COMPLEMENTARY FINANCING FOR ENVIRONMENT IN THE CONTEXT OF ACCESSION – INNOVATIVE RESOURCES

Synthesis of the national level analyses from Bulgaria, Croatia, Former Yugoslavian Republic of Macedonia, Turkey and Romania

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Supporting reports

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Kazakova, Y. & Todorova, M. 2007. Complementary Financing for Environment in the Context of Accession – Innovative Resources: A Review of the international experiences with PES. WWF DCP, Vienna/Sofia, 32 pp

Lang, S. 2007. Complementary Financing for Environment in the Context of Accession – Innovative Resources: Potential sustainable funding sources for case study funding needs, WWF European Policy Office, Brussels, 15 pp

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Complementary Financing for Environment in the Context of Accession – Innovative Resources: Synthesis of the National Level Analyses from Bulgaria, Croatia, Former Yugoslavian Republic of Macedonia, Turkey and Romania

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1 INTRODUCTION

The 2004 and 2007 EU enlargements have significantly enriched biodiversity within the EU territory. Moreover, the possible accession of several new eastern European countries in the future is foreseen to increase EU's biodiversity capital even further. However, the new biodiversity assets also bring forward new challenges for biodiversity conservation. The rapid economic development combined with major political and social changes in the new EU Member and Candidate States are increasingly pushing landowners and land-users to undertake activities that often lead to negative environmental impacts, including loss of biodiversity and ecosystems. Consequently, valuable ecosystem services, i.e. functions performed by natural ecosystems that directly or indirectly support human wellbeing, are being lost as a result of mismanagement and lack of incentives to preserve them[1].

Since the commitments made in 2001 by the European Council, halting the loss of biological diversity has formed the main goal of the EU policy for biodiversity and nature conservation. The EU nature Directives (i.e. the habitats and birds Directives) and the implementation of the Natura 2000 network play a key role in achieving this policy objective. It has also been acknowledged that due to the long history of land use in the EU a significant part of biodiversity lies outside the actual protected areas network. Consequently, increasing amount of attention is also currently given to ensuring the sustainable use and conservation of biodiversity and the related ecosystem services within broader land- and seascape.

In order to achieve the EU biodiversity goal and to match the pressures created by economic development on biodiversity in the EU Member and Candidate States sufficient funding for the conservation and sustainable management of biodiversity needs to be guaranteed. This forms one of the main challenges for the enlarging EU in the future. Finding innovative solutions is a key element within the current EU's biodiversity policy and in this context payments for environmental services (PES) are considered to have increasing potential in encouraging and financing conservation activities. The idea of PES is that those 'providing' environmental services by conserving natural ecosystems are also to receive compensation / payments from beneficiaries of the service[2]. By directly combining the providers and beneficiaries, PES may also succeed where other conservation approaches have failed. This may increase the appeal of conservation practices to a number of stakeholders, such as farmers.

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[1] Further information about biodiversity related ecosystem services see Millennium Ecosystem Assessment http://www.millenniumassessment.org/en/Synthesis.aspx

[2] For more information on PES see for example Wertz-Kanounnikoff, S. 2006. Payments for environmental services – A solution for biodiversity conservation? IDDRI publication 12/2006 ressources naturelles, Institut du Développement Durable et des Relations Internationales (IDDRI), Paris, France, 16 pp.

The application of direct payments for conserving biodiversity and related ecosystem services, particularly in agricultural areas, has started to gain increasing attention in the EU and elsewhere. For example, the EU payments under the rural development policy have become more and more focused on delivering biodiversity related benefits. However, the effectiveness and efficiency of these payments in supporting biodiversity conservation are still to be further assessed. A number of existing examples indicate, for instance, that the design of payment schemes needs to improved in order to ensure that supported activities fully deliver the defined biodiversity objectives. In order to monitor PES scheme results, more suitable and easy-to-measure indicators for conservation of biodiversity and ecosystem services need to be developed. In general, the future challenge is to establish financing systems in which the appropriate amount and form of payment for environmental services will have the desired effect in influencing the decisions of landowners.

2 OBJECTIVES AND STRUCTURE OF THE REPORT

This report presents a synthesis of the results from five case studies exploring the possibility to establish PES schemes for biodiversity conservation in two new EU Member States and three candidate countries, namely Bulgaria, Croatia, Former Yugoslavian Republic of Macedonia, Romania and Turkey. The report forms a part of a project 'Complementary Financing for Environment in the Context of Accession – Innovative Resources' (070201/2006/443879/MAR/E3) that has been carried out by the WWF Danube-Carpathian Programme and IEEP for the European Commission in 2006-2007.

The structure and objectives of this report are as follows: **Chapter 3** outlines the methodology used to calculate PES level estimates for different the case study areas considered in this study. It also summarises the criteria for selecting the case study areas at national level. **Chapter 4** provides a short synthesis on the different country case studies, including the main developments in land use and the main threats to biodiversity and ecosystem services. Against this background the Chapter also present the rationales behind the foci of PES schemes in case study areas. **Chapter 5** analyses the results of the PES calculations, including presenting the main land management practices suggested to be supported by PES schemes. **Chapter 6** provides information on the broader regional and national framework needed for establishing PES schemes in the studied countries. Finally, **Chapter 7** summarises the main conclusions from the five case studies and provides general recommendations for establishing PES schemes in Bulgaria, Croatia, Former Yugoslavian Republic of Macedonia, Romania and Turkey.

The detailed methodological framework for calculating PES levels and the individual country case studies can be found in Annexes to the final project report[3].

3 METHODOLOGY

The PES estimates presented in this study are based on the calculation of opportunity costs of land use changes in selected case study areas. Opting for high value biodiversity agriculture may mean not making use of the opportunity to move to higher profit agricultural practice in order to safeguard the biodiversity. The principle of PES here is simply to ensure that the PES covers the opportunity cost (here foregone increase in profit) and hence avoid the economic incentive to shift practice. Opting for high value biodiversity may also entail putting in place more expensive measures or practices; to encourage such practice the PES needs to cover the incremental costs, which can also be seen as the opportunity costs.

The collection of data and calculation of PES values has been carried out by using the methodology provided in Annex 1.1 of the final report[3].

In brief, the methodology consisted of three documents, designed to help country experts to collect data and carry on the country analysis:

1. *Methodology guidance document*: a step by step method to collect relevant information, calculate opportunity costs and analyse costs and benefits of possible PES
2. *Methodology template*: spreadsheets for the calculation of opportunity costs and gross margin and for the analysis of costs and benefits
3. *Country case study template*: the structure of the country reports

The main elements of the methodology, as described in the methodology guidance, were the following:

Task 1: Calculation of the opportunity costs, on the basis of the instructions given

Task 2: Analysis of costs and benefits of the suggested PES. In light of the calculated opportunity costs, the country experts have been requested to suggest possible level of payments, and indicate in quantitative or, when this was not possible, qualitative terms the costs and benefits associated to the PES.

The methodology guidance identified 7 steps to be followed in order to achieve the above mentioned tasks. These were:

Step 1: Characterise the case study region – carrying on a SWOT analysis for each study region, analysing legal, institutional and administrative frameworks and collecting information about high biodiversity value sites

[3] Kazakova, Y., Kettunen, M., Bassi, S., & ten Brink, P. 2007. Complementary Financing for Environment in the Context of Accession – Innovative Resources: Final Project Report. A project for the European Commission (contract 070201/2006/443879/MAR/E3). WWF Danube Carpathian Programme/Institute for European Environmental Policy, Brussels. 66 pp + Annexes

Step 2: Collect information on specific characteristics of the largest/most important land-uses in the study area
Step 3: Collect information on specific trends in land-use in the study area
Step 4: Select the sites (indicatively 2 or 3) for further analysis – where sites were meant to be rather homogeneous areas in terms of farming practices, consisting of one or more farms located in nearby areas and insisting on areas with similar biodiversity characteristics.
Step 5: Calculate opportunity cost in relation to specific biodiversity-friendly options
Step 6: Assess the costs and benefits of PES
Step 7: Analyse and discuss the costs and benefits of payment schemes at national level

The case study areas in the five countries considered in this study were selected by the project team based on the recommendations of the team's national experts. The general objective was that the selected case study areas were to be both representative of the situation at national level and also to present individual characteristics that could provide insights also at broader regional and EU level. The characteristics considered in this context included, for example different land use practices and management systems, focus of land use management activities and location of area (e.g. within and outside protected areas / suggested protected areas). In addition, the availability of data was considered as one of the important criteria for the site selection.

In addition, in each case study country national expert workshops were carried out to gain more information on the potential of establishing PES schemes for biodiversity. The insights of these workshops have been taken into account in the individual country case and when developing this synthesis report, including elaborating the suggested recommendations in Chapter 7.

4 LAND USE AND BIODIVERITY IN THE CASE STUDY COUNTRIES

This Chapter provides a brief synthesis on the current land use and state of biodiversity and related ecosystem services in the five countries considered in this study. Information on land use at the case study locations is provided (sections 4.1 – 4.5). This information is accompanied by a table summarising the main land uses, their profitability and impact on biodiversity in the area. In these tables the following indicators and colour coding has been used. These are introduced in Box 4.1 below.

Box 4.1. Indicators and colour coding for country case study Tables 4.2 – 4.6

Biodiversity friendliness: this level has been estimated on the basis of the information related to biodiversity values and impacts for each farming practice. The case for friendliness ranges from good or sufficient to insufficient or bad. While this is clearly not an exact science, it helps to present a useful picture to facilitate understanding.

bad	insufficient	sufficient	good

Profitability: A range of colours show if the profit deriving from the current practices is good, sufficient, zero, insufficient or bad for the farmer. Red has been used for negative values; zero in case of land abandonment (no profit). It can happen than that even a (relatively) gross margin will not be sufficient to carry on the existing practices – e.g. when it is not enough to cover for instance labour or machinery costs. Although the calculation of these costs has not been object of this study, it has been possible to get a sense of the level of profitability of practices thanks to the information gathered at country level, and in particular the trend that current practices are undergoing. Practices that are clearly declining are considered not sufficiently profitable, either in absolute terms (e.g. the gross margin do not cover labour costs) or in relative terms (e.g. they are not profitable compared to potential substitute practices). The colour coding reflects these considerations.

bad	insufficient	zero	sufficient	good

Trend: the up arrow indicates that a farming practice is expanding – e.g. becoming more popular among farmers and therefore more land is converted for that. The down arrow indicates a declining practice. The horizontal arrow indicates no trend – ie the situation concerning a certain farming practice remains constant.

increasing	↑	decreasing	↓	constant	⇔

4.1 Case study area Lonjsko Polje, Croatia

The Lonjsko Polje area is covered by grassland, arable and forest areas and it hosts one of the largest remaining naturally inundated areas in the Danube river catchment. The Lonjsko Polje Nature Park located in the area comprises of an area of 506 km^2. The park is a Ramsar site and a home to seven important habitats and 89 species mentioned in the EU Habitats Directive. In the preliminarily plans for the Croatian Ecological Network, Lonjsko Polje Nature Park area is evaluated as a core area of international importance e.g. a potential Natura 2000 site.

As regards ecosystem services, the Lonjsko Polje area forms a key element in the natural flood control system of the Sava River basin. This flood control system affects also the neighbouring countries Bosnia and Herzegovina and Serbia. The inundated floodplains play also an important role in maintaining the local and regional climate conditions. The area has a significant potential for nature tourism and recreation. Additionally, the cultural heritage value of the Lonjsko Polje Park, including its indigenous animal breeds and typical traditional wooden houses, is also high.

Despite its high biodiversity value the area of Lonjsko Polje is currently facing significant challenges related to high rate of depopulation. Land abandonment is particularly strong in grassland and forest areas where the traditional land management activities related to maintaining of pastures (e.g. grazing and mowing) are becoming less and less popular. If abandoned, these areas will no longer be managed by farmers, with negative implications for biodiversity. For instance, abandonment may lead to the loss of fragile ecosystems, spreading of alien species and increased likelihood of natural hazards (e.g. forest fires).

