

## Demand for public environmental goods from agriculture – finding a common ground

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**Abstract:** *This paper will draw on varied evidence to discuss the extent of public demand for goods and services provided by agriculture across Europe, with special emphasis on environmental services, such as landscape preservation and contributions to biodiversity. For this, a number of studies from European nations were analysed with reference to the following research questions: Is there a consistent demand for public goods from agriculture across Europe? Are there significant differences in the type of public goods and what are typical reasons for differences between the countries or regions? The results show that considerable differences exist to either the type of public goods as well as the levels of willingness to pay for the provision of public goods through agriculture. Most effects could be explained by regional differences in consumer preferences. However, some effects, such as income and embedding, became evident at various levels when evaluating the aspect of demand. In conclusion, there is apparent inconsistency in demand for public goods from agriculture across Europe; however, interpretation and comparison of demand need to take into account a complex set of regional and cultural factors.*

**Keywords:** *public goods, case studies, citizen preferences, willingness to pay*

### Introduction

Our rural landscape has increasing significance in terms of providing use values such as food and energy resources as well as non-use values such as environmental services and opportunities for recreation and tourism.

The latter functions in particular cannot be sustained without traditional forms of agriculture; thus they are indispensable to the appearance of our landscape today. The current observable main trends across Europe seem to threaten the continued provision of so-called “public goods” – first of all by an ongoing intensification of production and secondly by the discontinuing of farming with little economic rationale. Therefore the maintenance of farming practices which sustain the environment and provide ecological services, as well as continued development of the rural landscape, has become a political goal of Europe’s Common Agricultural Policy (CAP).

A large share of the EU budget (€54 billion) is spent annually on supporting European agriculture. The rationale for this major public spending is thus frequently debated. One way to justify these payments is the provision of evidence for public demand for values provided through the agricultural sector – whether it be use values or non-use values.

Numerous studies exist in terms of demand for public goods from agriculture. Since most public goods have certain non-market value, estimation is difficult; though an assessment of the entire value of public goods (use- and non-use values) provided through agriculture in Europe seems rash and almost impossible to calculate. However, a large number of case studies shows various aspects of the system.

## Research question and study outline

Our paper aims to give an overview of the extent of demand for public goods provided by agriculture across Europe. Despite a plethora of studies which reveal a considerable demand for public goods on a national level, cross-national comparative data are scarce. The available case-study-based literature gives an indication of the type of public goods which plays an important role in each country. For this study, a number of case studies selected by representatives from a pan-European research collaboration led by the IEEP London on the evaluation of public goods (Cooper, Hart et al., 2010) were compiled and analysed with reference to the following main research questions:

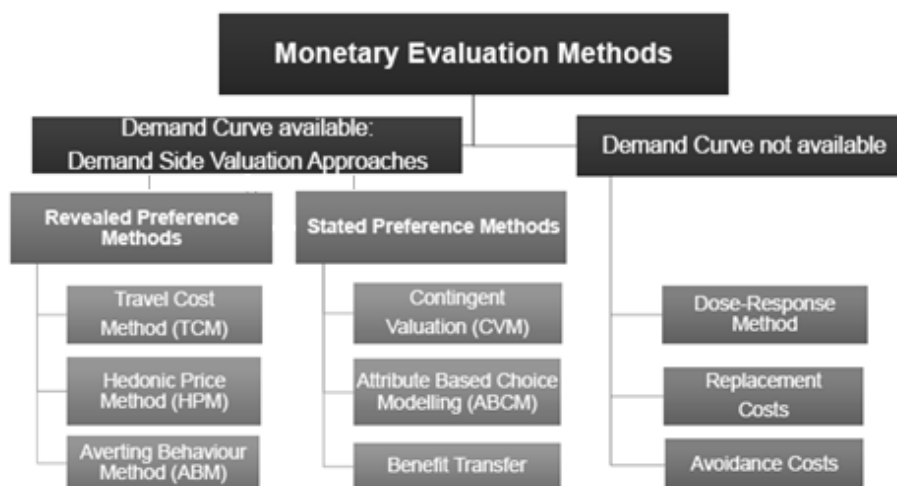
*Is there a consistent demand for public goods from agriculture across Europe?*

*Are there significant differences in the type of public goods and what are typical reasons for differences between the countries and respective regions?*

Apart from methodological differences, we expect considerable variation among the study regions with regard to the type of public goods under evaluation. There will be preferences for studies in different areas showing a certain dependency on matters of interest. The first part of the review will deal in detail with these differences.

