

12th Biennial Conference of the International Society for Ecological
Economics (ISEE 2012)
ECOLOGICAL ECONOMICS AND RIO +20
CONTRIBUTIONS AND CHALLENGES FOR A GREEN ECONOMY
29 May – 1 June, 2012, Rio de Janeiro, Brazil

Special pre-organised Session

“The role of economic instruments in the conservation policy mix”

**Ecological fiscal Transfers in Portugal: their role and incentive in the policymix
for biodiversity conservation**

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Abstract

This study was developed in the scope of POLICYMIX and SCALES projects (EC-FP7), building on the adopted common framework for assessing instruments in policy mixes. The objective is to analyse the functional role of ecological fiscal transfers (EFT) in the policy mix for biodiversity conservation in Portugal, as well as the incentives to change local public actors behaviour and increase policy outcomes.

Ecological fiscal transfers intend to align incentives of public actors at different

governance levels in order to foster biodiversity conservation objectives. Portugal is a pioneer within the European Union in the use of ecological fiscal transfers, through the amended Portuguese Local Finances Law (LFL) of 2007, which introduced ecological criteria in the allocation of fiscal revenues from the national to the municipal level in the country.

Intergovernmental fiscal transfers account for an average of around 60% of the budgets of Portuguese municipalities. Non-earmarking is the general principle adopted for intergovernmental fiscal transfers to the local level. This means that all monies are received as lump-sum transfers, with municipalities free to decide upon their use. The total area under protection and the percentage of municipal land taken up by conservation areas are the only conservation criteria involved in the ecological fiscal transfer component of this law. The quality of conservation areas is not taken into account.

This scheme provides for the compensation of municipalities whose economic development options have been limited by the land-use constraints imposed as a result of the designation of protected areas or Natura 2000 sites. This aspect is of particular importance when studying the functional role of ecological fiscal transfers in the Portuguese biodiversity conservation policy, as protected areas are the centerpiece of this policy.

To study the functional role of EFT, in terms of synergies, conflict or temporal sequencing with other instruments, the paper analyses the evolution of the conservation policy in Portugal based on published information.

A second part is focused in the ex-post analysis of the instrument performance in the context of the policymix, considering environmental and economic criteria. The analysis covers a period of 2 years (2008/09, with full implementation of the Law). The instrument is analysed in terms of the significance of fiscal transfers for municipal budgets, showing the impact of the Law across municipalities. The crossover effects of the several changes and adjustment mechanisms introduced in the Law are highlighted. The incentive and redistributive effects are also discussed.

Based on the results obtained, adjustments in the Law are discussed. Lessons learnt provide significant insights both for improving the functional role of LFL in the Portuguese conservation policy as well as the policy outcomes.

Keywords

Biodiversity conservation; Protected areas; Natura 2000; Intergovernmental fiscal transfers; Local Finances Law; Portugal

1. Introduction

It is widely acknowledged that the current trend of declining biodiversity represents a threat to human wellbeing and, for this, biodiversity loss has been extensively addressed as a serious global environmental issue over the past decades. The failure to account for the full economic value of ecosystems and their associated services has been pointed out as a primary cause of the continued loss of natural systems (TEEB, 2010). For this reason, there is a growing focus on finding suitable economic instruments to provide incentives for conservation and sustainable use of biodiversity. By relying on market mechanisms, it is possible to come up with more cost-efficient solutions to conservation, as actors are motivated through competition to develop new ways of safeguarding environmental resources (Vatn et al., 2011).

Using economic instruments in biodiversity policies can be an effective approach to reconcile conservation costs faced at the local level with the benefits of biodiversity conservation at higher levels of governance (Perrings and Gadgil, 2003; TEEB, 2011; Ring et al., 2010). However, most of economic tools applied to date (e.g. conservation subsidies, agri-environment schemes, and payments for environmental services) have focused on land users and thus, private local actors and their conservation costs. Addressing the cost of conservation for local public actors is still largely missing, even though these actors play an important role in implementing conservation policies at the local level. Intergovernmental fiscal transfers have been identified as a suitable instrument to address local governments in their role for biodiversity conservation and ecosystem management, as they can help to internalize the spillover benefits (positive spatial externalities) associated with these activities (SRU, 1996; Ring, 2002; Köllner et al., 2002; Ring, 2008).

Under fiscal transfer schemes, public revenue is redistributed through transfers from national and subnational governments to local governments, helping lower-tier governments cover their expenditure in providing public goods and services. Ecological fiscal transfers are distributed according to ecological or conservation-based indicators, aiming to compensate for the opportunity costs to local government of establishing and managing conservation areas or other environmental measures and/or for local public expenditure on conservation actions (Ring, 2008). The use of fiscal transfers for conservation policies is relatively new, and only few studies have

focused on assessing the effectiveness of this instrument. Although recommended in a number of countries for introduction, at present, ecological fiscal transfers have only been implemented in few countries, like Brazil and, more recently, Portugal.

Since 2007, Portugal acknowledges protected areas as an indicator for the redistribution of public revenues through fiscal transfers from the national budget to municipalities. In this paper, we first present the ecological fiscal transfers design and discuss its role in the Portuguese conservation policy, namely possible interactions with other conservation instruments. Following, we look at the impact of the introduced ecological criterion in regards to its conservation effectiveness and cost-effectiveness, as well as to the benefits generated to municipalities. We then discuss the development of new criteria as alternative ecological indicators.

2. Ecological Fiscal Transfer mechanism in Portugal

The Portuguese Local Finances Law specifies three different funds for the fiscal transfers from the national to the local level: (1) the **Financial Equilibrium Fund** (FEF – *Fundo de Equilíbrio Financeiro*) that corresponds to 25,3% of the average of the revenues collected from Personal Income Tax (IRS), Corporate Profits Tax (IRC) and Value Added Tax (IVA); (2) the **Municipal Social Fund** (FSM – *Fundo Social Municipal*) that corresponds to the expenses associated with devolved competencies from central to local administration regarding social public functions, namely concerning education, health and social action; and (3) a variable fraction corresponding to up to **5% of the IRS** (Personal Income Tax) collected from individuals living in the municipality.

The positive discrimination of the municipalities with land classified as protected areas is introduced in the allocation of funds from **the General Municipal Fund** (FGM), which corresponds to 50% of the Financial Equilibrium Fund (FEF); the remaining 50% are allocated to the Municipal Cohesion Fund (FCM), aimed at balancing development levels and opportunities among municipalities. FGM is allocated to municipalities according to the following criteria:

- 5% is equally distributed to all municipalities;

- 65% is allocated as a function of population density (weighted in order to benefit less populated municipalities), and of the average number of stays in hotels and camping grounds;
- 30% is distributed considering the municipalities' area and topography, and land surface under conservation networks:
 - 25% is distributed in proportion to the area, weighted by elevation levels, and 5% proportionally to the land surface classified as Natura 2000 or other protected areas, in municipalities with less than 70% of their territory under conservation networks; or
 - 20% in proportion to the area weighted by elevation levels, and 10% proportionally to the land surface classified as Natura 2000 or other protected areas, in municipalities with more than 70% of their territory under conservation networks.

