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Naturbanization and sustainability at Peneda-Gerês National Park

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ABSTRACT: Territorial sustainability is introduced in the discussion of naturbanization, namely to regulate urban expansion processes and to frame the analysis of population dynamics, urbanization and urban sprawl in rural areas of Northern Portugal integrated in or near the Peneda-Gerês National Park (PNPG). These dynamics relate to changes that have been re-occurring over the last fifteen years spurring shifts in land use patterns, urban settlements and economic development trends. Two municipalities partially comprised within the National Park were selected as case studies for deeper insight on the urbanization trends as measured by development control indicators and motivations to live in PNPG, obtained through surveys on life histories. The study shows some evidence of naturbanization and counterurbanization processes. Concluding remarks on policies and strategies show that the impacts of naturbanization seem to depend largely on the degree of interregional disparities and the specific territory at stake.

1 INTRODUCTION

A preliminary study about naturbanization processes in Peneda-Gerês National Park (PNPG) is one of the main goals of the present text. The concepts of counterurbanization, periurbanization and suburbanization, first developed by Berry (1976) and Champion (1989), have been used by different schools of thought according to their countries of origin. The common idea behind them is the process through which population abandons urban areas; the difference is the destiny of those persons. While periurbanization and suburbanization refer to the process commonly known as sprawl, counterurbanization deals with the movement of people to smaller towns and villages. Naturbanization, in turn, was introduced by Prados (2005) and focuses on the movement of people to natural areas. This new concept refers to a process of attraction of residential population towards areas that are situated within or near protected natural areas. These movements create new challenges for sustainability strategies, since the impacts arising from urban sprawl and building in natural parks may be severe.

International and European guidance as well as Portuguese legislation dealing with spatial planning, namely its main guiding law (Act 380/99), are already sustainability-oriented in terms of discourse, as can be found in section 2.2. The latter requires, for instance, that spatial plans identify both the natural, agricultural and forest resources, as well as carry out the delimitation of the so-called municipal ecological structures, which may be understood as "green plans" inside the spatial plans. The legal framework at the national level is mainly procedural, pointing out the fulfilment of some general obligations but avoiding details about how they should be accomplished. One possible explanation for this is the assumption that it should be the task of planning professionals to get down to practice, while some flexibility is essential for the implementation. Legislation embodies control mechanisms during the process of plan-making and approval, such as public participation and agreement policies between stakeholders, but usually they are scarcely developed, although their importance tends to increase.

Spatial planning has a great influence on sustainable development and on its national strategy, which was recently approved in Portugal. As a result, the authors are in favour of stronger

sustainability criteria during the elaboration of spatial plans and a better understanding of territory dynamics especially in critical areas for nature preservation. Such a system would represent a more systematic way of contributing to the broader goals of sustainable development through planning. The approach that links sustainability to theories about naturbanization needs further in-depth study so that all the fields of the conceptual framework as presented in section 0 can be fully applied. This section examines the available methods for assessing such policies.

The remainder of the text is related to research on PNPG and organized as follows. Section 3 introduces an exploratory outline of the analysis performed at the park. Data characterizing the region and the National Park about their main features, land uses and socioeconomic disparities is presented in subsections 4.1 to 4.5. In order to assess with greater reliability the occurrence of naturbanization flows, further investigation on the micro-aspects of urban development, as portrayed in public hearings and some qualitative research with small scale surveys, is introduced in the subsequent subsections. The final section presents concluding remarks on policies and strategies pursued at the institutional and the community levels.

2 SPATIAL PLANNING AND SUSTAINABILITY

2.1 *International and European levels*

Numerous international charters and other publications contain general recommendations to translate into practice the principles of urban sustainability – for instance, the Aalborg Charter and succeeding declarations. These, in turn, are the root of field campaigns such as the Local Agenda 21, the Sustainable Cities Programme, ran by UN Habitat, the Smart Growth Initiatives in the United States or the Sustainable Agriculture and Rural Development, coordinated by the Food and Agriculture Organization of the United Nations. Such projects are beginning to supply researchers with data and strategies that can be monitored and traced (Table 1).

At the European Union level there are two fundamental strategies with a territorial scope: the European Spatial Development Perspective (ESDP), approved in 1999, and the Thematic Strategy on the Urban Environment, adopted in 2006. The main policy options of the ESDP that are of particular interest for naturbanization areas are (European Commission 1999): (a) polycentric spatial development and a new urban-rural relationship; (b) parity of access to infrastructure and knowledge; and (c) the wise management of natural and cultural heritage.

Polycentrism and rural areas are the subject of an extensive set of guidance goals, focused on urban containment, urban-rural relationships and rural environment, including specifically small to medium-sized cities. Effective methods for reducing uncontrolled urban expansion are supported.

Table 1. Relevant documents and projects dealing with territorial sustainability.

Title	Date
Local Agenda 21 (United Nations)	1992
European Urban Charter (Council of Europe)	1992
Sustainable Cities Programmeme (UN Habitat)	1992
Ålborg Charter (International Council for Local Environmental Initiatives)	1994
Smart growth initiative	1996
European Sustainable Cities (European Commission, 1998)	1998
Guiding Principles for Sustainable Spatial Development of the European Continent (Council of Europe)	2000
Sustainable Agriculture and Rural Development (Food and Agriculture Organization)	2001
Sustainable development at the local level (European Council of Spatial Planners, 2002)	2002
European common indicators: towards a local sustainability profile (Ambiente Italia, 2003)	2003

Note: a more comprehensive list is available at EEA (2002:18–21).

Promotion of towns and countryside is put forth, aiming at strengthening their capability for joint networking, renewable energy development and small and medium enterprise entrepreneurship within the global aim of establishing functional regions. Small to medium-sized cities are targeted from the standpoint of integrated spatial development strategies and maintenance of basic services and public transport. Diversified development strategies are also promoted for rural areas, as is the support of sustainable and multifunctional agriculture, with emphasis on the diversification of agrarian land use. Education, training and creation of non-agricultural jobs are supported and promoted for the enhanced co-operation and exchange of information between these areas. Environmentally-friendly tourism is also an issue addressed by the guidance goals.

Relating to the important aspect of equity and parity of access to infrastructure and knowledge, two goals have been put forward:

- better co-ordination of spatial development policy and land use planning with transport and telecommunications planning;
- improvement of public transport services and provision of a minimum level of service in small and medium-sized towns and cities.

Pertaining to the third policy option of ESDP, the management of the natural and cultural heritage fosters the continued development of Natura 2000 ecological networks between nature sites and protected areas, supported by integrated spatial development strategies for protected areas, amongst others, based on territorial and environmental impact assessments and involving the concerned stakeholders. Additionally, there is a focus on promoting a greater use of economic instruments to recognise the ecological significance of protected and environmentally sensitive areas and a particular emphasis on creative restoration of landscapes which have suffered through human intervention, including recultivation measures.

The Thematic Strategy on the Urban Environment aims at contributing to a better implementation of existing European Union environment policies and legislation at the local level by supporting and encouraging local authorities to adopt a more integrated approach to urban management. It is structured around three main topics: environmental management, urban transportation and exchange of best practices, reinforcing the previous policy options and focusing on successful implementation.

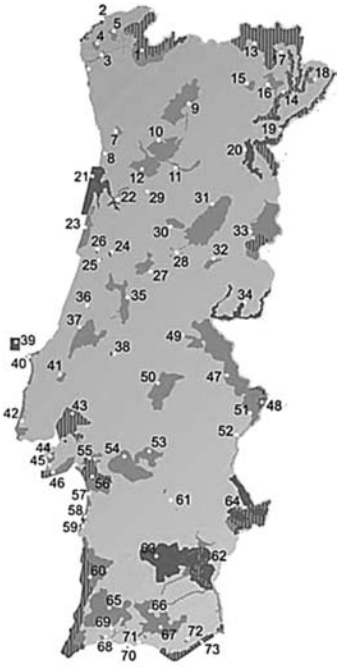
2.2 *National level*

In Portugal, the guiding policy concerning sustainability is presented in the National Strategy for Sustainable Development (ENDS), spanning the period of 2005–2015. Creating urban dynamics that are more inclusive and thus less destructive to the environment is one of its major goals.

Spatial planning and policy is dictated by Act 48/98, which defines main national guidelines. It establishes, *inter alia*, objectives such as: the rational use and management of natural resources, the maintenance of the environmental equilibrium, the humanization of cities and the functionality of the built-up spaces. It redefines the legal concept of the regional spatial plan, endowing it with an increased strategic worth that translates national economic and social strategies to the regional level and broadly frames the planning guidelines for municipal territories.

A bottom-up approach is under construction for a complex national planning system. It started in the beginning of the nineties when all Portuguese municipalities were required to prepare land use plans for the entirety of their territories. Nonetheless, the National Programme for the Territory and Land use Policies (PNPOT) – the upper layer of the system – was only approved in September 2007. It consists of a strategic national guidance document which shall be incorporated into spatial plans at the regional level and articulated with other national-level strategies like the ENDS. The programme is structured around five main objectives, two of which are highlighted: (a) the conservation of biodiversity, of natural and cultural heritage, and the sustainable use of energy and geological resources; and (b) the promotion of a polycentric development of the territories and the strengthening of the infrastructure that supports territorial integration and cohesion. Regional

1. Sítio Peneda/Gerês – ZPE Serra do Gerês
2. Sítio Rio Minho – ZPE Estuários dos Rios Minho e Coura
3. Sítio Rio Lima
4. Sítio Serra de Arga
5. Sítio Corno do Bico
6. Sítio Litoral Norte
7. Sítio Valongo
8. Sítio Barrinha de Esmoriz
9. Sítio Alvão/Marão
10. Sítio Montemuro
11. Sítio Rio Paiva
12. Sítio Serras da Freita e Arada
13. Sítio Montesinho/Nogueira
14. Sítio Rios Sabor e Maças – ZPE Rios Sabor e Maças
15. Sítio Romeu
16. Sítio Morais
17. Sítio Samil
18. Sítio Minas de Sto. Adrião
19. Sítio Douro Internacional – ZPE Douro Internacional e Vale do Águeda
20. ZPE Vale Do Côa
21. ZPE Rio de Aveiro
22. Sítio Rio Vouga
23. Sítio Dunas de Mira
24. Sítio Paúl de Arzila – ZPE Paul da Arzila
25. ZPE Paul da Madriz
26. ZPE Paul do Taipal
27. Sítio Serra da Lousã
28. Sítio Complexo do Açor
29. Sítio Cambarinho
30. Sítio Carregal do Sal
31. Sítio Serra da Estrela
32. Sítio Gardunha
33. Sítio Malcata – ZPE Serra da Malcata
34. ZPE Tejo Internacional, Erges e Pônsul
35. Sítio Sicó/Alvaiázere
36. Sítio Azabuxo/Leiria
37. Sítio Serra de Aire e Candeeiros
38. ZPE Paul do Boquilobo
39. Sítio Arquipélago da Berlenga – ZPE Ilhas Berlengas
40. Sítio Peniche/Santa Cruz
41. Sítio Serra de Montejunto
42. Sítio Sintra/Cascais
43. ZPE Lagoa Pequena
44. Sítio Fernão Ferro/Lagoa de Albufeira
45. Sítio Arrábida/Espichel – ZPE Cabo Espichel
46. Sítio S. Mamede
47. Sítio Estuário do Tejo – ZPE Estuário do Tejo
48. ZPE Campo Maior
49. Sítio Nisa/Lage da Prata
50. Sítio Cabeção
51. Sítio Caia
52. Sítio Rio Guadiana/Juromenha
53. Sítio Monfurado
54. Sítio Cabrela
55. Sítio Estuário do Sado – ZPE Estuário do Sado
56. ZPE Açude da Murta
57. Sítio Comporta/Galé
58. ZPE Lagoa de Santo André
59. ZPE Lagoa da Sancha
60. Sítio Costa Sudoeste – ZPE Costa Sudoeste



61. Sítio Alvito/Cuba
62. Sítio Guadiana – ZPE Vale do Guadiana
63. ZPE Castro Verde
64. Sítio Moura/Barrancos – ZPE Mourão/Barrancos
65. Sítio Monchique
66. Sítio Caldeirão
67. Sítio Barrocal
68. Sítio Ria de Alvor
69. Sítio Arade/Odelouca
70. ZPE Leixão da Gaivota
71. Sítio Ribeira de Quarteira
72. Sítio Cerro da Cabeça
73. Sítio Ria Formosa/Castro Marim – ZPE Ria Formosa – ZPE Sapais de Castro Marim

Figure 1. Location of PNPG and of other protected areas in Portugal.

spatial plans covering the entire country (one for each of the five NUT II regions) are still being prepared. Their conclusion is expected by the end of 2008.

