

VU Research Portal

Linking agricultural policies with decision making: A spatial approach

de Noronha Vaz, E.; Painho, M.; Nijkamp, P.

2013

document version

Early version, also known as pre-print

[Link to publication in VU Research Portal](#)

citation for published version (APA)

de Noronha Vaz, E., Painho, M., & Nijkamp, P. (2013). *Linking agricultural policies with decision making: A spatial approach*. (Research Memorandum; No. 2013-30). Faculty of Economics and Business Administration.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal ?

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

E-mail address:

vuresearchportal.ub@vu.nl

Linking agricultural policies with decision making: A spatial approach

Research Memorandum 2013-30

Eric Vaz
Marco Painho
Peter Nijkamp

Linking agricultural policies with decision making: A spatial approach

Eric Vaz¹, Marco Painho², Peter Nijkamp³

Abstract

Land-use change has been an increasing concern in most of Europe. While stakeholder's strategies of coping with land-use change have been constrained mainly due to socio-economic pressures, the natural landscape and fragile ecosystems are often harmed due to infrastructure and urbanization development. However, over the last 30 years, public regulations have become more explicit regarding environmental impacts at the regional level. The spatial assessment of ongoing rural and urban policies has led in the case of Portugal to concerns about the consequences of sustainable development in the context of existing legislation. A good example of this is the agricultural land loss that has occurred in Portugal over the last 30 years, in large part resulting from socio-economic pressures with which policy makers have not been able to handle.

The Reserva Agrícola Nacional (RAN) - translated as the National Agricultural Reserve - is an instrument for planning purposes that aims to identify and protect areas suitable for agricultural activities due to their favorable morphological, climatic and social characteristics. The RAN has changed its legal status more than four times in the last 20 years. These changes have mainly been influenced by the policies of regional development for the region. However, the ability to defend the interests of agricultural and rural communities in fragile ecosystems has been largely compromised as a result of socio-economic interactions brought about by the pressures of economic growth.

The spatio-temporal analysis of current land loss and geo-statistical investigation are suitable tools to understand the dynamics of change. The spatial properties of data inventories from the RAN and the CORINE Land Cover project enables the assessment of the changes within the policy context of the Algarve. An integrated assessment of agricultural land loss compared with urban growth parameters and population density is developed to generate a rich laboratory of spatio-temporal analysis of the carrying capacity of the regional/rural environment.

By undertaking a spatial analysis of the appropriation of agricultural land for urban use with overlay of population and urban data, a focus on the consequences of certain regulations on the dynamics of land-use change becomes possible. This paper aims: to further expand on the currently existing decrees which provide support to sustainable development in the region; to provide a qualitative assessment of future roles based on ethical values and economic efficiency; and to offer a feasible framework for policy makers regarding the trends of urban/agricultural dichotomy.

¹ Ryerson University, Department of Geography, Toronto, Canada

² New University of Lisbon, Institute of Statistics and Information Management, Lisbon, Portugal

² VU University Amsterdam, Faculty of Economics and Business Administration, Amsterdam, the Netherlands

1. Introduction

Environmental regulation is one of the most fundamental aspects for competitiveness, making it possible: reduce cost for industry and business; generate new markets for environmental goods and services; create jobs; and protect and sustain natural resources to avoid scarcity (Network of Heads of European Environment Protection Agencies, 2005). That said, environmental law which encompasses the Environmental law system may be defined as “an organized way of using all of the laws in our legal system to minimize, prevent, punish, or remedy the consequences of actions which damage or threaten the environment, public health, and safety. (p. 4)” (Steinway, 2007). However, from a strictly anthropocentric perspective, the very core of legislation of environmental issues is overshadowed by the interests of economic growth. The importance of seeing sustainable development as an interconnected reality, where there should be a fair distribution of resources and in which irreversible options must be handled with care (Gladwin et al., 1995) is often forgotten. Thus, environmental regulation is often infringed as a result of economic factors, making efficient regulation an area of dispute between the paradigm of growth and sustainability. This has especially been witnessed in recent decades, where environmental deterioration and increasing economic growth have brought scarcity to certain ecological sectors, such as agriculture and have led to increasing asymmetries.

Attempting to “minimize the consequences on environment” (Steinway, 2007) becomes a very difficult task, calling for regional decrees which legislate and articulate the policies

of sustainable development and environmental change, notwithstanding the paradigm of socio-economic growth. These decrees are, however, often restructured and reorganized to fit the current aspects of environmental degradation, and, as a consequence, they lack a stable and continuous monitoring of sustainability. Environmental degradation caused by human pressure has been observed in different regions of the world. In Europe, where, in general, strong legislation and a good legal system prevails, urban sprawl has been an inevitable. As a result of population increase and socio-economic growth, there has been significant land abandonment, especially in regions with a higher demand for tertiary sector activities. Environmental regulation, however, has not been able to solve this problem, and, taking as an example the Algarve in Portugal, such pressures have directly been responsible for the destruction of fragile ecosystems, loss of agricultural land, and coastal vulnerability. Coastal regions share a twofold problem for policy making: as a socio-economic system, they are located in highly productive regions which are far too complex to allow a linear analysis for policy making (EEA, 2006). On the other hand, the productive cycle of such areas relies heavily on ecosystems functionality which may jeopardize by excessive exploitation of goods and services. From a historical perspective, coastal areas have been the cradle for panoply of resources such as agriculture, leading to settlement patterns which have encouraged regional prosperity. Their unique landscape combines often moderate temperatures with a historico-cultural character which has also led to the development of tourist industries in such areas (Vaz and Nijkamp, 2009). However, excessive growth leads to the deterioration of coastal areas, compromising the resilience of such regions. In the long run, the ecosystem services of littoral regions must be carefully planned so as not to harm the fragile ecological habitats in such areas

(Costanza et al., 1997). The issue becomes one of the resilience of the environmental carrying capacity to support the demand for economic growth. While, for example, tourism may be a beneficial activity to some extent (Lacitignola et al., 2007), bringing jobs to certain coastal areas, the counterpart is rapid land deterioration as a result of seasonal population pressure (Kruger, 2005). The synergetic relation between economic growth and sustainable development is a very complex one, as the effects of socio-economic growth influence the system (or region) in a non-linear way. The dynamics of non-linear complex systems are very difficult to handle, making it necessary for legislation to be multidimensional. However, such environmental legislation has less influence on decision making, while narrowly focused environmental laws have a greater impact (Ruhl, 1999), as their area of application is more precise. Spatial analysis has been largely motivated by different scientific disciplines, such as geography, statistics, economics and mathematics. The analysis of complex systems (although a consensus is still lacking regarding their definition), has enabled to create structural analysis to be made of the combined factors of economic, social, and natural drivers (see Newman, 2005). One of the main advantages of complex systems analysis resides in the possibility of to have an integrated approach to understanding the global consequences of interactions (Taylor, 2005). The availability of spatial information and higher spatial resolution georeferenced economic, social, and environmental strata allows a much more coherent approach to integrated analysis: social, economic, and environmental phenomena happen in a specific space and time (Ryan, 2011). By combining different factors from heterogeneous variables that exist within a territorial unit over time, it becomes possible to find a coherent explanation of the key drivers for environmental

change through spatial metrics, leading to a better approximation of sustainable development (Uemaa et al., 2012). The cross-linkage of policy decisions implies a direct impact on land use and on territorial management (Morari et al., 2004). Spatial information and complex systems may, if combined correctly, create acceptable approaches to land-use change, and provide support in identifying the key drivers for certain land-use changes. This information permits a much more accurate approach to decision making and for understanding the relevant constraints that affect sustainable development (Nijkamp and Scholten, 1993).

3. The Study Area

The Algarve is the southern-most region of Portugal and has a unique ecological landscape, which forms a part of the continental network of conservation habitats, defined under the European Union Directives: 79/409/CEE and 92/43/CEE.

In terms of its geomorphology of the Algarve may be divided into three different areas: the *Interior*, the *Barrocal*, and the *Litoral*, but there is a significant asymmetry between the *Interior* (located at the north of the region) and the *Litoral* (the coastal areas of the Algarve). Figure 1 represents the geographical region of the Algarve and within it the land which is part of NATURA 2000 network. However, the increasing asymmetries between population escalations in the south of the Algarve compared with decline in the north, are jeopardizing the important ecosystems (Vaz et al., 2012) and putting at risk the development agenda of rural areas.