The total area under protection and the percentage of municipal land occupied by protected areas are the only ecological criteria at play in this law. The principle adopted for this intergovernmental fiscal transfer is non-earmarking, meaning that beneficiaries (local governments) are free to decide upon their use. Figure 1 presents a synthesis of the fiscal transfers components, including in green the ecological sign pathway.

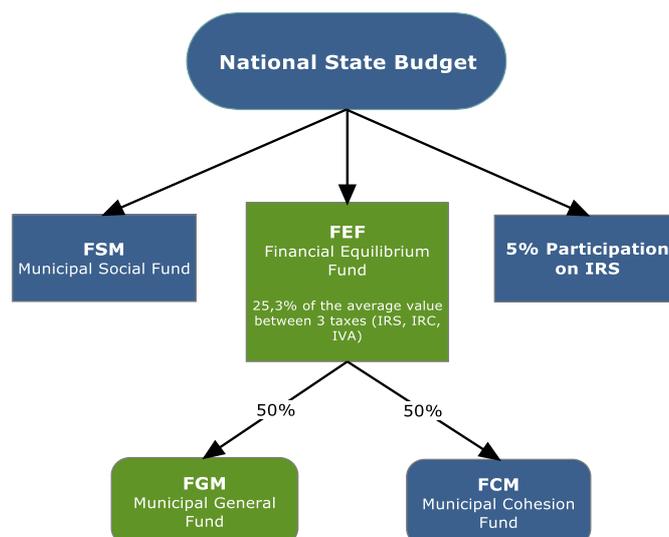


Figure 1- Representative scheme of the allocation of State funds to municipalities. The ecological signal is part of the allocation criteria of the FGM (50% of the Financial Equilibrium Fund)

3. Functional role of ecological fiscal transfers in the Portuguese biodiversity conservation policy

Local actors, private and public, run into management and opportunity costs due to conservation policies and, when there is a mismatch between those who bear the costs and beneficiaries of provided public environmental goods and services, these actors have no incentive to support conservation. Different types of economic instruments can help to internalize the positive externalities, namely spillover benefits, generated by local conservation activities, depending on the actors involved (Ring et al., 2010). Under public and private schemes, economic instruments are widely applied to compensate landowners and companies – private actors – for income forgone and opportunity cost of providing ecological goods and services (e.g. payments for ecosystem services).

In contrast, the conservation costs faced by municipalities and district governments – local public actors – are often neglected. These costs are usually caused by protected areas, one of the essential regulatory instruments of biodiversity conservation (MA, 2005; TEEB, 2011). Decisions about where conservation areas are to be located are often taken at higher levels of government, even though the costs of losing those areas for other social and income-generating developments are borne by local governments (Ring, 2002; Perrings and Gadgil, 2003). Particularly large protected areas and those associated with major land-use restrictions, such as national parks or Natura 2000 sites according to the EU Habitats Directive, may lead to missed development opportunities, and thus, to lower municipal budgets through forgone local taxes. Consequently, opposition of local governments towards new and existing protected areas is encountered globally, as they are perceived by local actors as an obstacle to development (Stoll-Kleemann, 2001; Ring et al., 2010).

Intergovernmental fiscal transfer can help to turn local opposition towards protected areas into active support by internalizing the positive externalities of protected areas and other conservation measures. Fiscal transfer schemes redistribute public revenues from national and regional governments to local governments aiming to provide the latter with financial resources to fulfill their local public functions, and to help reducing fiscal inequalities (Boadway and Shah, 2007). Usually, the

redistribution of public revenues to lower levels of government is based on socioeconomic indicators, reflecting the acknowledged relevance of the associated public functions. If ecological indicators are also used to guide distribution, fiscal transfers can compensate for the opportunity cost resulting from land-use restrictions and/or for local public expenditure on conservation (Ring, 2008; TEEB, 2011).

Existing ecological fiscal transfers schemes use officially designated protected areas as an indicator to allocate transfers, which are distributed in the form of lump-sum or general-purpose (unconditional) transfers. A few Brazilian states also consider the quality of protected areas to guide distribution to the municipalities.

Portugal is the first EU Member State to recognize protected areas as an indicator for the redistribution of public revenues through fiscal transfers from national to local governmental level (Santos et al., 2012). This instrument was introduced with the approval of a revised Local Finances Law (LFL – Law 2/2007, 15th January), which establishes the general principles and the rules for the transfer of funds from the State (national government) to the local level (municipalities).

The revised LFL introduced Article 6, which is dedicated to the promotion of local sustainability and establishes that ‘*the financial regime of municipalities shall contribute to the promotion of economic development, environmental protection and social welfare*’. Article 6 foresees as one mechanism to achieve this general goal, a positive discrimination of the municipalities with land classified as Natura 2000 Network or other national protected areas (Table 1) in the allocation of funds.

Table 1: Portuguese classified areas considered in the Local Finance Law

Natura 2000 Network	Special Area of Conservation (SAC), Habitats Directive
	Special Protection Area (SPA), Birds Directive
National Network of Protected Areas	National Park
	Natural Park
	Natural Reserve
	Protected Landscape Area
	Natural Monument

The classification of areas under protection status is one of the country's central instruments for conserving biodiversity and promoting sustainable use of natural resources, as well as for achieving Portugal environmental commitments to the European Union and United Nations (*i.e.* halting biodiversity loss until and after 2010/2020). Public policies for biodiversity conservation in Portugal date back to the 70s, and focused on the widespread strategy of removing areas and territories from the economic and territorial development process, in order to preserve them, thus benefiting nature and communities. This rationale of using command and control instruments for biodiversity conservation, that limit or restrict activities and land use, still prevails nowadays. Species and, by extent, their habitats have been the spotlight of national conservation efforts.

EFT, in theory, play an important role in the Portuguese environmental policy because they complement protected areas designation (C&C approach) with an economic instrument that accounts for the local conservation costs and spillover benefits related to the first. In addition, they are specific addressed to local public actors and, thus, complement instruments primarily addressed to private actors (e.g. agri-environment measures; compensation for damages caused by wolves).

Ecological fiscal transfers are compensatory measures that recognizes the positive externalities generated by protected areas, and may incentive municipalities to acknowledge and value their natural capital, and to maintain the supply of ecological goods and services at a level that could otherwise be reached only at higher social costs by protected area regulations on their own (Ring et al., 2010). No recognition of positive externalities is expected to lead to under-provision of public goods and services (Bergmann, 1999).

Ecological Fiscal Transfers, indirectly, also contribute to implement the National Strategy for Nature and Biodiversity Conservation (NSNBC), which is the most important reference document for biodiversity policy in Portugal. The strategy was adopted in 2001 (Council of Ministers Resolution No. 152/2001, October 11th) and defines the fundamental principles, objectives and lines of action for nature and biodiversity conservation, taking into account the international commitments assumed under the Convention on Biological Diversity (CBD). Among its 10 strategic action points, the NSNBC stresses the need for enhancing protected areas and Natura 2000 sites, and ensuring the conservation of their natural, cultural and social capital.