Where there is no land abandonment, there is a different challenge. Farming practices on arable land (mainly cultivation of maize and wheat) are becoming increasingly intensive. While current practices, although partially intense (e.g. in terms of fertilizer use), have only limited negative effects on biodiversity, further intensification will lead to drastic changes for habitats and species due to the loss of (semi)natural ecosystems to arable cultivation and by destructing important landscape elements for biodiversity (such as hedges).

In the light of the situation above, the Lonjsko Polje case study has focused on investigating options to use PES to avoid the abandonment of land and traditional management practices in order to maintain biodiversity and related ecosystem services in grassland and forest areas. As a second focus, the study also explores how PES could be used to avoid further intensification of maize and wheat production.

Table 4.1. Summary of the main current land use practices and their characteristics in Lonjsko Polje, Croatia

Land type	Management practice	Characteristics of management practice		
		BD friendly?	Profitable?	Trend
Grassland	Grazing (extensive)			↓

	Abandoned pastures			↑
	Hay meadows			↓
	Abandoned hay meadows			↑
Arable	Partially intensive maize			↑
	Partially intensive wheat			↑
Forest	Grazing			↓

4.2 Case study area Roussenski Lom, Bulgaria

The Bulgarian case study has been carried out in the area of Roussenski Lom Natural Park. The park is situated in the north-east of the country in a canyon-like valley of the Roussenski Lom River, the last major right tributary of the Danube. Roussenski Lom is an area with high biodiversity value. For example, altogether 29 habitat types, of which 17 are identified as in a need of strict protection, can be found within the park territory. The park also hosts a number species that are endemic either to Bulgaria or to the Balkan region. Not surprisingly, the park has been included in the Bulgarian Natura 2000 network. In addition to its unique biodiversity, the Roussenski Lom area has also an important historical and cultural significance to the region. Consequently, there is a high potential for developing tourism and recreation activities in the area.

Agriculture is the main land use in the Roussenski Lom area. Main crops cultivated include cereals (wheat, barley, corn and oats) and industrial plants (sunflower and tobacco). These crops occupy approximately 80 per cent of the area's arable land, whereas the rest is taken up by orchards and vineyards. Animal husbandry, including sheep, poultry, goat and cattle breeding, are also well developed in the area.

The agricultural land use in Roussenski Lom is becoming increasingly intensive and this trend is threatening the conservation of biodiversity and ecosystems in the area. Current threats to biodiversity include, for example, habitat loss and destruction due to agriculture expansion and overgrazing, and the contamination of soil and water by pesticides, fertilizers and agricultural waste. In particular, a key problem in Bulgaria is the illegal continuation of slash and burn management practices leading to the destruction of top soil and the loss of associated species. In addition to intensive agriculture, a number of pastures in Roussenski Lom are threatened by land abandonment. For example, the abandonment of pastures has resulted in the decrease of the number of hamster population in the area. Furthermore, uncontrolled development of tourism activities has also been shown to have negative effects on biodiversity, in particular on bird species.

Consequently, the Roussenski Lom case study has focused on assessing the use of PES in preventing the intensification of land use in areas with high biodiversity value. In addition, the case study has also looked into encouraging the maintenance of

extensive management practices in order to maintain the existing biodiversity on area's grasslands and pastures.

↑

Table 4.2. Summary of the main current land use practices and their characteristic in Roussenski Lom, Bulgaria

Land type	Management practice	Characteristics of management practice		
		BD friendly?	Profitable?	Trend
Arable land	Intensive cultivation of wheat			↑
	Intensive cultivation of corn			↑
	Intensive cultivation of sunflowers			↑
Grassland	Use as hay meadows			↓
Pastures	Extensive grazing			↓

4.3 Case study area Prespa region, the Former Yugoslav Republic of Macedonia

The Prespa region is situated in the south-west part of the Former Yugoslav Republic of Macedonia. The region is dominated by a prehistoric Prespa lake (about three million years old) and it is characterised by the presence of several distinct biomes situated along the mountain slopes around the lake, including wide zones of reeds belts along the lake shores. Consequently, the region is characterized by very rich biodiversity. On European and global scale, the Prespa region hosts 33 globally significant plant species and 13 habitat types of European importance. The ecosystems around the lake also play an important role in supporting the supply of clean fresh water in the area. In addition, the Prespa region is considered to be of great cultural and historic importance with high potential for tourism, including ecotourism.

The most important agricultural activity in the area is apple growing and the importance of this activity is continuously increasing. Presently, more than 80 per cent of the total apple production in the Former Yugoslavian Republic of Macedonia takes place in the Prespa region. Around 3,300 ha agricultural land (of total ~11.700 ha) in the region belongs to apple orchards and this agricultural activity is the main source of livelihood for almost 2,600 households in the Prespa region.

Increased and intensified apple production has resulted in to a number of negative effects on the environment, including biodiversity. For example, increase in irrigation has led to soil degradation and over-abstraction of water from the lake. The negative impacts on biodiversity include also habitat loss and destruction (of wet meadows) due to expansion and intensification of agricultural activities, eutrophication of the lake, and the contamination of soils and lake water due to use of pesticides and fertilizers. In order to diminish the threats to biodiversity, the Prespa region case study

has focused on assessing the possible role of PES in supporting less intensive (organic) apple growing practices in the area.

Table 4.3. Summary of the main current land use practices and their characteristics in Prespa region, the Former Yugoslavian Republic of Macedonia

Land type	Management practice	Characteristics of management practice		
		BD friendly?	Profitable?	Trend
Arable	Orchards			↑

4.4 Case study area Oas-Gutai Plateau, Romania

The Romanian case study area is located on the Oas-Gutai Plateau situated in the Northwest Carpathians in Maramures County in Romania. The plateau covers a total area of 147.000 ha (of which the actual case study site Tataru Field covers about 3.165 ha). The area is occupied by meadows (including afforested meadows) and pastures (1.272 ha and 1.893 ha respectively). The Oas-Gutai Plateau is an area characterised by high biodiversity, scenic landscapes and unique cultural heritage (e.g. traditional Romanian wooden architecture). The landscape is a mosaic of forests, semi-natural pastures and hay meadows with high biodiversity value. For example, more than 90 per cent of the Romanian endemic, quasi-endemic and threatened flora and more than 66 per cent of the globally threatened plants species (IUCN Red List, Habitats Directive) can be found on these grasslands. The area also hosts high number of habitats and species protected under the EU habitats and birds Directives and it has therefore been proposed to be designated as a Natura 2000 site in the near future.

The Oas-Gutai Plateau ecosystems also provide a number of services that support the human wellbeing in the area. These services include, for example, retention and filtration of fresh water, prevention of soil erosion and flooding, and tourism and recreation. One of the largest peat bog formations in Romania is also situated in the Oas-Gutai Plateau area. This ecosystem plays an important role in supporting natural carbon sequestration and mitigating climate change.

The local communities in the area are largely dependent on the plateau's natural resources for their livelihood and economic development. Current main sources of livelihood include mountain animal husbandry and dairy processing, traditional handicrafts, and timber extraction and processing. In addition gathering of herbs, mushrooms and wild forest fruits play an important role in area's subsistence economy. The majority of farmers still continue carrying out the traditional biodiversity friendly grazing and mowing practices. However, overgrazing of grasslands is an increasing problem in the vicinity of villages whereas the less accessible areas are threatened by land abandonment.

The continuation of traditional farming practices, e.g. extensive grazing and mowing, would be crucial in assuring the conservation of biodiversity and related ecosystem services in the Oas-Gutai Plateau area. Consequently, the goal of the Romanian case

study has been to explore whether PES schemes could provide a tool for maintaining the current land use in the area.

Table 4.4. Summary of the main current land use practices and their characteristics in Maramures areas, Romania

Land type	Management practice	Characteristics of management practice		
		BD friendly?	Profitable?	Trend
Sub-alpine grassland	Grazing			↓
Hay fields	Moving of hay meadows			↓
Forested hay fields	Moving of hay meadows			↓

4.5 Case study area Konya Basin, Turkey

The Konya Basin is located at an altitude of 900-1050m in the Central Anatolian region in Turkey. The basin covers an area of ca. 50,000 km^2, which is roughly 7 per cent of the total Turkish surface area. The plain is surrounded by limestone and volcanic mountain areas (with altitudes up to 3534 meters) which form the upper-catchment of the basin. These mountains also prevent any drainage of water to the sea. This makes Konya area a closed water basin characterised by a variety of water bodies, marshes or semi-marshes. Two of these ecosystems, namely the Eregli marshes and Konya Basin Salt Lake, were selected as case study areas for this study.

The Konya Basin is of outstanding importance to nature conservation particularly due to its unique wetlands and extensive areas of remaining salt steppe, including the associated fauna and flora. There are 11 Important Bird Areas (IBAs) within the basin (out of a total of 97 in Turkey) providing breeding ground for 8 out of the 13 globally threatened bird species breeding in Europe. Additionally, the upper-catchments of the basin are a home to various threatened mammal species such as Anatolian wild sheep, brown bear, jackal, lynx and wolf. The preliminary research also indicates that the basin holds at least 8 Important Plant Areas (IPAs). In addition to rare unique habitats and species, the Konya basin wetland also supports the supply of several ecosystem services, such as provisioning of fibre (reed), retention and purification of water, stabilisation of local / regional climate conditions (e.g. precipitation) and control of soil erosion.

A significant proportion of land in the Konya Basin has been designated as agricultural land covering in total ~2.366.000 ha of the area. About 48 per cent of basin's territory is covered by arable land of which cereals are cultivated on 37 per cent of the land on a rotational basis. Main cultivated crops include sugar beet, wheat and vegetables. Due to the dry and hot climate conditions, irrigation forms the most important limiting factor for agriculture in the basin.

The increased and intensified agricultural practices in Konya basin have lead to a number of significant negative environmental impacts, including the loss of biodiversity and ecosystem services in the area. The main underlying factors behind the negative effects include unsustainable use of water for irrigation (resulting in drying of wetlands and water bodies), draining of wetlands for arable cultivation and grazing pastures, and pollution of water bodies by fertilizers and agricultural waste. As a consequence, it has been estimated that 90 per cent of the wetland areas present at the start of the 20th century has already been lost. Similarly, most of the unique steppe areas have been lost. In parallel to the habitat loss, several endemic species have already become extinct and many others have undergone severe declines. As regards the supply of ecosystem services, the loss of wetlands and decline in water bodies' surface area (e.g. due to the over-extraction of water for irrigation) has caused changes in the precipitation regimes in several areas, including the Eregli marshes. Additionally, the loss of wetlands has diminished the natural water retention capacity in the area. These changes have also had a further negative effect on the agricultural production. In a similar manner, cutting of reed, one of the previous fundamental economical activities for a number of villages located in Eregli area, has been adversely affected by the decline of wetlands. The wind erosion has also been accelerated resulting in the loss of productiveness of agricultural soils.

Given the significant negative effects of current agricultural land use practices in Konya basin the focus of the Turkish case study has been to investigate the use of PES schemes for supporting more sustainable use of natural resources, particularly water reserves, in the area. Promoting the sustainable use of water would have direct positive effects on the maintenance of biodiversity and related ecosystem services in the basin.

Table 4.5. Summary of the main current land use practices and their characteristics in Konya Basin, Turkey

Land type	Management practice	Characteristics of management practices		
		BD friendly?	Profitable?	Trend
Arable	Cultivation of sugar beet			⇔
	Cultivation of wheat			⇔

5 POTENTIAL PES SCHEMES

5.1 Analysis of the calculated opportunity costs

Some definitions

The **opportunity costs** represent the potential revenue loss from moving from a current farming practice to a future, different one. They result from the difference between the current gross margin and the future one (see box 5.1). This takes into consideration changes in revenue and changes in costs due to practices and measures.

Box 5.1 The Gross Margin

The Gross Margin has been obtained as the difference between the costs of inputs, such as fertilisers or tractor fuel, and the price obtained for a crop/agricultural product produced with these outputs - per hectare. The calculation did not include fixed costs. It aimed to show the likely variations in farmers costs and returns when the farming practices change. The approach adopted for the calculations is similar to those used for the UK and Czech Republic PES studies, as reported in the document 'Developing an Agri-Environment Programmes in Central and Eastern Europe (IEEP, 2002).

In some cases an average value for the year has been used, in order to take into account values can be different in different seasons.

The gross margin can be negative if the current practices results in a loss for the farmer. This could be the case for instance if subsidies exist.