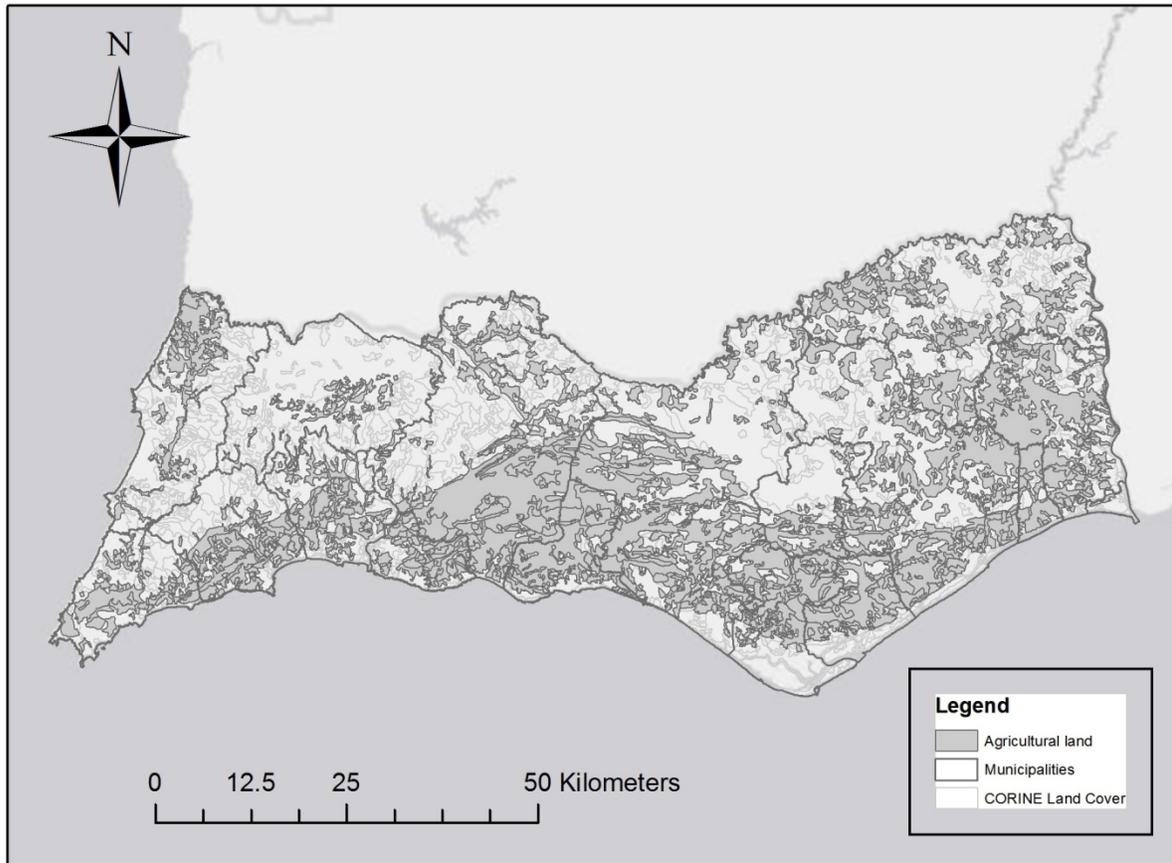


Figure 1 – Location of protected areas within the municipalities of the Algarve

While agricultural activity has been high in the *Barrocal*, which mostly in carob production, and in the *Interior*, where there is sheep herding and other agro-pastoral activities (Assunção, 1989), the *Litoral* has largely lost its agricultural sector to the exploration of tourism activities. Since the 1960s, the increase of tourism brought about by low-cost flights throughout Europe has been seen as an opportunity for economic growth and prosperity for the region. The creation of amenities and infrastructures to support a massive tourism industry has changed the activities of the primary sector to those of the tertiary sector, focusing predominantly on the service sector related to tourism. The development of the tourist industry has provided better job opportunities,

attracting a massive concentration of population in the Algarve, contributing directly to coastal population increase. Figure 2 shows the trend of population growth tendency since mid XVII century.

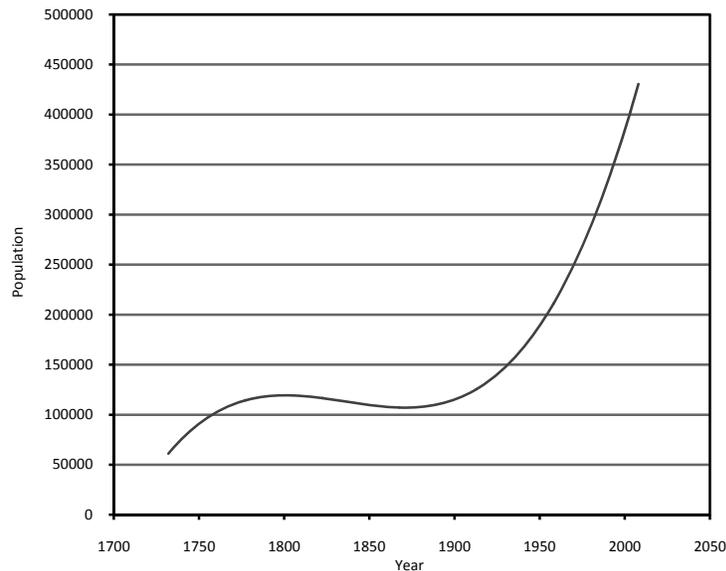


Figure 2 - Population growth in the Algarve since the XVII century

The exponential growth that the Algarve has experienced has particularly increased during the 1980s, and is a reflection of the mass tourism industry. While population in the Algarve in 1973 was of 63,682 inhabitants, by 1992, the growth rate was 167.62 per cent bringing the total population to 411,468 in 2004. The increase in population during the 18th century was a direct result of the efficiency of the local fishing industry, which provided jobs and economic prosperity during the 18th and 19th centuries. Another marked rise in the growth rate is registered during the 1990s, directly related to a new type of economic growth resulting from the development of the low-cost carriers for tourism purposes. In 2008, the Algarve region had a density of approximately 80 inhabitants per km². The asymmetry between the coastal area and the northern area of the

Algarve create a great variation in densities which is exacerbated during the summer months when its population triples clustering in the areas of tertiary sectors. Figure 3 shows the population density per parish, clearly reflecting the pattern of clusters along the coastal areas and lower densities in the interior.

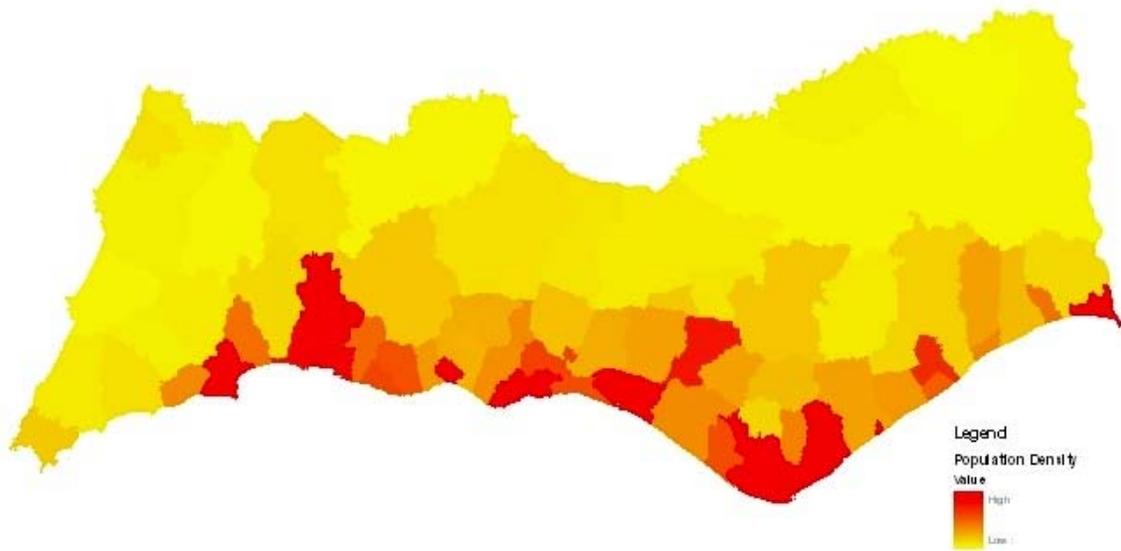


Figure 3 - Population density per Parish

The areas with the highest population density can be seen in the surroundings of Faro, the district capital of the Algarve, and in the areas of Albufeira, Portimão and Vila Real de Santo António.

4. Data and Methodology

This study is centred on the changes in the extent of Portuguese agricultural land since the end of the 1990s until the present. The depletion of the Algarve's rural areas in recent decades is accelerating and may lead to scarcity in the region. Loss of natural habitats and

biodiversity are an increasing concern for regional policy makers, and are widely recognized in the Municipal Plans of the Algarve (Petrov et al., 2009).

