbanized areas of Europe, close to the Green Heart, a protected National Landscape since 1998. The region is still under urban pressure from artificial uses expansion and from the increasing urban demand for recreation spaces. In general this demand for leisure and recreation in the landscape is seen as an opportunity to guarantee the future viability of the agrarian landscape and there is a strategy to develop the economic assessment of rural goods and services.

3.2 The importance of agrarian and artificial land

In general, the number of agricultural plots has decreased in a larger proportion than the surface; therefore there has been a process of enlargement of the average size of exploitations. The area of cultivated land has decreased in all cases but Tuscany. It is noticeable that in the Plain more than 90% of agrarian land remains cultivated (REGIONE TOSCANA 2007). There is also general trend to foster quality production and ecological agriculture.

3.3 Cultural and institutional context

It has to be highlighted that in all cases there is an increasing demand for recreation and open space activities. Connected with this demand, which is understood as an opportunity to reactivate the agrarian sector, sometimes farmers try to reorientate to multifunctional agriculture. Production of quality and – to a lesser extent – ecological agriculture are also predominant in these regions. There is altogether a general concern about shifting urban-periurban-rural Beyond these similarities, each case has its own peculiarities that are summarized below. What follows is a very brief summary of the

[1)] GIAUS: Grupo de Investigación Arquitectura, Urbanismo y Sostenibilidad. Research Group in Architecture, Urbanism and Sustainability

reports about Montpellier, Tuscany and Zuid-Holland, written for the "Agricultural space between the city and the countryside" in (VAZQUEZ & VERDAGUER 2010).

A social movement of young neo-rurals that moved from towns to the countryside seeking for a more sustainable way of living started in Tuscany some decades ago. With them new connections between urban and rural inhabitants were established, based in mutual confidence, short-chain production-consumption relationships and Solidarity Purchasing Groups. Since then, these networks have consolidated and the institutions have finally incorporated them to their strategies. By 2007 the regional government started the Filiera Corta (short-chain) project to promote local agriculture. Nowadays urban municipalities provide spaces for farmers and promote cultural activities connected to farmers' ecological products.[2)]

In Montpellier this process started later, nowadays there are some institutional projects to support local production[3)] and to promote short-chain commercialization of production. In this case, the ability of farmers unions to bring the periurban agriculture into the political agenda already for decades has to be highlighted. Different laws related to rural development have been passed and by 2005 a specific law for the development of rural areas (Loi développement des territoires ruraux) became an instrument to preserve periurban agrarian spaces and treat them favourably. SAFER, a public institution, facilitates access to land property for those collectivities that propose a project of public interest to manage an agrarian area.

In Zuid-Holland´s policies regarding agriculture, there has been a progressive shift from production to recreational activities and nature preservation. The Social and Economic Council of the Netherlands (Sociaal-Economische Raad) concluded that green (environmental) and blue (water management) services will play a decisive role for the future feasibility of farming (SER 2008). Emphasis is therefore put on Rural Good and Services approach. In fact public natural areas aimed for recreation are very expensive to upkeep and authorities are looking for more affordable alternatives, like promoting new management practices of agrarian areas to provide these recreational services (AALBERS 2009 et al.). Authorities try to foster this approach not only with regulations, but also by promoting it with subsidies for farmers providing green or blue services.

3.4 Integrating periurban agrarian ecosystems services

Cultural services of periurban agrarian ecosystems. In Tuscany, as well as in Montpellier and Zuid-Holland there is a wide recognition that farmers play an essential role in preserving the landscape. In South-Holland there is increasing interest in farming as providing social services, for education, nursery, therapy, healthcare and rehabilitation.

Provisioning services of periurban agrarian ecosystems. Tuscany and Montpellier have enhanced agricultural production of quality; wine with Denomination of Origin play an important economic role (linked to landscape preservation and tourism) also in the Douro Valley, close to Valladolid. Both in Montpellier and in Tuscany local associations (third sector) as well as authorities and universities aim to consolidate local production and short-chain relationships.

Supporting services of periurban agrarian ecosystems. In those cases where there is a commitment towards ecological agriculture, this has also positive consequences on supporting services provided by periurban agrarian systems. Some Universities, like the University of Florence are exploring possibilities to facilitate transition towards ecological agriculture.

4. Evolution 1990-2006

4.1 Urban sprawl or urban containment

In Figure 1 the same legend has been applied to represent the four cities and their hinterland within 30 km. Red areas show where new artificial areas have been developed. The graphics under the maps show the distribution of these new artificial areas in relation to the distance to the city core.