4. Interactions with other instruments

Portuguese EFT interact directly with the instruments that regulate or influence the process of classifying areas under networks for nature conservation. Several direct regulation instruments regarding biodiversity conservation are in play in Portugal, however, the Legal Framework for Nature Conservation and Biodiversity and the Natura 2000 Network Sectoral Plan are the two most relevant due to their role in establishing conservation areas, defining land management rules and rights, and restricting land use change.

Ecological fiscal transfers also interact with some of the existing economic instruments for biodiversity conservation, typical European subsidy-based instruments, such as agri-environment measures (AEM). More recently, other instruments have been created, such as public funds (e.g. Fund for Nature Conservation and Biodiversity).

A timeline of the economic instruments and regulation policies relevant for biodiversity conservation in Portugal is presented in table 2, while table 3 shows examples of instruments from other sectors that influence or potentially affect biodiversity conservation policies.

As explained above, the surface of protected areas is the ecological criterion used for redistributing public revenues to municipalities in the new Local Finances Law. Therefore, the Legal Framework for Nature Conservation and Biodiversity, which regulates the Fundamental Network for Nature Conservation¹, and land-use planning instruments, which set land use and conservation strategies at different territorial scopes, influence the operation of EFT.

Agri-environment measures (AEM) implemented under the European Common Agriculture Policy - the main conservation support program in the country - also interact with EFT. Instruments may overlap if local public actors are eligible to apply for AEM addressed to protected areas. However, in the cases where EFT aim to compensate the opportunity costs of biodiversity conservation in terms of lost tax

¹ The Fundamental Network for Nature Conservation comprises the National Network of Protected Areas (RNAP), the Natura2000 Network and all other areas classified under international commitments.

revenues for local governments (as happens in Portugal), while AEM cover the management costs for conservation measures, overlap does not exist.

Table 2 – Portuguese historical policy context of economics instruments and regulation policies regarding biodiversity conservation

DIRECT REGULATION	YEAR	ECONOMIC INSTRUMENTS
National Ecologic Reserve ²	1983	
1986 Portugal's adhesion to the EU		
Fundamental Law on Environmental Policy	1987	
	1991	Forest Action Program (1991-1993) Regulation (EEC) 2328/91
National Network of Protected Areas	1993	
	1994	Forestry Development Program (1994-1999) Regulation (EEC) 2080/92 and 2078/92
Fundamental Law on Forest Policy	1996	
Natura 2000 Network	2000	AGRO (AEM, 2000-2006) RURIS (AEM, 2000-2006)
National Strategy for Biodiversity and Nature Conservation	2001	
	2004	Permanent Forest Fund
National Strategy for Forests	2006	Portuguese Carbon Fund
	2007	ProDer (AEM, 2007-2013) Local Finances Law (LFL)
Elemental Network for Nature Conservation Natura 2000 Network Sectoral Plan	2008	
Forest Code	2009	Fund for Nature Conservation and Biodiversity

In fact, there are in Portugal a few AEM that aim to support local public actors to bear management costs of conservation. This is the case of the “Integrated Territorial Interventions”, a set of 13 agri-environment measures for promoting environmentally friendly agriculture and forestry systems in areas of special ecological interest, which includes Natura 2000 sites and Natural Parks. If Portuguese EFT also intends to cover, in addition to opportunity costs, management costs faced by public actors, instruments would be overlapping. On the other hand, measures oriented to public actors but

²Although the first National Park (Gerês) was created in 1971.

applied to areas outside conservation networks are more likely to complement EFT, as they could contribute to guarantee the territorial continuity of conservation promoted within protected areas.

Table 3 – Sectoral instruments potentially affecting conservation

Sectors	Activities	Instruments (examples)
Food Production	<ul style="list-style-type: none"> • Agriculture • Livestock • Fishing 	PRODER Program Agri-environmental measures
Land-Use Policy	<ul style="list-style-type: none"> • Urban areas and Rural areas • Forests 	Land Management Plans for Protected Areas
Tourism		Projects of potential national interest or of strategic importance (PIN ⁺)
Industrial production	<ul style="list-style-type: none"> • Timber 	Certification of Sustainable Forest Management (GFS)
Energy and climate change	<ul style="list-style-type: none"> • Biofuels 	National Programme for Climate Change (PNAC)
Water management		River Basin Management Plans

Complementarity among instruments is also expected when AEM are addressed to local private actors within protected areas. For instance, there are specific measures oriented to landowners in less-favored areas for agriculture (e.g. mountains) within Natura 2000 Network. In this case, while EFT explicitly address public actors, AEM aim to compensate private actors for their conservation costs (i.e. income loss associated to the restriction imposed by a conservation network).

5. Impact Evaluation

5.1. Cost-effectiveness and distributional aspects

5.1.1. *Relevance of fiscal transfers*

Intergovernmental fiscal transfers from central government are an important source of revenues for Portuguese municipalities: in average, they provide around 60% of the total municipal revenues, revealing an important dependency from national funding. Beyond fiscal transfers, municipal revenues come from different sources, such as

direct taxes (e.g. property taxes - *Imposto Municipal sobre Imóveis*– IMI), or indirect taxes/tariffs (e.g. water and sanitation).

In the majority of Portuguese municipalities fiscal transfers withstand for more than 75% of their total municipal revenues both for 2008 and 2009, as shown on Figure 2. However, the relevance of fiscal transfers for municipal revenues differs significantly between the municipalities. In 2008, for example, it ranged from 25% in Lisbon to 97% in Barrancos. The relevance of fiscal transfers is higher for inland municipalities than in coastal municipalities, as the latter are typically more populated and developed, with other relevant sources of revenues, such as property taxes.

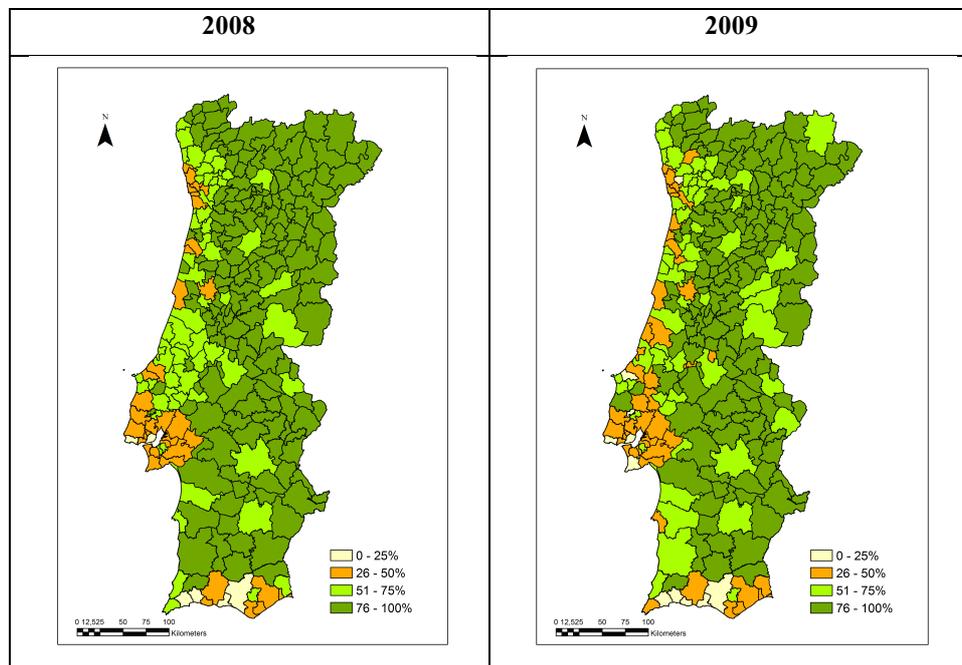


Figure 2 - Share of direct fiscal transfers in total municipal revenues, in 2008 and 2009

These conclusions imply that changes in LFL allocation criteria can have relevant impacts in terms of funding and, particularly, to the development strategy of municipalities with a high dependency on fiscal transfers.

