

31

ECOTERRA MODEL—APPLICATION OF ENVIRONMENTAL FISCAL REFORM IN LOCAL GOVERNMENT FINANCING IN PORTUGAL

Joana Calado Araújo Prates and João Joanaz de Melo¹

A. Introduction	31.01	D. The Ecoterra Model	31.21
B. Land-Use Management in Portugal	31.06	E. Data Sets and Criteria	31.22
C. Local Government Financing in Portugal	31.16	F. Results and Discussion	31.23
		G. Conclusion	31.40

A. Introduction

Land use management is one of the least studied, more difficult, but possibly one of the most important fields for the application of economic instruments in environmental policy. Present biodiversity loss is a consequence of the decisions of many individual users of environmental products and service flows. This is a result of the ‘unpriced scarcity’ and ‘lack of property rights’ nature of the environment. The social value of various biodiversity goods and service flows is not or is insufficiently reflected in market prices. As a result, an undesirable level of provision of these goods and services will result in their destruction or degradation.² **31.01**

¹ Joana Prates, Researcher at the Department of Environmental Science and Engineering, School of Science and Technology, New University of Lisbon, Portugal. Joanaz de Melo, assistant professor at the Department of Environmental Science and Engineering, School of Science and Technology, New University of Lisbon, Portugal. The authors would like to thank Fundação para a Ciência e Tecnologia, who finances the EcoTerra project under the reference POCI/AMB/63087/2004; and the IMAR—Institute of Marine Research, at the School of Science and Technology, New University of Lisbon, which hosts the EcoTerra project.

² PALD Nunes, JCJM Van den Bergh, and P Nijkamp, *The ecological economics of biodiversity—methods and policy applications* (Edward Elgar Publishing, 2003).

- 31.02** If a resource is not owned by any party, then short-term exploitation is favoured and the common resource may be depleted or damaged. Two types of institutional approach have been used to deal with externalities associated with the environment. The first includes the allocation of property rights: if the right holder can obtain benefits of regular resource use over the long term, he or she has an incentive to protect and sustain environmental resources. However, historical experience of the United Kingdom and other Western European countries shows that private land ownership provides no guarantee against environmental degradation. Thus, the second approach, explicit regulation, has become the dominant mode of environmental standard setting.³
- 31.03** The valuation of environmental and economic benefits of biodiversity has gained attention since the 1960s. This assessment demands the simplification and translation of biodiversity complexity and has led to several scientific studies, especially in the field of ecological economics.⁴
- 31.04** Portugal, like other countries, suffers a number of serious problems regarding land use, such as loss of natural and cultural heritage and other sensitive areas to urban sprawl, inadequate transportation policy, soil erosion, and pollution due to inadequate land use. Although some of this results from ignorance or malpractice, most of the critical actions have been fuelled by powerful economic incentives. Traditional command-and-control approaches by means of land-use plans and regulations have proved ineffectual to deal with most of the issues. Earlier research by the authors and others⁵ has identified a number of economic instruments that may influence land use and its environmental consequences. Three main types of instrument have been referred: funds, charges, and taxes.
- 31.05** The main purpose of the EcoTerra project at the New University of Lisbon is to study improvements in economic instruments that will foster environmentally

³ R Lawrence, CL Spash, and C Carter, 'Environmental Valuation in Europe—Property, rights and fairness', policy research brief no 6 (2000). Concerted action funded by the European Commission DG-XII and the Swiss Federal Office of Education and Science, and coordinated by Cambridge Research for the Environment (CRE).

⁴ R Constanza, R d'Arge, R de Groote, S Farber, M Grasso, B Hannon, K Limburg, S Naeem, R O'Neill, J Pruelo, R Raskin, P Sutton, and M van den Belt, 'The value of the world's ecosystem services and natural capital' [1997] *Nature* 387, 253–60.

⁵ J Melo, A Torres, and P Veloso, 'Os impostos relacionados com o uso da terra como instrumento de Ordenamento do Território' (1997) 10 *O Economista* 206–12 (Polimeios/Associação Portuguesa de Economistas); JJ Melo, C Furtado, L Rosado, and P Antunes, 'Instrumentos financeiros com influência no ordenamento do território' (1998) 11 *O Economista* 159–63 (Polimeios/Associação Portuguesa de Economistas); I Ring, 'Ecological public functions and fiscal equalisation at the local level in Germany' (2002) 42 *Ecological Economics* 415–27, <<http://www.elsevier.com/locate/ecocon>>; and J Prates, JJ Melo, and T Leonardo, 'Melhorar o ordenamento do território através do modelo de financiamento das autarquias locais' (Congresso Nacional de Engenharia do Ambiente, APEA, Lisboa, Novembro 2003).

friendly land-use planning. We follow the concept of the environmental fiscal reform currently being debated in the European Union (EU).⁶ Melo and Prates⁷ have advocated in particular the combined use of real estate taxation and state budget transfers to local authorities, to promote better land use. The concept is explored further here, looking at possible implications of this model to regional development and local financing.

