



REVEALING THE VALUE OF THE NATURAL ENVIRONMENT IN ENGLAND

A report to the
Department for Environment, Food and Rural Affairs

March 2004

REVEALING THE VALUE OF THE NATURAL ENVIRONMENT IN ENGLAND

A report to Defra

GHK Consulting Ltd

Residence 2

Royal William Yard

Plymouth

PL1 3RP

Tel: 01752 262 244

GFA-Race Partners Ltd

Royal Agricultural College

Cirencester

Gloucestershire

GL7 6JS

Tel: 01285 889 929

CONTENTS

EXECUTIVE SUMMARY	1
Revealing the Value of the Natural Environment	1
The Economic Impact of Environment-Linked Activity	1
Implications for Policy	2
Implications for Future Research.....	3
1 INTRODUCTION – PURPOSE AND SCOPE OF THIS REPORT	5
2 VALUES AND BENEFITS OF THE RURAL ENVIRONMENT	6
2.1 Defining Rural Environmental Activity	6
2.2 The Environment and the Economy – Values and Impacts	6
2.3 Methodological Framework	7
3 ECONOMIC IMPACT OF THE RURAL ENVIRONMENT IN ENGLAND	10
3.1 Methodology.....	10
3.2 Nature and Landscape Conservation	12
3.3 Agriculture and Food.....	15
3.4 Forestry and Forest Products.....	34
3.5 Commercial Fisheries	40
3.6 Tourism	43
3.7 Cross Sectoral Impacts – The Role of Quality of Life in Economic Development	54
4 ECONOMIC VALUE OF ENGLAND’S RURAL ENVIRONMENT	55
4.1 Types of economic value	55
4.2 Valuing the Natural Environment	55
4.3 Valuing Wildlife and Biodiversity Conservation.....	56
4.4 Valuing Landscape and Habitats	58
4.5 Economic Value of Agri-Environment Activities	62
4.6 Value of Ecosystem Functions and Services.....	63
4.7 Conclusions and caveats	64
5 WIDER INDICATORS OF THE VALUE OF THE NATURAL ENVIRONMENT	66
6 CONCLUSIONS AND RECOMMENDATIONS	69
6.1 England’s Natural Environment - Values and Impacts.....	69
6.2 Comparisons with Other Sectors	71
6.3 Policy Implications.....	72
6.4 Implications for Future Research	73
BIBLIOGRAPHY	75

EXECUTIVE SUMMARY

Revealing the Value of the Natural Environment

England's countryside supports valuable and varied landscapes and wildlife habitats, most of which have been shaped by centuries of economic activity. Natural and semi-natural systems are valuable to people because they:

- Support the production of food, timber and other rural produce.
- Provide a resource for recreation, leisure and tourism.
- Support vital ecosystem services – such as climate regulation, flood management and carbon storage.
- Provide habitats for wildlife, which is valued by people both because it adds interest to countryside activities and for its very existence.

The natural environment in England also has an important impact on the country's economy. Linkages between the environment and the economy can be grouped in terms of:

1. Activities that help to shape and manage the natural environment, such as nature and landscape conservation, agriculture and forestry. The activities of these sectors are responsible for building and maintaining the stock of natural capital.
2. Activities that benefit from the quality of the natural environment, such as tourism, fisheries, and the processing and marketing of “green” food and timber. These activities benefit from the services provided by natural capital.

The Economic Impact of Environment-Linked Activity

Collectively, activities within these sectors that are closely and positively connected with the management of the natural environment support 299,000 full time equivalent (FTE) jobs in England, and contribute £7.6 billion in gross value added (Table 1). This is more employment than is supported by either the chemicals or motor vehicle manufacturing industry in England.

These estimates are based on a review of a wide range of studies and statistical reviews that quantify economic activity in different rural sectors, and examine the linkages between the environment and the economy.

The review has estimated that:

- There are 8,600 FTE jobs in nature and landscape conservation in England, in a variety of public, voluntary and private sector organisations.
- Around a quarter of forestry employment and output can be attributed to the establishment and management of semi-natural woodlands, and the harvesting and processing of the timber they produce.
- Green agricultural systems, including organic systems and land in agri-environment schemes, are estimated to support 41,000 FTE jobs and contribute £840 million in value added.