5.1.2. Comparison between the new LFL and the previous law

The changes introduced by the 2007 Local Finances Law had an impact on fund allocation among municipalities. To assess it, the real transferred values of 2008 and 2009 were compared to the estimated transfers if applied the previous LFL criteria, assuming the same total amount of transfers (real national total transferred value).

This comparison allows the identification of which municipalities win and lose with the changes introduced in the allocation criteria by the new Law (see Figure 3).

In 2008, 43% of municipalities win with the new LFL criteria, and Vila Nova de Gaia was the one with the highest gain (2,8%). On the opposite, Castro Marim has the highest loss, -10,3%, due to the new allocation criteria.

In 2009, there are slight changes: 45% of municipalities win with the new criteria; however wins and losses are more significant. The maximum gain is of 5,3%, for Loures, and the major loss is for Óbidos, -22,8%.

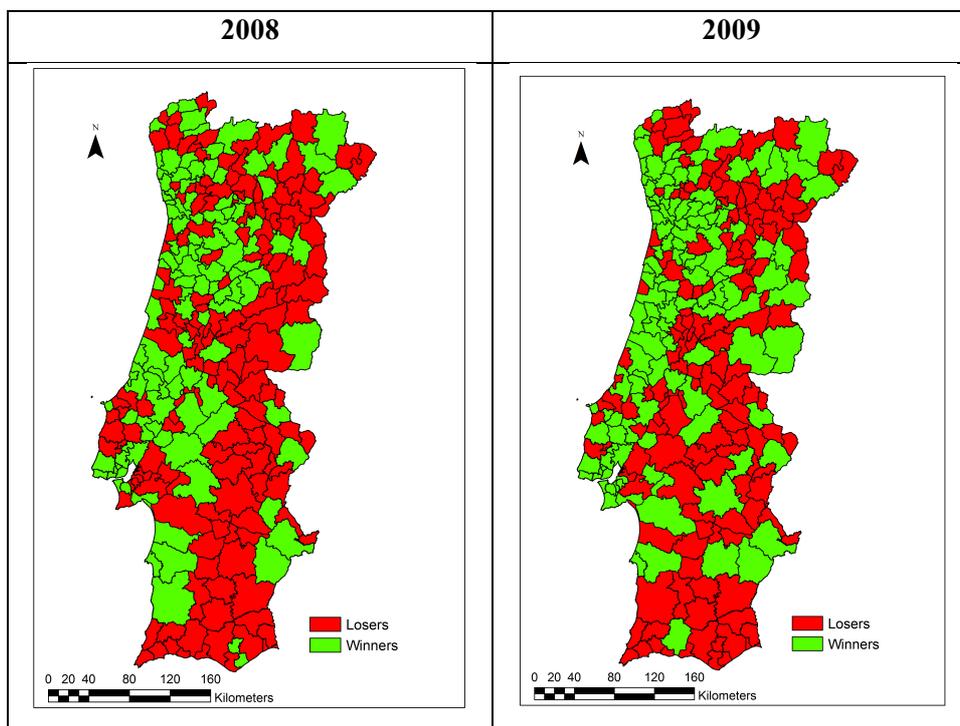


Figure 3 - Comparison of real transfers allocation based in the new and previous LFL criteria, using the same total transfer, in 2008 (on the left), and 2009 (on the right)

A more refined analysis was performed using a sample of municipalities (table 4) divided in two groups: the ones with more than 70% of municipal area under classification status; and the ones with less than 70% of classified area. The reference year considered was 2008.

Only two municipalities (Vila do Bispo and Aljezur) have considerable negative variations, -5,9%, all other municipalities vary between -1% and 1%. Note that 97% of Vila do Bispo area is classified under conservation networks, thus this municipality was supposed to be a major beneficiary of the new LFL. In addition, in the group of municipalities with more than 70% of classified area, only one wins with the new

criteria for fund allocation. This indicates that the introduction of an ecological signal was not sufficient to counterbalance other effects and provide a higher incentive to those municipalities with a larger proportion of protected areas.

Table 4 - Comparison of real 2008 transfers allocation based in the new and previous LFL criteria

Municipalities	Share of Class.	Real Transfers New Law 2008	Transfers Applying the	Differences	Comparing
	Conservation Area per Municipality		Old Law criteria for the same National Total Transfers value		with the Real Transfers New Law 2008
	(%)	€	€	%	
Municipalities with more than 70% of Classified Areas					
MANTEIGAS	100%	3.749.243	3.780.659	-0,8%	Loser
BARRANCOS	100%	3.203.738	3.230.583	-0,8%	Loser
CAMPO MAIOR	100%	4.402.813	4.439.705	-0,8%	Loser
VILA DO BISPO	97%	3.767.189	3.988.693	-5,9%	Loser
T. DE BOURO	95%	5.656.128	5.703.523	-0,8%	Loser
FREIXO ESP CIN	91%	4.803.725	4.843.976	-0,8%	Loser
MONCHIQUE	87%	6.448.121	6.502.152	-0,8%	Loser
MURTOSA	80%	3.693.300	3.724.248	-0,8%	Loser
ARRONCHES	79%	3.945.061	3.978.118	-0,8%	Loser
PORTO DE MÓS	76%	6.847.121	6.829.203	0,3%	Winner
ALJEZUR	73%	5.166.722	5.470.516	-5,9%	Loser
Municipalities with less than 70% of Classified Areas					
MÉRTOLA	60%	10.517.751	10.605.882	-0,8%	Loser
SESIMBRA	53%	5.128.655	5.184.736	-1,1%	Loser
AVEIRO	49%	9.190.900	9.176.537	0,2%	Winner
VIMIOSO	43%	6.079.020	6.129.958	-0,8%	Loser
SINTRA	36%	35.069.105	34.970.197	0,3%	Winner
AMARANTE	27%	14.374.890	14.381.184	-0,04%	Loser
V. CASTELO	15%	15.184.697	15.191.346	-0,04%	Loser
PESO DA RÉGUA	12%	6.179.792	6.162.362	0,3%	Winner
GRÂNDOLA	9%	6.732.129	6.730.139	0,03%	Winner
ÉVORA	6%	13.799.015	13.805.057	-0,04%	Loser
AG. BEIRA	3%	5.175.695	5.219.063	-0,8%	Loser
LISBOA	0%	62.579.750	62.403.250	0,3%	Winner
ALMEIRIM	0%	5.579.726	5.582.169	-0,04%	Loser
National Total		2.406.532.952	2.406.532.952		

5.1.3. Ecological transfer

In this section, the ecological signal introduced with the new LFL is analyzed in more detail. For this, Table 5 shows the relevance of ecological transfers for municipalities with more than 70% of Classified Areas, on their total municipal fiscal transfer, and on total municipal revenues. The results for 2008 and 2009 are quite similar, with small variations (1% - 2%).