Methodologically, the main objective of this study is to create comparable spatial data sets derived from land-use maps regarding urban land use and cross-link these with the loss of agricultural land by appropriation for urban use in the municipalities of the Algarve. Thus, this study proposes a land-use accounting methodology which involves studying population density dynamics and urban growth variations for similar time frames. This accounting methodology allows the main driver for agricultural land loss to be identified i.e. it considers whether urban growth may be considered as a significant driver for loss of rural areas, or, on the other hand, systemic population decrease in rural areas might be a key driver of agricultural land appropriation resulting in rural land abandonment, a common concern for the European Union (Weissteiner et al., 2011). A multi-temporal analysis for the decades of the 1990s and 2000, allows changes in the extent of both urban and agricultural areas to be tracked. These dynamics are registered as urban variations and agricultural land appropriation variations and assessed together with the population density profile per municipality. The impact of this analysis (see Figure 4) leads to a firm characterization of the responsible driver, as well as, a hypothetical evaluation of future trends regarding agricultural land use and population density for the region of the Algarve. This qualitative analysis, combined with the quantitative support from spatial data, enables a better understanding of the dynamics of sustainable development, considering that urban growth is an inevitable reality, but that the need for sustainable cities must also be taken into account.

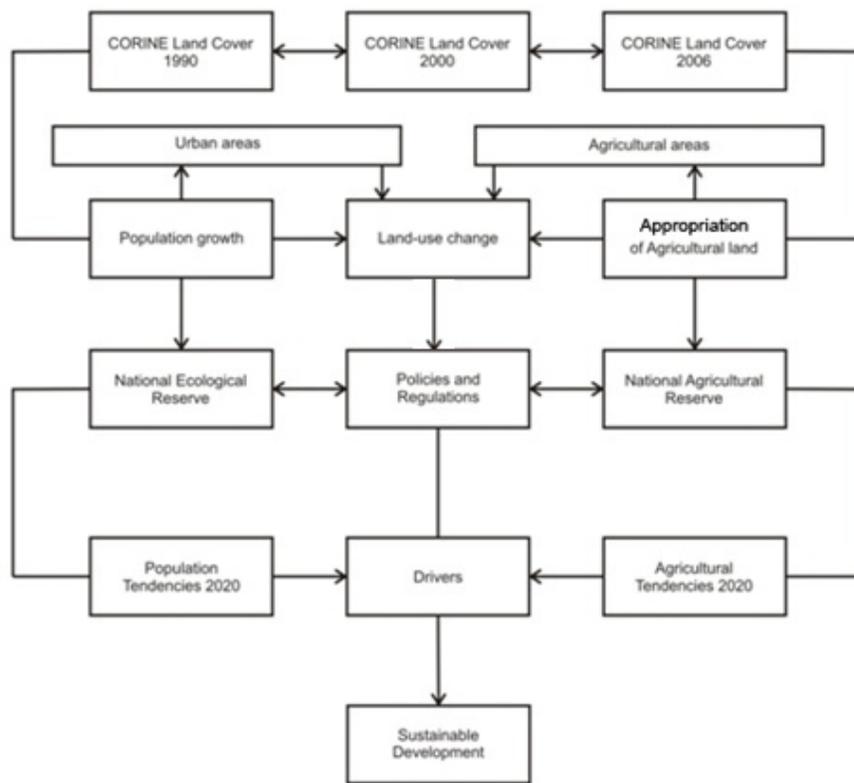


Figure 4 - Flow diagram of methodology

The comparison of the realities of both loss of agricultural land derived from land loss inventories and urban growth will allow us to have a comparative analysis using spatial information. Figure 4 shows the workflow involved in the comparison of the CORINE Land Cover period for 1990, 2000 and 2006 with the population growth surveys conducted from 1991 to 2008. Given the change analysis of the CLC periods, urban areas and agricultural areas are mutually assessed to examine land-use change. The diagnosis of population growth and appropriation of agricultural land are reported within the Directives of the framework of regulation between 1989 and 2008. The strategies for the National and Ecological Reserve and for the National Agricultural Reserve are based on existing policies, designed to sustain the available carrying capacity in order to take into

account the pressure of population tendencies for the period up to 2020 and agricultural trends for the same period. Population increase and urban growth were compared at the three time stamps available for CORINE Land Cover. Population increase showed a predominant tendency to locate at the coastal fringe, while urban sprawl occurred in the same areas where population change was evident. This comparison was made by normalizing population and urban density from 0-1, where the normalisation of urban density was computed as a result of considering 1 the total urbanisation and 0 to regions with no urbanisation. The multiple time series of population, urban quantification, agricultural quantification, and appropriation of agricultural land, as well as difference in the distribution of density allow a comparison of land loss and socio-economic driving forces. The result of this quantification will mitigate the impacts of urban pressure on the coastal areas of the Algarve, as well as recognize the on-going legal importance of quantitative spatial analysis within the notions of land appropriation for urbanization.

The CORINE Land Cover project (CLC) may be considered as a first attempt to derive spatial information about land use in the European context. The CLC started on 27 June 1985, as a programme that would address the following issues: State of individual environments; Geographical distribution and state of natural areas; Geographical distribution and abundance of wild fauna and flora; Quality and abundance of water resources; Land cover structure and the state of the soil; Quantities of toxic substances discharged into environments; and List of Natural Hazards (EEA, 1995). In this sense, the CLC can be seen as an experimental project for gathering, coordinating and ensuring the consistency of information on the state of the environment and natural resources in the Community (85/338/EEC, Council Decision 27/6/1985).

The Reserva Agrícola Nacional is a Portuguese tool for land management, which covers those areas which due to their favourable morphological, climatic and social conditions are considered to have the most potential for the development of agricultural activities. Essentially, the areas included within the RAN are more fertile, and, thus, would be a serious loss if appropriated for. Nevertheless, local patterns of agricultural activity, typical of the rural areas of the Algarve, have lost some of their traditional positive externalities, leading to an increase in negative externalities generated by non-systemic production sectors. This led in 1976 to the “Land-use Law” (Decreto Lei n. 794/76, 5th November), which brought policies for urban control, and the planning of agricultural activity. However, urban and population pressure, as well as the existing concentration on the secondary and the tertiary sector have led to further agricultural abandonment, and inevitable urban growth in Portugal. A special framework of legislation was conceived in 1982, which expressed the concerns about agricultural land loss, and thus the RAN (Decreto Lei n. 451/82, 16th November) was created, with the main objective of recovering lost agricultural and abandoned land and protecting vulnerable agricultural areas. The RAN is divided in two distinct classes (A and B), based on physical and geographical characteristics (Decreto Lei n. 196/89, 14th June). RAN land is systematically decreasing, while urban areas are registering a steady increase (Figure 5).

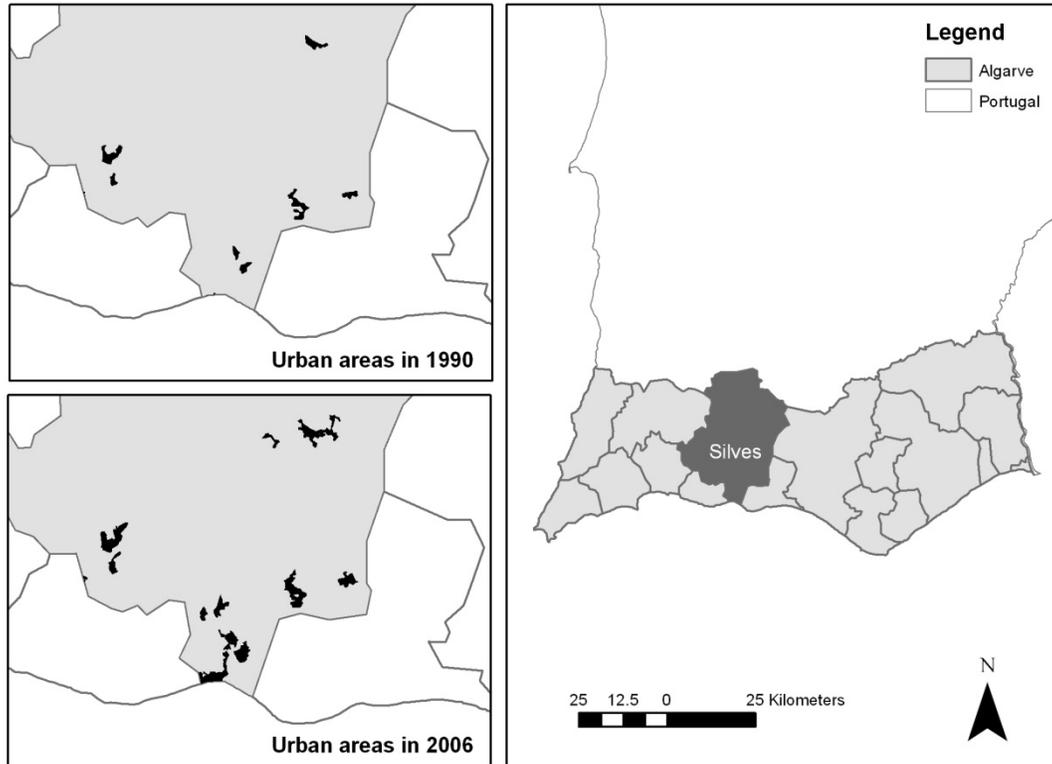


Figure 5 – Urban growth change in Silves

A closer analysis of land appropriation over the last decades shows a fluctuating pattern especially felt since 1996 (Figure 6). Strongly linked to existing land-use policies, the appropriation patterns show an increase since 1994, and in 2005 register the most significant appropriation of RAN land, with a total of 3,722,864 m² lost.