- The future of commercial fisheries, and fish processing activities, which support 5,300 and 8,300 FTE jobs respectively in England, depends on achieving sustainable management of the marine environment.
- Around 60% of rural tourism and recreation activity is dependent on landscapes and wildlife, supporting more than 190,000 FTE jobs.
- Nearly 2% of the £120 billion food chain involves the production and marketing of produce linked to a high quality rural environment.

Table 1: Impact of Activities Contributing to/Benefiting from a High Quality Natural Environment in England

	Employment (FTE)	GVA (£m)
Management of the rural environment:		
Nature and Landscape Conservation	8,600	223
Agriculture	41,400	837
Forestry and wood processing	3,600	93
<i>Sub Total</i>	<i>53,600</i>	<i>1,153</i>
Activities that benefit from the rural environment		
Tourism and recreation	192,000	5,040
Food processing and marketing	40,000	1,029
Fisheries	5,300	159
Fish Processing	8,300	175
<i>Sub Total</i>	<i>220,600</i>	<i>5,763</i>
Total	299,200	7,556

Numerous examples of the positive economic impacts of specific schemes, initiatives and sites concerned with the management of the natural environment are presented in the report.

Implications for Policy

The major economic significance of the natural environment is often underestimated. Conserving and managing the rural environment is not only important in its own right, but also in securing the range of benefits that the environment provides for society and the economy. Future policy decisions need to recognise the economic opportunities that the environment offers, and not regard it as merely a constraint to economic development.

The economic significance of the natural environment is increasing, especially as environmental objectives are becoming increasingly central to the development of

the main rural sectors such as agriculture, forestry, fisheries and tourism. Sustainable development depends on further integrating environmental concerns into these sectors. As a result, the rural environmental economy is likely to grow further. Increasing environmental activity in the larger sectors such as food and tourism offers particularly strong growth opportunities, and depends in turn on further development of environmental land management activities.

The positive links between the environment and rural economies mean that new environmental activities can offer economic opportunities to rural areas, and this is increasingly being recognised by economic development programmes and funding schemes. Care is needed in programming future activity, since it does not follow that new environmental projects will always bring economic gains. There is a need to understand the nature of the different linkages between the environment and the economy, and to be able to identify the impacts of new activity at the margin, recognising the risks of displacing existing economic activity.

Implications for Future Research

A large amount of evidence now exists documenting the positive linkages between the environment and the economy in rural areas in England. This report has reviewed that evidence and used it to develop estimates, for the first time, of the economic significance of activities contributing to, and dependent on, the management of England's natural environment.

One of the conclusions of our review is that the evidence documenting these linkages is fragmented, referring often to individual sectors and localities, and employing varied methodological approaches. The task of pulling it together to produce overall conclusions, and in particular numerical estimates at the national level, has been a challenging one, particularly within the very brief timescale in which this study was conducted. As a result it has been necessary to use a number of assumptions to produce these national estimates.

Future attempts to quantify the economic impacts of rural environmental activity would therefore benefit from further research, particularly at the national level. Key areas for research include:

- **The economic impact of England's rural environment** – in particular more detailed research into environment-economy linkages and refinement of the methodology employed in this study.
- **The economic impact of the nature and landscape conservation sector** – through a more standardised and comprehensive national survey.
- **The economic impacts of agri-environment schemes** – with more focus on economic impacts in scheme evaluation.
- **The economic significance of organic agriculture** – more information about organic farming in national agricultural statistics, and more attention to socio-economic impacts in policy evaluation.
- **The economic significance of environmental forestry** – greater focus on environment related forestry activities in sectoral studies and statistics.
- **The value of environment-related tourism** - national survey work to establish the economic significance of tourism dependent on wildlife and landscape.
- **The value of environmentally marketed food** – a national overview of the role of the environment in food marketing.

- **The role of environmental factors in influencing inward investment and relocation decisions** – evidence of influence of quality life and environmental factors on location decisions of companies and individuals.
- **The value of ecosystem services in England** – a review of the scale and economic importance of ecosystem services.