For example there may be additional (up front and annual) costs that the future farming practice may imply - as likely to be the case of turning to organic practice, there will be additional costs for certification, hedges maintenance, additional labour, specialised machinery, etc.

If the potential future farming practices offer to be more profitable than the current ones, there will be an opportunity for additional revenue, and the opportunity cost would be the foregone additional profit (all revenues and costs taken into account) that could have been obtained.[4] Usually this is the case when it is envisaged that traditional extensive practice will turn into intensive activities. Nevertheless, in some cases it seems that opting for more biodiversity-friendly practices can also lead to negative opportunity costs, as these practices can prove to be more profitable than the existing ones. This may happen for instance when the market price of organic products is so high as to make the activity more profitable, despite their lower production yield and the additional measures costs.

[4] So with the above method of opportunity cost equalling net costs tomorrow minus net costs today, under the circumstances of potential increased revenue, the 'opportunity cost' would be negative – ie an opportunity for gain. For the purposes here, the opportunity cost is simply the foregone 'opportunity for gain'.

It should be noted than all gross margins used for the calculations do not include subsidies – this in order to make an assessment on the basis of the value of farming practices only, disregarding national/local policies. Subsidies though have been noted separately whenever possible (see chapter 5.3), as a potential source to fund PES.

An **approximate income** value has been calculated. It is obtained by subtracting the expected costs of measures from the future gross margin. This is a better indicator of 'profitability' than the simple (future) gross margin, as it also takes into consideration the additional costs that may be necessary to set up the new farming practice. A negative value will imply that costs of measures overcome the profits from the crops production. In this case the profitability indicator will be red. If a value is positive though, it does not mean that the practice is necessarily profitable. The costs of measures in fact take into account only additional costs of equipments or labour, but not the current costs related to these factors of production. The level of profitability is determined in relation to the profitability of current practices (see indicators description in chapter 3). Ie, the profitability of a future option will be estimated relatively to the profitability of the current practice (e.g., if the current profitability is considered 'insufficient', a future income significantly above it will be considered 'sufficient' or 'good').

It should be noted that this 'approximate income' is part of the opportunity cost, given than the latter is calculated as current gross margin minus future approximate income.

A summary of the opportunity cost calculations are given for each of the case studies in turn below.

Croatia – Lonjsko Polje

Grassland: given that this type of land is mainly at risk of abandonment, opportunity costs were calculated using maize intensive farming as a benchmark (this being the most profitable practice analysed in the case study area). The calculations show that high opportunity costs are incurred when opting for organic practices or IPARD[5] practices in grasslands, especially in the case of grazing and pastures (ranging from 289 to 785). This is mainly due to the high costs of certification and for converting to the new practice. For instance, measures like shrub clearance, machinery and stables can be particularly high for abandoned hay meadows and abandoned pastures.

Hay meadows though have a relatively high gross margin, therefore the opportunity cost of conversion is less high than for grazing and pastures.

Arable: In the case of arable land, farming intensification clearly holds negative opportunity costs, as intense agriculture will bring higher profits at no additional costs. It is interesting to note that also the organic option has a negative opportunity

[5] IPARD is a pre-accession assistance tool for agriculture and rural development (for the period 2007-2013)

costs, as it is more profitable than the current one (although far less profitable than intensification).

Forest: It is unclear whether grazing in forest is a profitable activity or not, giving the difficulty to obtain data on this, and also the fact that this is often an ancillary activity and not the main source of revenue for farmers. Nevertheless, this activity is facing abandonment. The opportunity cost for abandonment has been set as equal to the forgone (estimated) gross margin.

Table 5.2. Summary of opportunity costs indicators in Lonjsko Polje, Croatia

Land	Practice	GM (€/Ha)	Options	Approx income	Profitable?	Op cost
Grassland	Grazing (extensive)	47	Abandon.	0		211
			Keep grazing	47		199
			Organic	-49		295
			IPARD	-43		289
	Abandoned pastures	0	Organic	-446		691
			IPARD	-540		785
	Hay meadows	320	Abandon.	0		246
			Keep meadows	320		-74
			Organic	185		61
			IPARD	180		66
	Abandoned hay meadows	0	Organic	33		213
			IPARD	-22		268
Arable	Partially intensive maize	33	Intensific.	246		
			Keep current	33		213
			Organic	55		191
	Partially intensive wheat	-14	Intensific.	164		
			Keep current	33		178
			Organic	15		149
Forest	Grazing	82	Abandon.	0		0
			Keep grazing	82		164

Bulgaria - Roussenski Lom

In the case of arable land, opportunity costs for less intensive practices, crop rotation and organic farming were calculated in relation to the most intensive/profitable options for each crop (wheat, corn and sunflower). For wheat, the opportunity costs

for more biodiversity- friendly options range from 43 €/Ha (crop rotation) to 135 €/Ha (organic). For corn, they range from 91 €/Ha (less intensive practices) to 122 €/Ha (for both crop rotation and organic). In the case of sunflower, opportunity costs range from 13 €/Ha (crop rotation) to 92 €/Ha (organic).

Grassland and pastures are experiencing mostly partially extensive practices. Intensive corn practices have been used as a benchmark, being the most profitable option in the region. For grassland, keeping hay meadows as they are has an opportunity cost of 55 €/Ha, while turning to Agri-Environment measures has a higher cost (105 €/Ha). Pastures face the highest opportunity costs: 187 €/Ha for keeping the current practice, and 191 €/Ha for implementing Agri-Environment measures.

Table 5.2. Summary of opportunity costs indicators in Roussensky Lom, Bulgaria

Land	Practice	GM (€/Ha)	Options	Approx income	Profitable?	Op cost
Arable	Wheat intensive	102	Intensive 1	126		0
			Intensive 2	104		21
			Less intensive	33		92
			Crop rotation	83		43
			Organic	-10		135
	Corn intensive	142	Intensive 1	171		34
			Intensive 2	205		0
			Less intensive	114		91
			Crop rotation	83		122
			Organic	84		122
	Sunflower intensive	82	Intensive 1	96		0
			Intensive 2	77		20
			Less intensive	11		85
			Crop rotation	83		13
			Organic	5		92
Grassland	Hay meadows	150	AE measures	100		105
			Keep current	150		55
Pastures	Partially Extensive	18	Keep current	18		187
			AE measures	14		191

The Former Yugoslav Republic of Macedonia – Prespa Region

In the case of apple orchards in the Prespa region, it appears that moving from the current intensive practice to less intense ones or to organic farming brings benefits not only from an environmental point of view but also from an economic perspective. Given the higher market price for organic/less intensive products, the gross margin

from these options in higher than the current. Therefore, in both cases the opportunity costs are negative. Apparently, the increase profit is much higher in the case of less intensive production (opportunity cost is -1,005€/Ha). Organic farming still lead to high profits, although the negative opportunity costs is less than the above (-195 €/Ha), given the lower gross margin (due to less production).

Table 5.3. Summary of opportunity costs indicators in Prespa region, FYROM

Land	Practice	GM (€/Ha)	Options	Approx income	Profitable?	Op cost
Arable	**Orchards**	2020	Less intens.	3,025		-1,005
			Organic	2,215		-195

Romania – Maramures, Oas-Gutai Plateau

All subalpine grassland, hay fields and forested hay fields lands are at risk of abandonment in the Oas-Gutai Plateau. At the same time, intensification could also be an option. The options of abandoning only part of the lands and of keeping current extensive practices have been explored. Intensive farming practices have been used as a benchmark to assess the opportunity costs.

Overall, opportunity costs for keeping current extensive practice or allowing only partial abandonment range between approximately 200 and 330 €/Ha. In all three cases the option of partial abandonment has a slightly lower opportunity cost than keeping the current practice, but the difference is not substantial.

Table 5.4. Summary of opportunity costs indicators in Oas-Gutai Plateau, Romania

Land	Practice	GM (€/Ha)	Options	Approx income	Profitable?	Op cost
Subalpine grassland	**Grazing**	73	Partial aband.	-20		211
			Keep grazing	-47		238
			Intensification	191		0
Hay field	**Hay meadows mowing**	65	Partial aband.	-45		296
			Keep mowing	-75		327
			Intensification	251		0
Forested hay fields	**Hay meadows mowing**	58	Partial aband.	4		257
			Keep mowing	-53		313
			Intensification	260		0

Turkey – Konya Basin

In order to address the problem of inefficient irrigation, the analysis looked at the opportunity costs of moving from the current system to a system of drip irrigation, which is less water intensive.

The study analysed three options for each site (Eregli and Salt Lake): changing the irrigation system while keeping the current crops; changing the irrigation and moving to less water intensive crops; changing the irrigation and only part of the crops.

Eregli: the opportunity cost of changing the irrigation system in the case of sugarbeet production in Eregli amount to 329 €/Ha – ie the additional costs of measures for setting up the new system, partially offset by a higher gross margin. The opportunity cost of changing irrigation system and moving to wheat instead is extremely high (3,155 €/Ha), mainly due to the relatively low gross margin from this type of practice. The costs of substituting half of the sugarbeet production with sunflower is less expensive than the above, but the opportunity cost is still relatively high (1,181 €/Ha).

Salt Lake: the opportunity cost of changing the irrigation system for wheat production in the Salt Lake area is 485 €/Ha. Substituting what with maize – which is less waster intensive – has a higher opportunity cost (701 €/Ha). Cultivating half what and half sunflower instead seems the most profitable option. The approximate income (ie the gross margin minus the additional costs of measures for setting the system up) is higher than the gross margin from wheat under the current irrigation regime, signalling that such a change may be more profitable than the current practice. Therefore, the opportunity cost is negative.

The above analysis of opportunity costs are based on the current prices of water, which is available below resource costs and hence subsidised. The costs will change if water prices become more cost reflective.

Table 5.5. Summary of opportunity costs indicators in Konya Basin, Turkey

Land	Practice	GM (€/Ha)	Options	Approx income	Profitable?	Op cost
Arable (Eregli)	**Sugarbeet**	2197	Change irrigation	1,868		329
			Irrig.+ wheat	-958		3,155
			Irrig+sugar&sunf.	1,016		1,181
Arable (Salt Lake)	**Wheat**	401	Change irrigation	-84		485
			Irrig.+ maize	-300		701
			Irrig+wheat&sunf	506		-105

5.2 Analysis of the total costs and benefits of the proposed PES

The above section has noted the range of 'opportunity costs' that farm owners would potentially face to ensure biodiversity friendly agriculture. The aim of a payment for environmental services, PES, is to pay the farmers for supporting the biodiversity. The PES therefore needs to be just more than the opportunity cost, so that there is no longer an economic incentive for biodiversity harmful practices, and indeed a marginally positive one – and a small 'mark-up' on the opportunity cost is useful to achieve this (see Box 5.2 on this issue of a 'mark-up' to help give a discrete positive signal and also the methodology document).

Box 5.2: PES and the 'mark-up'

In this study the overall PES is calculated as: *PES = Opportunity costs * mark-up*

In order to promote the highest level of biodiversity protection, different mark-ups have been used, according to the degree of environmental friendliness of the practices. The base mark-up is 10% - to make the final PES sufficiently greater than the opportunity cost to encourage action, but without being so big that funds are used inefficiently. Higher mark-ups - 13% and 15% for instance - can be used to promote the practices that are considered to be the best for biodiversity. In this way, the payment for more 'virtuous practices', among the biodiversity friendly options, will be slightly higher, hence signalling what options should be preferred.

What is the practice to be preferred though may change according to the land type of farming practice in use.

In principle this should offer a valuable signal to farmers and help protect or create environmental services. The uptake, of course, depends on a range of issues that go beyond the economic: opportunities outside of agriculture, awareness (of options), availability of inputs needed for different measures, availability of markets for products, and social norms. That said, clearly getting the economic signals right is arguably a *sine qua non*. In the text below we generally state that 'PESs will help'; this is short-hand for 'PES should offer the economic signals to help, but whether it helps in practice, depends on a mixture of features'.

Note that when PESs are mentioned here, these are the calculations for what a PES would have to be. It does not say that it is necessarily appropriate to pay that PES for the given site and practice. This depends on the quality and quantity of environmental service (biodiversity protected), and also whether it could be cheaper to buy the land rather than having a high annual PES payment.