B. Land-Use Management in Portugal

Nature conservation policy in Portugal emerged in the 1970s with framework legislation on protected areas such as parks and preserves. This framework aims to defend the areas in which the natural habitat has to be preserved, as well as the rational usage and defence of natural resources. Protected areas now encompass 8 per cent of the country's area, most under 1993 legislation. **31.06**

During the 1980s, two other land-use management tools emerged. *RAN*—*Reserva Agrícola Nacional* (national agriculture reserve, instituted by *Decreto-Lei nº 451/82*) protects the best agriculture soils, representing 12 per cent of the country's area. *REN*—*Reserva Ecológica Nacional* (national ecologic reserve, instituted by *Decreto-Lei nº 321/83*) protects essential biophysical networks and resources such as rivers and their banks, major aquifers, coastal areas, and highlands, representing about 40 per cent of the country's area. **31.07**

By 1982, municipal land use plans (*planos directores municipais, PDM*) were made mandatory (*Decreto-Lei nº 208/82, 26 Maio 1982*), mostly without practical effect. In 1994, the government decreed that financing for local projects under the European funds was restricted to municipalities with approved PDM, hence causing the rapid implementation of PDM. **31.08**

In 1987, a major milestone was reached with the approval of the *Lei de Bases do Ambiente* (framework law on the environment, *Lei nº 11/87*). This became the basis for many environment-related pieces of legislation. Later, the *Lei de Bases do Ordenamento do Território e Urbanismo* (framework law on land management and urbanism, *Lei nº 48/98*) constituted the reference for regional and municipal land-use plans. **31.09**

Further protection of unique and notable biodiversity values took place with the implementation of Birds and Habitats Directives, with the Natura 2000 **31.10**

⁶ EEB, <http://www.eeb.org/activities/env_fiscal_reform/Index.html> (October 2007).

⁷ JJ Melo and J Prates, 'EcoTerra Model—economic instruments for sustainable land use management in Portugal', Conference of the European Society for Environmental Economics (ESEE), Leipzig, Germany (5–7 June 2007) (published book of abstracts, papers available online).

Sectorial Plan. By 2007, designated sites covered about 22 per cent of the country, largely coincident with protected areas under national law.

- 31.11** Despite the effort to introduce a rational and integrated land-use management policy, these instruments did not have the expected outcome. REN and RAN are considered to be the more polemic land management instruments because of the restriction they impose on land uses. The constraint of property rights is socially badly accepted because it questions the personal welfare implied in land possession—especially because there is no compensation to the landowner for a restriction that is in the public interest. This conflict is suggested as one of the major obstacles to the efficient implementation of land-use instruments and nature conservation policy. Another obstacle to the implementation of REN is the delimitation process, conducted independently by each municipality, often controversial or poorly founded (sometimes too strict, sometimes too lax).⁸
- 31.12** Among other indicators of poor land use management, we can refer to the following.
- 31.13** Portugal has one of the highest rates of houses per family in Europe: 1.4 in 2005. However, 10 per cent of houses are not being used.⁹
- 31.14** Between 1985 and 2000, there was a 42 per cent increase in artificialized areas: most of these disperse urban growth, despite the fact that the population almost stabilized in the same period (Figure 31.1).

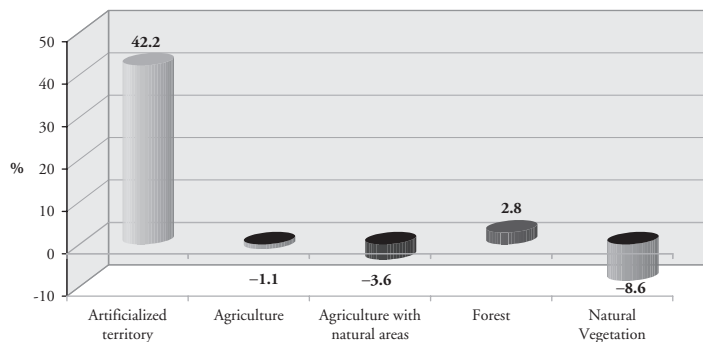


Figure 31.1 Relative variation of land-use classes in Portugal (1985–2000)

Source: CORINE Land Cover/Caetano *et al*, 2005.¹⁰

⁸ AC Cunha and JJ Melo, 'Ordenamento do território e finanças locais', 9ª Conferência Nacional do Ambiente (CNA, 2007), Universidade de Aveiro, 18–20 Abril 2007 (published proceedings).

⁹ INE, <<http://www.ine.pt>> (September 2007).

¹⁰ M Caetano, H Carrão and M Painho, 'Alterações da ocupação do solo em Portugal Continental: 1985–2000', Corine Land Cover 2000, Instituto do Ambiente (Dezembro 2005).