There are a number of sectorial or thematic plans that complement the broad spectrum plans mentioned above. They include such specific areas as nature conservation, forestry and water basin planning. In Portugal, there are a total of seventy-three classified sites, as shown in Figure 1 , but land use plans have not been developed yet for all of them. An inventory of other types of plans is provided in section for the PNPG area.

2.3 *Common elements across policy documents*

After analysing the documents mentioned in the previous sections, a non-exhaustive list showing the main elements addressed by urban sustainability policies was assembled (Table 2).

Table 2. Fundamental elements of urban sustainability.

Theme	Description
Sustainable urban development	
Urban structure and land use	Polycentrism of urban centres Higher densities around transportation nodes and networks Physical constraint of sprawl and of urban expansion areas Control of the amount of impervious and urbanized areas Mixture of uses Urban rehabilitation and regeneration Heritage protection Protection of sight and landscape views
Green areas	Primary and secondary green structure Natural, agriculture and forest areas Urban trees Protection of flooding areas
Sustainable urban transportation	
Mobility	Intermodality Speed and frequency of public transports Bus lanes, rail network, transit lines Cycle lanes and pedestrian routes Parking and localization of park and ride Speed limits
Air	Air quality and emissions reduction Automobile use restrictions Environmental friendly transportation
Sustainable construction	
Ecological construction	Wastewater collection, treatment and reutilization Composting toilets Insulation and passive solar design Heating and thermal and acoustic comfort Air ventilation and renovation Renewable and environmentally friendly energies Environmentally friendly materials Waste sorting Building versatility Pavement permeability
Sustainable urban management	
Water	Water networks Wastewater treatment Freshwater quality Riverbank quality
Waste	Waste collection techniques *In situ* composting
Noise	Noise minimization Noise barriers
Public participation and transparency	Public participation procedures Access to information Reporting obligations Transparency of the decision-making process

Source: Quental et al. 2004.

As can be seen, there coexist several different but complementary approaches to urban sustainability. They can be divided into six categories:

- a classification of the kind or degree of sustainability;
- a theoretical framework defining the main domains that sustainability encompasses, namely social, economic, environmental and territorial; the relevant issues to be considered in each of these domains; horizontal factors that affect the success of the model as a whole;
- policy formulation: principles, objectives and targets;
- standards: quantitative or qualitative parameters;
- monitoring: indicators;
- the geographic level being analysed.

There are also more specific approaches to urban sustainability, including the definition of sustainable land use, which "must secure that the inhabitants of the area can have their vital needs met in a way that can be sustained in the future, and is not in conflict with sustainable development at a global level" (Næss 2001: 505). The goal of sustainable land use was operationalized into five main objectives: (a) reduction of energy use and emissions; (b) minimization of conversion and encroachments on natural areas, ecosystems and soil resources for food production; (c) minimization of consumption of environmentally harmful construction materials; (d) replacement of open-ended flows, where natural resources are transformed into waste, with closed loops relying to a higher extent on local resources; and (e) a sound environment for the city's inhabitants.

There is strong evidence that spatial planning has an important role to play in achieving these goals: either directly, through the minimization of pressures such as land consumption, or indirectly, by acting upon the societal driving forces in a way that the environmental pressures are alleviated, namely the reduction of transport needs and of energy consumption (Næss 2001, Camagni et al. 2002).

3 METHODOLOGICAL ISSUES

In the first part of the study of PNPG, a conceptual multi-scalar framework of sustainability was used. This framework is seen as more global and more adjusted for the understanding of the development trends of a single study area. In fact, contrarily to the outcomes by Prados (2005) that studies the natural parks of the Andalusia region (Spain) and the naturbanization process that has been taking place there, the population trend is still declining in areas around natural parks in Portugal. Also, the wide variety of landscapes in such a small country can easily divert naturbanization flows towards several areas of the country.

Although exhibiting great contrasts, north-south (mountain, pedi-plain), interior-coast (interior plateau, coastal plain), Portugal comprises a territory that is still not too dispersed, displaying great landscape variety which, intrinsically, causes regions of interest for establishing a second home or for rural tourism activities to become plenty and diverse. Once again, this can weaken the visibility of the naturbanization phenomenon.

Reflecting the social evolution of the 1950s that fostered social transformations stemming from emigration and migration processes and that led to the subsequent weakening of population dynamics, the rural space in Portugal has been loosing its vitality in recent years. This situation has been leading to the decrease of agricultural activities that, consequently, became the basis for a certain degree of precariousness of the rural space in favour of increasingly larger urban spaces.

Analysing this phenomenon allows one to perceive the evolution of other aspects such as transportation networks, infrastructure and essentially, the "fiasco" stemming from the incapability of territory planning in integrating the rural areas in desirable development models within social-economic development. Consequently, the changes in rural space dynamics during the past recent years show that rural space has undergone three major changes: depreciation of agricultural activity, loss of population and lastly and most recently, the attractiveness of these spaces for

construction, as these are areas that display a more relaxing quality of life. Therefore, public and private investment specific for these areas have increased, boosting rural space dynamics.

Additionally, rural dynamics have been modified by tourism development and second-homes that, in terms of accessibility to improvements, have introduced a significant proximity facet between these areas and urban areas, central hubs of urbanization such as Portugal's major cities. Demand for construction in municipalities that are peripheral to large urban areas is increasingly greater, particularly when there is infrastructure already in place and where there are areas classified as natural heritage. This process is designated as counterurbanization and this concept is described by Berry (1976) as a process of population decentralization, that involves a switch in population displacement, previously countryside-city and afterwards, city-countryside. Conversely, naturbanization is a similar phenomenon that nonetheless shows differences with regards to the intensity of population displacement (Prados 2005). Given the living history and the existing national spatial arrangement from territory planning, getting to an analytical methodology for the confirmation of naturbanization phenomena that does not simply rely on an albeit pioneering and original methodology of studying population dynamics is rather difficult to accomplish.

Understanding that the hypothesis of naturbanization process occurring in PNPG could be difficult to validate solely with the population analysis and might involve several other approaches and methods, the analysis became typically exploratory, considering naturbanization flows encompassed by sustainable development. However, this decentralization phenomenon takes on a less defined and weaker character whereas countryside-city migration is carried out quickly and from a more centralised standpoint. Decentralization takes on a more disperse and less intense character. Some authors regard this new phenomenon as the "dispersed city", characterized by the spatial dispersion of the urban population that it is not functionally connected to activities specific of rural areas, i.e., population that resides in rural areas but does not carry out rural activities (Ferrás 1998, in Prados 2005).

As anti-urbanization trends developed, the formal separation between city and countryside (if there ever was such a separation) evolved, alongside economic and technological transformations that fostered the functional and physical integration of space. This integration was carried out to such an extent that economic activities and urban lifestyle spread practically throughout the entire territory of many countries (Machado 2003). Such areas are characterized by forms of dispersed urbanization, generally rendering the clear distinction between city and countryside utterly difficult. This happens where city peripheries or peri-urban areas exhibit a tendency for sprawling and, above all, for presenting boundaries that are increasingly difficult to define with regards to the rural area (Machado 2003).

At the current stage of research development, it is not yet possible to fully apply the conceptual framework shown in Table 2 to the research on PNPG hereby presented. The theoretical framework that defines the main domains of sustainability, namely social, economic, environmental and territorial, was addressed albeit the relevant issues to be considered in each of these domains were not fully covered and neither the horizontal factors that affect the success of the model as a whole. The aspects analysed relate to policy formulation in terms of principles, objectives and targets for urban development as well as standards pertaining to quantitative or qualitative parameters and monitoring indicators. Using a step by step approach, the geographical level under analysis was consecutively narrowed down from municipality to parishes and case studies. The initial study units correspond to the five municipalities included within the borders of the National Park. Although data for other neighbouring municipalities were not presented here, they were taken into consideration as well, namely for the Municipality of Vieira do Minho. Considering that there was not much gain in incorporating municipalities completely outside PNPG, the analysis was restricted to the ones totally or partially included inside it. For this first global approach, a limited number of variables were studied for the whole National Park area such as population and dwellings dynamics, public participation, territorial and land use planning, land cover and land use changes.

Other relevant demographic data such as age structure or causes underlying migratory movements already mentioned by Prados (2005) as possible useful indicators to be further examined were not used. Instead, the analysis was taken to a further degree of detail by aiming at the next administrative

level, the parish. All parishes fully or partially comprised within the borders of PNPG were studied in terms of population growth, socio-economics and land-cover. In this last topic, land-cover was analysed through orto-photomaps at the scale of 1:10 000, a more detailed study than the one performed at global PNPG level and surrounding areas at 1:100 000, using the CORINE Land Cover data as a basis.

Thus, naturbanization processes were further researched in two municipalities that showed high potential for these occurrences. Focused on detecting such flows and parting them from other possible causes for growth of the number of dwellings, a set of specific studies was undertaken with comprehensive methodologies suggested by Prados (2005). As such, several perspectives and indicators can be taken into account and aimed at further proving either the existence or lack thereof naturbanization flows.

Various sub-sections in section 4 detail the studies carried out in all the parishes of Terras de Bouro and one parish of Melgaço (Castro Laboreiro), since they stood out in terms of dwellings growth, showing more than a 25% increase of the housing stock in one decade (1991–2001). Therefore, individual proposals for zoning shifts in Terras de Bouro and life histories in Castro Laboreiro were studied in depth and cumulatively.

3.1 *Spatial analysis*

Spatial analysis tools were used with the purpose of further researching naturbanization processes in the Municipality of Terras de Bouro. Spatial data were added to the alphanumerical information originated in the preliminary hearing of the local land use plan (PDM) forms, where the type of request is evaluated with regards to the type of land use, name of land owner, zoning (urban, tourism, agricultural, etc.) and the reasons cited by the land owner for justifying the requested land use change versus what is established in the PDM. Additional information includes data from the Portuguese National Institute of Statistics (INE) regarding resident population, so that the density of applications can be correlated to increases or decreases in population. This analysis allows the distinction between existing pressures with a greater degree of certainty, separating rural land owners and returning immigrants' intentions of residence from potential land owners identified as promoters of the naturbanization phenomenon.