## Methodological approaches to analysing public goods

Very broadly, two approaches measuring demand for public goods can be distinguished. The first is to look at representative indicators or expressions of mass behaviour. These so-called *proxy indicators* might be, for example, visitor numbers to scenic areas, membership of environmental organisations or consumers' choice in buying organic products.



**Figure 1.** Classification of methodologies in demand side evaluation of public goods (own graph based on Turner, Pearce et al., 1993)

The other major approach in demand measurement in the field of public goods is to use monetary evaluation methods – mostly expressed through a willingness-to-pay value. Determining the willingness to pay (WTP) involves ascertaining from the individual either how much he or she is willing to pay to ensure that the public goods or a special attribute of a landscape connected to certain forms of land-use is preserved. Alternatively, the respondent will be asked how much they are willing to accept in compensation for the loss of some or all of these attributes. The latter concept is termed WTAC – willingness to accept compensation for change.

According to Figure 1, monetary evaluation methods can be distinguished whether a demand curve is available or not. If a demand curve in a real or hypothetical market is available, valuation approaches differ further with regard to the method of data collection. The majority of studies use Revealed Preference Methods where data is readily available. One example is the Travelling Cost Method (TCM). Here the expenses of travelling to a certain destination are used as an indicator for the willingness to pay. Another example of a revealed preference method is the WTP for an unspoilt

landscape expressed in higher land price calculated through a Hedonic Pricing Method (HPM), based on housing and property transaction data.

In the field of the so-called Stated Preference Methods – techniques where people are interviewed – Contingent Valuation Methods (CVM) and Choice Experiments (CE) are most frequently applied. Both of these methods are considered the most suitable for evaluation of public goods. Whether CVM or CE are applied, differing results emerge, which are not clear, however, and are sometimes even insignificant, for example results depending on the matter of study (Colombo, Calatrava et al., 2006) and inherent bias, such as strategic behaviour or embeddedness. With respect to landscape, public goods evaluation and aggregation to hectares and local population Swanwick and Hanley et al. (2007) remain in favour of CVM.

## Estimating public goods via proxy indicators

So-called proxy indicators derived from readily available statistics give some important indications of the differences in demand for public goods by agriculture across Europe. Some examples of possible proxy indicators are summarised in Table 1.

**Table 1.** Overview on selected proxy indicators in European countries.

	France	Czech Republic	Germany	Italy	Spain	Sweden	UK
Environ. Protection	98%	n.a.	98%	98%	96%	97%	98%
<i>Approval of environmental protection as a new social movement goal<sup>a</sup></i>							
Wildlife Protection	97%	n.a.	97%	96%	94%	89%	98%
<i>Approval of wildlife protection as a new social movement goal<sup>a</sup></i>							
Agricultural pollution	30%	23%	19%	26%	21%	18%	18%
<i>Use of pesticides, fertilizers, etc. Choice of main environmental worries<sup>b</sup></i>							
Loss in biodiversity	25%	29%	29%	17%	22%	34%	20%
<i>Extinction of species, loss of wildlife and habitats. Choice of main environmental worries<sup>b</sup></i>							
Organic Farming	2.1%	8.0%	5.4%	7.9%	4.5%	10.8%	4.6%
<i>Land area as proportion of all agricultural land<sup>c</sup></i>							
Organic Products	1.2%	n.a.	3.1%	3.8%	0.7%	3.0%	1.6%
<i>Market share in consumption<sup>d</sup></i>							
ENGO Membership	0.24%	0.05%	0.55%	n.a.	0.003%	1.94%	5.78%
<i>Members of largest ENGO as proportion of the total population</i>							
National Parks	1.7%	1.5%	2.7%	5.0%	0.7%	1.4%	8.2%
<i>Park area as proportion of the total land area<sup>e</sup></i>							