In short, existing legislation and planning efforts, although positive, have not been enough to curb most land-use management problems. **31.15**

C. Local Government Financing in Portugal

The most important instance of local government in Portugal is the municipal level, with significant autonomy and competences in a wide range of issues, including land-use management. There are 308 municipalities in Portugal (278 in the mainland and 30 in the autonomous regions of Azores and Madeira). **31.16**

Table 1 shows the structure of local government revenues in Portugal. It should be noted that 21 per cent of local financing is dependent on real estate taxes (real estate property tax, IMI; plus real estate transaction tax, IMT). This dependency is even higher if taking into account the revenue from construction fees and licences. There are many inconveniences associated with this model: it incentivizes lax urban planning rules to maintain revenues, and also makes those revenues vulnerable to crisis in the construction business. Another 22 per cent of the municipal revenues come from the municipal general fund (FGM), which is mostly proportional to population. On both counts, local government revenue depends upon conditions that are objectively harmful for the environment. **31.17**

In this chapter, we will focus our attention mostly on IMI and accessorially on FGM, the sources of municipal revenue that are most related with land use, and which depend only on national policies. **31.18**

The municipal real estate tax has an increasingly important role in local financing. In 2005, IMI revenue was already about €730 million.¹¹ At present, computation of IMI for urban real estate is based on the useful area of the building, modulated by a number of coefficients considering use (housing, services, or industry), location (available infra-structure), quality (comfort, equipment), and age. The current formula is more objective and equitable than the old one (before 2003). However, it completely overlooks environmental issues. Treasury offices are updating information on urban real estate in Portugal, a process that is expected to take until about 2013 (for non-urban real estate, no systematic update has begun or is programmed). Due to information updating only, IMI revenue is expected to grow by 70 per cent in 10 years; it will probably be more due to increasing urban expansion. With the current system, this growth will benefit essentially the densely populated coastal urban areas. **31.19**

¹¹ Reis, 'Finanças Locais: Diagnóstico da situação actual', Conferência no ISEG (Ministério das Finanças, 27 Janeiro de 2006).

Table 1 Sources of local government revenue, mainland Portugal (2003)

Local government revenues		€ million	%
Direct taxes	Real estate property tax (IMI)	681	11%
	Municipal vehicle tax (IMV)	103	2%
	Real estate transaction tax (IMT)	589	10%
	Local taxes	268	4%
Indirect taxes		159	3%
Transfers from state budget	Municipal general fund (FGM)	1,363	22%
	Municipal cohesion fund (FCM)	356	6%
	Municipal base fund (FBM)	286	5%
	European funds	371	6%
	Services and autonomous funds	99	2%
	Others	304	5%
Fees, duties, and penalties		196	3%
Property revenues (rents and similar)		115	2%
Sale of goods and services		152	2%
Sale of assets		412	7%
Financial assets		502	8%
Other revenues		204	2%
TOTAL		6,160	100%

Source: adapted from DGAL, <<http://www.dgaa.pt/default.asp?s=12140>> (October 2007).

31.20 The municipal funds are the most important national government transfers to local governments. The funds—*Fundo Geral Municipal* (FGM), *Fundo de Base Municipal* (FBM), and *Fundo de Coesão Municipal* (FCM) are based mostly on population, area, topography, and indicators of low development. Until 2007, no land use or environmental criteria were considered. The new local government financing law, which entered into force in 2007, establishes that 5 to 10 per cent of FGM shall be distributed according to the area included in the Natura 2000 Network and protected areas (nature parks and preserves). Politically speaking, this is a clear improvement, although the amount involved is low and implementation seems difficult, due to a number of technical problems.

D. The Ecoterra Model

31.21 The Eco Terra project focuses on the application of the concept of environmental fiscal reform to the promotion of better land use. The research and proposals developed are guided by the following general principles:

- Nature conservation should not be perceived as a restriction; it has to be considered and valued by its environmental services, such as water, soil, and biodiversity conservation. Compensation of this service should not be construed

as a payment for supposed lost income (often groundless anyway), but as a fair compensation for the public service those areas provide.

- The proposed model aims to: create an economic incentive both for the landowner and municipalities, regarding better environmental behaviour; give a sign to public opinion that the state values nature conservation and benefits whoever renders a public utility service in this domain; and create a fund to help finance nature conservation.
- These economic incentives should be financed by activities that, objectively, provoke environment depletion, such as urbanization of the land or intensive use of the soil, and should be balanced to guarantee an economic sustainability in the long term.
- Whenever possible, existing taxes and funds should be modified to comply with those aims, rather than creating new instruments (clearly, subsidies should be avoided, since they tend to be less equitable, more complex, and expensive to manage, and more liable to fraud).
- In accordance with the principle of fiscal neutrality in the Environmental Fiscal Reform, overall tax and local financing changes should be neutral for each group of stakeholders: government, regions, families, and companies. However, individual actors (for example, individual local governments and landowners) may be, and indeed should be, positively or negatively discriminated based on their environmental performance.

E. Data Sets and Criteria

The principles stated above can be applied with different scopes, practical criteria, and ambitions. In the present exercise, the following data and criteria were used: **31.22**

- The model was applied for mainland Portugal only, due to local government financing differences in Azores and Madeira (mainland Portugal represents 95 per cent of the population and 97 per cent of the country's area).
- Local governments and landowners who hold Natura 2000 sites, protected areas, and/or national ecological reserve (REN) are awarded a monetary benefit.
- A new Nature Fund is proposed, specifically to finance nature conservation projects at a local level. Such a fund should be governed not as a typical state subsidy, but in close cooperation with local authorities and environmental non-governmental organisations (NGOs) (nowadays, nature conservation in Portugal is severely hindered by dwindling funding from the state budget).