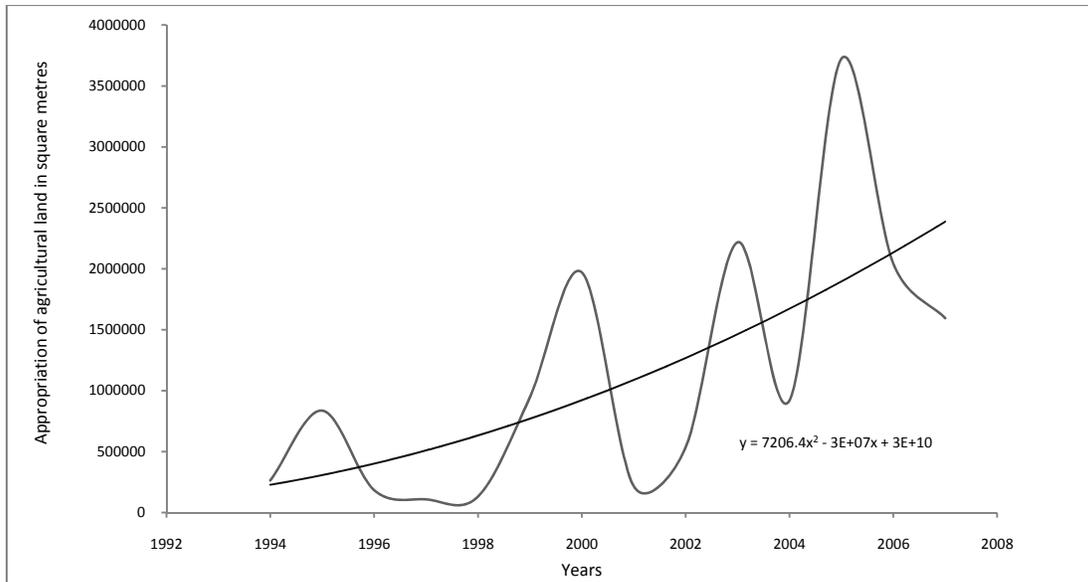


Figure 6 - Evolution of agricultural land appropriation

This pattern is of increasing concern, given the fluctuating nature of agricultural land appropriation and the increasing trend-line of loss of agricultural land. While the peak is, for now, registered in 2005, it seems to be expected that, with the current trend registered over the last decade and a half, that one might expect a further increase in 2010 to a peak comparable in 2003 for land appropriation in 2010. A closer analysis of urban growth tendencies for the Algarve region, as analysed by Vaz and others (2011), shows the overwhelming tendency of agricultural land loss due to urban pressure.

Analysis of urban growth patterns between the 1990s and 2006 demonstrates a continuous growth along all of the Municipalities (Table 2).

Table 2 - Ratio of urban land variation from CLC 90 to CLC 06 (in pixels)

Municipality	Urban land 90	Urban land 2006	Variation	Ratio
Castro Marim	3463	14145	10682	0.76
Alcoutim	506	2032	1526	0.75
Monchique	1304	5068	3764	0.74
Silves	10445	25517	15072	0.59
Vila do Bispo	6128	14510	8382	0.58
Tavira	7775	17942	10167	0.57
São Brás de Alportel	1836	4149	2313	0.56
Vila Real de Santo António	7816	17374	9558	0.55
Loulé	53601	116356	62755	0.54
Lagos	20980	44301	23321	0.53
Albufeira	30404	64128	33724	0.53
Lagoa	22264	45685	23421	0.51
Olhão	11407	21617	10210	0.47
Portimão	31276	53941	22665	0.42
Faro	21748	30750	9002	0.29
Aljezur	10990	14446	3456	0.24

Although all municipalities registered significant increase over the 15 years of study, a clear increase in urban sprawl has been verified in Castro Marim, Alcoutim and Silves. Curiously, these areas have had a long tradition in the agricultural sector in the Algarve, and have been subjected quite rapidly to urban growth. A further analysis of population density patterns in the Algarve, which also reflects this increase, may be a direct result of competitive prices for construction, as well as of existing road-networks that allow communication to important cities such as Faro, Portimão and Albufeira.

5. Conclusions

5.1. Urban growth and Agricultural land loss

A comparative analysis of existing land-use patterns regarding the appropriation, that is, the re-designation of agricultural land for urban use, allowed us to compare the results of urban variation per municipality with variation of loss of the RAN. The Algarve has witnessed severe loss of agricultural areas and significant decrease of the RAN. These changes, looking at the recent development of the European recession suggest also that most of the agricultural areas will continue to face increasing abandonment in detriment of leapfrogging of peri-urban infrastructure. The combination of assessing urban land and changes in the RAN, have allowed to understand the impacts of both urban concentration in littoral areas, but also understand at spatial level the dynamics of land use change in the Algarve. The municipal information for the Algarve also fosters the possibility to understand at local level impacts of these changes, such as the case of Silves, where agricultural production has been traditionally high, and current urban growth is following the tendencies of construction in peri-urban areas. Data sets of the RAN were summed to the same time frames as CLC data, and information were cross-linked. The result showed that Alcoutim, Monchique and Silves, with the most urban growth, also showed explicit loss of agricultural land by infringing the Agricultural regulation of the RAN in the case of Silves. While at the local level this information is not evident, a regional quantification of variations of the RAN and urban areas provide crucial information of land-change patterns for the Algarve. The combination of land use accounting methods, taking

advantage from combining different spatial inventories, allows for a better decision making in areas of rapid urban and agricultural land use transitions due to internal and external environmental, social and economic pressures. Geographic Information Systems therefore, may be understood as tools that allow hosting better local management, as well as bring more accurate information on current challenges facing the landscape as well as the rural environment of Europe's regions.