Sources: <sup>a</sup>(Mertig and Dunlap, 1995); <sup>b</sup>(European Commission, 2008); <sup>c</sup>(Willer, 2009); <sup>d</sup>(ZMP, 2009); <sup>e</sup>(UNEP-WCMC, 2009)

A first indication for the demand of public goods can be its degree of public approval. A cross-national comparison by Mertig and Dunlap (1995) among EU15-countries, along with Norway, Switzerland and the U.S., found some, albeit small differences among the Western European nations by comparing public approval of environmental protection as targets within new social movements. According to the study, the general level of approval of environmental protection is very high across Europe with little indecision. Slightly lower values obtained by Swedes for wildlife protection could be explained by the abundance of wildlife and the popularity of game hunting. In contrast, the loss in biodiversity is above average in Sweden. The authors conclude that “environmental (and wildlife) protection has truly become a valence issue eliciting little public opposition”.

According to a study by the European Commission (2008), agricultural pollution seems to be less worrisome to Germans, Spanish and British citizens when compared to the French and Italians.

The share of land under organic farming is another suitable indicator. According to Willer (2009), it is highest in Sweden, the Czech Republic and Italy; however, domestic market shares as an indicator for demand for organic produce is a better indicator for the respective nation. For example, consumption in Spain plays a marginal role.

Furthermore, membership of environmental non-governmental organisations (ENGOS) shows participatory engagement. The UK's largest ENGO reaches 5.6% of UK citizens alone, as compared to Germany, for example, with 0.5%. One explanation for the low ENGO memberships in the Czech Republic is that historically citizens are less involved in non-governmental organisations in general. This is currently changing and NGO membership is growing at an annual rate of 20%.

**Table 2.** Visitor numbers in selected European regions.

Name and country of location	Status / Management Body	Visitor days per year	Agricultural practice / most relevant land use
Wicken Fen, UK	National Nature Reserve	40,000	fenland, farmland, marsh, and reedbeds
Strumpshaw Fen, UK	Royal Society for the Protection of Birds	15 – 20,000	grazing by sheep, cattle, ponies, rabbits
Müritznational Park, GER	National Park	152,000 daily 238,000 overnight	woodland and lakes, 7% pastures and fields <sup>f</sup>
Berchtesgadener Land, GER	National Park	1.2 million	alpine pastures, roaming cows, traditional products <sup>g</sup>
Altmühltal, GER	Nature Park	573,300 daily 336,700 overnight	farmland, extensive sheep grazing <sup>f</sup>
Hoher Fläming, GER	Nature Park	245,900 daily 51,000 overnight	extensive grassland, fens, if dry: intensive cultivation
Eight Nature Parks, ES	Nature Park	average 140.000	criteria: > 40% of land cover by olive trees <sup>h</sup>
Cley Marshes, UK	Wildlife Trust	25,000 visitor centre 100,000 area estimate	reed cutting <sup>i</sup>
The Broads, UK	similar to National Park	5.4 million	traditional mixed farming, grazing marsh <sup>j</sup>

Sources: <sup>f</sup>(Job, Harrer et al., 2005); <sup>g</sup>(Job, Metzler et al., 2003); <sup>h</sup>(EUROPARC-España, 2008); <sup>i</sup>(Klein and Bateman, 1998); <sup>j</sup>(Bateman, Willis et al., 1992)

Furthermore, the share of land designated as National Park shows apparent differences in relevancy of landscape protection across Europe. In total more than 300 National Parks exist in Europe. In the UK, 8.2% of the national territory is protected within a National Park, in contrast for example to Spain, where only 0.7% of the area has National Park status (UNEP-WCMC, 2009).