1 INTRODUCTION – PURPOSE AND SCOPE OF THIS REPORT

Recent years have seen an explosion of interest in the links between the environment and the economy. Since economics is central to public policy and investment decisions, there has been substantial interest in the development of techniques that enable economic values to be put on environmental goods and services. Environmental threats caused by proposed developments, and competition for public funds between environmental and other development projects, have also led to increased interest in the positive impacts that the environment can have on the economy. The increasing prominence of the regional development agenda has been accompanied by efforts to demonstrate the significance of the environment to regional economies, resulting in the publication of environmental economy reports for the English regions.

This report, commissioned by DEFRA, summarises the evidence of the role that the rural environment plays in the English economy. It focuses on the rural land use aspects of the environment economy relationship. As well as summarising the evidence from previous studies, it presents overall estimates of the significance of different environment-related activity to the economy nationally. To complete the picture, the review provides a brief summary of experience in valuing the rural environment in England, and also reviews wider evidence of the value of the environment to society, by considering aspects such as the membership of environmental organisations, participation in environment-linked recreational activity, and evidence of the benefits of the environment to human health and well-being.

2 VALUES AND BENEFITS OF THE RURAL ENVIRONMENT

2.1 Defining Rural Environmental Activity

This report focuses on the economic values and impacts associated with England's rural environment - the country's landscape and biodiversity. It includes activities that help to manage and conserve landscapes and wildlife habitats, such as nature and landscape conservation, agriculture, and forestry. Also considered are the benefits that rural environmental management has on outdoor recreation and tourism, on fisheries, and on the production and marketing of food, timber and other rural produce.

Other environmental activities – many of which are included in other studies such as the regional environmental economy reports – are excluded from this one. These include pollution control, waste management, remediation of contaminated land, renewable energy generation and sustainable transport. Though some of these activities are located in rural areas, they are primarily concerned with the protection of the wider environment rather than directly with rural landscapes and biodiversity.

2.2 The Environment and the Economy – Values and Impacts

In considering linkages between the environment and the economy, it is important to make a clear distinction between the **value of the environment**, and the **economic impact of environmental activities**.

People **value** the countryside because it provides food and other rural produce, offers opportunities for leisure and recreation, and because they gain pleasure from the enjoyment and simple existence of wildlife and landscapes. The value of some of these services (e.g. harvesting of food) is expressed in market transactions, while others (countryside recreation, existence values) are unpriced but their values can be estimated using non-market valuation techniques (such as contingent valuation, choice experiments, travel cost method, hedonic pricing).

At the same time, the management of the rural environment supports economic activity and can have positive **impacts** on the economy. These include the employment and incomes supported by nature conservation activities, agri-environment schemes and woodland management projects, as well as resulting impacts on the tourism sector and through the marketing and processing of countryside produce. Measuring the significance of these activities does not itself provide estimates of the value of the rural environment, although we would expect the two to be related.

Box 1: Economic Impacts and Values – an Example

A farmer has an area of moorland, which he uses for grazing sheep. He receives an annual payment from DEFRA for maintaining an appropriate management regime, which helps to pay for shepherding and employment of a dry stone walling contractor. As a result the land is scenically attractive and rich in wildlife, with good heather cover and breeding populations of red grouse, raptors and breeding waders. This helps to encourage walkers and bird watchers to the area, who spend money in the local economy. The lamb produced on the farm is packaged locally and marketed as a local, environmentally friendly product.

Economic impacts. The agri-environment grant boosts the farm's output and farmer's income, and enhances employment locally, so there is a positive impact on the local economy. Since it is financed from national and EU taxes, this spending has an opportunity cost, and is likely to reduce expenditure elsewhere, so it would be misleading to claim that it has a net benefit for the national economy as a whole. There is an additional positive impact through tourism, which increases locally (though displacement of activity elsewhere needs to be considered) and by supporting the packaging and marketing of local lamb. Economic impacts can be measured in terms of the enhanced income and employment in the agriculture, food and tourism sectors, and using multipliers the wider economy, at different spatial scales (local, regional, national).