In 2008, for this group of municipalities, the ecological transfers represent, in average, 24% of the total municipal transfer, and 18% of their total municipal revenues. In 2009, the values are 25% and 19%, respectively. These figures indicate that ecological transfers have a significant weight on the annual budget of these municipalities. In Castro Verde, this dependency is particularly higher: in 2009, the ecological component was 44% of the total fiscal transfer and 37% the total municipal revenues.

To better understand the relevance of the ecological component for municipalities, unit indicators are presented for a sample containing municipalities with more than 70% of classified area, and with less than 70%. Table 6 presents the ecological transfers per unit of municipal area (hectare), population (inhabitant) and classified area (hectare).

The unit value of the ecological signal is 49€ (2008) and 54€ (2009) per ha of protected area for municipalities with more than 70% of their territory under protection status; in the remaining municipalities the values are approximately half, 25€/ha in 2008, and 27€ for 2009. The spatial distribution of this indicator per municipality is shown on Figure 4.

The distribution of the ecological based funds per inhabitant varies significantly in the municipalities of the sample, even between municipalities belonging to the same group.

Even though the ecological signal is not globally very strong, it is relevant for some municipalities with problematic socio-

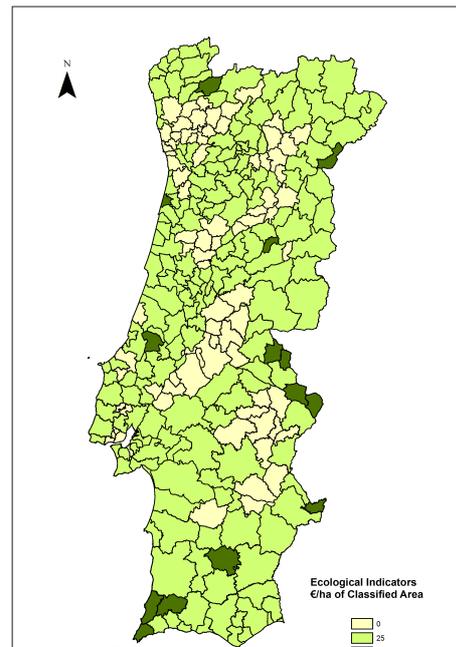


Figure 4. Ecological transfers per unit of protected area (€/ha), in 2008.

economic contexts and that have almost all the municipality area under protection status, as is the case of Barrancos.

Table 5 – Share of ecological transfers on municipal revenues, in 2008 and 2009.

	2008				2009		
	Share of Class. Conservation Area per Municipality	Ecological component	Share of the Ecological Component on Total Fiscal Transfer	Share of Ecological Component on Total Municipal Revenues	Ecological component	Share of the Ecological Component on Total Fiscal Transfer	Share of Ecological Component on Total Municipal Revenues
	(%)	(€)	(€)	(€)	(€)	(€)	(€)
MANTEIGAS	100%	599.120	16%	10%	662.433	17%	10%
MARVÃO	100%	760.953	22%	13%	841.144	23%	14%
BARRANCOS	100%	826.290	26%	25%	914.063	27%	26%
CAMPO MAIOR	100%	1.213.135	28%	25%	1.340.986	29%	24%
VILA DO BISPO	97%	855.718	23%	12%	946.153	25%	10%
TERRAS DE BOURO	95%	1.291.931	23%	21%	1.428.420	24%	22%
CASTELO DE VIDE	94%	1.226.599	31%	21%	1.356.209	33%	24%
FREIXO DE ESPADA À CINTA	91%	1.088.280	23%	21%	1.203.478	24%	22%
MONCHIQUE	87%	1.689.730	26%	18%	1.877.280	28%	19%
MURTOSA	80%	288.785	8%	6%	319.204	8%	6%
ARRONCHES	79%	1.217.399	31%	20%	1.346.156	32%	20%
PORTO DE MÓS	76%	982.326	14%	11%	1.086.111	15%	11%
CASTRO VERDE	76%	2.123.784	37%	34%	2.621.778	44%	37%
ALJEZUR	73%	1.167.256	23%	16%	1.306.925	25%	17%

Table 6 - Ecological Component Indicators

Municipalities	Ecological component		Ecological Component per unit					
	€		€/inhab		€/ha Munc		€/ha CA	
	2008	2009	2008	2009	2008	2009	2008	2009
Municipalities with more than 70% of Classified Areas								
MANTEIGAS	599.120	662.433	159	178	49	54	49	54
BARRANCOS	826.290	914.063	468	528	49	54	49	54
CAMPO MAIOR	1.213.135	1.340.986	145	162	49	54	49	54
VILA DO BISPO	855.718	946.153	158	174	48	53	49	54
TERRAS DE BOURO	1.291.931	1.428.420	166	187	47	51	49	54
FREIXO DE ESPADA À CINTA	1.088.280	1.203.478	277	309	45	49	49	54
MONCHIQUE	1.689.730	1.877.280	271	306	43	47	49	54
MURTOSA	288.785	319.204	29	32	40	44	49	54
ARRONCHES	1.217.399	1.346.156	374	417	39	43	49	54
PORTO DE MÓS	982.326	1.086.111	39	43	38	41	49	54
ALJEZUR	1.167.256	1.306.925	218	245	36	40	49	54
Municipalities with less than 70% of Classified Areas								
MÉRTOLA	1.897.556	2.131.244	247	284	15	16	25	27
SESIMBRA	254.735	281.673	5	6	13	14	25	27
AVEIRO	235.822	260.794	3	4	12	13	25	27
VIMIOSO	511.845	566.050	103	115	11	12	25	27
SINTRA	280.307	310.024	1	1	9	10	25	27
AMARANTE	201.737	223.139	3	4	7	7	25	27
VIANA DO CASTELO	117.831	130.096	1	1	4	4	25	27
PESO DA RÉGUA	27.797	30.701	2	2	3	3	25	27
GRÂNDOLA	170.081	187.996	12	13	2	2	25	27
ÉVORA	188.590	607.901	3	11	1	5	25	27
AGUIAR DA BEIRA	0	0	0	0	0	0	0	0
LISBOA	0	0	0	0	0	0	0	0
ALMEIRIM	0	0	0	0	0	0	0	0
National Total	2.406.532.952	2.513.722.014						

5.1.4. Smoothing Mechanisms

According to the new LFL, the final value transferred to each municipality is based on a gross total transfer value, sum of the three main funds (FEF (=FGM+FCM), FSM and 5% participation on IRS), corrected according to the adjusting (smoothing) rules shown on Figure 5.