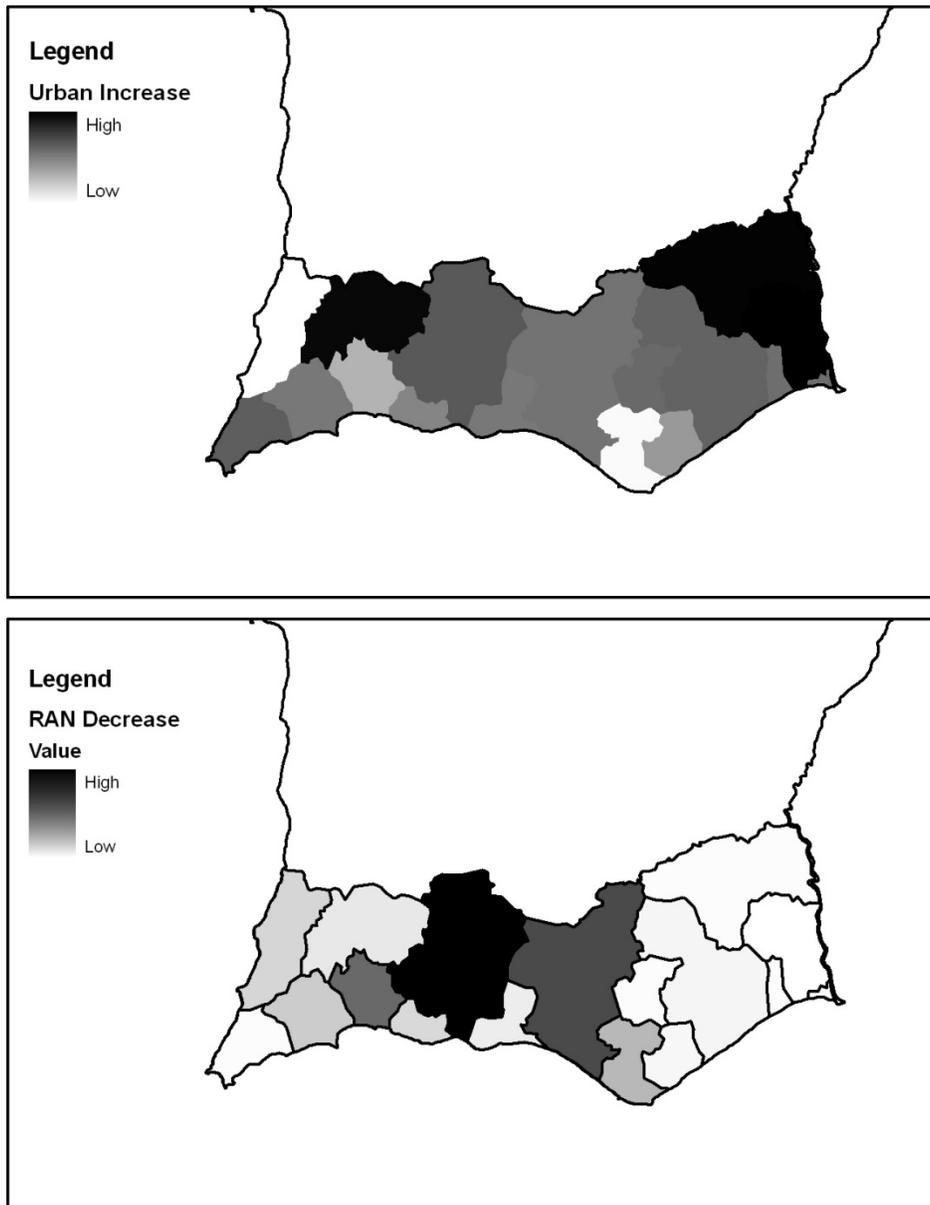


Figure 7 – Comparison of RAN decrease and urban increase in the Algarve

While this acknowledgement is quite obvious, the Algarve shows an increasing tendency of land appropriation, with a rising propensity for urban growth along the appropriated lands. This pattern seems to be combined with a fluctuating tendency of policies in the areas which have allowed the appropriation of agricultural land during certain years (2000, 2003 and 2005), where these appropriations are mainly linked to important regional activities such as the Euro 2004 football championship.

The economic prosperity brought by the tourist industry, has stimulated the strategy of the creation of infrastructures within the Algarve. Within the concept that currently promotes the Algarve as a sun and beach district – the “Allgarve” – appropriation of agricultural land has led to unavoidable agricultural land loss, especially in peri-urban fringes. The environmental consequences of this growth are evident: traditional agricultural land has greatly decreased, while new infrastructures have increased around certain central areas along the coastal regions.

5.2. The Reserva Agrícola Nacional in the future

On the 29 January 2009 a new legislation came to force Reserva Agrícola Nacional (RAN) under the law 196/1989 of the 4th of June, the objective of this law is, is to reinforce the legal nature and the importance of the public administration of the RAN. According to the United Nations definition and nomenclature of territories, methodologically, this classification envisages the better protection of natural resources throughout the country.

For the first time in the regulation history of the RAN, the use of digital information derived from geo-referenced data sets will have an important role in the analysis and synthesis of crucial information for better management. While in recent there have been an unbalanced management of agricultural land as an inevitable result of the economic growth of urban areas, in the future the better integration of information could lead to improved decision making. The Comissão Regional da Reserva Agrícola might have an important role in reshaping the balance of sustainable development for the Algarve.

It is likely that spatial information will have an important role in creating synergy within this Commission, allowing more interactive and more soundly-based decision making.

Acknowledgments:

The authors would like to thank a blind reviewer for the very useful comments given for this paper. Special thanks also to André Torre and Jean-Baptiste Traversac, for the organisation of the special session in Territorial Governance, presented at ERSAs 2010.

References

- Assunção, J. P., 1989, A Influência dos Factores Ecologicos e Humanos na Evolução da Agricultura Algarvia, O Algarve - *Na perspectiva da Antropologia Ecológica*, pp. 271-290. (Faro: Universidade do Algarve).
- Costanza, R.; D'Arge, R.; de Groot, R.; Farber, S.; Grasso, M.; Hannon, B.; Limburg, K.; Naeem, S.; O'Neill, R. V.; Paruelo, J.; Raskin, R. G.; Sutton, P.; van den Belt, M., (1997), The vale of the world's ecosystem services and natural capital, *Nature*, 387, pp. 253-260.
- Donoghue, D. N. M, 2002, Remote sensing: environmental change, *Progress in Physical Geography*, 26(1), pp. 144-151.
- EEA (European Environmental Agency), The changing faces of Europe's coastal areas, Report 8/2006. (url: http://www.eea.europa.eu/publications/eea_report_2006_6, consulted on: 2nd January 2009).
- Gladwin, T.N; Kennelly, J. J.; Krause, T-S. 1995, Shifting Paradigms for sustainable development: implications for management theory and research, *Academy of Management Review*, 20(4), pp. 874-907.
- Kruger, O., 2005, The role of ecotourism in conservation: panacea or Pandora's box?, *Biodiversity and Conservation*, 14, pp:579-600.
- Lacitignola, D.; Petrosillo, I.; Cataldi, M.; Zurlini, G., 2007, Modelling socio-ecological tourism-based systems for sustainability, *Ecological Modelling*, 206, pp.196-204.
- Morari, F.; Lugato, F. and Borin, M., 2004, An integrated non-point source model-GIS system for selecting criteria of best management practices in the Po Valley, North Italy, *Agriculture, Ecosystems & Environment*, 102(3): 247-262
- Network of Heads of European Environment Protection Agencies, 2005, The Contribution of Good Environmental Regulation to Competitiveness, European Environmental Agency. (url: <http://www.eea.europa.eu/highlights/Ann1132149255>, consulted on: 22nd December 2009).
- Newman, L., 2005, Uncertainty, innovation, and dynamic sustainable development. *Sustainability: Science, Practice, & Policy*, 1(2), pp. 25-31.
- Newton, A., Icely, J. D., Falcao, M., Nobre, A., Nunes, J. P., Ferreira, J. G. and Vale, C., 2003, Evaluation of eutrophication in the Ria Formosa coastal lagoon, Portugal. *Continental Shelf Research*, 23(17-19), 1945-1961.

Nijkamp, P.; Scholten, H., 1993, Spatial Information Systems: Design, Modelling, and Use in Planning, *International Journal of Geographical Information Science*, 1, pp. 85-96.

Petrov, L.; Lavalle, C. and Kasanko, M., 2009, Urban land use scenarios for a tourist region in Europe: Applying the MOLAND model to Algarve, Portugal, *Landscape and Urban Planning*, 92(1): 10–23.

Ruhl, J. B., 1999, Sustainable Development: A Five Dimensional Algorithm for Environmental Law, *Stanford Environmental Law Journal*, 18(31), pp. 31-64.

Ryan, R. L., 2011, The social landscape of planning: Integrating social and perceptual research with spatial planning information, *Landscape and Urban Planning*, 100(4): 361–363.

Steinway, D. M., 2007, Fundamentals of Environmental Law, in *Environmental Law Handbook*, 19th edition, ed: Sullivan, T., pp. 1-66. Plymouth, UK: Government Institutes - The Scarecrow Press.

Taylor, P. J. (2005) *Unruly complexity: Ecology, interpretation, engagement*, Chicago: The University of Chicago Press.

Uuemaa, E.; Mander, Ü. and Marja, R., 2012, Trends in the use of landscape spatial metrics as landscape indicators: A review, *Ecological Indicators*, *in press*.

Vaz, E.; Walczynska, A. and Nijkamp, P., 2012, Regional Challenges in Tourist Wetland Systems: An Integrated Approach to the Ria Formosa in the Algarve, Portugal, *Regional Environmental Change* (DOI: 10.1007/s10113-012-0310-9).

Vaz, E.; Noronha, M. T.; Nijkamp, P., 2011, Spatial Analysis for Policy Evaluation of the Rural World: Portuguese Agriculture in the Last Decade, Chapter 7, Ed. Torre, A. and Traversac, J-B, *Territorial Governance: Local Development, Rural Areas and Agrofood Systems*. (Springer Verlag: Dordrecht), pp. 107-122.

Vaz, E; Nijkamp, P., 2009, *Historico-Cultural Sustainability and Urban Dynamics, Enhancing the City - New Perspective for Tourism and Leisure*, Urban and Landscape Perspectives Series, Ed. Maciocco, G. and Serreli, S., pp. 155-177.

Weissteiner, C. J.; Boschetti, M.; Böttcher, K.; Carrara, P.; Bordogna, G. and Brivio, P. A., 2011, Spatial explicit assessment of rural land abandonment in the Mediterranean area, *79(1-2): 20–36*.

Wrigley, E. A., 1985, Urban Growth and Agricultural Change: England and the Continent in the Early Modern Period, *Journal of Interdisciplinary History*, 15(4), pp. 683-728.