Software graphic tools designed to create polygons or points that combine to depict the "image" of the request in terms of form, morphology and area, were used in order to allow a detailed in-depth analysis of the requests, their locations and typologies according to physical factors of the municipal territory, namely altimetry, slopes and sun exposure, along with planning factors and restrictions concerning land uses, in terms of rural land, urban land and corresponding classes. For instance, a "buffer" instruction can be used to determine the distance between requests for service and infrastructures such as water distribution, wastewater collection and power distribution, distance from urban clusters, distance from the transportation network, amongst other applications.

More globally, these tools can also be used for the evaluation of territoriality by assessing the distance from different parishes and seats of the municipalities to the main urban cluster. These analyses allow the subsequent design of an evaluation methodology for each request so that it can be catalogued in terms of the trends under discussion with a greater certainty.

The following is the description of correlations between data and recent land use changes that demonstrate processes of naturbanization and counterurbanization, subsequent to the brief description and characterization of the target territorial unit presented above. With the onset of the PDM for the Municipality of Terras de Bouro, a period for service and information requests was conducted, resulting in 429 preliminary hearing enquiries. These enquiries were carried out by the residents and concern, for the most part, applications for land use changes (from rural to urban), along with a few suggestions vis-à-vis the heritage conservation policy of the municipality. The latter reveals already a certain level of appreciation towards the sensitive nature of this territory but it was not considered for the purposes of the study. The evaluation of the relevant requests was grouped in terms of their territorial prevalence and type (single family residence, multi-family residence, space for tourism facilities, amongst others), providing insight on how these new potential urban

pressures are cast upon the municipal territory. However, attending to the fact that the increase in number of homes is associated to an increasing second-home phenomenon in Portugal, data from preliminary hearings become pivotal, allowing, for instance, the identification of plots, land owners and applicant's job, as well as inferring on the type of use that will be given to the home.

All applications for land use changes were thoroughly studied and consistent with several defined technical aspects, so that they could be readily classified according to the following categories: (a) preferred direction for expansion and maintenance; (b) methodological errors and cartography of existing PDM and (c) single requests. Preferred direction of expansion corresponds to places adjacent to already existing urban clusters so that there is some cohesion of the urban mesh, standing for strongly built areas with adequate physical and infrastructural conditions. Methodological errors and cartography of existing PDM concern applications that were not included by the requested land use class due to technical mishaps in terms of cartography or methodology, namely the disregard of small population nuclei that, at the time when the existing PDM was being prepared, had not been classified as urban land or rural cluster (classes from the previous PDM). Single requests are characterized by individual requests that are generally located away from other urban or rural clusters and lacking great infrastructure and equipment (though accessible).

Differentiating typology is important for sorting requests and fitting them to typological classes: new pressures for urbanizing or applications from land owners that, because of a prior technical and scale error, requested the due correction which, ultimately, would not correspond to the intended goal of the analysis. These requests for land use change are very important, as they reflect the municipality's development model (urban expansion areas supply and demand pattern) that is explained not only by the morphology of the proposed zoning and conditioning factors changes but also by its assessment. This assessment demands meticulous, extensive in situ work and cartography analysis, allowing the preparation of an application evaluation matrix that is used to verify, geographically, a series of important aspects. For the reasons stated above, the work methodology is GIS-based, which, subsequently, provides data that can be manipulated through a multi-criteria analysis.

The final assessment of land use change requests takes into account the following evaluation criteria for land use change requests: (a) proximity to existing constructions and nearness to existing urban area; (b) proximity to main transportation network; (c) impact caused by growth; (d) cohesion of the urban mesh; (e) characteristics of surrounding area; (f) avoidance of natural barriers (waterways, steep slopes); and (g) persistence of the dominant trend.

3.2 *Life histories enquiries*

Pertaining to the other parish of Castro Laboreiro, the method of interviews was used to understand why people were living in this remote location and the rate of construction being at such high levels. This survey on life histories allows for an assured accountability of new comers within naturbanization flows but it is heavily time consuming. However, it brings the added benefit of allowing the understanding of different perceptions according to different lifestyles. A face to face interview type of enquiry was conducted at the parish of Castro Laboreiro. This survey method proved adequate to describe the characteristics of the target population. Standardized questions were posed to different types of people and the results obtained were precise and comparable, because everyone was required to answer the same questions. This is a method that usually produces high levels of reliability since every person is presented with standardized questions. Therefore, observer subjectivity is kept to a minimum. Additionally, questions were general enough in order to suit all respondents.

In the questionnaires, a set of topics was proposed in which the results were categorized in two groups: naturbanization induced causes and other motivations. The criteria used for the categorization were: (a) main location address; (b) reasons for being in Castro Laboreiro; (c) main disadvantages of living in Castro Laboreiro and (d) main advantages of living in Castro Laboreiro. Crossing the results from first and second categories, it was possible to detect if people were in Castro Laboreiro for environmental quality and/or escaping city life and cumulatively

were originally from out-of-town. In this case, people were further questioned about their life histories.

As with any survey method, it is desirable that a large number of the selected population sample is willing to abide by the surveyor's requests. As such, there was special care about selecting the most suitable places for conducting the survey. In order to detect naturbanization motivations to live in the PNPG area, newly-built houses were selected and a door-to-door survey was conducted in three villages. Furthermore, due to population dispersal in this parish, places of public and leisure gathering were selected such as churches' squares right after Sunday mass and after meal periods in local coffee shops.

4 INVESTIGATING NATURBANIZATION AT PENEDA-GERÊS NATIONAL PARK

4.1 *A brief presentation of the National Park*

PNPG is located in the northwest of Portugal, extending to parts of the Municipalities of Melgaço, Arcos de Valdevez, Ponte da Barca, Terras de Bouro and Montalegre (Figure 2). The park runs along the Spanish border (the Baixa Limia – Serra do Xurés Natural Park) from the Castro Laboreiro plateau by way of the Peneda, Soajo, Amarela and Gerês mountains to the Mourela plateau in the south. Created in 1971, PNPG was the first protected area in Portugal and received the status of National Park because of its ecological, scientific and educational values.

PNPG extends through an area of 703 km^2 (or 885 km^2 if the surrounding areas belonging to the Natura 2000 network are included) and is the only protected area in Portugal that falls under the International Union for the Conservation of Nature and Natural Resources (IUCN) category II: National Park. IUCN (nowadays and since 1990, World Conservation Union) guidelines state that National Parks are natural areas of land and/or sea designated to (a) protect the ecological integrity of one or more ecosystems for present and future generations, (b) exclude exploitation or occupation contrary to the purposes of designation of the area and (c) provide a foundation for spiritual, scientific, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible. Less than 30% of the Park lands (194 km^2) are private property. From the total of 703 km^2, 7% are public property (53 km^2) and the remaining 456 km^2 are common property.

An important feature of the landscape is the constant presence of water. The few villages in the high lands are located near arable land with built terraces. Accommodation for visitors is limited but consists of several low-budget hotels in Caldas do Gerês (spa town) or in renovated village houses for rent in Soajo and Lindoso. There is also a "pousada" (equivalent to a luxury rural hotel), that caters to the more expensive market, and six small camping sites.

The park can be explored by car or by several pedestrian routes and hiking trails. Several interesting spots can be found there, such as the old Roman and pre-Roman villages ("castros") at Castro Laboreiro and Calcedónia, the trail at Mezio, the monastery at Pitões das Júnias, the remarkable sanctuary at Peneda, the shrine at São Bento da Porta Aberta, the traditional small granaries built of granite ("espigueiros"), the many waterfalls and Portela do Homem, known for its Roman milestones, the largest number of its kind in the Iberian peninsula.

4.2 *Socioeconomic dynamics*

According to the socioeconomic data from INE, the population inside PNPG is living well below the national average and also below the average for the Natura 2000 sites in Portugal (Table 3). These statements, based on available indicators, may not correlate necessarily to the perceived quality of living by the inhabitants, which is also influenced by the high natural beauty of the landscape. However, the numbers show beyond doubt that PNPG has a rural deprived population facing a serious unemployment problem.

Figure 3 shows the historical trends of population residing in PNPG. Between the mid 19th century and 1930 there was a slow growth of around 4% per decade. From 1930 until 1950 there

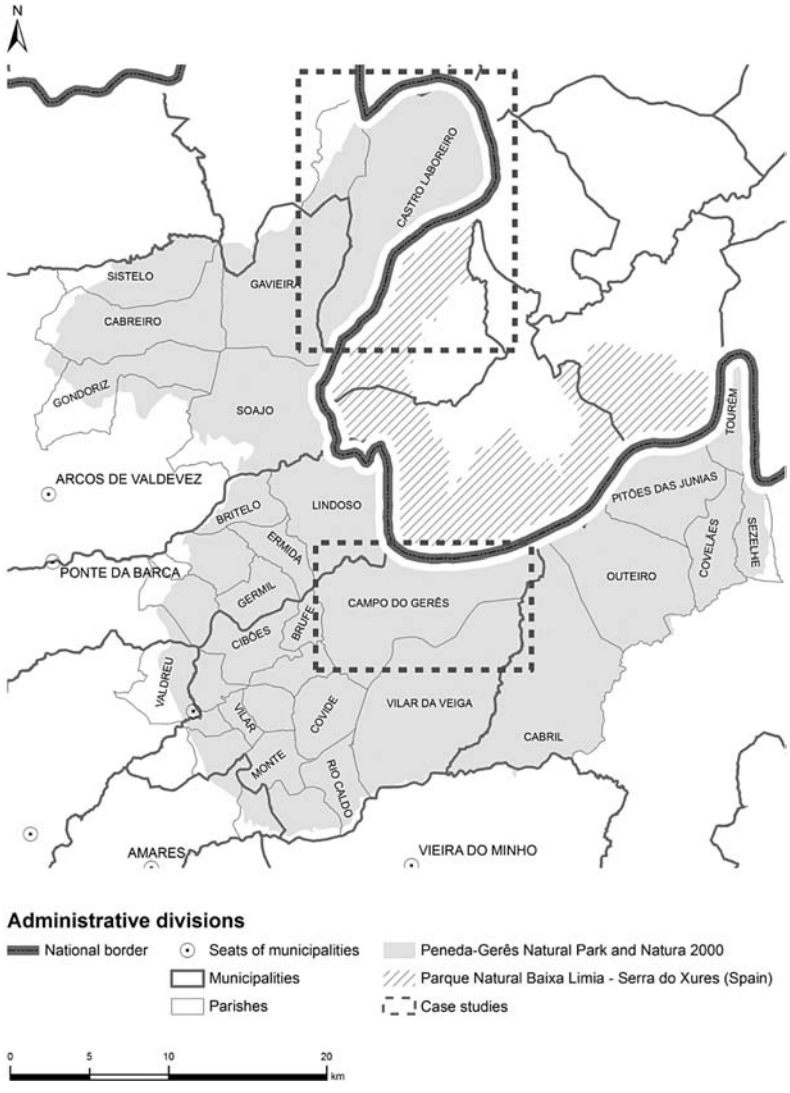


Figure 2. Administrative divisions among PNPG. Case study areas are shown.

Table 3. Selected socioeconomic indicators for different territories.