In each section, tables are presented noting, L**and type, practice, options, level of biodiversity friendliness and level of profitability, the PES and the revenue. As regards revenue and PES,** the aim is that the PES, combined with the various costs (of measures, inputs etc) and combined with the gross margin, will lead to the farmer seeing a range of potential revenues, with the highest being for the most biodiversity friendly practice. In the case of grasslands, it was concluded that the most beneficial system is to follow environmental standards (that fit to IPARD) while for other land type – e.g. arable – the most beneficial system is organic.

From land abandonment to extensive practices

Croatia: Land abandonment in Lonjsko Polie is more a social than an economic issue. Young generations move from the countryside to the close urban areas for social and cultural reasons, e.g. because they find urban life and related job opportunities more attractive. In this case offering a PES for maintaining the existing agriculture practices may not be sufficient to reverse the trend[6]. Nevertheless, the study tried to estimate how much a payment should be to make grassland farming practices (mainly grazing and mowing) more economically attractive. Intensive maize production has been used as a benchmark, since this practice is considered profitable for farmers, and at the same time represents also a useful benchmark for the arable land options.

PES range between 200 €/Ha and 900 €/Ha for avoiding the abandonment of grazing and pasture practices. In the case of hay meadows, it is difficult to assess a PES given that the gross margin from this practice is relatively high (320 €/ha), ie higher than intensive arable practice. This may signal that the reasons for abandoning hay meadows may lay beyond economic reasons (e.g. social/cultural reasons), and other measures than PES should be taken into consideration.

Also in the case of forest, it is difficult to assess how much a payment should be, given that grazing in forests is usually an ancillary activity. Nevertheless, using again intensive maize as benchmark, a PES of 189 €/Ha has been calculated.

In these areas, PES (or other measures) could potentially reduce land abandonment and therefore help maintaining the high biodiversity value of grasslands and forests. For the owner, this will result in benefits in terms of agri-tourism activities, food and fibre, and local meat products for niche markets. For the public, it biodiversity protection will bring benefits from birds watching, climate regulation, flood prevention, recreation/amenity values and cultural heritage.

[6] This underlines an important point to consider regarding the potential effectiveness of PES systems. PES can be used to ensure that the economic signal for the activities goes the 'right' way (in the sense here: to support biodiversity rich agricultural practice). It is not set up as a tool to help address rural urban migration or a wider opportunity cost question of relative potential incomes of urban jobs vs rural ones. That is more complex.

Table 5.6. Summary of PES indicators in Lonjsko Polje, Croatia (grassland and forest)

Land	Practice	Options	BD friendly?	Profitable?	PES	Revenue
Grassland	Grazing (extensive)	Abandon.				
		Keep grazing			225	272
		Organic			325	276
		IPARD			332	289
	Abandoned pastures	Organic			760	314
		IPARD			903	363
	Hay meadows	Abandon.				
		Keep meadows			n/a	
		Organic			n/a	
		IPARD			n/a	
	Abandoned hay meadows	Organic			n/a	
		IPARD			n/a	
Forest	Grazing	Abandon.				
		Keep grazing			189	271

Romania: Also in Romania socio-economic reasons lay under land abandonment. Calculating PES for Romania though has been simplified by the existence of intensive practice options, which offer a baseline to establish payments. The assumption behind the calculation is that PES should be at least enough to guarantee as income as 'attractive' as the one from profitable intensive practices. As a further encouragement to make farmer prefer extensive practices to intensive ones, a mark-up of 10% has been added – on top of the opportunity costs. The PES therefore range from 261 €/Ha to 359 €/Ha for keeping the current intensive practice (grazing or mowing), and from 232 €/Ha to 326 €/ha for reducing abandonment.

PES can therefore potentially help reduce the current phenomenon of land abandonment, preserving partially or entirely current practices and therefore avoiding relevant biodiversity loss. From preserving biodiversity, land owner and the general public will benefit from food, fibre, mushrooms and medicinal plant harvesting, opportunities to develop (eco)tourism activities and recreation, natural pollination, flood prevention and climate regulation – among the main ecosystems services.

It should be noted though that economic incentives may not be sufficient to prevent land abandonment – given that also cultural and social implications may come into play in the farmers' decision making. Therefore, other measures may need to complement the PES.

Table 5.7. Summary of PES indicators in Oas-Gutai Plateau, Romania

Land	Practice	Options	BD friendly?	Profitable?	PES	Revenue
Subalpine grassland	**Grazing**	Partial aband.			232	212
		Keep grazing			261	215
		Intensification				
Hay fields	**Hay meadows mowing**	Partial aband.			326	281
		Keep mowing			359	284
		Intensification				
Forested hay fields	**Hay meadows mowing**	Partial aband.			282	286
		Keep mowing			344	292
		Intensification				

Bulgaria: Meadows and pastures are also under threat of land abandonment in Bulgaria. In some cases meadows are also at risk of been used for the cultivation of grape and other plants/crops. Intensive corn production has been used as a baseline to assess opportunity costs and, accordingly, PES. A mark-up of 10% was added on top of opportunity costs for keeping current practices, and of 13% for implementing Agri-Environment (AE) measures.

For grassland hay meadows, a suitable payment appears to be 61 €/Ha for keeping current practices, and 119 €/Ha for AE measures. Payments are higher for pastures: 206 €/Ha for keeping current practices, and 216 €/Ha for AE measures.

These payments can help avoid meadows degradation (if converted into agriculture land) or abandonment, biodiversity loss (especially of bird and plant species), and soil contamination and depletion.

Table 5.8. Summary of PES indicators in Roussensky Lom, Bulgaria (grassland and pastures)

Land	Practice	Options	BD friendly?	Profitable?	PES	Revenue
Grassland	**Hay meadows**	AE measures			119	219
		Keep current			61	211
Pastures	**Partially**	Extensive			206	224

	Extensive	AE practices			216	230

Avoid intensification

Croatia: in arable land, maize and wheat production is undergoing intensification, with serious threats for biodiversity. PES have been calculated using the approximate income from intensive practice as a benchmark, under the assumption that if a more biodiversity friendly practice is slightly more profitable than intense ones, a farmer will opt for the former. A slight mark-up has been added to the income from intense practice: 10% for keeping the existing practice, and 15% for organic – in order to incentivise the most biodiversity friendly options. PES are in the order of 220-234 €/Ha for maize and 171-196 €/Ha for wheat. It is interesting to observe that, despite the higher mark-up, PES are lower for organic production than for keeping the current practice.

Table 5.9. Summary of PES indicators in Lonjsko Polje, Croatia (arable land)

Land	Practice	Options	BD friendly?	Profitable?	PES	Revenue
Arable	Partially intensive maize	Intensific.				
		Keep current			234	267
		Organic			220	275
	Partially intensive wheat	Intensific.				
		Keep current			196	229
		Organic			171	186

From intensive to biodiversity-friendly

Bulgaria: Agriculture practices in arable land in the Roussensky Lom region are intensive, and risk to intensify further. The most intense/profitable possible options have been used as benchmarks to establish payments, assuming that farmers opting for biodiversity friendly practices will need to be paid at least as much as to have a revenue comparable to the income from intensive practices. A mark-up of 15% has been used for organic, and of 10 % for both crop rotation and less intensive practices.

For wheat, the lowest payment will be for introducing crop rotation (47 €/Ha), followed by 101 €/Ha for less intensive practices and 155 €/Ha for organic. For corn, payment should amount to 100 €/Ha for less intensive practices, 135 €/Ha for crop rotation and 140 €/Ha for organic. Finally, in the case of sunflower, the payment for crop rotation will be the lowest (15€/Ha), while less intensive practices and organic requires higher payments 993 and 105€/Ha respectively).

By restoring more bio-diversity friendly practices, PES can help protect birds and plant species and reduce soil contamination and depletion – especially due to the high use of fertilizers for intensive practices.

Table 5.10. Summary of PES indicators in Roussensky Lom, Bulgaria (arable land)

Land	Practice	Options	BD friendly?	Profitable?	PES	Revenue
Arable	Wheat intensive	Intensive 1				
		Intensive 2				
		Less intensive			101	135
		Crop rotation			47	130
		Organic			155	146
	Corn intensive	Intensive 1				
		Intensive 2				
		Less intensive			100	214
		Crop rotation			135	218
		Organic			140	224
	Sunflower intensive	Intensive 1				
		Intensive 2				
		Less intensive			93	105
		Crop rotation			15	98
		Organic			105	110

Former Yugoslav Republic of Macedonia:

Less intensive practices and organic farming revealed to be more profitable than current intensive ones, and therefore could be win-win options from and economic and environmental point of view. PES do not seem to be necessary, given that the economic signals are already given by the higher profitability. Nevertheless, both organic and less intensive practices are not spreading in the Prespa region, and this may be due to issues different than economic – e.g. to lack of awareness, lack of development of markets for organic/biodiversity-friendly products etc. Other types of incentives therefore may need to be developed.

Once the right set of tools will be identified, farmers could potentially move from intensive to less intensive practices. The gain from improved biodiversity protection will result in greater potential from ecotourism, improved landscape and amenity value, and improved water and soil quality thanks to a reduced use of fertilizers. Less intensive practice will also have positive effects on the nearby Prespa Lake - currently suffering from eutrophication and over-abstraction of water - and on wet meadows biodiversity.

Table 5.11. Summary of PES indicators in Prespa region, FYROM

Land	Practice	Options	BD friendly?	Profitable?	PES	Revenue
Arable	Orchards	Less intens.			0	3,025
		Organic			0	2,215

From resource intensive to resource efficient

Turkey: the PES has been calculated adding a 10% mark-up on top of the opportunity costs. In the Eregli area, the calculations reveal that some options are relatively very expensive to finance, namely the option of substituting half of sugarbeet with sunflowers (PES € 1,299/Ha) and, in particular, the option of substituting the entire sugarbeet production with wheat (PES 3,470€/Ha). Both options include the change in irrigation system. The PES for only changing the irrigation system is relatively more modest (362 €/Ha), and seems therefore more realistic.

In the Salt Lake area, the highest PES is the one for substituting wheat with maize (€/Ha 771) – including the change in irrigation -, while changing the irrigation system only may require a payment of about 533 €/HA. The option of substituting half of the wheat production with sunflower (and moving to drip irrigation) is particularly interesting, as it seems to be more profitable than the current practice. A payment in this case does not seem necessary. Nevertheless, it will be important to understand why farmers have not moved so far to this more profitable option, which may represent a win-win solution in economic and environmental terms. This may be due for instance to lack of awareness on this option's benefits. Measures different to PES therefore may need to be sought in order to promote this practice.

Effective PES can realistically help improve the irrigation system, with several benefits both in term of ecosystem services and in term of additional income from landscape/agriculture related activities. For instance, a more efficient irrigation system can increase groundwater levels, have a positive impact on the precipitation regime of the region, increase agricultural production, increase the surface area of wetland and its values and functions (regulation of climate, access to freshwater, control of wind erosion, waste management etc) and decrease agricultural pollution. Furthermore, improved environmental conditions can increase the share of alternative income generated through reed cutting, turbary picking and fishing, and offer opportunities for ecotourism and bird watching.

Note that with a change in water pricing ('getting the prices right'), the above numbers would change.

Table 5.12. Summary of PES indicators in Konya Basin, Turkey

Land	Practice	Options	BD friendly?	Profitable?	PES	Revenue
Arable (Eregli)	**Sugarbeet**	Change irrigation			362	2,280
		Irrig.+ wheat			3470	2,512
		Irrig+sugar&sunf.			1299	2,620
Arable (Salt Lake)	**Wheat**	Change irrigation			533	449
		Irrig.+ maize			771	471
		Irrig+wheat&sunf			0	506

5.3 Comparison of the costs and benefits between regions/countries

The table below shows the level of the PES identified in this study for the different case study areas. In order to keep the scale at a reasonable size, two payments (namely for the options 'change in irrigation and wheat' and 'change in irrigation and sugar and sunflower' in Turkey) have not been included, since they were too high (above 1,000 €/Ha) and therefore were considered unrealistic.

It can be observed that the payments vary widely across countries. This may be due by difference in agriculture practices, in purchase power and other local conditions.