- The additional money needed for the Nature Fund and the benefits to local governments and landowners should be financed by the predicted increase in IMI revenues. The rationale for this is that urban IMI represents a tax on major environmental-consuming activities, and should therefore be ‘recycled’ into environmental protection. In this exercise, we propose that two-thirds of the predicted 70 per cent increase of IMI between 2004 and 2013 is allocated to nature-related purposes; and that 10 per cent of FGM is also allocated to nature-related purposes. Our reference year is 2003 (when the new IMI code was implemented and for which most relevant data sets are available).
- The amount diverted from IMI, plus the amount already allocated to nature in FGM, is to be divided into three equal parts: local governments, landowners, and Nature Fund.
- At present, no digital cartography is available for REN in most of the country, and it is thus impractical to cross-reference it with protected areas and Natura 2000. For the purpose of this exercise, those areas were simply added together, and are hereafter referred to as ‘classified areas’.
- Ideally, the benefits for classified areas should be echeloned according to their intrinsic ecologic value, but that is a complex issue beyond the scope of this chapter. In this exercise we shall distribute the funds proportionally to total classified area.

F. Results and Discussion

- 31.23** Table 2 shows a prediction, for the year 2013, of how the EcoTerra model (applied with the criteria discussed above) would change the structure of local financing. We assumed that the sources of revenue other than IMI would remain constant, and that IMI revenue would increase by 70 per cent over 2003 levels.
- 31.24** In short, €445 million out of a total revenue of €6,603 million (6.7 per cent) would be allocated to nature-related expenditure: €148 million to local governments proportionally to classified areas; €148 million to landowners proportionally to classified areas; and €148 million to nature conservation local projects through the Nature Fund, presumably invested locally proportionally to Natura 2000 area. (Note: minor discrepancies with other data are expected due to unresolved inconsistencies between information sources.)
- 31.25** Looking only at local government revenue, some local governments will receive less than before. However, taking into account that part of that money will be redistributed to landowners and through local projects, it is quite probable that many more people will benefit locally, and that will contribute to local development.

Table 2 Perspective for the year 2013 of differences between the present local financing model and the EcoTerra model in mainland Portugal

Financing model	Source		Direct beneficiary		Total
Reference model (2007 local financing law)	IMI	1,124	Local government	6,603	6,603
	Municipal funds	2,004			
	Other sources	3,475			
	Direct IMI	815	Local government	6,307	
Municipal funds (except nature)	1,868				
Other sources	3,475				
EcoTerra model	IMI and FGM earmarked for nature-related expenditure	445			6,603
			Landowners	148	
			Local nature projects	148	

Note: all values in € millions, at 2003 prices.

Source: adapted from DGCI (Direcção-Geral dos Impostos), IMI datasets for 2003 and 2004, provided by DGCI in unpublished digital format (2007); and DGAL (2007).

The benefit to landowners and local governments each would amount to **31.26** €27/year/ha of classified area. In comparison, the average agricultural subsidy to agriculture from European funds in Portugal amounts to about €100/year/hectare of farmland (based on IFADAP 2007¹² and IA 2005¹³). So, although the total amount involved is relatively low, it is significant for both municipalities and landowners possessing classified areas. The fund for local nature projects would amount in average to €78/year/ha of Natura 2000 areas.

Perhaps more significant than a national analysis are the local consequences. **31.27** All base data were processed by municipality and then aggregated into sub-regions for analysis. In mainland Portugal, there are no autonomous regions; the 278 municipalities are grouped into five regions and 28 sub-regions for planning and statistical purposes. The sub-region is the best level for analysis because it corresponds to roughly homogeneous areas.

We should first note that the proportion of classified areas varies widely from one **31.28** sub-region to another. This is actually the leitmotiv for the whole exercise, because areas that provide the ‘biodiversity service’ to society should indeed be benefited. (Some municipalities and sub-regions may show over 100 per cent classified area,

¹² IFADAP, <<http://www.ifadap.min-agricultura.pt>> (October 2007).

¹³ IA, *Relatório do estado do ambiente 2004* (Instituto do Ambiente, Lisboa, 2005).

because in this simplified exercise, area included both in Natura 2000 and REN was counted twice; in a real application, a finer analysis will be needed.)

31.29 Of course, a question then arises: what is the impact of the proposed model on the development ability of each region? We tried to answer this question by crossing the results of the model with selected demographic, land use, budgetary, and economic-development indicators.