Last but not least, visitor numbers to protected areas give a very good impression of the demand for public goods. For most protected areas, only rough estimates of visitor numbers are available. While for some National Parks exact numbers (through the counting of visitors at entry points) are available (see Table 2), in most nature parks such evaluation is not possible. In the UK, annual visitor numbers to protected areas are enormous and give a straightforward indication of public demand: 18 million visits to National Nature Reserves; an estimated 73 million annual visits to Countryside Parks (Urban Parks Forum and Garden History Society, 2008) and three million visitors to all AONBs – Areas of Outstanding National Beauty (DEFRA, 2008).

Site-specific information from reserves and protected areas shows large numbers of visitors (see Table 2). For example, high visitor numbers to the Spanish countryside dominated by olives give an important hint of the role olive groves play in Spain. Annual reports reveal that the numbers counted on information points in eight Spanish natural parks average 140.000 visitors per year (EUROPARC-España, 2008). Among the counting and estimation conducted in the UK, the Broads reached 5.4 million visitor days in one year. Information on visitor numbers in Germany is relatively scarce. In a country-wide principal study, the average expenditure of daily visitors back in 1995 was €19,80 per person and day (DWIF in Job, Harrer et al., 2005). Visitors who undertake hiking tours over longer distances spend €12.80 – comparably less money (Harrer and Scherr 2000 in Job, Harrer et al., 2005).

Such monetary values could in theory be applied to visitor numbers to get a rough estimate of expenditures in the area.

### Monetary evaluation approaches to public goods – overview and presentation of study sites

Based on the general review, different types of public goods are grouped into five categories and mapped to show the distribution across Europe (see Figure 2). Among the chosen categories, the demand for agricultural landscapes is the most frequent topic of evaluation, followed by farmland biodiversity (species and habitats).

Studies of other categories of public goods from agriculture, such as the maintenance of soil, water and air quality, contributions to animal welfare, the prevention of natural hazards and climate change issues are also found in the literature, but to a lesser extent.