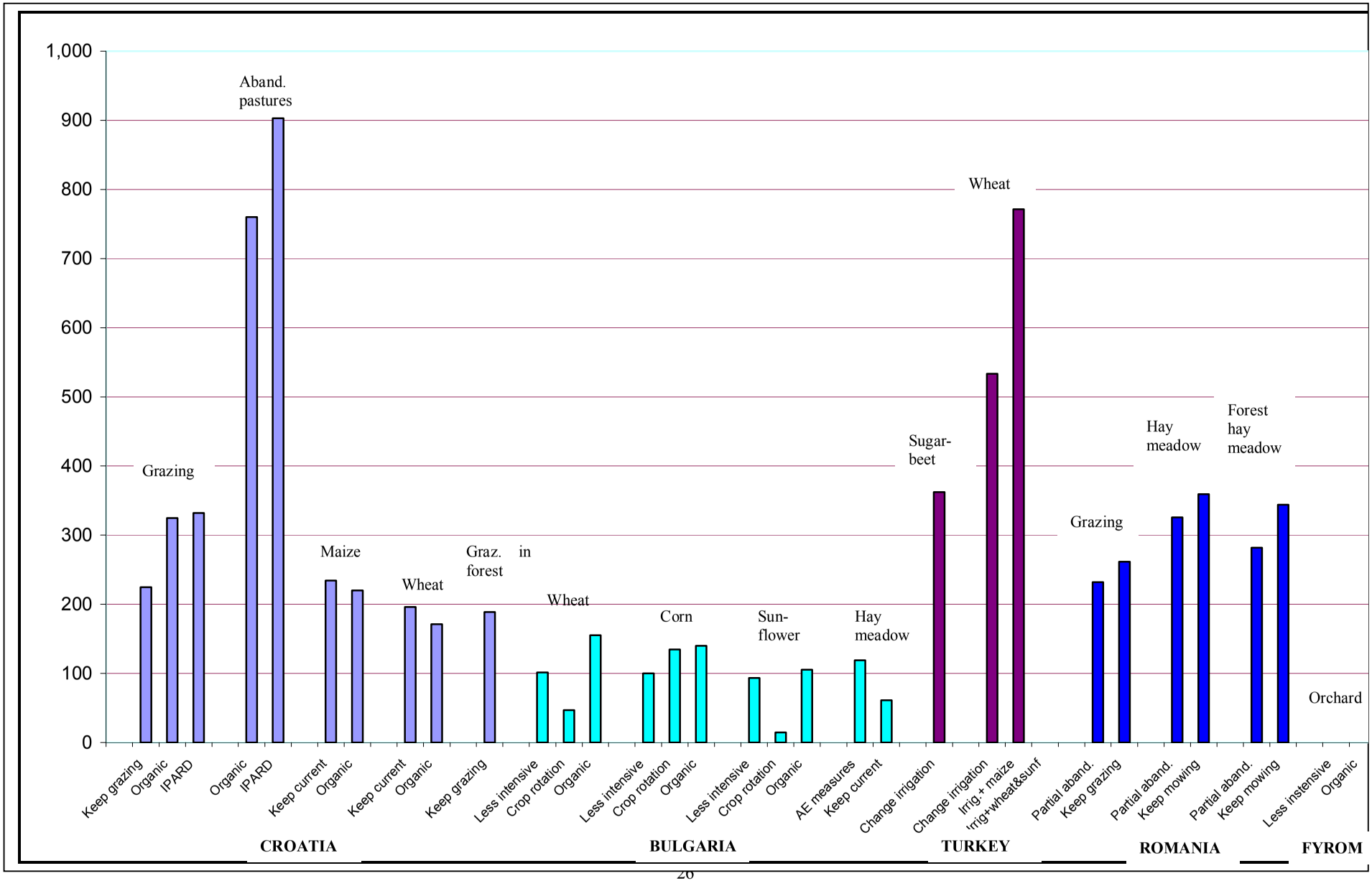
In Croatia they range on average between 200 and 300€/Ha, with a peak of 8-900€/Ha for pastures.

Bulgaria has the lowest PES values, ranging approximately from 50 to 150 €/Ha.

Turkey has the highest PES, with the exception of the option 'change in irrigation and wheat and sunflower' – in the case of wheat production – which appears to require no payment. As it will be noted below though, high subsidies are already existing in Turkey, which could cover such high PES.

In Romania payments range approximately between 250 and 340 €/Ha, while in the Former Yugoslav Republic of Macedonia PES could not be necessary at all.

Figure 5.1 Level of PES in the country case studies



When PES are not the best measure:

- The opportunity costs for switching to biodiversity friendly practices is negative – in other words it already makes economic sense to switch:

    - In the Former Yugoslavian Republic of Macedonia organic farming is more profitable than the current intensive practice used for apple orchards. This could be due for instance to lack of awareness (of farmers and/or the public administration), lack of developed niche market for organic products etc. National/regional/EU funds should address these issues rather than provide direct payments to farmers, in order to promote organic opportunities.

    - In the Salt Lake area in Turkey, the option of changing the irrigation system and switching half of the wheat production into sunflower seems more profitable than the current practice. This, again, can be due to lack of awareness, or to other reasons hampering the production of sunflower in the area. These issues should be explored further and addressed appropriately.

- The change in land use, like land abandonment, is due to non-economic pressures: e.g. cultural changes, education level etc

    - In Croatia grassland and forest areas are often abandoned for social and cultural reasons, e.g. new generations prefer to move to the nearby cities. This is particularly true for hay meadows, which seem to bring a relatively high gross margin, but nevertheless the activity in these areas is still declining. Therefore, it can be expected that even high payments may not be sufficient to limit the migration from rural to urban areas. In some cases the option of land purchase by public authorities can be more effective. Also, in economic terms, land purchase can in some cases be cheaper than PES, ie when assessed PES are relatively high (like in the case of abandoned pastures)

    - In Romania subalpine grasslands, hay fields and forested hay fields are also at risk of abandonment. Although PES may help reduce this phenomenon – since the gross margin from these activities is actually relatively low compared to intensive practices – it will be key also to understand and address other causes of land abandonment (e.g. social, cultural, institutional). Also in this case, land purchase could be an option. The same can be said for hay meadows in Bulgaria.

- In cases where there are existing subsidies that can already make biodiversity friendly options appealing, but that, despite these, changes are not made:

    - In Turkey high subsidies are already in place to promote the adoption of drip irrigation (see also section below on existing financial sources). These subsidies are in some cases higher than the PES identified in this study. This may signal that, despite the economic tools are there, they are not sufficiently promoted, or there is not sufficient awareness among farmers on the benefits these subsidies can bring – both under an economic and environmental point of view. Whatever the reason, it will be key that economic measures – whether

in the form of national subsidies or PES - are sufficiently promoted, and that awareness is rose among farmers and public authorities. Furthermore, it is obligatory to introduce appropriate water pricing in Turkey, which will provide a strong economic signal to farmers to start exploring water-saving options.

- In cases where the biodiversity saved / fostered and hence environmental services procured are not significant and PESs needed would be high – in other words marginal gain and high cost.
    - This is obviously complicated as it requires an accurate judgement on the benefits from the environmental services. E.g. Turkey for the arable land the sugarbeet+irrigation+sunflower case and for Croatia under the option of continuing current practice under the partially intensive wheat and maize cases
- In cases where purchasing the land would be cheaper than paying a high annual PES (see comments on land abandonment above).

Finally, the scale of the PES may not always be appropriate, especially if there are subsidies elsewhere that contribute to the problem – e.g. water subsidies. Every effort should be made to address the original problem, rather than simply counter one subsidy with another. Getting the prices right will help make PES as a policy tool more cost-effective.

Existing regional/national sources for funding PES

Some information has been obtained regarding existing subsidies for agriculture in the cases study countries. Some are already promoting biodiversity friendly practices or techniques, while others are generally allocated for growing certain type of crops. A summary table is provided below. The table summarises the PES findings of each country case study, and shows which subsidies are available for each option. It is interesting to note that in some cases the subsidies in place seem already sufficient to cover in great part or in total the proposed PES.

For instance, subsidies for organic farming of maize and wheat (400€/Ha) are far above the suggested payment identified in this study (171-200 /Ha). This reveals that resources are available for promoting this type of practice.

In Bulgaria the existing subsidies could potentially cover, in part or in total, the suggested PES. Nevertheless, the same subsidies are available also for intensive practices, therefore do not provide a clear incentive to prefer one practice over another. It can be argued that the existing subsidies should be channelled primarily towards biodiversity friendly practices, in order to drive farmers towards these options.

In Turkey the existing subsidies for drip irrigation are more than enough to make the change in irrigation economically feasible in the case of sugarbeet. They are also sufficient to cover the proposed PES for moving from wheat to maize and to

sunflower (including changing the irrigation system). Nevertheless, these subsidies have so far been ineffective in changing farmers practices (see comment above).

In Romania some subsidies exist for promoting Good Agricultural and Environmental Conditions (GAEC), while no information on subsidies was available for the Former Yugoslavian Republic of Macedonia.

Country Region	**Land**	**Practice**	**Options**	**PES**	**Subsidies**
CROATIA					
Lonjsko	Grassland	Grazing (extensive)	Abandon.		
Polje			Keep grazing	225	14
			Organic	325	14
			IPARD	332	116
		Abandoned pastures	Organic	760	14
			IPARD	903	116
		Hay meadows	Abandon.		
			Keep meadows	n/a	14
			Organic	n/a	14
			IPARD	n/a	129
		Abandoned hay meadows	Organic	n/a	14
			IPARD	n/a	129
	Arable	Partially intensive maize	Intensific.		170
			Keep current	234	170
			Organic	220	400
		Partially intensive wheat	Intensific.		220
			Keep current	196	220
			Organic	171	400
	Forest	Grazing	Abandon.		
			Keep grazing	189	
BULGARIA					
Roussensky	Arable	Wheat intensive	Intensive 1		128
Lom			Intensive 2		128
			Less intensive	101	128
			Crop rotation	47	128
			Organic	155	128
		Corn intensive	Intensive 1		72
			Intensive 2		72
			Less intensive	100	72

Country Region	Land	Practice	Options	PES	Subsidies
			Crop rotation	135	72
			Organic	140	72
		Sunflower intensive	Intensive 1		72
			Intensive 2		72
			Less intensive	93	72
			Crop rotation	15	72
			Organic	105	72
	Grassland	Hay meadows	AE measures	119	Maintenance of meadows - 31,5 Stop applying fertilizers - 77 Rotational extensive grazing - 61 Reseeding of meadows/pastures - 100
			Keep current	61	
	Pastures	Partially Extensive	Extensive	206	
			AE practices	216	Reseeding of meadows/pastures - 100
TURKEY					
Eregli	Arable	Sugarbeet	Change irrigation	362	800
			Irrig.+ wheat	3470	300
			Irrig+sugar&sunf.	1299	577.5
Salt Lake	Arable	Wheat	Change irrigation	533	300
			Irrig.+ maize	771	875
			Irrig+wheat&sunf	0	562.5
ROMANIA					
Maramures	Subalpine	Grazing	Partial aband.	232	
	grassland		Keep grazing	261	54 for GAEC
			Intensification		
	Hay fields	Hay meadows mowing	Partial aband.	326	
			Keep mowing	359	54 for GAEC
			Intensification		
	Forested	Hay meadows mowing	Partial aband.	282	
	hay fields		Keep mowing	344	54 for GAEC
			Intensification		
FYROM					
Prespa	Arable	Orchards	Less intensive	0	0

Country Region	Land	Practice	Options	PES	Subsidies
			Organic	0	0

The development of a PES system would clearly need to build in the existing subsidies and a reform of these - together with a review of other issues (water subsidies, awareness raising, markets for goods etc) - could be an important part of the step forward.

INSIGHTS ON THE REGIONAL AND NATIONAL FRAMEWORK NEEDED FOR ESTABLISHING PES

It has been widely acknowledged that PES schemes cannot function and effectively deliver their objectives without an appropriate legislative, political and institutional support. In addition, the broader socio-economic and cultural aspects, such as the existence of markets for local products and the level of education of the population, play an important role in guaranteeing the success of PES schemes. Consequently, in addition to the suggested PES schemes the case studies also identified a number of elements and framework conditions for successful implementation of the schemes.