Indicator	PNPG	Natura 2000 network in Portugal	Portugal	Unit	Year
Population	4.76	329.4	10,356	10^3 people	2001
Population density	7.6	17.1	113.2	people/km	2001
Farmers and shepherds	46.3	15.9	11.4	% of the total population	2001
Activity rate	27.1	38.1	48.2	% of the total population	2001
Purchasing power	32	49	100	%	2002

Source: Instituto Nacional de Estatística 2001

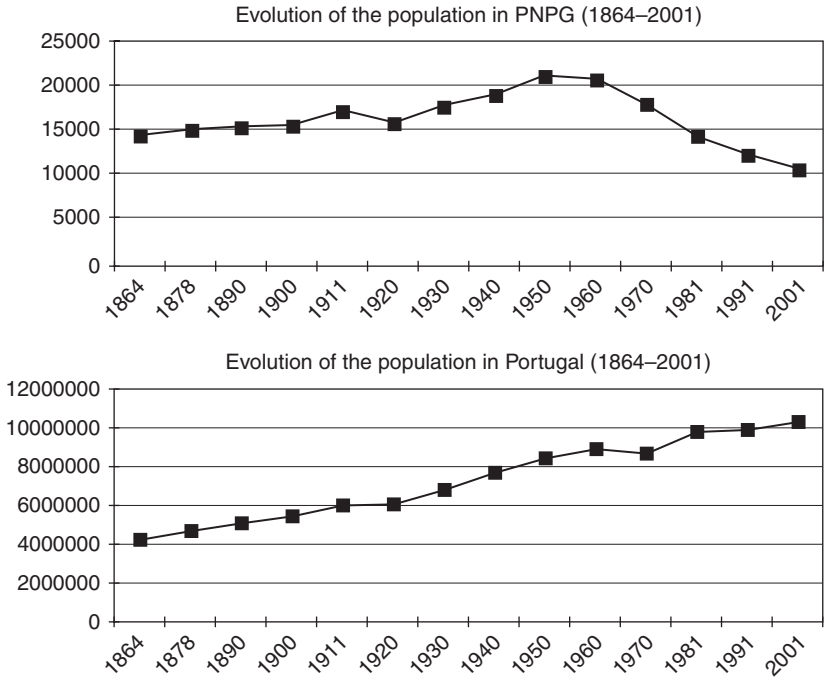


Figure 3. Evolution of the population in PNPG and in Portugal (1864–2001). Source: Fernandes 2006.

was a steeper rise at a magnitude of 10% per decade, similar to the decline in population that followed and that is still very much present today. As a consequence, PNPG's population is significantly lower today than in the beginning of the 19th century. Additionally, until 1950 the trends in PNPG followed, albeit at a slower pace, those of the whole country. From then on, the decoupling and inversion is unmistakable.

The growth phase that lasted until mid twentieth century can be explained by the expansion of agricultural plantations such as the corn revolution (Ribeiro 1945). It was interrupted by stagnation periods during World War I and the pneumonic epidemics in 1919. Two main factors account for the population decline that took place after 1950: strong emigration (particularly between 1950 and 1970) and rural exodus. The perceived lack of opportunities is a powerful incentive for people looking for better living conditions to migrate to more vibrant urban areas – which is particularly true for youngsters and young adults who attended school and thus have higher expectations for their future. In a global and competitive economy such as nowadays', these forces probably tend to intensify, even though naturbanization processes (of an incomparably smaller magnitude) may become increasingly important for the future of natural areas.

Although population in PNPG has been dropping, the number of households kept growing in the 1991–2001 decade (see Table 4 and Figure 4). This growth was prominent in the Municipality of Terras de Bouro located in the centre of PNPG and encompassing lands around the national road to one of the borders with Spain – where it reached 27%, more than doubling the rates occurring at any other municipality of PNPG and above the national and regional averages.

Most parishes inside and outside PNPG are facing a population decline and an increase in the number of dwellings, but the latter seems to be a little more spread inside the park. The attraction poles in both municipalities although small in total size are located close to national roads as well as to the city of Braga which may possibly divert naturbanization trends in the nearby areas. This is relevant for detecting naturbanization trends as the PNPG parishes have as a whole a remoter location than the parishes outside the park.

Table 4. Evolution of population and dwellings in PNPG parishes and inclusive territories (1991–2001).

Territorial division	Parish*	Population change (%)	Dwellings change (%)
Portugal		4.9	20.7
Northern region (NUT II)		6.3	25.5
PNPG		−14.1	n.a.
Minho-Lima (NUT III)		0.1	17.4
Arcos de Valdevez		−8.3	5.1
	Cabana Maior	−22.7	2.8
	Cabreiro	−20.9	−3.0
	Gondoriz	−6.0	−0.6
	Soajo	−15.6	−11.3
	Gavieira	−19.2	55.6
Melgaço		−9.5	12.2
	Castro Laboreiro	−16.3	28.9
	Lamas de Mouro	−19.6	4.3
Ponte da Barca		−1.8	10.2
	Britelo	−16.8	−5.0
	Entre Ambos os Rios	0.7	4.3
	Ermida	−25.3	5.9
	Gemil	−32.0	21.3
	Lindoso	−22.1	13.3
Cávado (NUT III)		11.3	34.3
Terras de Bouro		−11.5	27.0
	Campo do Gerês	−3.1	31.2
	Covide	−17.4	24.5
	Rio Caldo	−16.5	36.5
	Vilar da Veiga	−6.7	44.5
Alto Trás-os-Montes (NUT III)		−5.1	15.0
Montalegre		−17.3	12.8
	Cabril	−11.2	20.5
	Covelães	−24.4	−4.7
	Outeiro	−14.7	0.7
	Pitões das Júnias	−11.1	13.5
	Sezelhe	−20.8	17.0
	Tourém	−15.1	9.4

Source: Instituto Nacional de Estatística 2001.
*Only parishes partially or totally inside PNPG are shown.

The information presented suggests a naturbanization trend inside and around PNPG since there are some "islands" of population growth (e.g., in the parish of Entre Ambos os Rios, in Ponte da Barca, and in the parish of Vilar da Veiga, in Terras de Bouro) within a large area of strong real estate development. That is, some parishes seem to be able to counteract the global trend of population decline seen throughout the countryside. There seems to be only one exception to this trend as the Municipality of Arcos de Valdevez does not show population increase inside PNPG and the dwellings growth is not occurring in the majority of the parishes.

The fact that the Municipality of Arcos de Valdevez portrays a slower trend towards naturbanization may be explained by the neighbouring Municipalities of Amares and Vila Verde's growth, which seem to be experiencing a counterurbanization trend as working population from Braga begins to settle down in nearby areas. The main reason lies in several factors, namely proximity to the city and lower housing prices, thus explaining the growth in population and dwellings and eventually creating a trend more linked with counterurbanization than naturbanization.

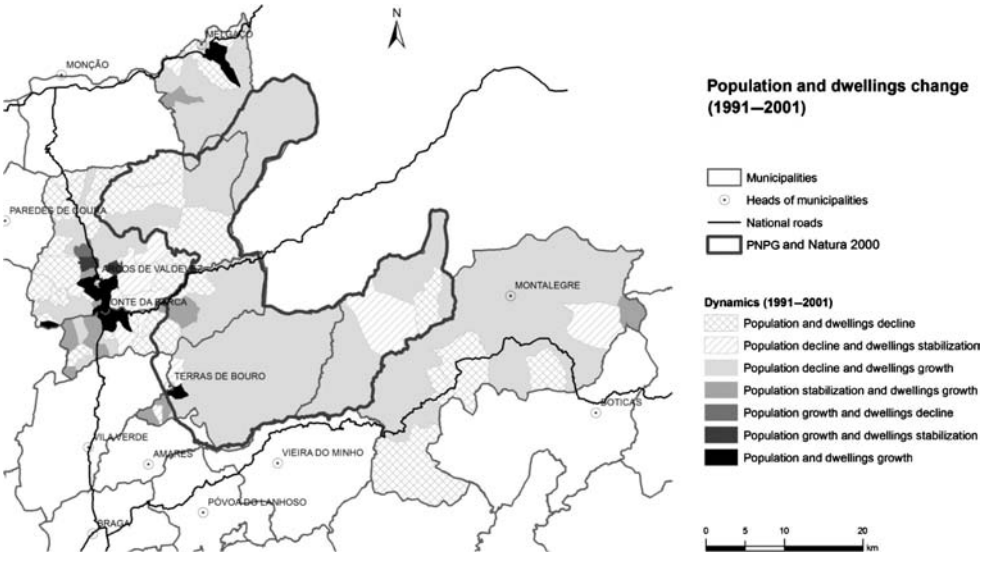


Figure 4. Evolution of the population and dwellings in parishes inside PNPG (1991–2001).

However, it is difficult to assure that this naturbanization trend is of a different nature from that seen in the rest of the country, since data do not distinguish between the types of existing occupation. Usually, and even if exceptionally a decrease in the total number of completely infra-structured dwellings is observed, the number of houses for secondary or seasonal uses continues to increase.

Comparing data on population and urbanization from all the parishes inside PNPG, a first conclusion can be drawn. Major increases in the housing stock (above 25% per decade) were observed in all parishes of Terras de Bouro and also in Melgaço but only in one parish (Castro Laboreiro). These municipalities will be further analysed in the sections 4.6 and 4.7.

4.3 *Public participation*

According to the several policy documents mentioned in sections 2 and 0, public participation is essential for sustainable development. Being tourism one of the driving economic activities in natural areas, it has become the focus of strategies to enhance governance and allow entrepreneurs and residents to actively participate in the definition of development guidelines.

Swarbrooke (2005: 25) suggests that the key issues in the sustainable tourism debate are the principle of partnership, the green tourist, community involvement and local control, de-marketing: places, time, people, concept of carrying capacity, ecotourism, lack of performance indicators, value judgments and lack of factual evidence.

A forum concerning protected areas, developers and other agents that promote the European Charter for Sustainable Tourism (ECST) in protected areas – in both Portugal and Spain – has taken place to discuss the PNPG. The ECST forum was created in 2002 as a fundamental pre-requisite for ECST candidacy and aimed at defining a model for action and development for tourism activities in protected areas, encompassing the following tasks: (a) define the objectives and sustainable tourism strategy (based on territorial assessments); (b) define a formal strategy via a five-year action-plan that implements activities towards sustainability, and (c) create a permanent working partnership.

The objectives of the Iberian network of the ECST in protected areas are primarily the promotion of debate and exchange of experiences and know-how, and the development of joint actions

including both countries. The sharing of experiences is carried out via interaction between technicians and entrepreneurs. There are partnering project proposals aimed at implementing common action (communication and broadcasting of ECST), with the purpose of bringing to the ECST the Iberian experience and reality. The Iberian network enables a new mechanism: the participation of a delegation of park representatives attend the annual meetings of the European Park Network, promoted by the EUROPARC Federation, since many are unable to attend the meeting.

The forum resulted in the improvement of relationships between the PNPG, local bodies and the tourism sector. It enabled the consolidation of a technical body including PNPG, regional tourism associations (ADERE), municipalities and regional tourism development representatives that have since assisted in sustainable tourism issues. Other benefits were also reaped, such as the furthering of knowledge regarding the target region in terms of in-bound trips, allowing for a good analysis of the current situation. Opportunities for joint ventures were created, making use of the common objectives and coordination between the stakeholders. Relations between the various economic agents were also improved. Additionally, the forum allowed for the creation of a privileged information exchange structure, focused on access to standards, specific regulations, funding programmes, etc. In practical terms and regarding the application of PNPG to the ECST, the five-year action-plan includes the formal diagnosis and definition of objectives and development strategy.