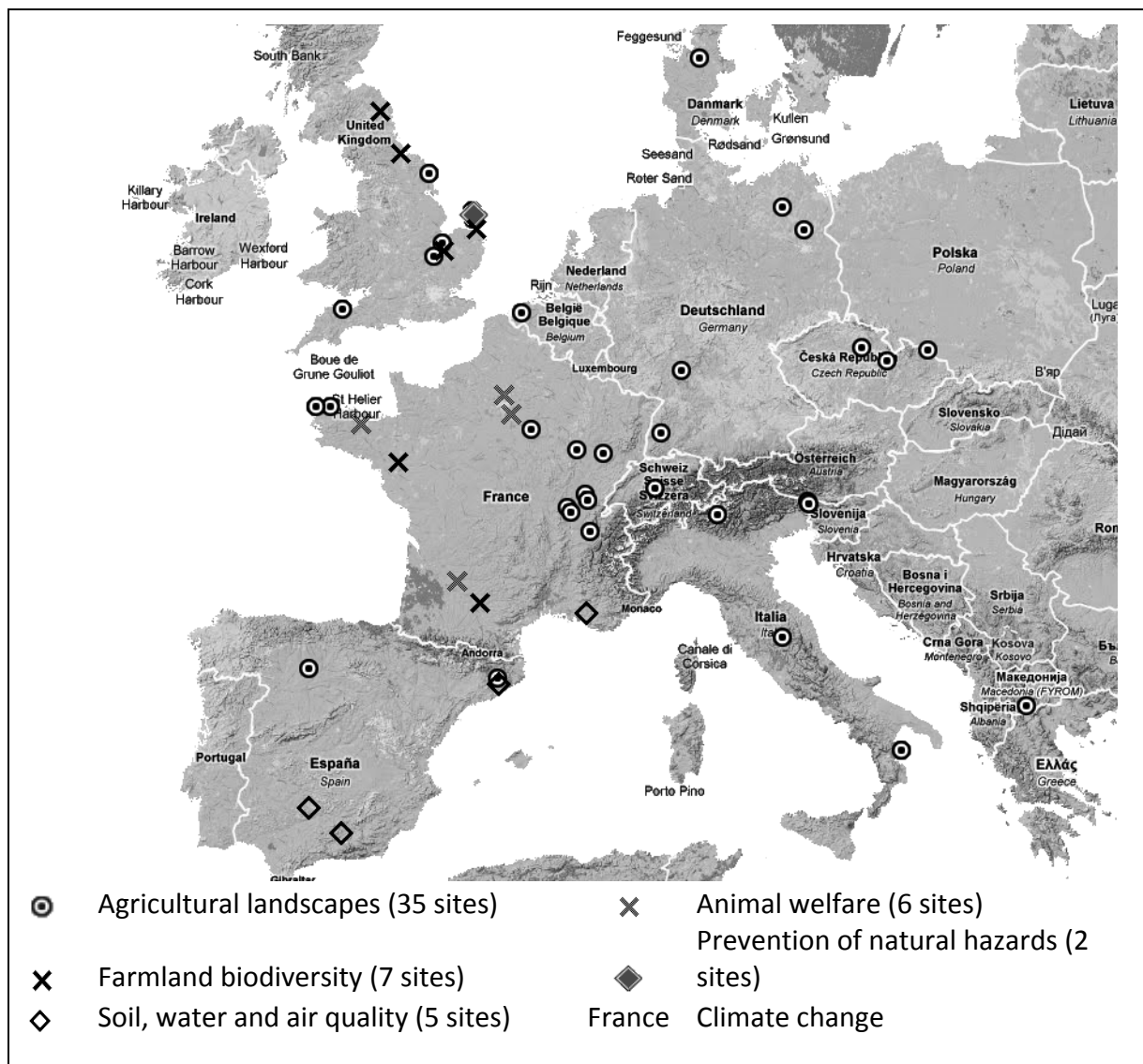


Figure 2. Distribution and number of study regions of the evaluated studies according to the type of public goods

From the literature review, some initial observations can already be drawn on the geographical distribution of studies of public goods. The focus of the studies reflects a range of factors – such as research fields, political priorities, etc. and cannot be seen solely as an artefact of the distribution of

the provided public goods. Soil and water quality has higher relevance in southern Europe and a number of studies have been undertaken in Spain. Numerous studies about food quality and animal husbandry were conducted in France, in which animal welfare is to some degree part of the concern. Air quality and climate change has also been studied in France. In Germany, food security was a topic, in Italy, agri-tourism.

From the variety of agriculturally used landscapes across Europe, a selection of four has been taken to illustrate the possibilities. These examples are mountain areas, wetlands and riparian ecosystems, and hedgerows, including other landscape elements and olive groves which are more relevant in southern Europe. Case studies from these landscape types are used to illustrate the scope of WTP and thus the demand for them.

### **Artisanal production from mountain areas**

A good way to protect agricultural systems which would vanish under the forces of the world market is bringing them to value and finding ways to distinguish them from other, much more easily producible goods. A certain willingness by consumers to pay a premium for quality products exists, for example with artisanal production of cheese and meat in France.

In the Auvergne Region the WTP for cheese was studied (Dobremez L., Ernoult C. et al., 2008), as well as hand-made high-quality Laguiole knives from the Aveyron region at the southern border of Auvergne (Hirczak M., Moalla M. et al., 2005). In the Parc Naturel des Volcans d’Auvergne, in the same region, the WTP for meat and cheese from Salers breed cows was analysed. Since they feed on herbage-base at low stocking rates, in order to comply with a labelling scheme, there are positive external effects to the agricultural landscape associated (Vollet, Candau et al., 2008). According to authors of studies in the Auvergne Region, there is a strong demand for local goods linked to a specific territory. The presence of a local beef breed, the Aubrac, has “high relevance in that area”. Here, the concept of local production and marketing with the help of an EU labelling scheme – Protected Designation of Origin (PDO) – seems to work in support of local production and the demand for high-quality products has been continuously increasing for many years (Vollet, Candau et al., 2008).

### **Wetlands and riparian ecosystems**

Two wetlands evaluated with reference to the value of public goods were the riparian forests adjacent to the Garonne River near Toulouse, France (Amigues, Boulatoff et al., 2002), and the Natura-2000 zone of the Erdre Marshes north of Nantes, also in France (Maresca and Ranvier, 2006). The average WTP for a restoration of the riparian habitat programme through an increase in local taxes from face-to-face respondents was €14 p.a. (Amigues, Boulatoff et al., 2002). Postal survey respondents had an average willingness to accept (WTAC) €122 per ha for an increase in the unused strip on their land by the river from 3m to 10-15m.