5.4 National legislative and policy framework

According to a number of the case studies, the existing national legislative framework for environmental protection still needs strengthening in order to support the establishment of PES schemes. In some cases, e.g. the Former Yugoslavian Republic of Macedonia, it was also considered that a specific legislative instrument for establishing PES schemes would be needed. In addition, even in cases where appropriate environmental legislation was already in place there were still serious problems with the compliance. Consequently, enforcing the implementation of the existing legislation was also seen as one of the prerequisites for PES scheme implementation. For example, in Croatia and the Former Yugoslavian Republic of Macedonia the actual use of fertilisers and pesticides exceeded the legal limitations. Similarly, in Bulgaria the restrictions for slash and burn management practices were not respected by the farmers. In order to address this, the compliance with existing national environmental legislation was suggested to be included as an entry level requirement for PES scheme participation in Bulgaria.

Several case studies stated that the current national legislation and administrative systems for landownership were inadequate to support the establishment of PES schemes. There was a general lack of updated information on the situation regarding land ownership and no mechanisms for the transfer of land ownership and/or tenancy were in place. This was foreseen to pose problems to the identification of PES payment beneficiaries. It was also anticipated to hinder the establishment of PES related management activities on abandoned land areas. In addition, in several countries, e.g. Bulgaria, Croatia and Turkey, the existing / previous legislation on landownership and heritage had resulted in a high number of small land ownerships. According to the case studies, this made the management of larger areas for biodiversity conservation purposes more difficult.

As regards the policy framework, the case studies indicated that the different relevant policy sectors, agricultural and rural development polices in particular, did not at present provide proper support to the establishment and implementation of PES schemes for biodiversity. In the contrary, in several cases the support and incentives provided under the agricultural policy (e.g. agricultural subsidies) were directly supporting unsustainable agricultural land use in the case study areas. For example, in Turkey subsidies of 50 EUR per hectare were provided for the cultivation of sugarbeet

and wheat. This was regardless of the fact that sugarbeet and wheat had been identified as very irrigation intense crops. Consequently, it was considered that prior to the establishment of PES schemes serious attention was to be paid to the removal of any perverse incentives conflicting with the PES schemes' objectives.

In addition, it was considered that the current and/or foreseeable policy priorities for mitigating climate change could also conflict with the PES schemes' biodiversity objectives. For example, promoting the increase of forested areas for carbon sequestration or use of agricultural land for biofuels could, to a certain extent, make PES schemes supporting traditional biodiversity friendly farming practices unappealing for farmers. The possible conflicts between the different land uses supported by climate change and biodiversity policies are, of course, depended on type of management activity (e.g. afforestation by native species vs. monocultures) and where this activity takes place. For example, plantation of monocultures has an adverse effect on biodiversity whereas afforestation of a number of patches within landscapes with native species may increase habitat diversity in the area. In addition, some abandoned land may be of relatively limited value in terms of biodiversity conservation and therefore the total advantages of afforestation may be more beneficial.

5.5 Platform for PES payments and the supporting economic framework

In all countries the suggested PES schemes were anticipated to be based on public payments to service providers. The potential beneficiaries included both individual farmers and farmer associations. The payments were mainly seen to be given on an annual basis, however in some cases (e.g. in the case of initial investments costs) the possibility to support the annual payment schemes by one off payments was also considered. The payment schemes were suggested to be overseen by the national and regional administrative bodies.

In addition, in a number of cases, including Bulgaria, Croatia, the Former Yugoslavian Republic of Macedonia and Romania, the 'main' PES schemes were also foreseen to be supported by payments embedded in the traded agricultural products, i.e. farmers could receive higher revenue for their products through marketing organic and/or biodiversity friendly local produce. It was, however, noted that there was first a need to create markets for these products at regional, national or cross-border level. For example, the establishment of labelling, branding and certification schemes for products originating from the case study areas was required. In several occasions the suggested PES schemes were also anticipated to be supported by payments related to the direct the use of biodiversity and ecosystems by beneficiaries. This economic support included activities and revenue related to ecotourism in the area (e.g. park admissions and revenue from ecotourism related services).

It was expected that in addition to public payments some PES schemes could also be supported by / based on private investments. However, it was considered that the current magnitude of the local private business in case study areas was still not sufficiently strong to support investments equivalent to PES like schemes. However, on the long run it was seen possible that some investors would recognise the link

between the biodiversity value and business opportunities in these areas, notably for tourism and development of regional food specialities, resulting in a higher interest and increased potential for private PES schemes.

In some cases it was already foreseen that PES financing platform and/or its supporting economic framework was to require cooperation at broader regional / cross-border level. For example, in order to fully succeed a certification of organic apples from Prespa region (a cross-border region between the Former Yugoslavian Republic of Macedonia and Greece) would also require similar system to be established also at the Greek side of the border. Creating a framework for cross-border cooperation to support the PES schemes was also relevant in the case of Croatia where parties providing or maintaining an environmental service (flood protection) were located in a different country than parties receiving the benefits.

5.6 Institutional capacity, knowledge base and the level of education

All the case studies recognised that PES payments were a rather novel tool for biodiversity conservation in the countries in question. Consequently, it was highlighted that the existing institutional capacity was unlikely to be adequate for the establishment of the schemes. It was therefore considered important that broad and comprehensive capacity building for administrative bodies responsible of the design, implementation and monitoring of the schemes was to be organised. It was also noted that the existing data on land use and the status of biodiversity did not provide adequate basis for the establishment and monitoring of PES schemes. Consequently, sufficient resources were to be guaranteed to support the effective development and monitoring of the schemes.

All the case studies indicted that the existing social and human capital required for the adoption and implementation of PES schemes for biodiversity was quite poor. The PES measures were considered to require specific skills that the envisaged beneficiaries (farmers) and other beneficiaries were lacking. It was also noted that most of the relevant stakeholders had limited interest and/or knowledge of measures maintaining biodiversity in agricultural land. Therefore, appropriate education and dissemination programmes were seen as necessary elements to increase the interest of local stakeholder in biodiversity and ecosystem services conservation and guarantee the uptake of PES schemes. The case studies also emphasised that the implementation of PES scheme activities required the establishment of adequate and ongoing support, such as making relevant and up-to-date information available for stakeholders and organising advisory services assisting in the implementation of the scheme requirements.

At a broader level, improving the level of environmental awareness, e.g. on the socio-economic value of biodiversity, was also seen as an important element in supporting the successful establishment of PES schemes. Awareness rising was seen as a key to gain more broader public support to PES schemes and it was also suggested to contribute to the creation of market demand for biodiversity friendly products and services (e.g. ecotourism).

CONCLUSIONS & RECOMMENDATIONS

5.7 Conclusions

Agriculture was regarded as one of the main land uses affecting biodiversity and biodiversity related values and services in all Member and Candidate States included in the study. All of the case studies identified agriculture as the key sector to be considered as potential target for applying PES for biodiversity conservation. In all of the countries in question certain types of agriculture were causing negative impacts on biodiversity. These impacts were mainly caused by the destruction of (semi)natural habitats, overgrazing, over exploitation of water, widespread use of fertilisers, and contamination of land and water due to inadequate waste management and use of pesticides, and also the existence of subsidies. From a positive side, traditional extensive agricultural practices played a key role in maintaining agricultural biodiversity in a number of countries, e.g. in Bulgaria, Romania and Croatia.

The five country analysis revealed a number of region- and area-specific attributes the PES schemes needed to take into consideration. Consequently, the proposed content of the PES schemes, e.g. requirements and targeted measures, differed between the case studies. These findings strongly indicate that the PES schemes should be flexible in order to allow different regional/local needs to be addressed. However, a number of similarities between the five case study countries could also be identified.

In the majority of the case studies, conservation of biodiversity and (semi)natural ecosystems formed the main focus of the suggested PES schemes. However, in all cases the suggested payments for biodiversity also strongly supported the maintenance of a number of ecosystem services such as the provision and purification of water (e.g. Turkey, Croatia, Former Yugoslavian Republic of Macedonia), landscape beauty, cultural heritage, tourism and recreation (e.g. Bulgaria, Croatia and Romania), flood prevention (Croatia and Romania) and climate regulation (Turkey and Croatia). In the case of Turkey, the recommended approach to promote conservation of biodiversity was to direct the actual payments to sustainable consumption of water (see below). Consequently, the case studies indicated that in all countries considered there are several possible synergies to be gained between PES for biodiversity conservation and ecosystem services. However, when considering the possibility of using one payment to support a number of different goals (e.g. biodiversity conservation and maintenance of different ecosystem services) careful consideration should be given to make sure that supporting one objective, such as provisioning of water, mutually supports and / or does not conflict with the other identified goals, e.g. conservation of rare and endemic species. In particular, a PES scheme primarily targeted to deliver one specified biodiversity or ecosystem services related objective should not have negative effects on other (identified or unidentified) biodiversity values and services in the area. Therefore, the PES schemes should be carefully planned with an aim to reach best synergies between payments for biodiversity conservation and for conservation of ecosystem services.

Based on the analyses, extensive traditional farming practices created the highest biodiversity benefits in agricultural ecosystems in **Bulgaria, Croatia** and **Romania**. However, in all the countries in question these practices were currently threatened either by agricultural intensification or land abandonment. Therefore, the established PES schemes were suggested to focus on maintaining these types of land use practices also in the future. The suggested actions to be promoted by PES were similar in all three countries including restrictions and/or requirements related to mowing, grazing and use of fertilizers and pesticides. PES levels were calculated on the basis of the profits obtainable from intensive farming practices: the payment should be high enough to make biodiversity friendly practices more attractive (from an economic point of view) than intensive agriculture. Also, the payments should be higher the more biodiversity-friendly a practice is (e.g. so as to make organic farming more 'appealing' than less extensive practices in arable land).

In the **Former Yugoslavian Republic of Macedonia**, intensive or intensifying apple production was the main agricultural land use threatening biodiversity in the case study area. Consequently, it was suggested to promote biodiversity friendlier apple cultivation through organic farming. Apparently organic farming in the Former Yugoslavian Republic of Macedonia can be more profitable than the current intensive production, given the higher market price of organic apples. In this case no PES should be required, but it will be key to understand why organic practices have not taken off so far (e.g. because of lack of information/awareness, difficult bureaucratic procedures etc) and how the issue should be addressed. Organic farming was also considered as one of the possible focal areas of the PES schemes in Bulgaria, Croatia and Romania.

In the **Turkey** case study, the loss of biodiversity was a direct consequence of over consumption and contamination of water. It was therefore considered that the most suitable way to conserve biodiversity in the case study areas would be to tackle the underlying problem, i.e. the unsustainable consumption of water. This was suggested to be done through obligatory introduction of water pricing followed by ~~directing~~ possible PES to support a change towards water efficient irrigation practices and less water-intensive crops (although the change in crop can be in some cases unrealistic given the high opportunity costs). In Turkey the existing subsidies for agriculture and irrigation systems could be more than enough to cover most of the proposed PES – which therefore would not require additional financial resources. Nevertheless it was observed that, although relatively high, the existing incentives for drip irrigation have not been sufficient to spur farmers to change their systems so far. This is a clear example of how sometimes economic signals are not enough, and they may need to be associated with additional measures, e.g. to make farmers aware of water scarcity problems and environmental impacts.

All suggested PES schemes were anticipated to be based on public payments to service providers and they were recommended to be overseen by the national or regional administration. In addition, in a number of cases, the 'main' PES schemes were also foreseen to be supported by payments embedded in the traded agricultural products, i.e. farmers could receive higher revenue for their products through marketing organic and/or biodiversity friendly local produce. Also, on several occasions biodiversity conservation in the case study areas was anticipated to be

concurrently supported by payments related to the direct the use of biodiversity and ecosystems by beneficiaries, e.g. ecotourism generated income in the area.