2009-1	Boriana Rukanova Rolf T. Wignand Yao-Hua Tan	From national to supranational government inter-organizational systems: An extended typology, 33 p.
2009-2	Marc D. Bahlmann Marleen H. Huysman Tom Elfring Peter Groenewegen	Global Pipelines or global buzz? A micro-level approach towards the knowledge-based view of clusters, 33 p.
2009-3	Julie E. Ferguson Marleen H. Huysman	Between ambition and approach: Towards sustainable knowledge management in development organizations, 33 p.
2009-4	Mark G. Leijssen	Why empirical cost functions get scale economies wrong, 11 p.
2009-5	Peter Nijkamp Galit Cohen-Blankshtain	The importance of ICT for cities: e-governance and cyber perceptions, 14 p.
2009-6	Eric de Noronha Vaz Mário Caetano Peter Nijkamp	Trapped between antiquity and urbanism. A multi-criteria assessment model of the greater Cairo metropolitan area, 22 p.
2009-7	Eric de Noronha Vaz Teresa de Noronha Vaz Peter Nijkamp	Spatial analysis for policy evaluation of the rural world: Portuguese agriculture in the last decade, 16 p.
2009-8	Teresa de Noronha Vaz Peter Nijkamp	Multitasking in the rural world: Technological change and sustainability, 20 p.
2009-9	Maria Teresa Borzacchiello Vincenzo Torrieri Peter Nijkamp	An operational information systems architecture for assessing sustainable transportation planning: Principles and design, 17 p.
2009-10	Vincenzo Del Giudice Pierfrancesco De Paola Francesca Torrieri Francesca Pagliari Peter Nijkamp	A decision support system for real estate investment choice, 16 p.
2009-11	Miruna Mazurencu Marinescu Peter Nijkamp	IT companies in rough seas: Predictive factors for bankruptcy risk in Romania, 13 p.
2009-12	Boriana Rukanova Helle Zinner Hendriksen Eveline van Stijn Yao-Hua Tan	Bringing is innovation in a highly-regulated environment: A collective action perspective, 33 p.
2009-13	Patricia van Hemert Peter Nijkamp Jolanda Verbraak	Evaluating social science and humanities knowledge production: an exploratory analysis of dynamics in science systems, 20 p.

2009-14	Roberto Patuelli Aura Reggiani Peter Nijkamp Norbert Schanne	Neural networks for cross-sectional employment forecasts: A comparison of model specifications for Germany, 15 p.
2009-15	André de Waal Karima Kourtit Peter Nijkamp	The relationship between the level of completeness of a strategic performance management system and perceived advantages and disadvantages, 19 p.
2009-16	Vincenzo Punzo Vincenzo Torrieri Maria Teresa Borzacchiello Biagio Ciuffo Peter Nijkamp	Modelling intermodal re-balance and integration: planning a sub-lagoon tube for Venezia, 24 p.
2009-17	Peter Nijkamp Roger Stough Mediha Sahin	Impact of social and human capital on business performance of migrant entrepreneurs – a comparative Dutch-US study, 31 p.
2009-18	Dres Creal	A survey of sequential Monte Carlo methods for economics and finance, 54 p.
2009-19	Karima Kourtit André de Waal	Strategic performance management in practice: Advantages, disadvantages and reasons for use, 15 p.
2009-20	Karima Kourtit André de Waal Peter Nijkamp	Strategic performance management and creative industry, 17 p.
2009-21	Eric de Noronha Vaz Peter Nijkamp	Historico-cultural sustainability and urban dynamics – a geo-information science approach to the Algarve area, 25 p.
2009-22	Roberta Capello Peter Nijkamp	Regional growth and development theories revisited, 19 p.
2009-23	M. Francesca Cracolici Miranda Cuffaro Peter Nijkamp	Tourism sustainability and economic efficiency – a statistical analysis of Italian provinces, 14 p.
2009-24	Caroline A. Rodenburg Peter Nijkamp Henri L.F. de Groot Erik T. Verhoef	Valuation of multifunctional land use by commercial investors: A case study on the Amsterdam Zuidas mega-project, 21 p.
2009-25	Katrin Oltmer Peter Nijkamp Raymond Florax Floor Brouwer	Sustainability and agri-environmental policy in the European Union: A meta-analytic investigation, 26 p.
2009-26	Francesca Torrieri Peter Nijkamp	Scenario analysis in spatial impact assessment: A methodological approach, 20 p.
2009-27	Aliye Ahu Gülümser Tüzin Baycan-Levent Peter Nijkamp	Beauty is in the eyes of the beholder: A logistic regression analysis of sustainability and locality as competitive vehicles for human settlements, 14 p.

2009-28	Marco Percoco Peter Nijkamp	Individual time preferences and social discounting in environmental projects, 24 p.
2009-29	Peter Nijkamp Maria Abreu	Regional development theory, 12 p.
2009-30	Tüzin Baycan-Levent Peter Nijkamp	7 FAQs in urban planning, 22 p.
2009-31	Aliye Ahu Gülümser Tüzin Baycan-Levent Peter Nijkamp	Turkey's rurality: A comparative analysis at the EU level, 22 p.
2009-32	Frank Bruinsma Karima Kourtit Peter Nijkamp	An agent-based decision support model for the development of e-services in the tourist sector, 21 p.
2009-33	Mediha Sahin Peter Nijkamp Marius Rietdijk	Cultural diversity and urban innovativeness: Personal and business characteristics of urban migrant entrepreneurs, 27 p.
2009-34	Peter Nijkamp Mediha Sahin	Performance indicators of urban migrant entrepreneurship in the Netherlands, 28 p.
2009-35	Manfred M. Fischer Peter Nijkamp	Entrepreneurship and regional development, 23 p.
2009-36	Faroek Lazrak Peter Nijkamp Piet Rietveld Jan Rouwendal	Cultural heritage and creative cities: An economic evaluation perspective, 20 p.
2009-37	Enno Masurel Peter Nijkamp	Bridging the gap between institutions of higher education and small and medium-size enterprises, 32 p.
2009-38	Francesca Medda Peter Nijkamp Piet Rietveld	Dynamic effects of external and private transport costs on urban shape: A morphogenetic perspective, 17 p.
2009-39	Roberta Capello Peter Nijkamp	Urban economics at a cross-yard: Recent theoretical and methodological directions and future challenges, 16 p.
2009-40	Enno Masurel Peter Nijkamp	The low participation of urban migrant entrepreneurs: Reasons and perceptions of weak institutional embeddedness, 23 p.
2009-41	Patricia van Hemert Peter Nijkamp	Knowledge investments, business R&D and innovativeness of countries. A qualitative meta-analytic comparison, 25 p.
2009-42	Teresa de Noronha Vaz Peter Nijkamp	Knowledge and innovation: The strings between global and local dimensions of sustainable growth, 16 p.
2009-43	Chiara M. Traversi Peter Nijkamp	Managing environmental risk in agriculture: A systematic perspective on the potential of quantitative policy-oriented risk valuation, 19 p.
2009-44	Sander de Leeuw	Logistics aspects of emergency preparedness in flood disaster prevention, 24 p.

	Iris F.A. Vis Sebastiaan B. Jonkman	
2009-45	Eveline S. van Leeuwen Peter Nijkamp	Social accounting matrices. The development and application of SAMs at the local level, 26 p.
2009-46	Tibert Verhagen Willemijn van Dolen	The influence of online store characteristics on consumer impulsive decision-making: A model and empirical application, 33 p.
2009-47	Eveline van Leeuwen Peter Nijkamp	A micro-simulation model for e-services in cultural heritage tourism, 23 p.
2009-48	Andrea Caragliu Chiara Del Bo Peter Nijkamp	Smart cities in Europe, 15 p.
2009-49	Faroek Lazrak Peter Nijkamp Piet Rietveld Jan Rouwendal	Cultural heritage: Hedonic prices for non-market values, 11 p.
2009-50	Eric de Noronha Vaz João Pedro Bernardes Peter Nijkamp	Past landscapes for the reconstruction of Roman land use: Eco-history tourism in the Algarve, 23 p.
2009-51	Eveline van Leeuwen Peter Nijkamp Teresa de Noronha Vaz	The Multi-functional use of urban green space, 12 p.
2009-52	Peter Bakker Carl Koopmans Peter Nijkamp	Appraisal of integrated transport policies, 20 p.
2009-53	Luca De Angelis Leonard J. Paas	The dynamics analysis and prediction of stock markets through the latent Markov model, 29 p.
2009-54	Jan Anne Annema Carl Koopmans	Een lastige praktijk: Ervaringen met waarderen van omgevingskwaliteit in de kosten-batenanalyse, 17 p.
2009-55	Bas Straathof Gert-Jan Linders	Europe's internal market at fifty: Over the hill? 39 p.
2009-56	Joaquim A.S. Gromicho Jelke J. van Hoorn Francisco Saldanha-da-Gama Gerrit T. Timmer	Exponentially better than brute force: solving the job-shop scheduling problem optimally by dynamic programming, 14 p.
2009-57	Carmen Lee Roman Kraeussl Leo Paas	The effect of anticipated and experienced regret and pride on investors' future selling decisions, 31 p.
2009-58	René Sitters	Efficient algorithms for average completion time scheduling, 17 p.