A Contingent Valuation survey by Ragkos and Psychoudakis et al. (2006) attached monetary values to goods and services provided by the areas of the Zazari and Cheimaditida Lakes, Western Macedonia in Greece. The land neighbouring the lake is mainly agricultural, deciduous and shrub woodland or wetlands. The surrounding areas have important ecological functions supporting approximately 140 different bird species and 21 rare plant species – however, the biodiversity of the lakes is currently decreasing. Both lakes are under threat due to water withdrawal and eutrophication by agriculture. The study revealed that the sum of all WTP values of separate functions was greater (€211.30) than the WTP for wetland functions as a whole (€125.80). This divergence is an example of the well known embedding effect. The fact that wetland protection was considered by 97% of respondents shows the exigency of the problems there.

## Hedgerows and other landscape elements

The threat to the agricultural landscape in Monts d'Arrée in Central Brittany, France consists of the removal of hedgerows around fields in the northern part and the establishment of a natural scrubland in the southern part. The park administration already carries out actions in order to stop hedge removal and scrubland succession. The economic valuation of landscape changes using Contingent Valuation was done by Dachary-Bernard (2007) employing a survey among tourists and residents. The results revealed that the current public policy of maintaining scrubland at a low height went against the wishes of the residents. The results also showed that the aggregated (residents and tourists) WTP was €43 p.a. per household for the highest level (highest density) of hedgerows and €18 p.a. per household for the lowest level (highest forestation) of scrubland.

The demand for the preservation of landscape elements was evaluated through a Contingent Valuation study by Hanley and Oglethorpe et al. (2001) in four regions in the UK: Cambridgeshire, East Yorkshire, Devon and Hereford. One of the goals of the study was to ground the declining demand curve of the marginal WTP in response to an abundance of landscape feature onto a wider empirical base (proof of the abundance-effect). For this purpose, the WTP was determined with regard to the goal to protect hedgerows from further losses. In Devon, the WTP ranged from €23.16 and €41.60 for 10% and 50% losses, to €24.58 and €30.73 for 10% and 33% losses. In Hereford the range of differences was much wider: the comparable figures were €16.86 and €23.95 (10% and 50% losses) and €30.41 and €41.13 (10% and 33% losses).

## Olive groves in the Mediterranean area

Of the 6.8 million ha worldwide of olive trees, the majority are located in the Mediterranean and dominate its landscape. EU production of olive products comes primarily from Spain, followed by Italy, Greece, Portugal and Croatia. Apart from the steadily increasing demand for olive oil – in Europe and around the world – the abandonment of olive groves due to future changes in the CAP is a widespread concern. According to Organic-World.net (2009), approximately 280.000 ha of olive groves are farmed organically, out of more than five million ha in the EU; this amounts to about 5% of the area.

In Andalucía, a region in Spain where 80% of the country's olive trees grow, a Choice Experiment showed that the population of mountain areas in particular values the multifunctional aspects of the specific agricultural practice of growing olive trees (Arriaza, Gómez-Limón et al., 2008). On average, each resident would pay €0.62 p.a. for a 1% increase in other fruit-tree surface – improving the visual quality of the landscape – and €0.53 p.a. for 1% reduction of farm abandonment – preventing rural depopulation in mountain areas. Although the results of the study suggest that there is a certain demand for the various functions, the citizens' valuation of the whole notion of multifunctionality and the various attributes that the concept involves, is heterogeneous and depends largely on the socio-economic characteristics of the individuals (Arriaza, Gómez-Limón et al., 2008).