In addition to the actual PES schemes, the case studies identified a number of framework conditions for successful implementation of the schemes. It was considered highly important that these requirements were taken into account when considering the further development of PES schemes in the studied countries. The most important identified framework conditions include:

- improving and consolidating the legislative frameworks for landownership in the case study countries;
- further developing the national environmental legislation and/or improving the implementation of and compliance with existing environmental legislation, e.g. including restrictions for fertilisers and pesticides (Croatia and Former Yugoslavian Republic of Macedonia) and restrictions for slash and burn practices (Bulgaria);
- addressing the wider economic signals coming from resource pricing (e.g. water and avoiding harmful subsidies), product pricing (e.g. for fertilisers and pesticides to avoid overuse) and liability and compensation (to ensure that polluters pay for the damage). In each of these cases the incentives for biodiversity rich agriculture can be improved and the level of required PES can be reduced, making PES a more cost-effective tool and allow a more efficient use of public funds.
- as PES is a rather novel instrument in all studies countries, organising broad and comprehensive capacity building on PES schemes for all relevant stakeholder, including beneficiaries (farmers) and administrative bodies responsible of the design, implementation and monitoring of the schemes;
- securing adequate and ongoing support to implement PES schemes in practice, including guaranteeing availability of relevant and up-to-date information for stakeholders, provisioning of advisory services for implementing the scheme requirements etc.;
- supporting general environmental education and capacity building, e.g. on the socio-economic value of biodiversity, marketing of local environmentally friendly / organic products etc. among all relevant stakeholders;
- ensuring that the different sectoral policies, including agricultural, rural development and climate change polices, support the establishment and implementation of PES schemes for biodiversity. For example, promoting the increase of forested areas for carbon sequestration or use of agricultural land for biofuels (e.g. providing financial incentives) can, to a certain extent, make PES schemes supporting traditional biodiversity friendly farming practices unappealing for farmers;
- eliminating all subsidies that support intensive agriculture in PES target areas and therefore conflict with any suggested PES schemes for biodiversity conservation, including supporting cultivation of water intensive crops (Turkey);
- creating a framework for cross-border cooperation to support the PES schemes, this is relevant in cases where parties providing or maintaining an environmental services are (partly or fully) located in a different country than parties receiving the benefits, e.g. in case of cross-border river basins.

All the country analysis concluded that the case study results were also indicative of, and to a certain extent applicable in, the wider regional and/or national situation. The issues that the suggested PES schemes intend to address, i.e. abandonment of agricultural land, overexploitation of water resources and a number of negative effects of intensive agriculture, are common in different areas throughout south-eastern Europe. In addition, land abandonment and water scarcity are also increasingly prominent problems in the western and central Europe, including several old EU Member States. It was also considered that even though the suggested PES schemes focus on addressing agricultural land use well organised PES systems for the agricultural sector could be a starting point for extending PES to other sectors as well (e.g. forestry, industry, tourism and energy sector). Therefore, the country analysis and, in particular, the further development of PES schemes in the studied Member and Candidate States can provide valuable lessons for developing PES schemes at the wider national, regional and even European level.

In addition, the lessons learned from the studied five countries can help to revise and update the existing PES schemes, including the agri-environment schemes implemented under the EU rural development policy. In this context, the country analysis indicates that existing EU agri-environment policies are mainly focused on addressing the negative impacts of agricultural intensification and they fail to take into account problems related to abandonment of land. Therefore, their potential value in addressing the current biodiversity related problems in several New Member States (and also in some old Member States, e.g. Spain, Portugal) seems rather limited.

It should be noted that in many countries, including Bulgaria, Croatia and Romania, the problems related to conserving biodiversity in agricultural ecosystems are part of a wider social crisis in rural areas. Depopulation, ageing, migration of vital inhabitants to urban areas, lack of social services and infrastructure are among the most important drawbacks for living in rural areas. Neither the existing agri-environment payments nor the potential introduction of PES will be sufficient to hold back the exodus of rural population. These should go hand in hand with a comprehensive set of rural development measures enabling rural areas to become attractive enough for living.

Even though it is difficult to estimate the total final benefits and costs resulting from the implementation of the suggested PES schemes it can be foreseen that the schemes would provide and/or support the provisioning of a variety of biodiversity and socio-economic benefits in the studied rural areas. In general, together with a number of other biodiversity related economic activities (such as ecotourism and income from biodiversity friendly/organic products) the PES schemes can support the maintenance and diversification of the sources of livelihood in rural areas. The suggested PES for biodiversity would also support the maintenance of a number of locally, regionally, nationally and internationally valuable ecosystem services, such as recreation and ecotourism, water supply and purification and flood protection. In addition to the benefits for biodiversity and related ecosystem services, the PES schemes are considered to provide a good basis for a shift from unsustainable agricultural practices to the environmentally sustainable ones. In addition, PES systems are envisaged to act as instruments to raise environmental awareness in the studied countries, by allocating

tangible economic values to services or externalities which generally have no price assigned to them.

5.8 Recommendations

Based on the five country analysis, including recommendations arising from the national expert workshops, a number of general recommendations for the development and implementation of PES schemes for biodiversity conservation in Bulgaria, Croatia, the Former Yugoslavian Republic of Macedonia, Romania and Turkey have been developed. These recommendations, listed below, address a number of relevant aspects related to the scheme design and implementation including: potential content of the schemes; calculation of the payment levels; and developing the broader framework for successful PES schemes. Also, some recommendations for the development of PES schemes in the new EU Member and Candidate States have been identified. The recommendations' level of implementation has been indicated in brackets as international, national, regional and/or local.

5.8.1 Development and content of the schemes

- PES schemes should always be tailored to **suit the regional / local requirements** and they should be able to adapt to different seasonal and spatial, cultural and legal, technical and economic situations. Consequently, the national and/or the EU framework for PES schemes should be flexible and allow different regional / local needs to be addressed. For example, in the case of the studied countries the agri-environment framework for PES schemes should support the implementation of measures tackling with the abandonment of agricultural land *(national, regional & local level)*

- The **objectives of PES schemes should be measurable and clear and the required activities should be realistic and feasible** to the level of payment. Distinctions should also be made between operational, specific and general objectives. Overcomplicated requirements can prevent the uptake of the schemes. Based on the country case studies, main activities considered to be supported by the PES include sustainable and biodiversity friendly farming practices, organic farming and sustainable tourism. There is also a need for simultaneous capacity building (see below) *(national & regional level)*

- In all case study countries PES for biodiversity can **combine payments for biodiversity conservation and for the maintenance of ecosystem services** (e.g. combining payments for sustainable water use with biodiversity conservation). However, when considering this, the possibility of potential trade-offs between different services should be carefully considered. This would be necessary to avoid possible conflicts between supported services. *(national & regional level)*

- Appropriate **governance framework for the PES schemes** should be designed and implemented. Different roles, e.g. administration of payments and

monitoring, should be clearly allocated to relevant national, regional and local bodies. In addition, when appropriate and necessary establishment of new management bodies should be considered. Wider stakeholder involvement in implementation and monitoring of the schemes should also be considered. For example, environmental organisations have a potential to become involved in PES initiatives as co-executors or through monitoring of environmental processes, ensuring follow-up and transparency. *(national, regional & local level)*

- Adequate resources should be allocated to the **collection of information** to support the design of PES schemes. All country case studies indicate that field surveys and gathering of data is needed to establish PES schemes. This includes, for example, information needed to select the priority areas for PES schemes, developing necessary databases and ensuring adequate monitoring of the outcomes etc. *(national & regional level)*

- When developing and implementing the PES schemes, **wide stakeholder participation** ranging from representatives of the national administration to the potential PES beneficiaries should be secured. Involving all stakeholders at an early stage of the planning process improves the content of the PES schemes, e.g. assures that the goals are realistic and that the foreseen requirements are feasible to carry out in practice. Stakeholder involvement also increases the future buy in to the schemes. *(national, regional & local level)*

- When possible and appropriate, establishing **national legal framework for PES** should be considered. The recognition of PES as an instrument in current legislation could facilitate dissemination and implementation of such systems. *(national level)*

- In order to support the implementation of and compliances with existing environmental legislation the possibility of including **mandatory entry level compliance** in PES schemes to determine the basis on which a farmer is eligible for PES should be considered. These entry level requirements could include compliance with relevant national environmental legislation and regional/local policies and plans (e.g. requirements and recommendations set out in area's national park management plans) *(national level)*

- **Land purchase or long-term lease of land** as a part of the PES schemes should be considered. In areas where depopulation and ageing are problems vast areas are abandoned and left without cultivation. This situation could be improved by establishing a public financing mechanism for land purchase. Alternatively, an efficient mechanism for a long-term land lease from state and/or local authorities could be developed. This would enable the nature conservation authorities (e.g. park management authorities) to buy or lease the land and manage it in a biodiversity friendly manner. These institutions usually have interest and sufficient capacities to manage land according to biodiversity friendly practices but lack the means to acquire the land. *(national & regional level)*

- An appropriate **financing platform for PES** schemes should be developed. The case studies indicate that the PES financing should be based on public payments (a combination of one-off and continuous payments). Where appropriate, providing fiscal incentives, credits etc. instead of cash payments should be considered. For example, permits for tourism-related activities such as the sale of food and/or handicrafts may be used as compensation for families who work in conservation of grazing lands. *(national, regional & local level)*

- Developing **several parallel PES schemes** or supporting the establishment of public funded PES schemes by other **market based instruments** should be considered. These instrument could include, for example:
  - stimulation of sustainable rural tourism and ecotourism in the area through the introduction of tax concessions on the profits of travel agencies from activities in the national parks / Natura 2000 area;
  - stimulation of donations from local companies through tax concessions. These donations would be used to support nature conservation in the area;
  - stimulation of biodiversity friendly land use and management practices in the area by proving tax concessions for farmers with approved agri-environment plans;
  - support for the production and marketing of local biodiversity friendly/organic products through eco-labelling schemes and tax concessions (e.g. organic products, products from particular protected areas, products from endemic / native breeds and plant varieties, etc.);
  - when appropriate, introduction of schemes for natural flood protection, including compensating the owners/users of riparian agricultural lands (which are mainly meadows and corn fields) for the loss of harvest; compensating for the maintenance of riparian dikes or for the loss of income when necessary to let the flooding of the land in certain months;
  - when appropriate, e.g. in the case of areas with high national biodiversity value, imposing penalties (e.g. taxes) on landowners for land abandonment. *(national, regional & local level);*
  - when possible, make the polluter pay for damage to ecosystems and others' wellbeing;
  - when possible (e.g. if no other overriding and defensible objectives exist), remove harmful subsidies (e.g. water subsidies) .

- In order to guarantee the long-term effectiveness of PES schemes, the **longevity of schemes**, in particular their financing platform should be guaranteed. Consequently, project-based financing schemes for PES should not be considered as an optimal solution. If payments stop after a short period, it is very likely that the provider will stop providing its service, especially in the field of biodiversity conservation. In order to guarantee the long term funding of PES schemes adequate resources should be allocated to locating new sources for funding. *(national & regional level)*

- **Diverse sources for financing** PES schemes should be considered. For example, in the case of agricultural systems financing of PES schemes should not be solely focused on funding available from agricultural sector (e.g. the EU agri-environment schemes). Drawing funding from a broad variety of sources

helps to guarantee that all relevant aspects of / supporting to the PES schemes become financed. For example, a number of required investments (e.g. for ecotourism) and capacity building activities could be financed though the support available for regional development.