2009-59

Masood Gheasi
Peter Nijkamp
Piet Rietveld

Migration and tourist flows, 20 p.

2010-1	Roberto Patuelli Norbert Schanne Daniel A. Griffith Peter Nijkamp	Persistent disparities in regional unemployment: Application of a spatial filtering approach to local labour markets in Germany, 28 p.
2010-2	Thomas de Graaff Ghebre Debrezion Piet Rietveld	Schaalsprong Almere. Het effect van bereikbaarheidsverbeteringen op de huizenprijzen in Almere, 22 p.
2010-3	John Steenbruggen Maria Teresa Borzacchiello Peter Nijkamp Henk Scholten	Real-time data from mobile phone networks for urban incidence and traffic management – a review of application and opportunities, 23 p.
2010-4	Marc D. Bahlmann Tom Elfring Peter Groenewegen Marleen H. Huysman	Does distance matter? An ego-network approach towards the knowledge-based theory of clusters, 31 p.
2010-5	Jelke J. van Hoorn	A note on the worst case complexity for the capacitated vehicle routing problem, 3 p.
2010-6	Mark G. Lijesen	Empirical applications of spatial competition; an interpretative literature review, 16 p.
2010-7	Carmen Lee Roman Kraeusl Leo Paas	Personality and investment: Personality differences affect investors' adaptation to losses, 28 p.
2010-8	Nahom Ghebrihiwet Evgenia Motchenkova	Leniency programs in the presence of judicial errors, 21 p.
2010-9	Meindert J. Flikkema Ard-Pieter de Man Matthijs Wolters	New trademark registration as an indicator of innovation: results of an explorative study of Benelux trademark data, 53 p.
2010-10	Jani Merikivi Tibert Verhagen Frans Feldberg	Having belief(s) in social virtual worlds: A decomposed approach, 37 p.
2010-11	Umut Kiliç	Price-cost markups and productivity dynamics of entrant plants, 34 p.
2010-12	Umut Kiliç	Measuring competition in a frictional economy, 39 p.

2011-1	Yoshifumi Takahashi Peter Nijkamp	Multifunctional agricultural land use in sustainable world, 25 p.
2011-2	Paulo A.L.D. Nunes Peter Nijkamp	Biodiversity: Economic perspectives, 37 p.
2011-3	Eric de Noronha Vaz Doan Nainggolan Peter Nijkamp Marco Painho	A complex spatial systems analysis of tourism and urban sprawl in the Algarve, 23 p.
2011-4	Karima Kourtit Peter Nijkamp	Strangers on the move. Ethnic entrepreneurs as urban change actors, 34 p.
2011-5	Manie Geyer Helen C. Coetzee Danie Du Plessis Ronnie Donaldson Peter Nijkamp	Recent business transformation in intermediate-sized cities in South Africa, 30 p.
2011-6	Aki Kangasharju Christophe Tavera Peter Nijkamp	Regional growth and unemployment. The validity of Okun's law for the Finnish regions, 17 p.
2011-7	Amitrajeet A. Batabyal Peter Nijkamp	A Schumpeterian model of entrepreneurship, innovation, and regional economic growth, 30 p.
2011-8	Aliye Ahu Akgün Tüzin Baycan Levent Peter Nijkamp	The engine of sustainable rural development: Embeddedness of entrepreneurs in rural Turkey, 17 p.
2011-9	Aliye Ahu Akgün Eveline van Leeuwen Peter Nijkamp	A systemic perspective on multi-stakeholder sustainable development strategies, 26 p.
2011-10	Tibert Verhagen Jaap van Nes Frans Feldberg Willemijn van Dolen	Virtual customer service agents: Using social presence and personalization to shape online service encounters, 48 p.
2011-11	Henk J. Scholten Maarten van der Vlist	De inrichting van crisisbeheersing, de relatie tussen besluitvorming en informatievoorziening. Casus: Warroom project Netcentrisch werken bij Rijkswaterstaat, 23 p.
2011-12	Tüzin Baycan Peter Nijkamp	A socio-economic impact analysis of cultural diversity, 22 p.
2011-13	Aliye Ahu Akgün Tüzin Baycan Peter Nijkamp	Repositioning rural areas as promising future hot spots, 22 p.
2011-14	Selmar Meents Tibert Verhagen Paul Vlaar	How sellers can stimulate purchasing in electronic marketplaces: Using information as a risk reduction signal, 29 p.

2011-15	Aliye Ahu Gülümser Tüzin Baycan-Levent Peter Nijkamp	Measuring regional creative capacity: A literature review for rural-specific approaches, 22 p.
2011-16	Frank Bruinsma Karima Kourtit Peter Nijkamp	Tourism, culture and e-services: Evaluation of e-services packages, 30 p.
2011-17	Peter Nijkamp Frank Bruinsma Karima Kourtit Eveline van Leeuwen	Supply of and demand for e-services in the cultural sector: Combining top-down and bottom-up perspectives, 16 p.
2011-18	Eveline van Leeuwen Peter Nijkamp Piet Rietveld	Climate change: From global concern to regional challenge, 17 p.
2011-19	Eveline van Leeuwen Peter Nijkamp	Operational advances in tourism research, 25 p.
2011-20	Aliye Ahu Akgün Tüzin Baycan Peter Nijkamp	Creative capacity for sustainable development: A comparative analysis of European and Turkish rural regions, 18 p.
2011-21	Aliye Ahu Gülümser Tüzin Baycan-Levent Peter Nijkamp	Business dynamics as the source of counterurbanisation: An empirical analysis of Turkey, 18 p.
2011-22	Jessie Bakens Peter Nijkamp	Lessons from migration impact analysis, 19 p.
2011-23	Peter Nijkamp Galit Cohen-blankshtain	Opportunities and pitfalls of local e-democracy, 17 p.
2011-24	Maura Soekijad Irene Skovgaard Smith	The 'lean people' in hospital change: Identity work as social differentiation, 30 p.
2011-25	Evgenia Motchenkova Olgerd Rus	Research joint ventures and price collusion: Joint analysis of the impact of R&D subsidies and antitrust fines, 30 p.
2011-26	Karima Kourtit Peter Nijkamp	Strategic choice analysis by expert panels for migration impact assessment, 41 p.
2011-27	Faroek Lazrak Peter Nijkamp Piet Rietveld Jan Rouwendal	The market value of listed heritage: An urban economic application of spatial hedonic pricing, 24 p.
2011-28	Peter Nijkamp	Socio-economic impacts of heterogeneity among foreign migrants: Research and policy challenges, 17 p.
2011-29	Masood Gheasi Peter Nijkamp	Migration, tourism and international trade: Evidence from the UK, 8 p.
2011-30	Karima Kourtit	Evaluation of cyber-tools in cultural tourism, 24 p.

	Peter Nijkamp Eveline van Leeuwen Frank Bruinsma	
2011-31	Cathy Macharis Peter Nijkamp	Possible bias in multi-actor multi-criteria transportation evaluation: Issues and solutions, 16 p.
2011-32	John Steenbruggen Maria Teresa Borzacchiello Peter Nijkamp Henk Scholten	The use of GSM data for transport safety management: An exploratory review, 29 p.
2011-33	John Steenbruggen Peter Nijkamp Jan M. Smits Michel Grothe	Traffic incident management: A common operational picture to support situational awareness of sustainable mobility, 36 p.
2011-34	Tüzün Baycan Peter Nijkamp	Students' interest in an entrepreneurial career in a multicultural society, 25 p.
2011-35	Adele Finco Deborah Bentivoglio Peter Nijkamp	Integrated evaluation of biofuel production options in agriculture: An exploration of sustainable policy scenarios, 16 p.
2011-36	Eric de Noronha Vaz Pedro Cabral Mário Caetano Peter Nijkamp Marco Painho	Urban heritage endangerment at the interface of future cities and past heritage: A spatial vulnerability assessment, 25 p.
2011-37	Maria Giaoutzi Anastasia Stratigea Eveline van Leeuwen Peter Nijkamp	Scenario analysis in foresight: AG2020, 23 p.
2011-38	Peter Nijkamp Patricia van Hemert	Knowledge infrastructure and regional growth, 12 p.
2011-39	Patricia van Hemert Enno Masurel Peter Nijkamp	The role of knowledge sources of SME's for innovation perception and regional innovation policy, 27 p.
2011-40	Eric de Noronha Vaz Marco Painho Peter Nijkamp	Impacts of environmental law and regulations on agricultural land-use change and urban pressure: The Algarve case, 18 p.
2011-41	Karima Kourtit Peter Nijkamp Steeff Lowik Frans van Vught Paul Vulto	From islands of innovation to creative hotspots, 26 p.
2011-42	Alina Todiras Peter Nijkamp Saidas Rafijevas	Innovative marketing strategies for national industrial flagships: Brand repositioning for accessing upscale markets, 27 p.