## Discussion

### Generally there is a positive willingness to pay for public goods

The analysis of the proxy indicators shows that huge parts of the population in Europe have a certain willingness to pay for public goods. This result is also confirmed by the monetary case studies, which give proof of positive WTP values in a more quantitative manner. The values obtained range from €14 p.a. in the case of riparian habitat restoration to €41 for the protection of hedgerows. Our results correspond to other meta-studies. Nunes and van den Bergh (2001) concluded in their early comprehensive comparison of values attached to biodiversity that results of the empirical analysis "give unequivocal support to the belief that biodiversity has a significant, positive social value". The same holds true for public goods provided by agriculture.

### **Furthermore, our results show the varying demand from country to country**

Proxy indicators – which allow direct comparison – show that demand for public goods varies from country to country in their respective regions. In some fields European nations developed a similar pattern on a high level of achievement (the level of approval of environmental protection with respect to environmental / wildlife protection). Significant differences between countries became visible in the popularity of organic consumption; here the UK and France are less engaged. In addition, membership of environmental organisations and land set aside for protection under a National Park scheme showed a high variance.

Differences in demand for public goods become even more pronounced when looking at the monetary evaluations; though results of these studies are not directly comparable. However, it becomes even more difficult, since all studies choose subjects according to regional preferences for research and evaluation. From the regional case studies, it is to be expected that individuals' WTP might be higher in the case studies than on average across Europe. Examples of local preferences are: olive groves in Spain, water shortage and prevention of forest fires in Italy and Spain or hedgerows in the UK, etc.

### **Non-comparability of values**

In summary, our study showed the overall non-comparability of absolute values of WTP or WTAC and thus values cannot be directly summed up. This already becomes evident when looking at the units of measurement used. Usually, individuals' WTP or WTAC are calculated in € p.a., but sometimes households are also considered. Often figures are further aggregated with respect to the local inhabitants of the area. Furthermore, the results are dependent on the income and educational situation in the respective countries, since an increase in education, level of income and age had a positive effect on the WTP (Ragkos, Psychoudakis et al., 2006).

A further reason why values are impossible to add up is the well-known embedding effect. The more designated a public good is analysed, the stronger the embedding effect will show. This effect results in an overestimation of the WTP, since the sum of a number of separate payments (real or imaginable) is usually higher than one payment "embedding" all aspects of public goods.

### **Additionality effect – what is the baseline?**

Additionality is the most fundamental topic overall. Most studies focus on changes rather than on levels of public goods. The question might be: "How much are you willing to pay for a significant *improvement* in water quality?" From an economist's point of view, keeping conditions *ceteris paribus* makes sense, as already stated by Nunes and van den Bergh (2001). The main reason is that WTP or WTAC are based on compensation or equivalence variations of a change. Often, studies rely on a certain baseline and take current levels of provision for public goods for granted. In reality, this is far from the case. In order to provide a rationale for public funding of the provision of public goods within the agricultural sector, it is necessary first of all to attribute the monetary values to a current, already established level of public goods and then, secondly, to estimate the changes.