As beneficial as the forum demonstrated to be, there were nonetheless some limitations. Some economic agents lacked the adequate motivation, as the ECST is a mid to long-term process and does not necessarily produce immediate results. Another difficulty was getting the participants involved in real, tangible broadcasting and communication activities. Because a forum is a type of meeting that is essentially based on intervening and debating, it creates some level of expectation that may not be met. Therefore, it is important that it is kept in check to an extent. Another important aspect is the need for political endorsement prior to presenting any decisions as such. The technical participation was strong and dominant, furthering the need for increased political participation. It is well known that participation can be managed (Sharp 2002) by those actively involved in the process and so, in rural areas with a restricted number and variety of stakeholders and residents, public participation processes can easily be taken over by dominant actors.

The power to influence decisions, or the nature of democracy as classically defined by Arnstein (1969) through the ladder of participation, is normally graded at level three or four for public participation in land use planning (Lourenço 2003). It is rather distant from the manipulation of citizens on the first step of the ladder but also far away from "citizen power" of the higher rungs. Levels three (informing) and four (consulting) imply methods such as attitude surveys, neighbourhood meetings, and public hearings. Inviting citizens' opinions, like informing them, can be a legitimate step toward their full participation (Arnstein 1969), but if consulting them is not combined with other modes of participation, it is still deceiving of citizens' expectations since they do not actually get to make decisions. Under municipality initiative and national guidance, territory plans are subject to public hearings procedures that nowadays include consultation beforehand of plan revision and update, besides the typical long established public hearings period before plan approval.

Although the goal to promote public hearings in revision processes of PDM is somewhat recent, some municipalities foster its wide application. This might be a strategy to accommodate PNPG strict requirements as well as other national areas constraints and at the same time shield themselves from potential allegations. These may come from residents or outside investors, that later on would have their development intentions denied by the municipality which in turn would be most likely accused of not catering to local development and community well being. Public participation of PNPG inhabitants in the park territory was already stated in the master plan of 1996 and carried out normally before any plan approval (PDM and others). Curiously, no Local Agenda 21 plans have been prepared in any of the five municipalities included in PNPG, with the exception of the Municipality of Melgaço which is included in a sub-regional Minho valley Local Agenda 21 still at its infancy.

Table 5. Approved spatial plans that extend partially or completely over PNPG.

Name	Typology	Main theme	Level
National Programme for the Territory and Land use Policies (PNPOT)	Strategic	General	National
Northern region spatial plan (PROT) (not in force yet)	Strategic	General	Regional
Alto Minho forestry plan	Forestry land use and management	Forests	Subregional
Baixo Minho forestry plan	Forestry land use and management	Forests	Subregional
Barroso Padrela forestry plan	Forestry land use and management	Forests	Subregional
PNPG master plan	Land use	Nature conservation	Subregional
Natura 2000 plan	Land use	Nature conservation	Subregional
Cávado river basin plan	Land use	Water	Subregional
Lima river basin plan	Land use	Water	Subregional
Plan for Touvedo dam catchment area	Land use	Water	Subregional
Plan for Caniçada dam catchment area	Land use	Water	Subregional
Agro-environmental zoning plan for PNPG	Financial	Agriculture and funding	Subregional
Local land use plans for each municipality (PDM)	Strategic and land use	General	Municipal
Strategic plan of Ponte da Barca	Strategic	General	Municipal

4.4 *Territorial and land use planning*

If one is to judge spatial planning by the number of plans in force, PNPG is certainly a thoroughly planned area. In a non-exhaustive inventory it is possible to count twelve plans of different kinds, scales and sectors, the majority of them being zoning-oriented (see Table 5). This is partially due to the fact that PNPG is situated in a transition region according to administrative and natural boundaries, since it lies between the green Minho and the dried lands in Trás-os-Montes. It is questionable whether such a dispersion of goals and norms through plans effectively contributes to a balanced and sustainable territory. A more pro-active and integrated planning system concentrating more on management and less on report working is urgently needed.

At the national level, PNPOT specifically addresses PNPG, considering that mountain activities in the area should be promoted, including tourism and environmental protection. Nevertheless, development options are far from clear. Instead, strategies are usually taken as win-win situations, with no evident concessions, ignoring the long lasting conflicts between nature conservation and economic development altogether. Some recommendations are given, however, regarding the urban areas where investments should be concentrated.

The northern region spatial plan (PROT) is still being prepared and approval is expected by late 2008. Little is said about the National Park in the supporting technical reports: PNPG is typically considered as a place for nature conservation "lost" in the border with Spain. This can be consistent with the goal of nature conservation and even with the fact that choices have to be made regarding which territories should be developed in a competitive world. In fact, strategies and information tend to concentrate on more active urban poles (Viana do Castelo, Ponte de Lima – see Figure 5) in sectors such as industry, services, agriculture, energy and tourism. However, mountain areas deserve specific measures in order to prevent further human desertification. Naturbanization, probably as a result of its diffuse and recent nature, is not yet considered by the planning system, neither its potential effect of helping to curb down population exodus.

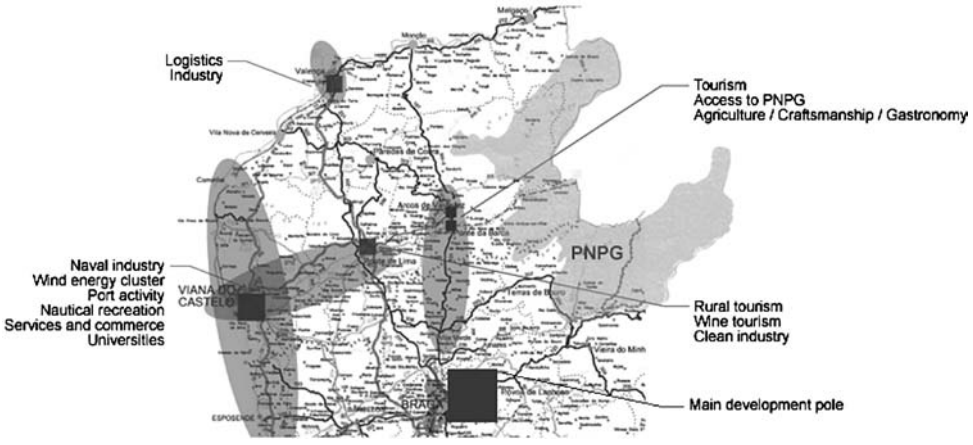


Figure 5. Territorial model presented in the Northern region spatial plan (Minho-Lima subregion).

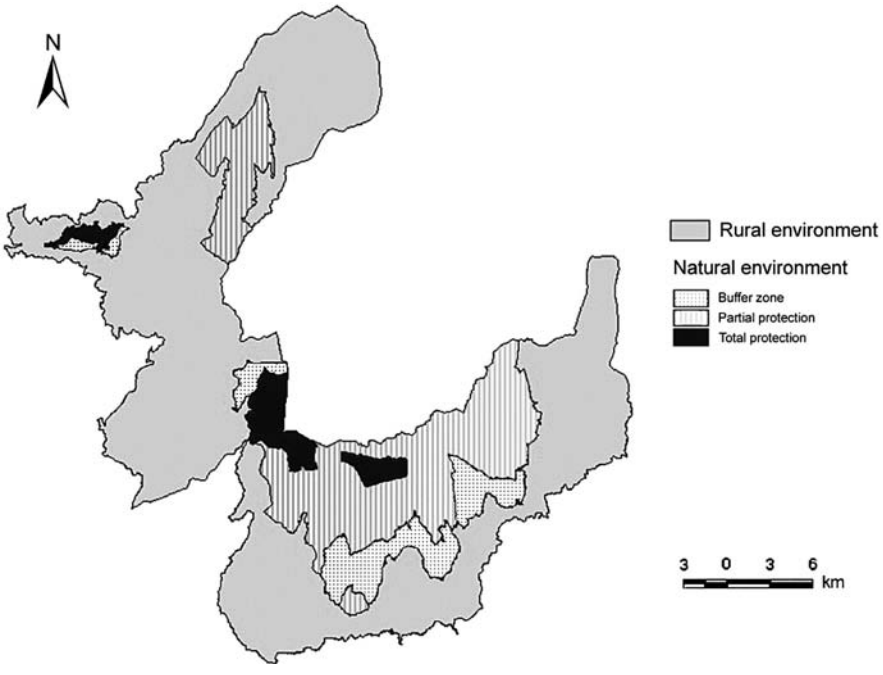


Figure 6. Zoning established by PNPG master plan.

PNPG was first zoned for conservation purposes in 1979. Later, in 1995, this zoning classification was updated under the PNPG master plan. The territory is divided into two main zones – rural environment and natural environment – characterized by different levels of protection depending upon several criteria such as the ecosystems in place, the kind and intensity of human land uses and the flora and fauna existent (see Figure 6). The latter is subdivided accordingly in three types of classified areas where the "total protection" status is the strictest one and comprises only a minor part of the total land. The plan is currently under revision, as well as most PDM for the five municipalities.

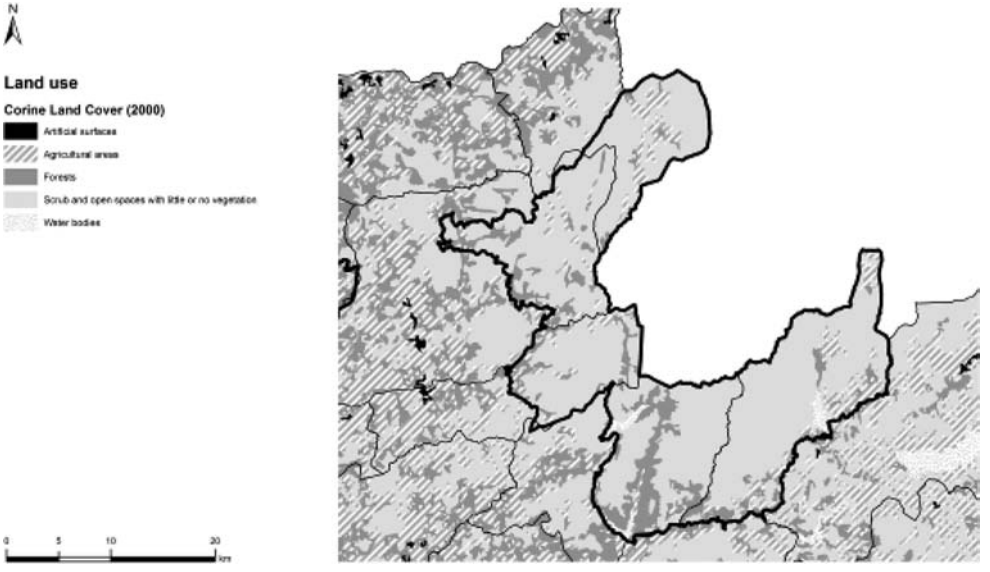


Figure 7. Land cover in PNPG and surrounding region (2000).

There is a particular interaction between PNPG master plan and local land use plans. While the former typically defends self-containment for urban areas, there was a need to make agreements and compromises with the municipalities' proposals fostering urban growth. In Melgaço and Arcos de Valdevez some expansion of the urban boundaries was allowed as there was consensus for most places, but in the villages of Lordelo, Cunha and Soajo, municipalities' intentions were not accepted by the National Park since the proposed urban expansion was considered excessive and invaded agricultural lands (Parque Nacional Peneda-Gerês 2007).