- 2011-43 Eric de Noronha Vaz
Mário Caetano
Peter Nijkamp A multi-level spatial urban pressure analysis of the Giza Pyramid Plateau in Egypt, 18 p.
- 2011-44 Andrea Caragliu
Chiara Del Bo
Peter Nijkamp A map of human capital in European cities, 36 p.
- 2011-45 Patrizia Lombardi
Silvia Giordano
Andrea Caragliu
Chiara Del Bo
Mark Deakin
Peter Nijkamp
Karima Kourtit An advanced triple-helix network model for smart cities performance, 22 p.
- 2011-46 Jessie Bakens
Peter Nijkamp Migrant heterogeneity and urban development: A conceptual analysis, 17 p.
- 2011-47 Irene Casas
Maria Teresa
Borzacchiello
Biagio Ciuffo
Peter Nijkamp Short and long term effects of sustainable mobility policy: An exploratory case study, 20 p.
- 2011-48 Christian Bogmans Can globalization outweigh free-riding? 27 p.
- 2011-49 Karim Abbas
Bernd Heidergott
Djamil Aïssani A Taylor series expansion approach to the functional approximation of finite queues, 26 p.
- 2011-50 Eric Koomen Indicators of rural vitality. A GIS-based analysis of socio-economic development of the rural Netherlands, 17 p.

2012-1	Aliye Ahu Gülümser Tüzin Baycan Levent Peter Nijkamp Jacques Poot	The role of local and newcomer entrepreneurs in rural development: A comparative meta-analytic study, 39 p.
2012-2	Joao Romao Bart Neuts Peter Nijkamp Eveline van Leeuwen	Urban tourist complexes as Multi-product companies: Market segmentation and product differentiation in Amsterdam, 18 p.
2012-3	Vincent A.C. van den Berg	Step tolling with price sensitive demand: Why more steps in the toll makes the consumer better off, 20 p.
2012-4	Vasco Diogo Eric Koomen Floor van der Hilst	Second generation biofuel production in the Netherlands. A spatially-explicit exploration of the economic viability of a perennial biofuel crop, 12 p.
2012-5	Thijs Dekker Paul Koster Roy Brouwer	Changing with the tide: Semi-parametric estimation of preference dynamics, 50 p.
2012-6	Daniel Arribas Karima Kourtit Peter Nijkamp	Benchmarking of world cities through self-organizing maps, 22 p.
2012-7	Karima Kourtit Peter Nijkamp Frans van Vught Paul Vulto	Supernova stars in knowledge-based regions, 24 p.
2012-8	Mediha Sahin Tüzin Baycan Peter Nijkamp	The economic importance of migrant entrepreneurship: An application of data envelopment analysis in the Netherlands, 16 p.
2012-9	Peter Nijkamp Jacques Poot	Migration impact assessment: A state of the art, 48 p.
2012-10	Tibert Verhagen Anniek Nauta Frans Feldberg	Negative online word-of-mouth: Behavioral indicator or emotional release? 29 p.

2013-1	Tüzin Baycan Peter Nijkamp	The migration development nexus: New perspectives and challenges, 22 p.
2013-2	Haralambie Leahu	European Options Sensitivities via Monte Carlo Techniques, 28 p.
2013-3	Tibert Verhagen Charlotte Vonkeman Frans Feldberg Plon Verhagen	Making online products more tangible and likeable: The role of local presence as product presentation mechanism, 44 p.
2013-4	Aliye Ahu Akgün Eveline van Leeuwen Peter Nijkamp	A Multi-actor multi-criteria scenario analysis of regional sustainable resource policy, 24 p.
2013-5	John Steenbruggen Peter Nijkamp Maarten van der Vlist	Urban traffic incident management in a digital society. An actor-network approach in information technology use in urban Europe, 25 p.
2013-6	Jorge Ridderstaat Robertico Croes Peter Nijkamp	The force field of tourism, 19 p.
2013-7	Masood Gheasi Peter Nijkamp Piet Rietveld	Unknown diversity: A study on undocumented migrant workers in the Dutch household sector, 17 p.
2013-8	Mediha Sahin Peter Nijkamp Soushi Suzuki	Survival of the fittest among migrant entrepreneurs. A study on differences in the efficiency performance of migrant entrepreneurs in Amsterdam by means of data envelopment analysis, 25 p.
2013-9	Kostas Bithas Peter Nijkamp	Biological integrity as a prerequisite for sustainable development: A bioeconomic perspective, 24 p.
2013-10	Madalina-Stefania Dirzu Peter Nijkamp	The dynamics of agglomeration processes and their contribution to regional development across the EU, 19 p.
2013-11	Eric de Noronha Vaz Agnieszka Walczynska Peter Nijkamp	Regional challenges in tourist wetland systems: An integrated approach to the Ria Formosa area, 17 p.
2013-12	João Romão Eveline van Leeuwen Bart Neuts Peter Nijkamp	Tourist loyalty and urban e-services: A comparison of behavioural impacts in Leipzig and Amsterdam, 19 p.
2013-13	Jorge Ridderstaat Marck Oduber Robertico Croes Peter Nijkamp Pim Martens	Impacts of seasonal patterns of climate on recurrent fluctuations in tourism demand. Evidence from Aruba, 34 p.
2013-14	Emmanouil Tranos Peter Nijkamp	Urban and regional analysis and the digital revolution: Challenges and opportunities, 16 p.
2013-15	Masood Gheasi	International financial transfer by foreign labour: An analysis of remittances

	Peter Nijkamp Piet Rietveld	from informal migrants, 11 p.
2013-16	Serenella Sala Biagio Ciuffo Peter Nijkamp	A meta-framework for sustainability assessment, 24 p.
2013-17	Eveline van Leeuwen Peter Nijkamp Aliye Ahu Akgün Masood Gheasi	Foresights, scenarios and sustainable development – a pluriformity perspective, 19 p.
2013-18	Aliye Ahu Akgün Eveline van Leeuwen Peter Nijkamp	Analytical support tools for sustainable futures, 19 p.
2013-19	Peter Nijkamp	Migration impact assessment: A review of evidence-based findings, 29 p.
2013-20	Aliye Ahu Akgün Eveline van Leeuwen Peter Nijkamp	Sustainability science as a basis for policy evaluation, 16 p.
2013-21	Vicky Katsoni Maria Giaoutzi Peter Nijkamp	Market segmentation in tourism – An operational assessment framework, 28 p.
2013-22	Jorge Ridderstaat Robertico Croes Peter Nijkamp	Tourism development, quality of life and exogenous shocks. A systemic analysis framework, 26 p.
2013-23	Feng Xu Nan Xiang Shanshan Wang Peter Nijkamp Yoshiro Higano	Dynamic simulation of China's carbon emission reduction potential by 2020, 12 p.
2013-24	John Steenbruggen Peter Nijkamp Jan M. Smits Ghaitrie Mohabir	Traffic incident and disaster management in the Netherlands: Challenges and obstacles in information sharing, 30 p.
2013-25	Patricia van Hemert Peter Nijkamp Enno Masurel	From innovation to commercialization through networks and agglomerations: Analysis of sources of innovation, innovation capabilities and performance of Dutch SMEs, 24 p.
2013-26	Patricia van Hemert Peter Nijkamp Enno Masurel	How do SMEs learn in a systems-of-innovation context? The role of sources of innovation and absorptive capacity on the innovation performance of Dutch SMEs, 27 p.
2013-27	Mediha Sahin Alina Todiras Peter Nijkamp	Colourful entrepreneurship in Dutch cities: A review and analysis of business performance, 25 p.
2013-28	Tüzün Baycan Mediha Sahin Peter Nijkamp	The urban growth potential of second-generation migrant entrepreneurs. A sectoral study on Amsterdam, 31 p.

- 2013-29 Eric Vaz
Teresa de Noronha
Vaz
Peter Nijkamp The architecture of firms' innovative behaviors, 23 p.
- 2013-30 Eric Vaz
Marco Painho
Peter Nijkamp Linking agricultural policies with decision making: A spatial approach, 21 p.