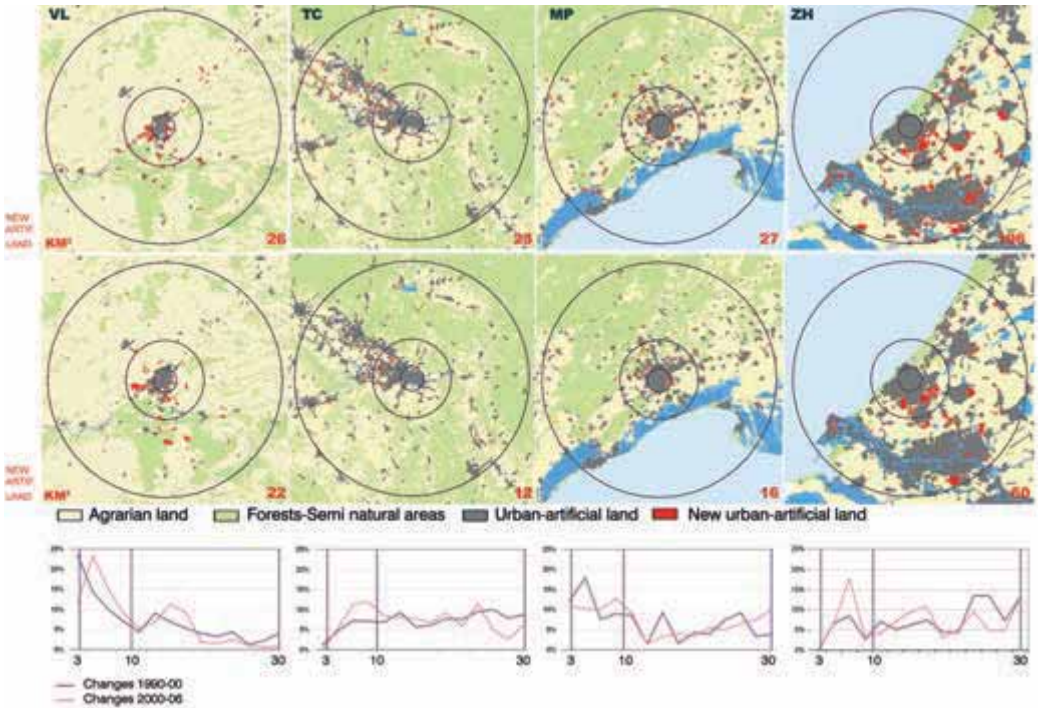


Fig. 1: Spatial temporal layer. Artificial uses: Changes 1990-2000 and 2000-2006

[2)] The project ARTE E CIBO allocates specifc spaces within museums to gastronomic cultural activities and commercialization. The project Patti di Filiera promotes agreements between producers and other sectors like restaurants, commerce or tourism.

[3)] Projects like CROC *(Compétences, Réseaux, Observatoire, Communication)* or platforms like Qualité Hérault or Bienvenué à la Ferme.

The expansion of artificial land has been especially relevant in the surroundings of The Hague, or more specifically, in the conurbation The Hague Rotterdam. Both cities exert great pressure on agricultural land. Artificial land accounted already for more than 30% of total surface by 1990, with the highest rate of m^2 of artificial land per capita (approximately 618, compared to 200 in Valladolid). The official discourse of preservation of the open space has not been translated in effective containment of urban expansion.

In Valladolid, between 1990 and 2000 artificial land increased by 37%. Its historical urban contention has disappeared, following the path of other western countries. In this case the gradient of distribution of new artificial lands is very clear from the city core to the countryside. Between 1990 and 2000 new developments concentrated mainly within a radius of 5 km and there was a minor peak at 12 km distance, where some of the secondary cities are located. This urban expansion is by no means, under control, between 2000 and 2006 it has increased by 30% and the curves of distribution are slightly displaced 2-3 km further to the centre.

In Tuscany urban expansion has been much moderated, with 27 new km^2 between 1990 and 2000 and only 12 between 2000 and 2006. Practically all new developments are located along the eastern axis: Firenze-Prato-Pistoia, in the Parco della Piana. This process was a matter of concern for different authorities that have approved different kinds of plans to preserve open space, agrarian land and traditional structures.

4.2 Shifting agricultural land

In Figure 2, changes in agricultural land between 1990 and 2000 and between 2000 and 2006 are drawn proportionally. The projection of expected changes in a business-as-usual scenario are also drawn in faded colors.

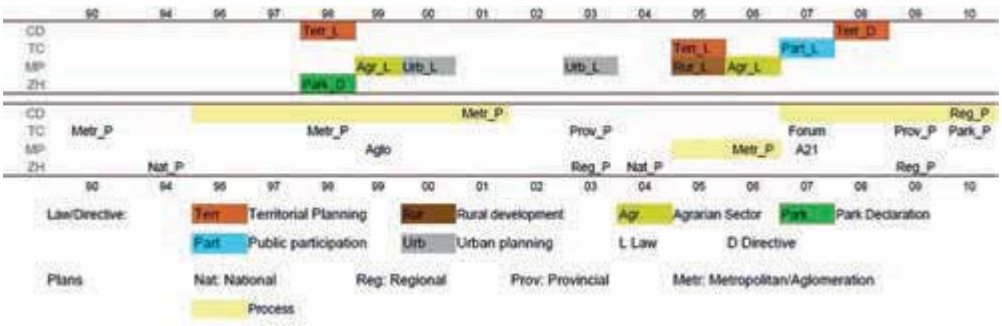
Whereas in Montpellier and Tuscany basically loss of agricultural land was the result of urbanization, in Valladolid main changes in agrarian land were due to shifting from one category of agriculture use to another (according always to CLC) and this sometimes is derived from changes in the way that mixed patterns are categorized.