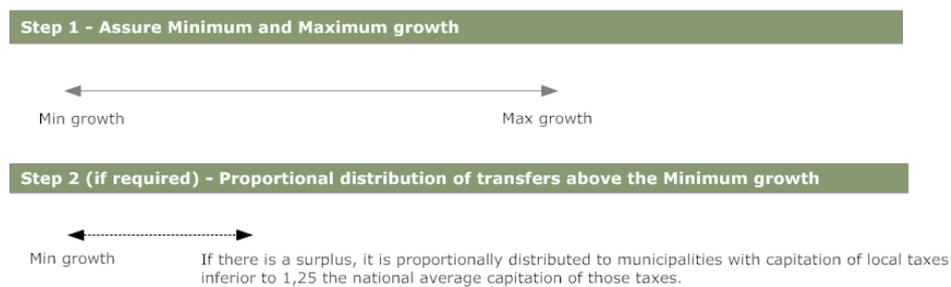


Figure 5 – Rules for adjusting the Gross Total Transfer value into the Final Real transfer

The goal is to provide **more evenness** in fund allocation between municipalities with different economic wealth and development and **avoid strong variations** each year. However, in the short term, they reduce the impact of the changes introduced by the new law on fund allocation.

To assess the impact of these smoothing mechanisms in the ecological sign, we used a scenario, for 2008, where the new local finances law was applied assuming that there was no ecological component (this means that the area criterion in FGM, 30%, will only consider total municipal area, eliminating the weight attributed to the ecological component).

The comparison (Figure 6) shows several differences in the Gross total transfer value (before applying the smoothing mechanisms), where some municipalities benefit from the presence of the ecological criterion, and others lose with its adoption as a criteria for fund allocation. However, after applying the smoothing mechanisms established in the Law, the real effective impact of the ecological component is only on 4 municipalities, one of them winning and the other three losing, and the remaining municipalities would not suffer any real changes.

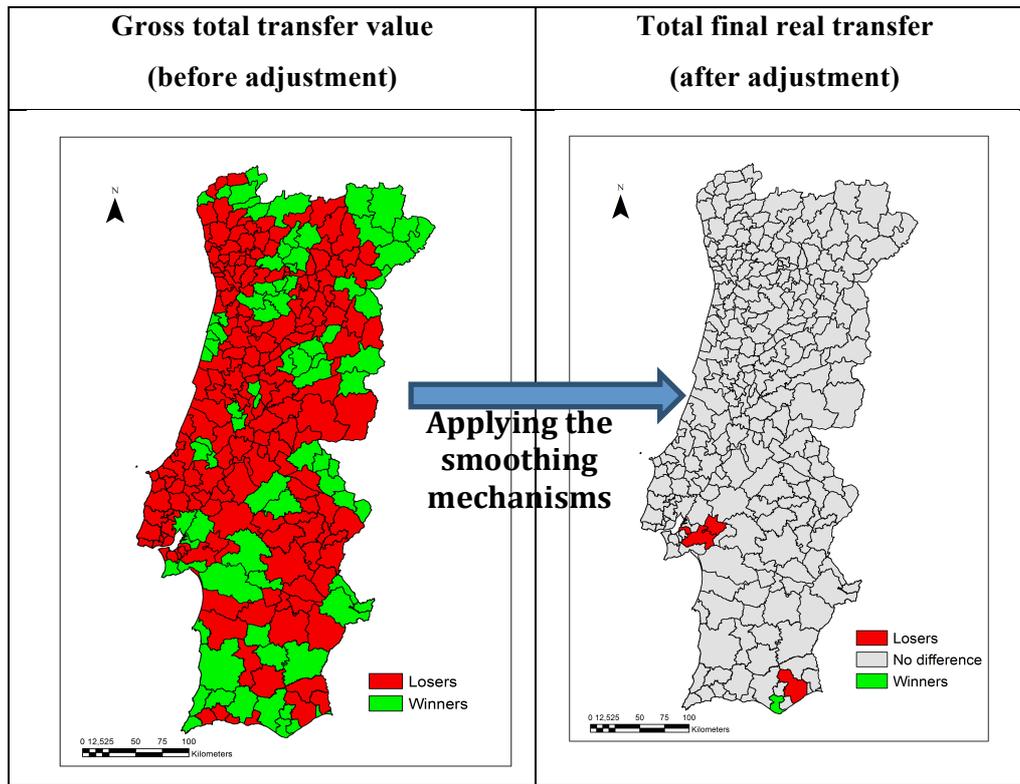


Figure 6 - Impact of the Smoothing mechanisms in 2008

The introduction of these smoothing mechanisms, which have a strong impact on fund allocation, is another factor that contributes to reduce the financial incentive offered to municipalities by the ecological fiscal transfers scheme.

5.2. Conservation effectiveness

As previously referred, the mechanism is mainly oriented to compensate for opportunity costs supported by municipalities, and the principle adopted for this intergovernmental fiscal transfer is non-earmarking, meaning that all transfers are received as lump-sum transfers, where beneficiaries (local governments) are free to decide upon their use. For this reason it not possible to clearly assess the ecological effectiveness resulting from the use of the ecological transfers amounts, as the allocated funds are not necessarily applied in conservation measures. Besides that, this mechanism is too recent, in an ecological timescale, to evaluate direct or indirect impacts (positive or negative) on municipalities behavior and decisions related with the conservation of protected areas, biodiversity and ecosystem services.

Nonetheless, it is possible to compare the ecological transfers per municipality with the expenditure on biodiversity conservation to discuss their commitment with conservation. For this comparison, we used data available on *Municipal Surveys for Environmental Protection*, from the National Statistics Institute, regarding the “biodiversity and landscape protection” domain. This category includes all necessary activities undertaken by municipalities for the protection of ecosystems and habitats, fauna and flora, landscape protection, due to their aesthetic value, and for the preservation of natural sites, protected by national or international laws. It also includes activities aimed at the conservation of endangered species of fauna and flora, activities for forest management and protection, and the restoration of affected landscapes to enhance their natural functions or add to their aesthetic value. The rehabilitation costs of abandoned mines or paths, activities of restoration and cleaning aquatic sites, elimination of acids and artificial agents of eutrophication, pollution clean-up in aquatic sites, as well as cleaning coastal areas and beaches are also included. Activities related to the management of urban parks and gardens are not included in this cost category.

The maps on Figure 7, illustrate the share of municipal expenditure on biodiversity protection in relation to the ecological transfer, in 2008 and 2009.