31.30 Figure 31.2 shows population density and urban concentration.

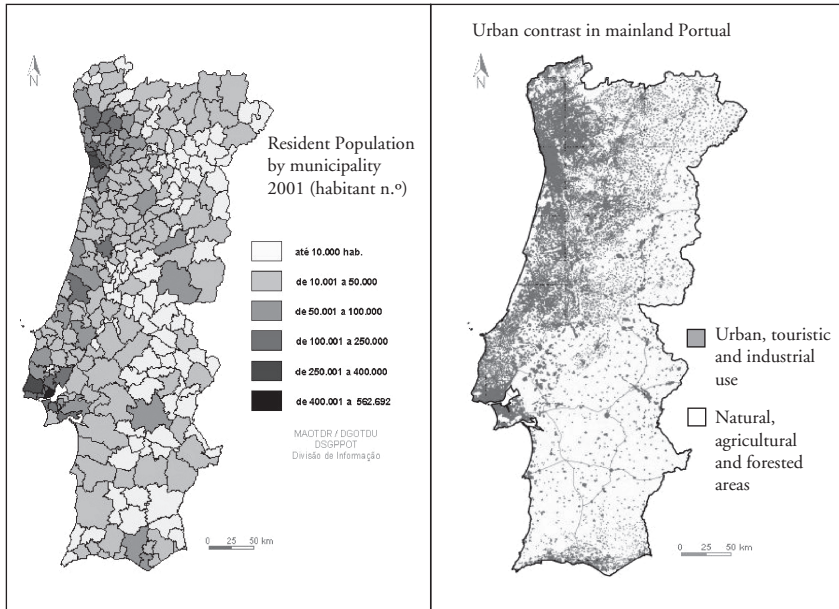


Figure 31.2 Left—resident population in 2001 by municipality; right—contrast between urban and rural areas

Source: DGOTDU, 2007.¹⁴

31.31 We have used the regional gross domestic product (GDP) as a simple indicator for economic development;¹⁵ in this exercise, we do not discuss social development indicators.

31.32 On the other hand, unfortunately, most information about individual municipal budgets is very difficult to come by, or is incompatible because of different sources and criteria. Hence, the regionalized result of the application of the EcoTerra model is analysed based only on the following items, for which compatible information exists: state budget transfers to the municipal governments through the

¹⁴ DGOTDU, <<http://www.dgotdu.pt>> (October 2007).

¹⁵ <<http://www.ine.pt>>.

municipal funds; IMI (both direct revenue and indirect revenue distributed according to the EcoTerra model); plus amounts distributed to landowners and the proposed Nature Fund, supposed to be spent locally. These items together represent 47 per cent of total municipal revenue predicted for 2013 (at 2003 prices), which we consider significant enough for a preliminary analysis.

Figure 31.3 and Table 3 show the location of sub-regions in mainland Portugal and how they are affected by the proposed model, as related to per capita GDP. **31.33**

We may regroup the 28 sub-regions into five groups according to the benefits of the new model and the level of economic development: **31.34**

- The largest group (14 sub-regions) is economically poor, with low population density and little urban development, but these regions have high importance for nature conservation. This group is highly benefited by the EcoTerra model, as intended.
- The second largest group, eight sub-regions, have a moderate economic development (between 75 and 100 per cent of the national average) combined with high population density and urban growth. This group is moderately prejudiced by the model, as expected, because they are usually poor in classified areas.
- Three of the richest sub-regions (Lisbon, Algarve, and Baixo Mondego) are among those with higher population density and urban growth. These are moderately prejudiced by the model, as expected, because they are relatively poor in classified areas, and they lose part of their IMI revenue linked to the urban growth.
- Two sub-regions show both large classified areas and high gross domestic product (GDP) per capita (due to relatively modern, concentrated industry), but relatively low population density. Hence, they are benefited by the model.
- Only one poor sub-region (with a GDP per capita equal to 55 per cent of the national average) is actually prejudiced by the model. This is a rather unexpected result that appears to have been caused by exceptionally high IMI revenue in 2003, our reference year.

Table 3 and Figures 31.4, 31.5, 31.6, and 31.7 show the relation between revenue change with the EcoTerra model and, respectively: per cent of classified areas; GDP per capita; growth of artificialized territory; and population density. **31.35**

Looking at relations between the results of the EcoTerra model and several indicators, it should first be noted that more sub-regions are benefited by the EcoTerra model than are prejudiced. **31.36**

In all cases, benefits from the new model are explained by high nature conservation value. This, of course, was the aim of the model. In the majority of sub-regions, this also corresponds to a significant upgrade in revenue to economically **31.37**

AU: The text was repeated twice in MSS. It is inserted in Figure. Is it ok? Please suggest.