4.5 *Land cover and land cover changes*

Land cover at PNPG is dominated by open spaces with little or no vegetation associated with high altitudes and extensive animal farming (see 7–10).

Land use statistics are summarized in Table 6, Table 7 and Table 8. Forest cover in PNPG remains modest (around 15%) and tends to decrease, although the main forest losses in the region have occurred outside the National Park. The small decrease in the absolute forested area (around 3%) hinders a high turnover of this kind of land cover, i.e. a significant proportion of the forested area became impoverished at the same time a smaller area of deforested lands became forested. Also, the effects of a large wild fire that occurred in 2006 and consumed one of the most important conservation woods are not visible on the map, though some regrowth is expected. It is estimated that about 4000 ha of these high importance forests remain.

A global trend towards vegetation cover impoverishment is visible: a transition to a state of a more sparsely cover or a more dramatic change to bare rock due to severe soil erosion. The absolute change of the class "shrubs, herbaceous vegetation or no vegetation" is not so pronounced because some agricultural areas have been transformed into it. Conservation measures are thus needed to prevent vegetation cover from further degradation.

Cultivated lands are less common and are used mainly for private household-feeding. Agriculture abandonment was insignificant either in absolute or relative terms in the last decade. This can be explained by the dominance of animal farming, especially in the common ownership mountain ridges ("baldios", in Portuguese) – however, these lands are not classified as agricultural per CORINE guidance. As for cattle, its impact on the environment is two-fold, carrying both burden

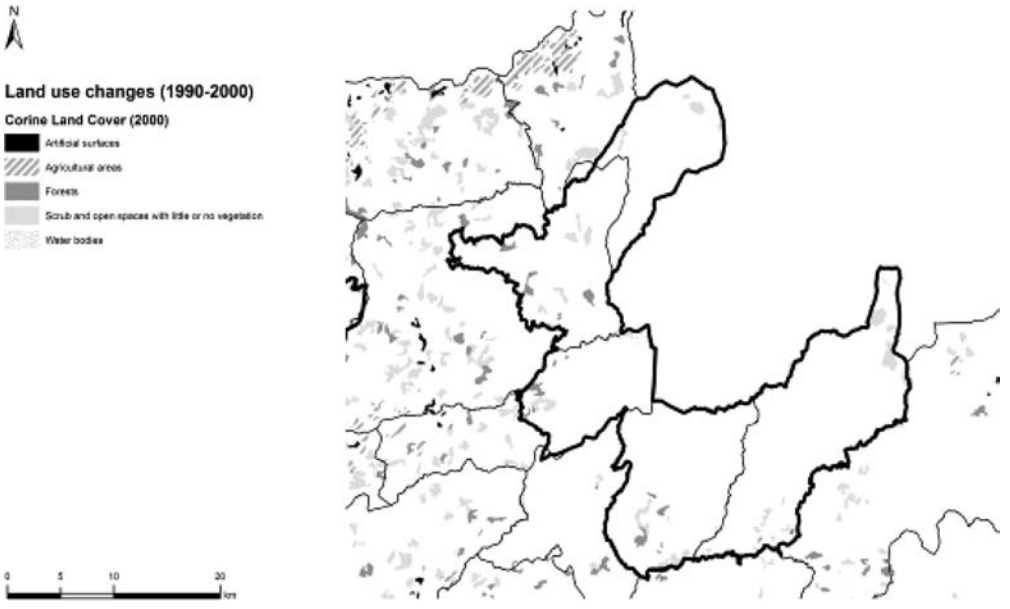


Figure 8. Lands that shifted uses (1990–2000). Land cover in 2000 is shown.

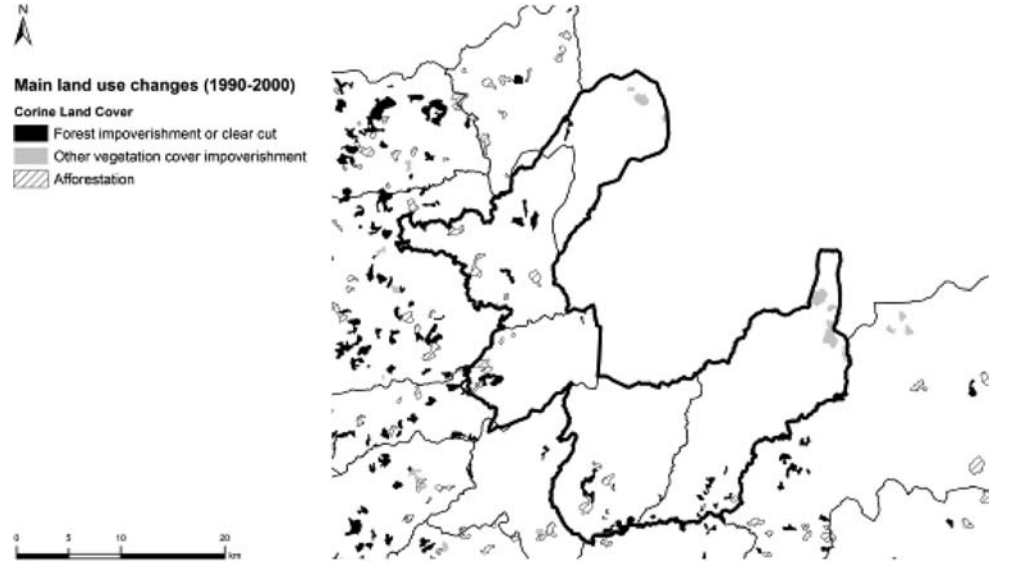


Figure 9. Main binomial land use changes (1990–2000).

and benefit. On one hand, grazing cattle prevents natural vegetation from growing and consequently restoring the ecosystem up to its peak. Conversely, cattle contributes to the emergence of landscape mosaics that results from the association of forest patches with natural shrub vegetation upon which the rich fauna of the park is dependent. Still, it is common for shepherds to set fires – usually illegal – in order to retain the natural pastures. Sometimes these fires spread out and burn up large patches of forests and natural ecosystems. Thus, forest restoration is a priority to be spatially determined according to specific studies.

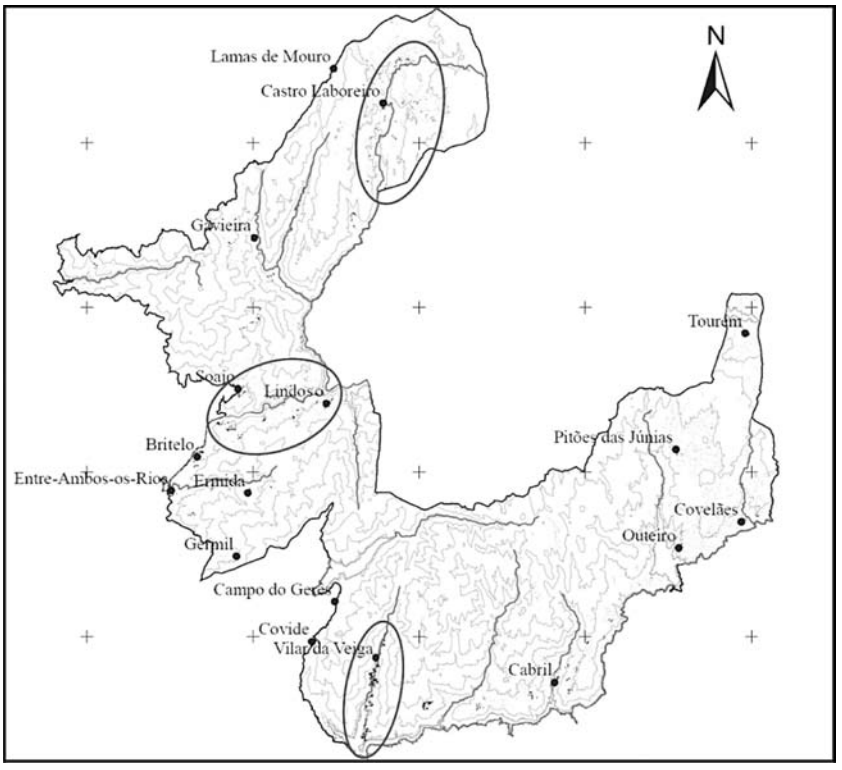


Figure 10. New urban areas between 1990 and 2000 (Fernandes 2006).

Table 6. Area occupied by land use classes in PNPG and surrounding Natura 2000 sites (in 2000).

	Area	
Land cover class	(ha)	(%)
Artificial surfaces	2	0.1
Agricultural areas	9063	10.2
Forests	12,637	14.3
Areas with shrub, herbaceous or no vegetation	65,590	74.1
Water bodies	1186	1.3

An interesting and unexpected phenomenon is the decrease of artificial surfaces by half between 1990 and 2000. This results from the conversion of dump sites into open spaces with little vegetation or into grasslands, though the area itself is insignificant since only around 0,1% of the land cover is included in the first category. This decrease has to be understood according to the database used, CORINE Land Cover, in which the smallest mapping unit is 25 ha. When higher resolution data are used (1:10 000 orto-photomaps), new spots of urbanization become visible along valleys and near reservoir lakes, especially in the municipalities of Ponte da Barca and Terras de Bouro, and in mountain areas in Melgaço (parish of Castro Laboreiro) as shown in Figure 10. In this particular

Table 7. Land cover changes in PNPG and surrounding Natura 2000 sites (between 1990 and 2000).

Land cover class	Class change (ha)	Class change (%)	Relative change (% of the total PNPG surface)
Artificial surfaces	−98	−61.3	−0.11
Agricultural areas	−42	−0.5	−0.05
Forests	−418	−3.2	−0.47
Areas with shrub, herbaceous or no vegetation	418	0.6	0.47
Water bodies	140	1.3	0.16

Table 8. Main binomial land use changes in PNPG and surrounding Natura 2000 sites (1990–2000).

Land cover class	Change (ha)	Relative change (% of the total land use changes)	Relative change (% of the total PNPG surface)
Forest impoverishment of clear cut	1382	39.0	1.6
Other vegetation cover impoverishment	880	24.8	1.0
Afforestation	983	27.7	1.1

Table 9. Number of applications filed to the Ecological Lands Council to remove the REN status.

Number of parishes	Number of applications (a)
3	$46 \leq a \leq 54$
7	$27 \leq a \leq 40$
3	$12 \leq a \leq 19$
6	$0 \leq a \leq 8$

Source: Barros (2008) based on the Local Council Archives.

parish, new constructions are located along a major axis near the Spanish border (Fernandes 2006) and most of them took over previous agricultural areas.

4.6 *Case study: requests for zoning shifts in the Municipality of Terras de Bouro*

Further research was carried out at Terras de Bouro, the municipality that stands out in terms of global data for growth in the number of dwellings (Barros 2008). Surprisingly, three parishes were singled out because of the high number of applications submitted that requested permission for building in sensitive areas, thereby stripping them of their special status – ecological areas (REN) or agricultural areas (RAN) – see Table 9. This may be explained by the significant area of the municipality that is under ecological and agricultural restrictions which constrain building capacities. It should be noted that inside PNPG other constrains besides the special REN and RAN status apply (refer to section 4.4 for an explanation of land use plans in PNPG). REN and RAN classification have a national scope of application and therefore, areas thus classified are scattered throughout the country.