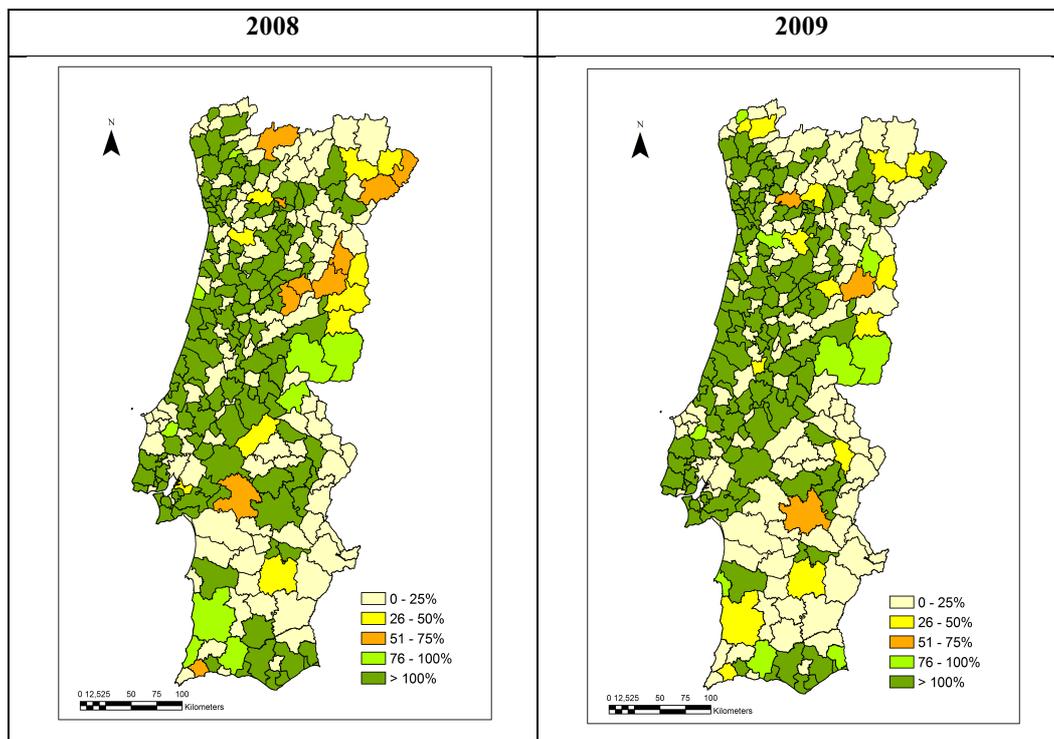


Figure 7 -Municipal expenditure on biodiversity conservation compared to Ecological transfers, in 2008 and 2009.

In both years approximately 48% of the municipalities have ecological expenditures higher than the ecological transfer they receive from the Local Finances Law. In a number of cases this happens because municipalities with no classified areas on their territory receive zero from the ecological component. However, the implementation of biodiversity protection and conservation measures is not exclusive to classified areas. In the remaining 52% of the municipalities the expenditures on biodiversity conservation are, in average, only 12% of the revenues from ecological transfers, mainly because several municipalities have no expenditure on biodiversity conservation.

Focusing the analysis on the group of municipalities with more than 70% of their territory under classification status (benefit with a higher percentage of ecological component in the FGM), it is possible to verify that none of them has high shares of expenditure on biodiversity when compared to their ecological revenue from LFL transfers (except Aljezur in 2008). In fact, most of them have zero expenditure on biodiversity protection, according to the available data. These results can be justified by the role of other environmental authorities (e.g. Institute for Nature Conservation) that assume the costs of the interventions in protected areas (Table 7).

6. New ecological criterion for the LFL

As previously explained, the current ecological criterion considered in the allocation of the General Municipal Fund (FGM) to municipalities is based on classified areas. However, the fact that some municipalities do not encompass protected areas does not mean that they are not contributing or investing in ecological aspects. In addition, ecological values and services are not restricted to protected areas or Natura 2000 sites, as they are a complex and connected network that covers all territory.

Based on the idea that the introduction of other indicators that better reflect ecosystem values and services can complement the current ecological criterion, some scenarios considering alternative indicators for the allocation of the FGM are being developed. A spatially explicit analysis is being performed to investigate: a) the distribution of the FGM **ecological component** (i.e. the share of the FGM distributed to each municipality through the ecological criteria); b) the variation of the total sum

allocated to each municipality from the FGM, taking as a reference the 2008 real transfers.

Table 7- Share of expenditure in ecological revenues, for Municipalities with more than 70% of classified areas

	Share of Class. Conservation Area per Municipality (%)	2008			2009		
		Ecological component (€)	Municipal Expenditure on Biodiversity Cons. (€)	Share of the expenditure in ecological revenues (%)	Ecological component (€)	Municipal Expenditure on Biodiversity Cons. (€)	Share of the expenditure in ecological revenues (%)
MANTEIGAS	100%	599.120	102.000	17%	662.433	22.000	3%
MARVÃO	100%	760.953	0	0%	841.144	0	0%
BARRANCOS	100%	826.290	0	0%	914.063	0	0%
CAMPO MAIOR	100%	1.213.135	0	0%	1.340.986	0	0%
VILA DO BISPO	97%	855.718	0	0%	946.153	0	0%
TERRAS DE BOURO	95%	1.291.931	0	0%	1.428.420	0	0%
CASTELO DE VIDE	94%	1.226.599	284.000	23%	1.356.209	55.000	4%
FREIXO DE ESPADA À CINTA	91%	1.088.280	0	0%	1.203.478	0	0%
MONCHIQUE	87%	1.689.730	281.000	17%	1.877.280	131.000	7%
MURTOSA	80%	288.785	0	0%	319.204	0	0%
ARRONCHES	79%	1.217.399	65.000	5%	1.346.156	48.000	4%
PORTO DE MÓS	76%	982.326	121.000	12%	1.086.111	131.000	12%
CASTRO VERDE	76%	2.123.784	58.000	3%	2.621.778	118.000	5%
ALJEZUR	73%	1.167.256	1.038.000	89%	1.306.925	308.000	24%

One of the alternative indicators considered was the sum of the average provision of cultural, regulating and supporting ecosystem services by each municipality, estimated according to Burkhard et al. (2009) approach.

In this case, the percentage of the FGM considered for calculating the ecological component was 18%, three times the observed in 2008 when the total value transferred through the ecological criterion was around 6% of the FGM. This change is intended to increase the weight of the ecological criterion in the FGM distribution, while at the same time respecting the hierarchy established in the LFL by maintaining it as the third most relevant criterion. Note that by increasing the ecological component the representativeness of other non-ecological criteria was proportionally reduced: *population density* corresponds to 55% of the total FGM, and *total municipal area* to 22%.

In the presented scenario, the ecological component was calculated based on two indicators: 1) 50% of the ecological component (9% of FGM) used the indicator composed by the sum of the mean provision of cultural, regulating and supporting services by each municipality; 2) the other half considered the indicator currently used in EFT, the surface of classified areas. The sum of the amounts calculated using both indicators provided the final ecological transfer.

In this scenario, all municipalities received funds, suggesting that they all provide ecological services at some level. In average, municipalities received around 635.000€ from the ecological component, and the highest and lowest transfers were observed in the municipalities of Odemira (3.807.982€) and Porto (40.943€), respectively. The funds received by the majority (72%) of municipalities increased with the new criterion. However, there were municipalities with significant losses, as, for instance, Lisbon, with -14,6%.