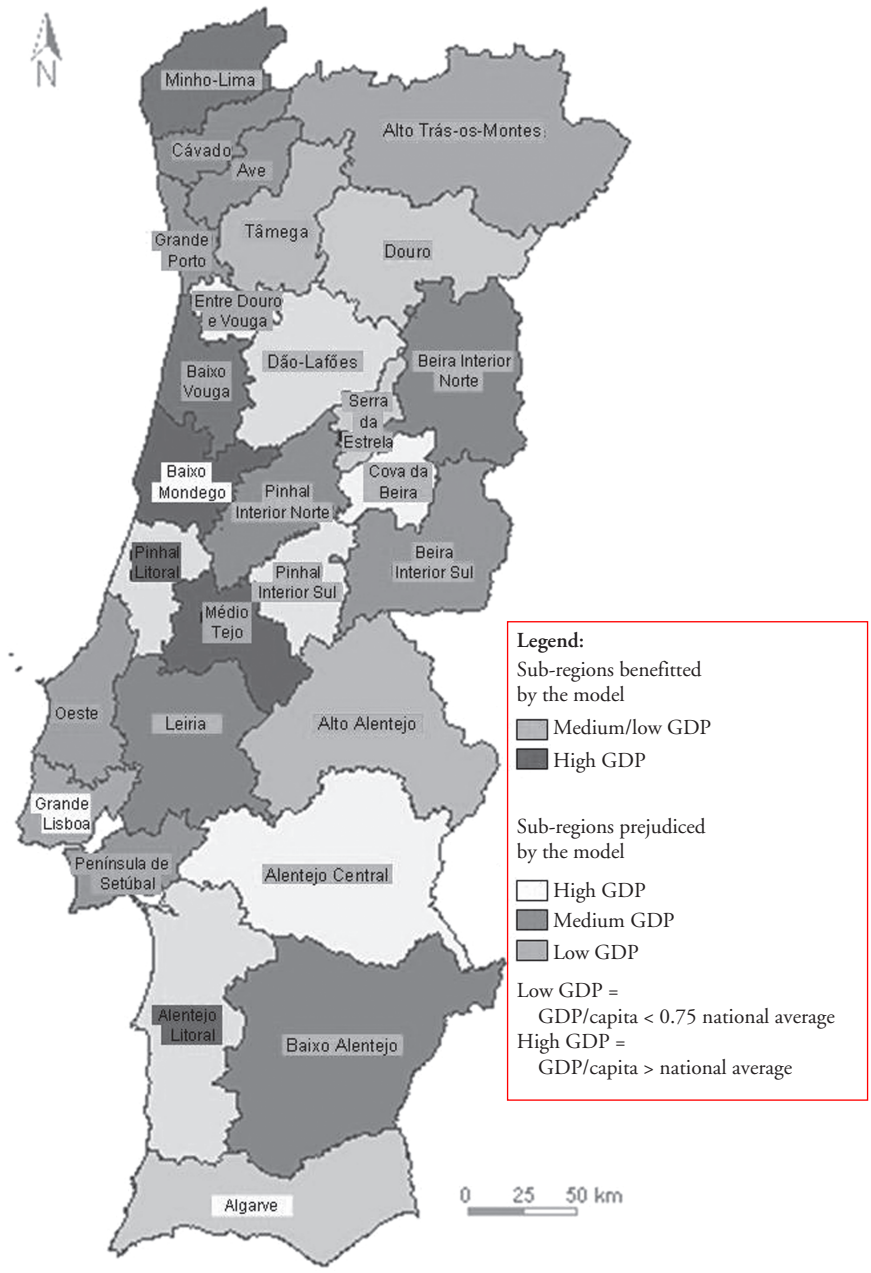


Figure 31.3 Results of application of the EcoTerra model by sub-region (adapted from DGOTDU 2007¹⁹)

Table 3 Results of the application of the EcoTerra model by sub-region (adapted from DGCI, 200716)

Region (NUTS II)	Sub-region (NUTS III)	Present model municipal funds +IMI (€ million)	EcoTerra model mun.funds+IMI (€ million)	Variation by sub-region (%)
Norte	Minho-Lima	92.1	95.3	3
	Cávado	95.6	89.0	-7
	Ave	126.8	114.1	-10
	Grande Porto	198.9	167.7	-16
	Tâmega	250.1	218.9	-12
	Entre Douro e Vouga	66.7	61.2	-8
	Douro	105.6	113.6	8
	Alto Trás-os-Montes	120.1	164.5	37
Centro	Baixo Vouga	106.2	102.0	-4
	Baixo Mondego	96.5	92.3	-4
	Pinhal Litoral	53.2	57.2	7
	Pinhal Interior Norte	84.9	87.0	2
	Dão-Lafões	95.8	101.3	6
	Pinhal Interior Sul	28.5	33.5	18
	Serra da Estrela	21.2	28.2	33
	Beira Interior Norte	65.4	81.4	24
	Beira Interior Sul	49.7	53.3	7
	Cova da Beira	25.0	29.0	16
	Oeste	199.2	162.8	-18
Médio Tejo	77.6	76.2	-2	
Lisboa	Grande Lisboa	402.1	332.4	-17
	Península de Setúbal	146.2	128.6	-12
Alentejo	Alentejo Litoral	75.0	93.4	25
	Alto Alentejo	76.3	110.8	45
	Alentejo Central	84.2	108.8	29
	Baixo Alentejo	84.4	132.7	57
	Lezíria do Tejo	92.0	91.5	0
Algarve	Algarve	209.3	201.5	-4
Total		3128.3	3128.3	0

poor areas; the two notable exceptions (*Pinhal Litoral* and *Alentejo Litoral*) are also rightly benefited, because they managed to combine economic development with large classified areas.