With the onset of the PDM for the Municipality of Terras de Bouro, a period for requesting service and information was conducted resulting in 429 preliminary hearing inquiries related to

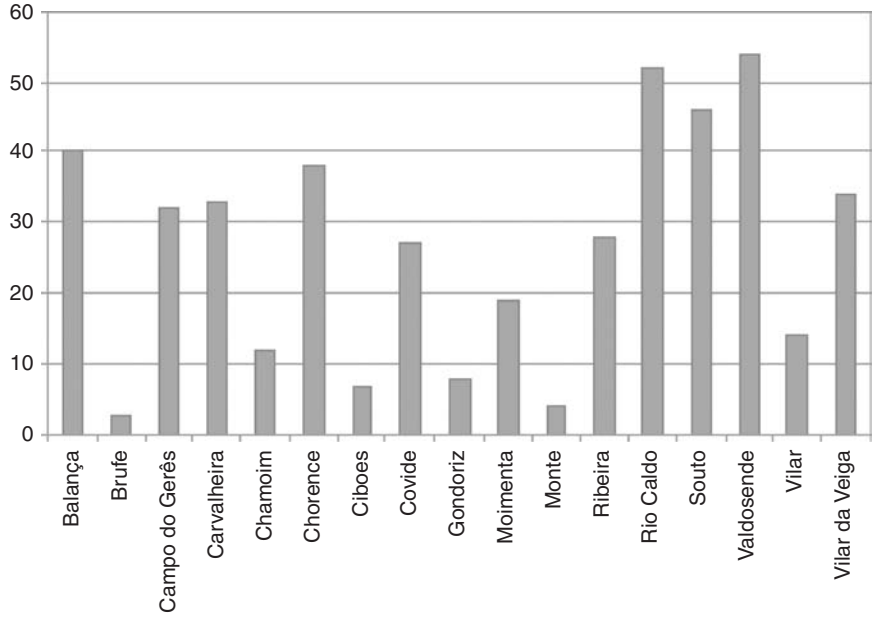


Figure 11. Number of requests for zoning shifts by parish formulated in preliminary hearings.

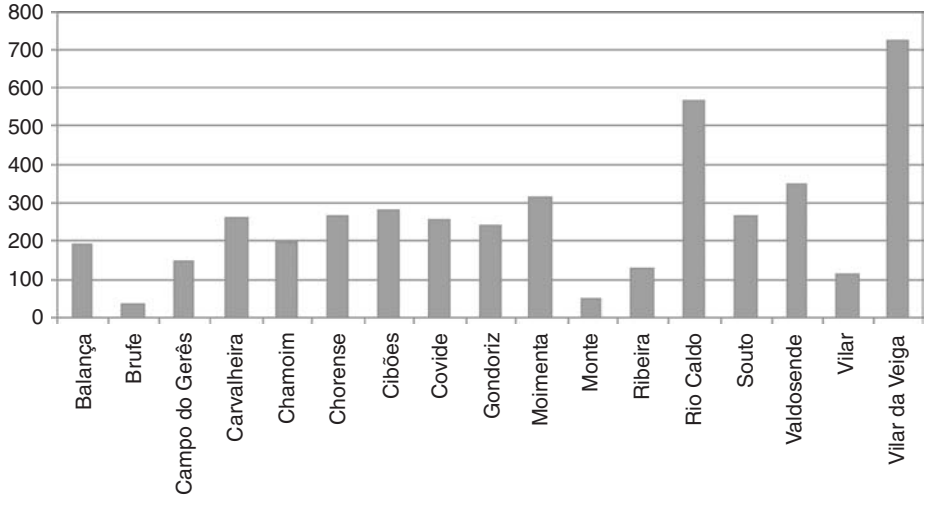


Figure 12. Number of buildings by parish. Source: Instituto Nacional de Estatística, 2001.

541 areas. As shown by comparing the number of existing buildings by parish with the number of requests, there is not a direct correlation between them (see 11–12).

A first analysis regarding the high number of preliminary requests per location, allows the conclusion that the parishes located around the Caniçada dam (Valdosende, Rio Caldo and Vilar da Veiga) concentrate the highest figures, followed by the parishes located around the seat of the

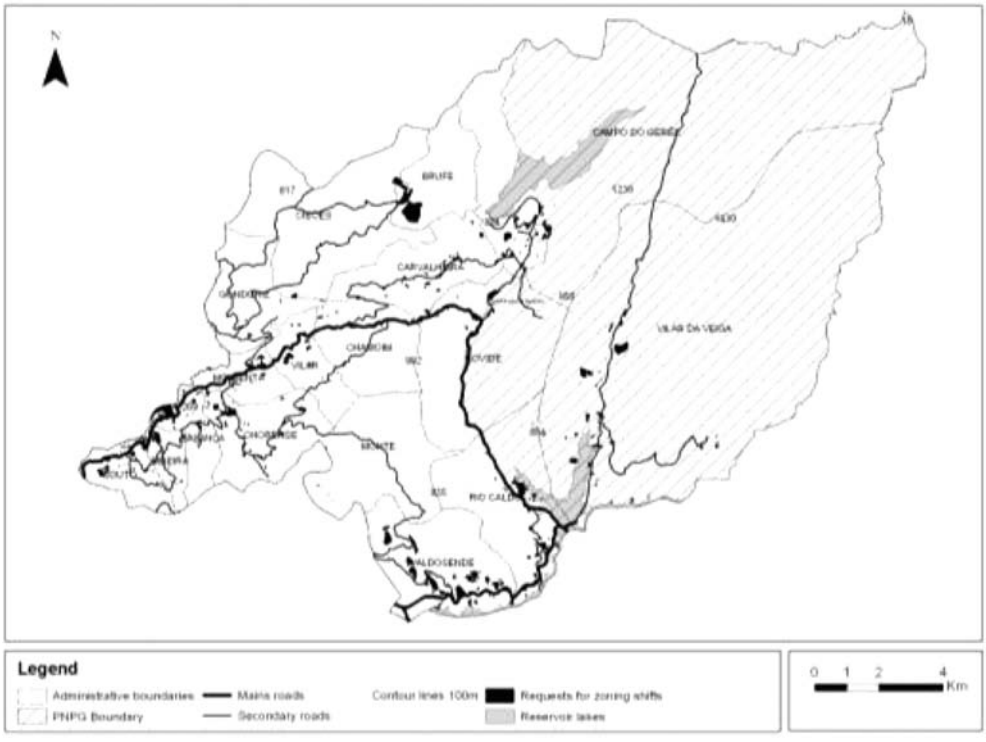


Figure 13. Location of requests for zoning shifts.

municipality and national road 205-3 (Moimenta, Ribeira, Souto) towards the main urban pole of the sub-region, the city of Braga, with its 100 000 inhabitants.

A selection of relevant indicators shows (Table 10) that PNPG parishes stand out in the context of Terras do Bouro Municipality with heavy number of requests for land use shifts and with higher rates of activity than the averages of municipality and PNPG, being closer or slightly above the averages for Natura 2000 areas. Also worth mentioning are the percentages of people employed in the tertiary sector, as figures fall within the interval between 40 and 70% in 2001.

A synthesis of all analysed requests evidences the trend for urbanization in rural territory and especially in plots facing restrictions on urban expansion (see Table 11).

In conclusion, there is a consistency of outputs from several numerical and spatial data (see 13–14), all of which point to potential trends for urbanization along main road axis and privileged locations near dams and reservoir lakes.

4.7 *Case study: life histories of Castro Laboreiro's inhabitants*

There was full compliance of all the people that were asked to answer a few questions about their personal motivations for being in that specific location at that time. Nobody refused to be interviewed and most of the people were local residents while the others were visitors. A few people living in recently built houses were also interviewed. All of the people approached responded to the questionnaire, meaning that there was 100% participation in the survey effort.

This survey was undertaken at one of the parishes with higher population loss (Castro Laboreiro, in the Municipality of Melgaço, with a loss of 16,9% people in the last decade) and an accrued increase in the number of dwellings (28.9%). One of the main findings was that for a sample

Table 10. Selected socioeconomic variables for the parishes of Terras de Bouro with the highest number of requests.

Parish	Variable	1991	2001	Variation (units)		Requests (no.)	Main location of requests
Campo do Gerês	Inhabitants, HM	193	187	−6	∇		Vilarinho das Furnas dam; inside PNPG
	Dwellings	125	164	39	▲	20	
	Activity rate (%)	37	32	–	∇		
	Tertiary sector (% of the population)	53	70	–	▲		
Covide	Inhabitants, HM	489	404	−85	∇		Geographical center of municipality; inside PNPG
	Dwellings	204	254	50	▲	27	
	Activity rate (%)	28	41	–	▲		
	Tertiary sector (% of the population)	34	49	–	▲		
Moimenta	Inhabitants, HM	772	803	31	▲		Seat of municipality
	Dwellings	294	420	126	▲	20	
	Activity rate (%)	34	38	–	▲		
	Tertiary sector (% of the population)	69	72		▲		
Rio Caldo	Inhabitants, HM	1189	993	−196	∇		Major road axis, inside PNPG; Caniçada dam
	Dwellings	430	587	157	▲	52	
	Activity rate (%)	29	35	–	▲		
	Tertiary sector (% of the population)	45	53	–	▲		
Souto	Inhabitants, HM	625	564	−61	∇		Major road axis
	Dwellings	222	259	37	▲	46	
	Activity rate (%)	37	35		∇		
	Tertiary sector (% of the population)	51	60	–	▲		
Valdosende	Inhabitants, HM	742	699	−43	∇		Major road axis; Caniçada dam
	Dwellings	284	347	63	▲	54	
	Activity rate (%)	30	34		▲		
	Tertiary sector (% of the population)	35	42	–	▲		
Vilar da Veiga	Inhabitants, HM	1640	1530	−110	∇		Inside PNPG; Caniçada dam
	Dwellings	571	825	254	▲	34	
	Activity rate (%)	33	36		▲		
	Tertiary sector (% of the population)	48	53	–	▲		

Source: Instituto Nacional de Estatística, 1991; Instituto Nacional de Estatística, 2001.

Table 11. Urban areas and proposed expansion from requests analysis.

Zoning type (PDM)	Area (km^2)
Urban	1.6
Rural	2
Rural (restricted construction)	4.6
Heritage value	0.3

Source: Barros (2008) based on the evaluation of public hearings during the PDM revision process.