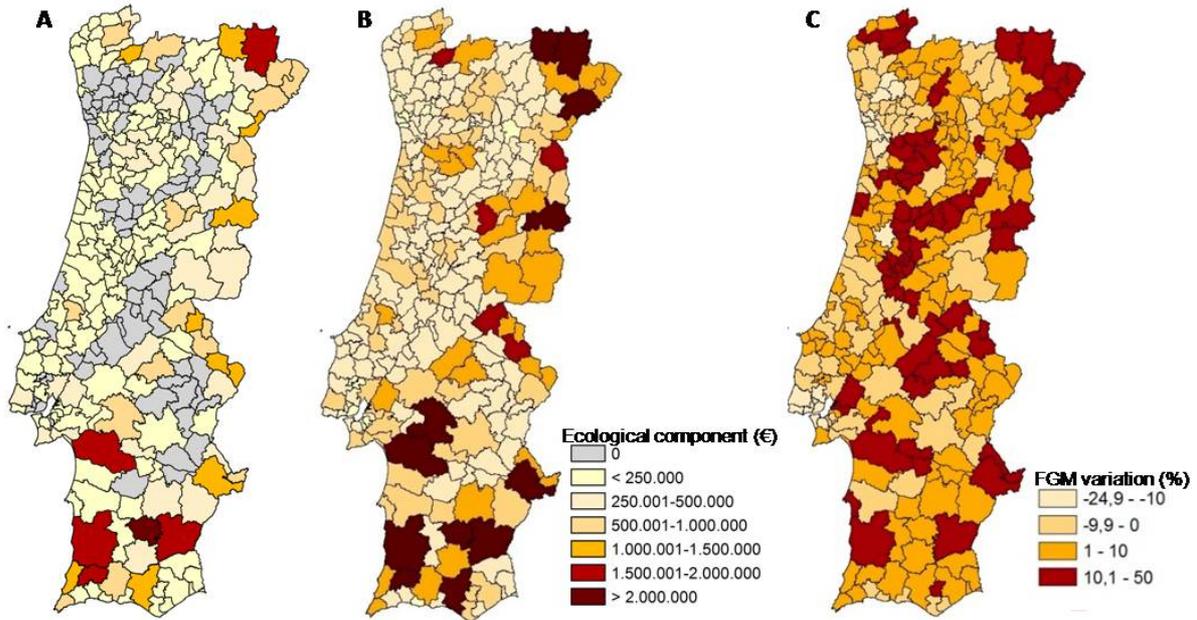


Figure 8 – Fund allocation of the ecological component (€), using the criteria proposed in the scenario, and consequent impact on FGM (%)

A - Real allocation of ecological component; B – Ecological component according to the new scenario; C- Variation of FGM, when comparing real FGM allocation with scenario FGM allocation

7. Conclusion

The New Portuguese LFL introduces a new scheme that intends to compensate municipalities for land-use constraints imposed by the classification of protected areas or Natura 2000 sites, thus providing an incentive and creating a new mindset in local authorities more favourable to biodiversity conservation. This objective is aligned with the theoretical recommendations stating that intergovernmental fiscal transfers can be an effective instrument to support the local provision of ecological goods and services with spillover benefits, when ecological indicators are used for redistributing finances from central to local levels (Ring, 2002; Köllner et al., 2002; May et al., 2002; Ring, 2008a, b).

The ecological component applied in the Portuguese Local Finances Law discriminates positively municipalities with high percentages of classified areas. However, the current ecological criterion used for fund allocation, based on a single indicator - surface of classified areas, does not compensate all municipalities, despite

their contribution to the protection and conservation of biodiversity and ecosystem services.

The significant number of changes simultaneously introduced by the new LFL made the ecological component difficult to grasp by the affected stakeholders, due to the presence of many crossover effects that hide the financial incentive offered to municipalities by the ecological signal.

Furthermore, this mechanism is too recent, in an ecological scale, to be possible to evaluate the existence of direct or indirect impacts (positive or negative) on protected areas, biodiversity and ecosystem services. Nonetheless, it may be an important step to change the mindset of decision makers.

Further research on the adoption of alternative criteria for the allocation of ecological fiscal transfers is being developed, exploring opportunities to improve the Portuguese LFL in order to strengthen the incentives both to maintain the existing biodiversity values and ecosystem services, and create new conservation areas.

8. References

- Bergmann, E., 1999. Lenkung der Flächenausweisung über Zuweisungen? Informationen zur Raumentwicklung 9, 555–564.
- Boadway, R., Shah, A., 2007. Intergovernmental fiscal transfers: principles and practices. The World Bank, Washington, D.C.
- Burkhard, B., Kroll, F., Müller, F., Windhorst, W., 2009. Landscapes' Capacities to Provide Ecosystem Services - a Concept for Land-Cover Based Assessments. Landscape Online 15, 1-22. DOI:10.3097/LO.200915
- Köllner, T., Schelske, O., Seidl, I., 2002. Integrating biodiversity into intergovernmental fiscal transfers based on cantonal benchmarking: a Swiss case study. Basic and Applied Ecology 3, 381-391.
- MA (Millennium Ecosystem Assessment), 2005. Ecosystems and Human Well-being: Biodiversity Synthesis. World Resources Institute, Washington, D.C.

- Perrings, C., Gadgil, M., 2003. Conserving biodiversity: Reconciling local and global public benefits In: Kaul, I., Conceição, P., le Goulven, K., Mendoza, R.U. (Eds.): Providing global public goods: Managing globalization. Oxford University Press, Oxford, pp. 532-556.
- Ring, I., 2002. Ecological public functions and fiscal equalization at the local level in Germany. *Ecological Economics* 42, 415-427.
- Ring, I., 2008. Integrating local ecological services into intergovernmental fiscal transfers: The case of the ecological ICMS in Brazil. *Land Use Policy* 25, 485-497.
- Ring, I., Drechsler, M., van Teeffelen, A.J.A., Irawan, S., Venter, O., 2010. Biodiversity conservation and climate mitigation: what role can economic instruments play? *Current Opinion in Environmental Sustainability* 2, 50-58.
- Santos, R., Ring, I., Antunes, P., Clemente, P., 2010. Fiscal transfers for biodiversity conservation: the Portuguese Local Finances Law. *UFZ Diskussions papiere* 11/2010. Helmholtz Centre for Environmental Research, Leipzig.
- Santos, R., Ring, I., Antunes, P., Clemente, P., 2012. Fiscal transfers for biodiversity conservation: the Portuguese Local Finances Law, *Land Use Policy*, 29 (2), 261-273.
- SRU (Der Rat von Sachverständigen für Umweltfragen), 1996. Konzepte einer dauerhaft-umweltgerechten Nutzung ländlicher Räume. Sondergutachten. Metzler-Poeschel, Stuttgart.
- Stoll-Kleemann, S., 2001. Opposition to the designation of protected areas in Germany. *Journal of Environmental Planning and Management* 44, 109-128.
- TEEB, 2010. Mainstreaming the Economics of Nature: A Synthesis of the approach, conclusions and Recommendations of TEEB. Available online at <http://www.teebweb.org/TEEBSynthesis-Report/tabid/29410/Default.aspx>, accessed 10 April 2012.
- TEEB, 2011. The Economics of Ecosystems and Biodiversity in National and International Policy Making (ed Patrick ten Brink), Earthscan, London. Available online at <http://www.teebweb.org>, accessed 10 April 2012.

Vatn, B. A., Barton, D. N., Lindhjem, H., Movik, S., Ring, I., Santos, R., 2011. Can Markets Protect Biodiversity? An evaluation of different financial mechanisms. Noragric Report No. 60, Department of International Environment and Development Studies, Noragric.