Only in Montpellier and Tuscany urban pressure seems to be under control. Especially in the latter the containment of urban expansion has resulted in reducing almost by half the loss of agricultural land. On the contrary in Valladolid urban sprawl was by 2006 far from being controlled. Probably only the structural crisis, bursting by 2007, has reverted this expansive trend.

Fig. 2: Changes in agricultural land. 1990-2000 and 2000-2006 (Source of data: CLC)

4.3 Different planning approaches

Figure 3 shows the different plans and legal instruments regarding periurban spatial planning in each area.



Laws and plans. Milestones:	
CD	1998: Regional Law on Territorial Planning (Ley de Ordenación del Territorio Cas tilla y León) 2001: Metropolitan Plan. Directrices de Orde nación Territorial de Valladolid y su Entorno, DOTVa ENT 2008: Terrritorial Directive. Directrices Esenciales de Ordenación del Territorio CyL 2010: Regional Plan. Plan Regional del Valle del Duero
TC	1990: Metropolitan plan Piano strutturale area metropolitana Firenze-Prato-Pistoia 2003: Provincial plan. Piano territoriale di Coordina mento provincia de Prato. 2007: Forum. Local stakeholders create a forum for the agrarian park in Prato 2009: Regional plan. Piano Territoriale di Coordina mento Provinciale 2010: Park Plan. Master Plan Parco della Piana.
MP	1999: Agricultural Law. Loi d'Orientation Agricole with protection for agrarian areas *(Zone Agricole Protégé)* 2000: Urban planning law. Loi Solidarité et Renouvellement Urbain 2001: It is created the Aglomeration de Montpellier 2003: Loi Urbanisme et Habitat 2005: Rural development law. *Loi développement des territoires ruraux*w with protection for peri urban agrarian areas *(Périmètre de Protection et de Mise en Valeur des Espaces Agricoles et Naturels Périurbains)* 2006: Metropolitan Plan. SCoT Montepellier 2007: Local Agenda 21 starts
ZH	1998: Nationale Landschap Groene Hart 2003: Regional Plan. Streekplan Zuid-Holland. 2004: National Plan. Nota Ruimte 2004: Provincial (structural vision) plan. Provinciale Ruimtelijke Structuurvisie 2020 2005: Territorial Agreement. VeenweidePact Krim penerwaard 2006: Nota Ruimte officially into act 2009: Regional plan (nature protection/management) Natuurbeheerplan Zuid-Holland

Fig. 3: Regulations, territorial and urban plans. 1990-2010

According to the results of urban containment, Tuscany had the most successful approach. The different provinces involved had their own plans and they discussed and agreed on the structural plan for the regional area. There is also a pro-active law regarding public participation, although it was passed after the period of land changes' analyzed. Noticeably, part of Tuscany´s success has to be derived from the social movement that linked urban and rural inhabitants.

Montpellier has partially reduced its urban pressure on agrarian periurban land. In this case, the spatial plan is also later to the period analyzed. Therefore, the key factor has to be found in a wide legislative pro-agrarian sector and pro-rural development.

The Dutch system of spatial planning is widely recognized, and it is certainly impressive its ability to agree and coordinate spatial plans at different scales. Nevertheless, the practical implications of these hierarchical plans have been weakened. In areas of high urban pressure, these plans have not been able to thwart the expansion of artificial land over agricultural land. In fact agrarian land has neither the wide social support of Tuscany Plain, nor the legal protection of French framework.

4.4 Lessons learned

Comparing different metropolitan areas allows us to understand the process by which rural urban relationships are shifting and to identify how spatial planning may contribute to optimize multifuncionallity of periurban agrarian ecosystems. In short, to understand the role that spatial planning may play to control urban expansion, and to preserve and reconnect periurban agrarian spaces with urban inhabitants, in a quest for a more cohesive and resilient territory.

The most successful case analyzed, Tuscany, based its success in the ability of its inhabitants to build over a wide period of time, strong networks between rural and urban spheres, between producers and consumers. Local agriculture of high quality was part of a social movement to reconnect urban citizens to their surroundings. Here the highest rates of cultivated agrarian land are to be found together with participatory process of urban and territorial planning. Traditional landscapes depend on farmers and are recognized as highly valuable by the population. Agriculture focus on provisioning services was complemented with cultural services and – as agroecological agriculture is increasing – supporting and regulating services.

In the case of South Holland, it appears that, when dealing with agricultural land protection, policies in favour of recreational and nature conservation goals connect well with people expectations. Nevertheless relegating production to a very secondary position reduces the possibilities to encourage public-citizen support for the conservation of periurban agrarian systems.

The analysis of Montpellier provided information to conclude that strong institutions with competences and laws that enable them to facilitate social projects of sustainable land management are effective to cope with urban pressure. They only work if there is a social recognition of the value of local agriculture, together with farmers or collectives committed to work in this sector.

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