- All the case studies indicate that the establishment of PES schemes would require relative high transaction costs (e.g. capacity building, setting up institutional and monitoring structures for schemes etc). Consequently, enough **resources to cover the transaction costs** should be made available. In this context, it should also be considered that if transactions costs are very high PES schemes are less likely to be an effective mechanism for delivering biodiversity conservation objectives and other measures would be needed to support the PES establishment. *(national & regional level)*

- **Training and advisory services** should form an integral part of the PES schemes (see section 6.2.3 below). *(national & regional, local level)*

- When needed and appropriate, developing **cross-border cooperation** mechanisms between neighbouring countries should be promoted. This is particularly the case when the providers and beneficiaries of a service (biodiversity conservation and/or related ecosystem services) are located in different countries. For example, the maintenance of river basin ecosystem services, e.g. flood protection and water purification, takes primarily place upstream of a river whereas the benefits occur downstream and in river delta areas. *(international, national & regional)*

- Appropriate **monitoring and evaluation of PES schemes** should be guaranteed and the methods for this should be designed already in the beginning of the PES development process. Monitoring and evaluation should provide information on the relevance, effectiveness and efficiency of PES schemes. In order to obtain clear and useful information through the monitoring and evaluation process, objectives of PES schemes have to be clearly defined (see above). Since it is impossible to monitor the effects of PES schemes on each single parameter affected by the programme, a system of indicators should be developed. These indicators should be simple, clear, effective and relevant for the national conditions. Monitoring indicators could include: the area (ha) of agricultural land under PES scheme; number of farms; percentage of uptake as compared to estimations and targets: geographic distribution of farms covered by PES; relationship between farm size and participation in PES scheme; area of proposed Natura 2000 areas participating in the scheme; number of certain species, etc. *(international, national & regional)*

- **Periodical revisions of PES** may be necessary, in order to take into account variation of the parameters used for their calculations (see chapter 5.8.2 below) and/or changes in the socio-economic context. *(national & regional)*

5.8.2 Calculation and level of payment

- When calculating PES for moving **from intensive practices to more biodiversity friendly ones**, the opportunity cost should measure the profit forgone from substituting an activity with another, as the difference between gross margin from intensive and less intensive practices. The costs also incorporate the investment in additional measures needed to set up and carry out the new activity. In order to induce a farmer to abandon a profitable intensive farming practice for a less profitable sustainable one, a compensation payment should be sufficient to cover the profit foregone and the additional expenses incurred - hence the overall opportunity cost. An additional amount (mark-up) could usefully also be paid on top of it, in order to make biodiversity friendly options more attractive (see below). *(national & regional)*

- In some cases the **opportunity costs for switching to biodiversity friendly practices can be negative**, or smaller than for other more intensive practices. This is because in some cases profits from biodiversity friendly practices can be higher, e.g. organic products can have a high market value. These are possible win-win situation, in which environmental benefits also bring economic benefits. In these cases PES may not be necessary. Nevertheless, if farmers have not opted for environmental practices despite the market signals, it is possible that either other economic factors enter into play in the decision making, or that there is lack of awareness about potential extensive alternative. If so, it will be crucial to understand clearly the reasons hampering the shift towards sustainable practices, and address these issues (e.g. through education and awareness raising among farmers and local authorities). *(national & regional)*

- When the current practices are not economically attractive, e.g. when PES schemes are meant to **prevent traditional/extensive agriculture to become intensive**, the real opportunity for farmers will be to move towards a more profitable intensive practice. The opportunity costs therefore should be calculated on the basis of the profit from these potential intensive practices, i.e. as the difference between the gross margin from intensive practices and the GM from the extensive practices one wants to keep/introduce. In this way farmers will have incentives to opt for (or keep) extensive practices rather than move towards intensive ones and away from traditional ones. *(national & regional)*

- In the case of **land abandonment**, the opportunity cost is not represented only by the profit forgone from ceasing a farming activity. When abandoning a land, a farmer usually decide to opt for more profitable farming activities elsewhere, e.g. intensive practices in more fertile areas, or for different economic activities, like a job in urban areas. The real opportunity cost therefore would be represented by the difference between a (likely low or even negative) profit from the abandoned farming practice and the more profitable income from other activities. Since the range of alternative activities can be extremely wide, calculating the opportunity cost can prove to be very difficult and different for each farmer. In these cases it can be more effective to choose a general **benchmark** – e.g. the income from a profitable farming practice in the area, or

the average farmer income according to national/regional statistics. *(national & regional)*

- The **interaction between non-economic pressures and land abandonment** has to be taken into consideration. Land abandonment can be induced by factors going beyond the mere profitability of a farming practice. Farmers can leave the countryside for cultural or social reasons, e.g. because of changes in the education level that may lead workers to look for higher skilled jobs. In this case even high PES levels may not be sufficient to retain the population (with the required skills) in the country areas. In these cases alternative measures, like land purchase, can be more effective than PES (see also section 5.2.1 above). *(national & regional)*

- The payment should be such that the overall profit that the farmer will get from the extensive farming practice – ie its gross margin minus the cost of additional measures and plus the PES (what we called the 'revenue') – should be slightly higher than what he could get from more intensive options. This should prevent the farmer from opting for (or continuing with) profitable intensive practices. This higher price (or **mark-up**) can be determined as a fixed percentage over the opportunity costs or the benchmark value (according to the method chosen). *(national & regional)*

- This study chose to use **differentiated mark-ups according to the level of biodiversity protection** of the incentivised practice. For extensive farming practices a mark-up of 10 per cent has been used. Different mark-ups (13%, 15%) can be used to differentiate between practices according the level of environmental friendliness, e.g. differentiating between the practices that requires some standards to be met (e.g. IPARD or AE measures), organic farming and 'simple' extensive practices. The idea behind this approach is that the most biodiversity friendly practices should be the one rewarded the most. In this way clear price signals will promote higher biodiversity protection. *(national & regional)*

- PES calculations usually rely on a certain number of **statistical data and assumptions which can vary over time**. For instance, the market for organic products is relatively young and small, and prices may still be volatile. Consequently, changes in products prices may sensibly change gross margin values, and therefore the PES amount. Payments set up in a certain moment of time may not be suited to a changed context, e.g. they can prove to be too high or too low than before, and eventually lead to perverse incentives. It may be crucial then that the PES levels and corresponding management options are submitted to periodical revisions, in order to take into consideration possible variations of the parameters used for their calculation. (See above section 5.2.1). *(national & regional)*

- The analysis of **labour and maintenance costs** (machinery, buildings, equipment etc.) of current farming practices fell outside the scope of this study, since the main focus has been to calculate opportunity costs on the basis of the gross margin. Nevertheless, it is recommended that a full analysis of the economic context (including average salaries etc.) be done to give a clear

picture of the economic sustainability of current practices. This should also help understating current trends and can provide more precise information on farmers' incomes. *(national & regional)*

- The calculations of **gross margin in the case of grassland** can be complex, given that the income arising from the land is not only related to the grazing activity, but also to the value of animal breeding. When assessing opportunity costs, the approach used and the assumptions adopted to calculate the gross margin should be adequately clarified.

- **In some cases PES are not the best measures** to promote biodiversity friendly practices. This is the case for instance when biodiversity friendly practice are more profitable than intensive ones, but despite this they are not implemented. Or when, despite sufficient subsidies are already in place, changes are not made. These situations may signal that the taking over of biodiversity friendly options is not due to economic reasons, but rather to social and cultural causes (e.g. lack of awareness and training), to poor infrastructures or markets (e.g. lack of niche markets for local/organic products), insufficient capacity of institutional bodies (e.g. lack of initiatives from local authorities) etc. Direct payments in these cases may me inefficient, and funding should rather be used to invest in different initiative, once the causes have been identified.

5.8.3 Developing the broader framework for successful PES schemes

- The importance of clearly **defined landownership** (i.e. to avoid the 'tragedy of the commons') has been recognised as an essential requirement for successful establishment and implementation of PES schemes. However, in a number of countries, including Bulgaria, Croatia, Romania and Turkey, the situation regarding property rights for land or land use remains ambiguous. Therefore, it is of high importance that the legislative framework of landownership, management and regulation is improved and consolidated before (or in parallel with) establishing the PES schemes. *(national level)*

- When necessary, the **national environmental legislation should be improved** and any gaps negatively affecting the establishment and implementation of PES schemes for biodiversity should be identified and addressed. In addition, the compliance with existing environmental legislation which supports the implementation of schemes should be enhanced (see also section 6.2.1 above). *(national, regional and local level)*

- Establishment of **PES schemes should be supported by the relevant national policy sectors**, e.g. policies for agriculture, forestry, energy, water, ecotourism, genetic resources etc. In particular, it should be assured that activities supported by other policy sectors, such as climate change, agricultural and rural development policies, do not conflict with the objectives of foreseen PES schemes (i.e. perverse subsidies should be removed). For example, incentives for afforestation can undermine the support to keep

abandoned land in agricultural use (See Chapter 6 for further consideration). *(national level)*

- When possible, **synergies between PES schemes for biodiversity and incentives provided by other policy sectors** should be encouraged. This could be achieved, for example, by creating national incentive schemes that allow regional conditions and characteristics to be taken in to consideration. For example, in the case of Turkey the government subsidies supporting a shift to sustainable irrigation methods also support the conservation of biodiversity in the case study area. *(national level)*

- Areas targeted or foreseen to be targeted with PES schemes should be taken into consideration in the national, regional and local **land use planning** processes. For example, agricultural systems with high biodiversity value could be identified in land use master plans and the development of other land use practices in these areas could be restricted. In general, adoption of integrated land use planning and management practices in the PES target areas should be endorsed. For example, national, regional and local guidelines for integrated planning and management should be developed. *(national, regional and local level)*

- **Wider stakeholder support** to PES schemes should be promoted. For example, biodiversity conservation and environmental protection organisations should start to implement biodiversity programmes directed towards PES target sector and group (farming and farmers). Organic farming organisations should broaden their focus towards nature conservation issues. They are mostly focused on production, marketing and inspection issues and don't communicate the environment/nature conservation aspects of organic farming either to farmers or to consumers. In general, forging alliances with local, regional, national and international organisations, NGOs, natural resource-related educational centres and companies should also be endorsed to promote the uptake and implementation of PES systems. For example, international organisations and project implementing agencies also play a role in supporting the creation and implementation of monitoring and certification mechanisms for environmental services. Civil society organisations could fulfil the key function of providing information to particular stakeholder groups, can raise awareness and stimulate public debate, and can act as political pressure groups. *(national, regional and local level)*

- In the PES target areas, the beneficiaries (in this case the farmers) should receive diverse **environmental and professional training** to help them to get maximum benefits from the established PES schemes and related measures. For example, advice and training should be provided on how the local products and services can best access and be competitive on the market. In this context, delivering clear, simple and accurate information concerning direct selling of local/traditional products, animal welfare, hygiene standards for small-medium size farms would be of assistance. *(regional and local level)*

- The **institutional capacity** of organisations responsible for assisting and informing the PES beneficiaries (i.e. farmers) in adopting biodiversity friendly

land use practices should be strengthened. A number of case studies reveal that the national institutions involved are not acquainted with measures to improve or maintain biodiversity in agricultural land and have no related educational and advisory activities or programmes in place. *(national, regional and local level)*

- Support should be given to raising general **environmental awareness** among the PES beneficiaries (farmers) and broader stakeholders, including consumers, over the importance of biodiversity, ecosystem services and sustainable management of land. In the PES target areas focus should be given to providing information on the role of ecosystems subjected to PES schemes in conserving biodiversity and ecosystem services. In order to encourage consumers to demand biodiversity friendly and/or organic products and eventually pay a premium price for them it is necessary to provide the consumers with relevant information (e.g. via labels, leaflets, opportunities to visit biodiversity friendly managed farming areas, etc.). This requires creating institutional structures for consumer information and advice. *(national, regional and local level)*

- If feasible and appropriate, **media** could be used as a tool to communicate the importance and benefits of biodiversity friendly land use to the public and, in that way, general awareness and acceptance could be raised. These can be done for example through popular but educative TV and radio programmes, articles in daily press and magazines, etc. Media channels could also be used as tools for increasing awareness of local products produced in environmentally friendly way.*(national, regional and local level)*

- Scientific **research** related to biodiversity friendly land use and market based instruments, such as PES schemes, for biodiversity conservation should be further endorsed in order to strengthen and disseminate methodologies to quantify positive and negative externalities created by a change in land use or land cover. In this context, university and environmental, forestry and agricultural scientific organisations should consider promoting research regarding the impacts of PES schemes as well as payment mechanisms should be supported. In a broader context, universities and other research institutions should adapt their curricula and include biodiversity topics in their programmes. Research on biodiversity protection measures in farming should be generally encouraged by the relevant national instances, e.g. by ministries dealing with education, environment and agriculture. *(national and regional level)*

To conclude, the analysis of all the case studies has provided evidence that PES schemes could be a potential and beneficial tool for supporting conservation of biodiversity, e.g. related ecosystem services, in the studied countries. However, as described above, the case studies also highlighted that PES schemes should be carefully designed to actually deliver the identified objectives. Additionally, the PES schemes do not function in a vacuum and therefore in order for the schemes to succeed a number of related external factors should be taken into consideration during the PES design and implementation.