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## References

- Amigues, J.-P. and C. Boulatoff, et al. (2002) "The benefits and costs of riparian analysis habitat preservation: a willingness to accept / willingness to pay contingent valuation approach." *Ecological Economics* **43**: 17-31.
- Arriaza, M. and J.A. Gómez-Limón, et al. (2008) "Demand for non-commodity outputs from mountain olive groves." *Agricultural Economics Review* **9**(1): 5-23.
- Bateman, I.J. and K.G. Willis, et al. (1992). *Recreation and Environmental Preservation Value of the Norfolk Broads: A Contingent Valuation Study*. Norwich, Environmental Appraisal Group, University of East Anglia.
- Colombo, S. and J. Calatrava, et al. (2006) "Analysing the social benefits of soil conservation measures using stated preference methods." *Ecological Economics* **58**(4): 850-861.
- Cooper, T. and K. Hart, et al. (2010) *The Provision of Public Goods through Agriculture in the EU. Report for DG Agriculture*. London, Institute for European Environmental Policy.
- Dachary-Bernard, J. (2007) "La méthode des choix multi-attributs appliquée aux Monts d'Arrée." *Cahiers d'Economie et de Sociologie Rurales* **84-85**: 134-165.
- DEFRA. (2008, 10/2008) "P1 Number of visits to nature reserves in England." Retrieved 20.07.2009, from <http://www.defra.gov.uk/wildlife-countryside/pdf/biodiversity/indicator/200810p1.pdf>.
- Dobremez L. and C. Ernoult, et al. (2008) *Mise en relation de la qualité des produits et des paysages: enseignements issus de l'analyse comparée ente le fromage AOC Saint Nectaire et la marque viande bovine du parc naturel régional du Morvan* - Final Report: 40.
- EUROPARC-España (2008) *Anuario EUROPARC-España el estado de los espacios naturales protegidos 2007*. Madrid, Fundación Fernando González Bernáldez.
- European Commission (2008) Attitudes of European citizens towards the environment. *Special Eurobarometer, TNS Opinion & Social. 295/ Wave 68.2*.
- Hanley, N. and D. Oglethorpe, et al. (2001) *Estimating the value of environmental features - report to MAFF*. Edinburgh, Institute of Ecology and Resource Management (IERM), University Edinburgh and Scottish Agricultural College (SAC).
- Hirczak M. and M. Moalla, et al. (2005) Du panier de biens à un modèle plus général des biens complexes territorialisés: concepts, grille d'analyse et questions. *Symposium INRA PSDR "Territoires et enjeux du développement régional"*. Lyon, France, 9-11 March 2005.
- Job, H. and B. Harrer, et al. (2005) "Ökonomische Effekte von Großschutzgebieten - Untersuchung der Bedeutung von Großschutzgebieten für den Tourismus und die wirtschaftliche Entwicklung der Region." *BfN-Skripten* **135**.
- Job, H. and D. Metzler, et al. (2003) *Inwertsetzung alpiner Nationalparks - Eine regionalwirtschaftliche Analyse des Tourismus im Alpenpark Berchtesgaden*. Kallmünz / Regensburg, Verlag Michael Lassleben.
- Klein, R. J. T. and I. J. Bateman (1998) "The Recreational Value of Cley Marshes Nature Reserve: An Argument Against Managed Retreat?" *J.CIWEM* **12**(8): 280-285.
- Maresca, B. and M. Ranvier (2006) Biodiversité: combien est-on prêt à payer? Une méthode exploratoire appliquée au programme Natura 2000. *Consommation et Modes de Vie* **198**, CREDOC. **198**.
- Mertig, A.G. and R.E. Dunlap (1995) "Public Approval of Environmental Protection and other Social Movement Gals in Western Europe and the United States." *International Journal of Public Opinion Research* **7**(2).
- Nunes, P. and J. van den Bergh (2001) "Economic valuation of biodiversity: sense or nonsense?" *Ecological Economics* **39**: 203-222.
- Ragkos, A. and A. Psychoudakis, et al. (2006) "Using a functional approach to wetland valuation: the case of Zazari-Cheimaditida." *Reg Environ Change* **6**: 193-200.
- Swanwick, C. and N. Hanley, et al. (2007) *Scoping Study on Agricultural Landscape Valuation - Final Report to DEFRA*. London, Department of Landscape University of Sheffield, Environmental Economics Research Group University of Stirling, Sustainability Research Institute University of Leeds.
- Turner, R K. and D. Pearce, et al. (1993) *Environmental Economics*, Harvester Wheatsheaf.

- UNEP-WCMC. (2009) "World Data Base on Protected Areas." Retrieved 05.08.2009, from <http://www.wdpa.org/>.
- Urban Parks Forum and Garden History Society (2008) Towards a country parks renaissance - Section 2: The Present - An Audit of Country Parks Today, The Countryside Agency.
- Vollet, D. and J. Candau, et al. (2008) "Landscape elements: Can they help in selling 'Protected Designation of Origin' products?" *Landscape Research* **33**(3): 365-384.
- Willer, H. (2009) "Agricultural land and producers." Retrieved 12.01.2010, from <http://www.organic-world.net/statistics-europe-land-producers.html>.
- ZMP (2009) *Marktanteile von Bio-Lebensmitteln in Europa*. ZMP, FiBL and Aberystwyth University.