Large urban centres such as Coimbra, Aveiro, Lisboa, Porto, and Setúbal and the region of Algarve should receive less from municipal funds and IMI than before. This makes sense, since these areas are the richest, the biggest resource consumers, and thus those who most contribute to nature degradation. They usually have relatively less classified areas, and should therefore be the ones to bear the burden to finance nature conservation

Table 4 Comparison between the results of the EcoTerra model and key indicators, by sub-region

Sub-regions	Revenue variation with EcoTerra Model	Classified areas	GDP/capita (€/hab/year)	Increase of artificialized territory (1985–2000)	Population density (pop/km ²)
Minho-Lima	3%	68%	8,246.8	27.82	112.7
Cávado	-7%	50%	10,200.4	57.2	320.4
Ave	-10%	32%	10,443.1	83.21	360.1
Grande Porto	-16%	18%	13,218.1	199.95	1,553.4
Tâmega	-12%	60%	7,320.8	46.68	227.1
Entre Douro Vouga	-8%	42%	10,955.8	62.8	325.4
Douro	8%	51%	8,506.6	5.33	53.1
Alto Trás-os-Montes	37%	78%	8,401.3	3.42	27.0
Baixo Vouga	-4%	69%	12,316.0	36.23	216.0
Baixo Mondego	-4%	76%	13,578.6	20.31	163.5
Pinhal Litoral	7%	82%	13,693.6	35.44	147.3
Pinhal Interior Norte	2%	67%	7,799.6	6.18	52.6
Dão-Lafões	6%	54%	9,224.6	17.26	82.9
Pinhal Interior Sul	18%	71%	8,591.2	2.85	22.7
Serra da Estrela	33%	110%	7,734.7	3.83	56.7
Beira Interior Norte	24%	52%	8,907.5	3.92	27.9
Beira Interior Sul	7%	32%	11,150.3	3.84	20.4
Cova da Beira	16%	56%	8,250.5	5.13	67.3
Oeste	-18%	36%	12,062.3	44.28	146.7
Médio Tejo	-2%	51%	11,702.3	21.97	99.4
Grande Lisboa	-17%	45%	21,897.9	162.75	1,411.3
Península Setúbal	-12%	51%	9,987.9	94.79	475.5
Alentejo Litoral	25%	64%	17,599.6	4.07	18.4
Alto Alentejo	45%	73%	11,400.7	2.2	19.6
Alentejo Central	29%	69%	11,480.4	3.73	23.6
Baixo Alentejo	57%	79%	10,083.8	2.06	15.4
Lezíria do Tejo	0%	43%	12,152.8	22.36	57.3
Algarve	-4%	63%	14,105.5	26.59	80.5

Source: adapted from ICN 2005,¹⁶ INE 2007,¹² and Caetano et al, 2005.¹³

¹⁶ ICN, 'Area of protected areas and Natura 2000 by municipality' (2005) in unpublished digital format.

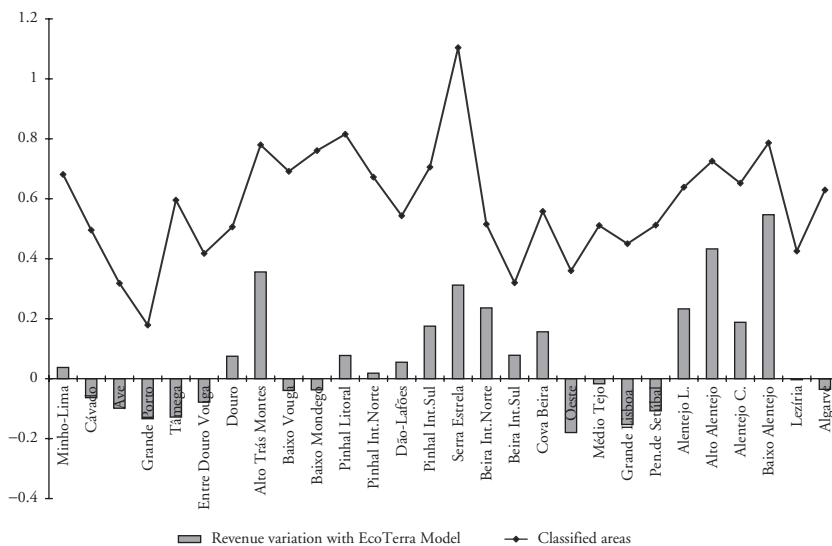


Figure 31.4 Relation between revenue variation with EcoTerra model and per cent of classified areas

Source: adapted from ICN 2005.²⁰

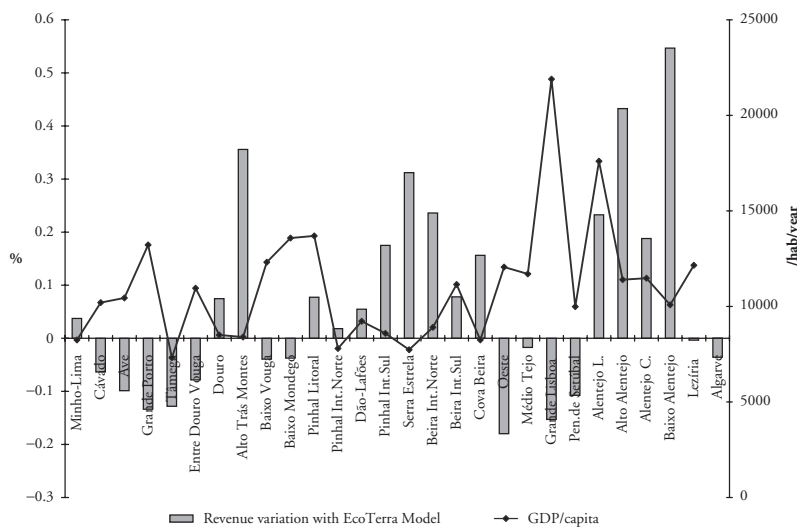


Figure 31.5 Relation between revenue variation with EcoTerra model and GDP per capita