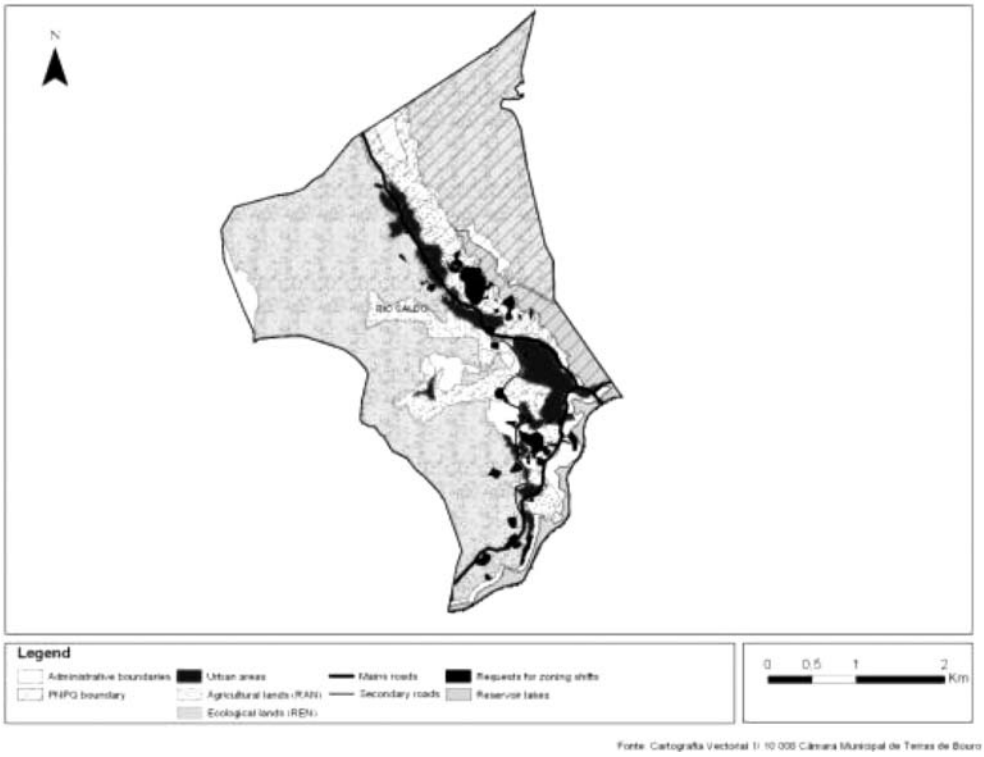


Figure 14. Example of location of requests for zoning shifts inside Rio Caldo parish.

population of property owners where 44% live predominantly in large urban centres or abroad (32%), people chose to have a house in this parish mainly because they have their family roots there (63%). However, an increasingly important percentage mentioned landscape (18%) and getting away from major urban centres (15%), providing some evidence of naturbanization principles and motivations. As such, the majority of the houses serve as homes for weekends and holidays. In the future, this periodic and/or seasonal flow of people – though not yet a naturbanization trend – may become one when people retire from active work. The phenomenon of naturbanization is clearly illustrated by one out of the twenty-five people interviewed that having left the city of Lisbon has come to Peneda-Gerês to live and work.

Major advantages of living in PNPG as seen by the interviewee are lack of pollution (42%), quietness (28%) and less traffic and noise (25%). Typical problems worthy of notice are lack of adequate access or cultural activities mentioned each by 16% of the people interviewed. Lack of medical assistance was mentioned by 24% of the people as a major problem while 44% referred a wide variety of other issues instead. Namely, the lack of a reliable mobile communications network is considered very disadvantageous when people set up a business. They suffer constrains in their daily life activities. Due to this remoteness, simple tasks can become very cumbersome, delayed, or even impossible to carry out. In addition, this specific interview revealed a strong opposition to ideas or actions that could potentially ruin the natural beauty of PNPG landscape, such as proposals to build supermarkets or large constructions. In view of these different opinions it is obvious that the perception of new entrepreneurs and outside people coming to live in PNPG is related to other lifestyles and do not follow the local people's needs and aspirations. In the future, this could bring conflicting and opposing views on development proposals for the area.

5 DISCUSSION AND CONCLUSIONS

5.1 *Limitations of the analysis*

Several limitations of this study should be addressed. One limitation was the restricted number of study sites. The data for this study were gathered in five municipalities and at micro level, at five parishes within PNPG. Future research designs might incorporate additional study units, especially the one and the only parish inside PNPG that shows population growth.

A second limitation dealt with the treatment of "urbanization potential" in the Municipality of Terras de Bouro study sites. Based upon the three-fold typology of urban pressure inferred from the requests of zoning changes, a dummy variable set was operationalized in GIS to capture local context and differentiate between naturbanization trends and others. Terras de Bouro, where all PNPG inclusive parishes had high growth rates for dwellings, showing both urban presence and pressure, served as the reference municipality in the analyses. Future studies might incorporate more sophisticated contextual variables and enlarge the territorial scope.

However, these limitations may be viewed as advantageous to the study. As mentioned, the research design specified that data would be collected in some study units but it is important to note that these were not randomly selected parishes. Instead, each unit portrays a clear trend for construction of new dwellings pointing to relatively significant levels of urbanization taking into consideration the territory at stake. The use of an exhaustive classification scheme (i.e. land uses and urbanization pressures in agricultural, ecological and other areas) to categorize requests provided ample justification for the use of a restricted number of parishes from the municipality that has more territory inside PNPG boundaries and one of the highest protected ecological land percentage (80%).

A holistic approach, albeit time consuming, is seen as desirable in the study of a single natural area as PNPG, placing the area and the naturbanization concept within the context of the ongoing changes in the economic and territorial environment. The framing of this theoretical concept in a broader strategic context aiming towards sustainability has the potential to design an integrated reliable diagnosis that can foster more adjusted forms of global intervention. Although it is known that achieving sustainable development will require a set of policy measures better tailored than the previously used, a lot remains to be learned about the naturbanization and counterurbanization processes in Northern Portugal. Subsequently, the outcomes of these diagnosis efforts should be incorporated in the policy-making strategies for natural areas.

5.2 *The occurrence of naturbanization processes in PNPG*

Some field knowledge shows that naturbanization and counterurbanization may be present in PNPG area. This distinction is possible due to the accessibility, location and landscape patterns as they vary. One parish is in the main access to Braga while the other two are in remoter places but with beautiful scenery. It is well known that increasing levels of affluence and higher levels of mobility led to the increased action radius of residential consumers (Bowler et al. 1992, Dieleman & Wegener 2004). This is combined with the ideal of owning a single family home, the need for a supportive environment for raising a family and the appeal of rural ambience (Audirac et al. 1990). Consequently, population in some rural areas grew at the end of the 20th century (Bontje 2001, Batty et al. 2002). In fact, in the last four decades of the 20th century, European, North American and other Western countries experienced growth of urbanized areas in the form of suburbanization of residential and economic functions, succeeded or accompanied by counterurbanization where population from the core and suburbs moved out to more rural areas (Berry 1976, Bontje 2001, Batty et al. 2002). As seen in the literature, people want to live in small towns and rural areas, yet few want to live far from a large or medium sized city (see Fuguitt & Brown 1990).

Some authors regard this new phenomenon as the "dispersed city", characterized by the spatial dispersion of the urban population that it is not functionally connected to activities specific of rural

areas, i.e. the population that resides in rural areas but does not carry out rural activities (Ferrás 1998, in Prados 2005).

As anti-urbanization trends developed, the formal separation between city and countryside (if there ever was such a separation) evolved alongside economic and technological transformations that fostered the functional and physical integration of space. This integration was carried out to such an extent that economic activities and urban lifestyle spread practically throughout the entire territory of many countries (Machado 2003).

Such areas are characterized by forms of dispersed urbanization, generally rendering the clear distinction between city and countryside utterly difficult. This happens where city peripheries or peri-urban areas exhibit a tendency for sprawling and, above all, for presenting boundaries that are increasingly difficult to define with regards to the rural area (Machado 2003). This is happening throughout the Metropolitan Area of Oporto and its connections to main Northern region towns of Braga and Guimarães that are less than 40 km from PNPG border. As it was verified, those counterurbanization plans start to approach the outskirts of PNPG.

But in the other two parishes the explanations do not follow this trend and a naturbanization process (Prados 2005) seems to be under way. Effectively, protected natural areas are an increasingly popular and an important driving factor in the attraction of residential and other consumption orientated activities towards rural areas. Changes in the socio-demographic and economic structure, in the form of settlements and agricultural landscapes in the PNPG, need to be studied and more research and field work needs to be done here.

Shifts are easily detected in changes of the landscape, on rehabilitation of urban centres, renovation of existing housing stock and construction of second homes, infrastructure renewal of the areas, development of enterprises associated with new activities, especially tourism and related services. Explaining factors for naturbanization process such as increased personal mobility, economic diversification, greater public investment, competitive land prices and housing characteristics are also found in the northern region of Portugal as they were found in Andalusia. The same evidence applies for other determinants such as the process of agricultural land abandonment and the creation of new outdoor recreational activities and the re-creation of traditional activities.

In this context, conflicting uses can arise due to the pressures brought about by new business activities on protected areas, even if several studies and management plans have been carried out. Thus, the negative aspects of naturbanization, namely the destruction or downgrading of ecologically sensitive areas and landscapes, the destruction of social values of rural areas, especially communitarian practices, needs further research and consequently careful policy attention. As researched by Prados (2005), the presence of or the proximity to protected nature is not the only factor determining the attractiveness for living in a rural area, mainly by urban new-comers. Rural areas closer to urban regions are subject to their centripetal tendencies but the urbanizing trend was also detected in more remote rural areas with specific characteristics, namely river banks and closeness to dams and lake reservoirs. Therefore, other factors have to be taken under consideration such as accessibility to water sports and proximity to main roads and to larger urban centres. Areas under analysis in and around the PNPG, namely in the Municipality of Terras de Bouro, prove the existence of both naturbanization and counterurbanization phenomena. But naturbanization trends and their effects on population flows, number and location of related urban centres are much more limited and reduced in a quantitative approach than counterurbanization movements.

5.3 *The role of naturbanization in the future of remote natural areas*

The future of non-competitive rural areas and, particularly, remote natural parks, is a long concern of planning professionals. This concern is at odds with envisioned strategic solutions which, in fact, are rare or altogether absent from spatial plans (see section 2.2 and 4.4). The difficulty of the problem should encourage national and regional governments to develop creative approaches and new roles for these low density areas detached from the competitive economy, but instead, priority is given – somewhat understandably so – to more active urban areas for which competitive

potential is higher. Strategic spatial planning thus becomes not really a way of inverting perceived negative trends (rural desertification) but more an instrument of stimulating desirable installed and emerging capacities.

Given appropriate regulation, naturbanization processes may become relevant if a brighter future for low density natural areas is to be achieved. These counterurbanization fluxes were not analysed until now by the technical groups working on the spatial plans (namely the regional plan), and as a consequence it is highly plausible that no specific incentives will be devised. If natural areas such as PNPG continue to be regarded as "lost territories", what future should be expected?

Besides tourism development, which has already been attracting a great deal of investment, four emerging fundamental processes should be studied and stimulated:

– creation of benefits (payments, or of other kind) for land managers protecting ecosystems and biodiversity. Although most of the ecosystem services are not currently valued, this situation shall change in the future, since those services are increasingly important for the sustainability of the earth system and, specifically, of urban areas, which are dependent on large amounts of resources coming from rural areas;
– taking advantage of the new markets that are starting to value environmental services, in accordance with the previous objective. It is the case of the European Union emissions trading scheme, through which forestry projects may be supported by industries falling under the emissions quota allowance system;
– naturbanization processes which may become a promising human qualification of remote natural areas such as PNPG. People living in these places may derive their income from land management (farming, forestry, animal farming, payment from other ecosystem services), or telecommuting (working at home).

The three emerging processes described above, in combination with powerful driving forces such as tourism development, could, in the near future, forge a favourable environment for a truly sustainable development for low density natural territories. Achieving a correct balance between natural, economic and human systems is a major challenge for society but certainly not an impossible one, and natural parks where naturbanization processes start to play a role may be in a prominent position for that.

The last twenty years have shown that traditional planning policies are no longer able to manage the wide range of demands upon space that comes from a diverse group of actors, such as those found in rural areas today. Strategic analysis on several topics including stakeholder analysis needs to be consistently carried out and the environmental aspects should be integrated into territorial issues. More decentralized, bottom-up and flexible management of sustainable policies needs to be practice within a monitored planning process where research takes place.

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