Source: adapted from INE 2007.¹²

Critical Issues in Environmental Taxation

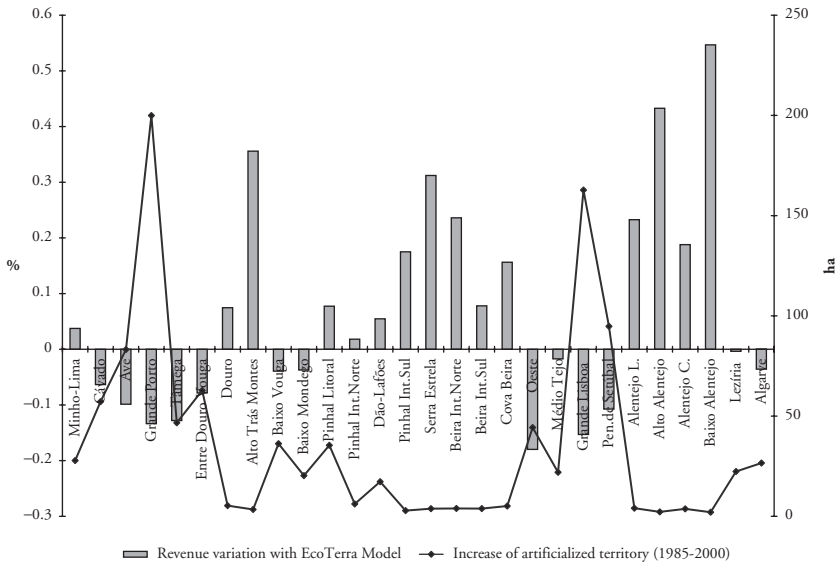


Figure 31.6 Relation between revenue variation with EcoTerra model and increase of artificialized territory.

Source: adapted from Caetano et al, 2005.¹³

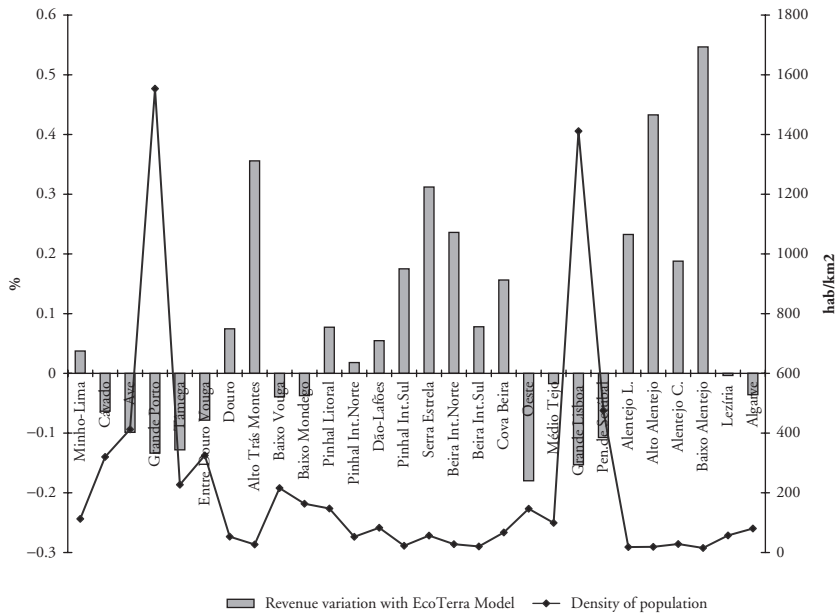


Figure 31.7 Relation between revenue variation with EcoTerra model and population density.

Source: adapted from INE 2007.¹²

in less developed regions. Moreover, because other financing sources (such as IMT, direct taxes, urbanization fees, and participation in national taxes) are higher in richer sub-regions, actual budget implications should be lower than predicted in this exercise.

Exceptions to the general pattern discussed above, notably the Tâmega sub-region, should merit closer scrutiny in further research. The first step will be to study the actual evolution of IMI, for which data is expected to be available shortly. **31.39**

G. Conclusion

The exercise performed in this chapter proves the feasibility of a concept: tax collection can have policy aims, and nature conservation can be funded by taxes based on environment-consuming activities. The financial resources exist, and relatively minor changes in existing instruments can do the job. **31.40**

Public opinion is bound to be open to the idea, because most citizens, companies, and municipalities stand to gain with the proposed model. **31.41**

Regarding regional development, the proposed scheme seems to be quite positive: urban and economically strong regions receive marginally less revenue from a growing real estate property tax, while under-developed, nature-rich regions are significantly benefited. Both receive an incentive to continue or begin environmentally friendly land-use policies. **31.42**

The things that are missing are better information systems that allow for easier cross-reference of land use, planning and taxation information, and political will. This may stem from either an advanced concept of tax and environmental policy by the government, or by public opinion pressure. **31.43**