Economic values. Management of the land maintains and enhances the biodiversity and landscape value of the area – people enjoy visiting the area more, visitor numbers increase, while non visitors also gain satisfaction from knowing that the wildlife of the area is increasing. The management of the land also results in the production of a premium product, more highly valued by consumers and enhancing the return to the producer. The economic value of environmental enhancements can be estimated using non-market valuation techniques (contingent valuation, travel cost, hedonic pricing) to assess values to users and non-users, and market-based measures (using data on market output to consider benefits to the producer and consumer). Since valuation of non-market benefits is often problematic, non-monetary measures (e.g. participation rates) can also be valuable. It is important to note that economic impacts and values are related, in that they both depend on the number of visitors and levels and value of marketed outputs, but that they are not the same. Economic values are measured by changes in consumer surplus (the value derived by consumers and individuals over and above the price they pay in the market) and producer surplus (the income received by producers over and above the minimum required to supply the good or service). Economic impacts are concerned with the effects that activities have on the economy (incomes and employment).

2.3 Methodological Framework

Management of the environment impacts on the economy in different ways. Activities can be broadly grouped in terms of:

- Those concerned with the protection, management and enhancement of the environment (e.g. nature conservation, environmental schemes in agriculture and forestry);
- Those that benefit from the quality of the environment (e.g. tourism, fishing, food and timber processing and marketing).

Or, in other words:

- Activities that help to build and maintain the stock of environmental capital;
- Activities that utilise environmental capital to produce other goods and services.

Figure 1: Environmental Capital Based Definition of Rural Environmental Economy

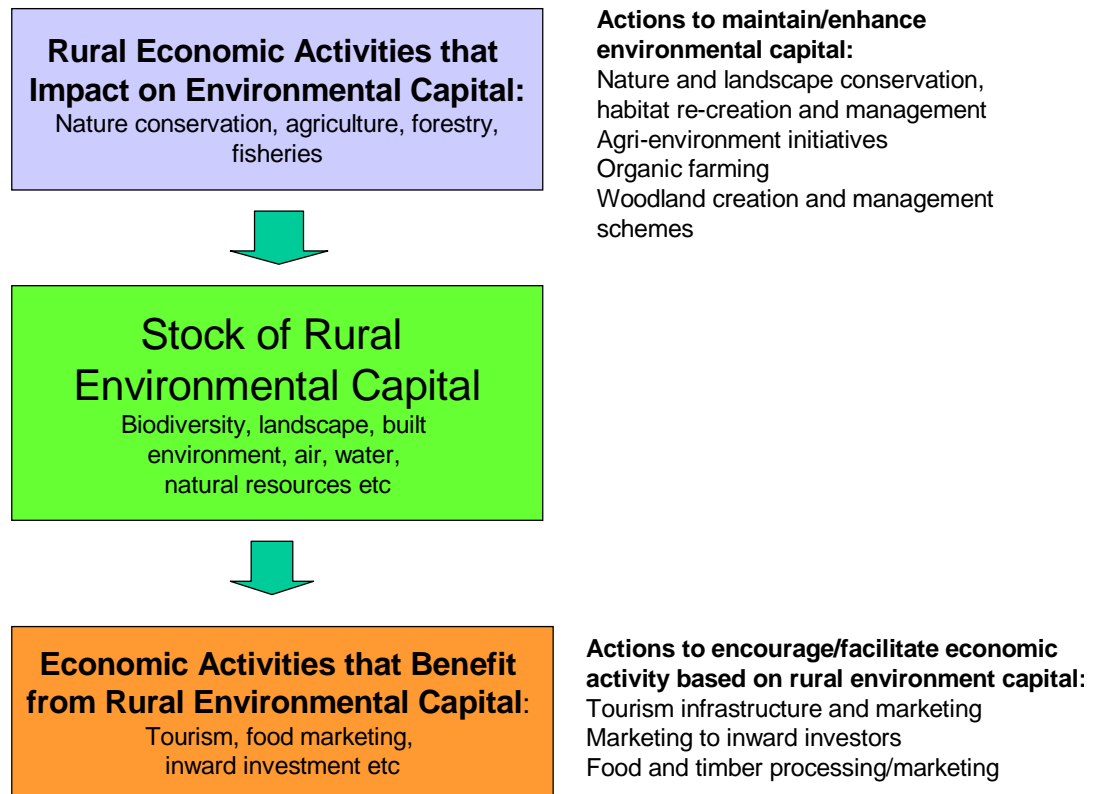
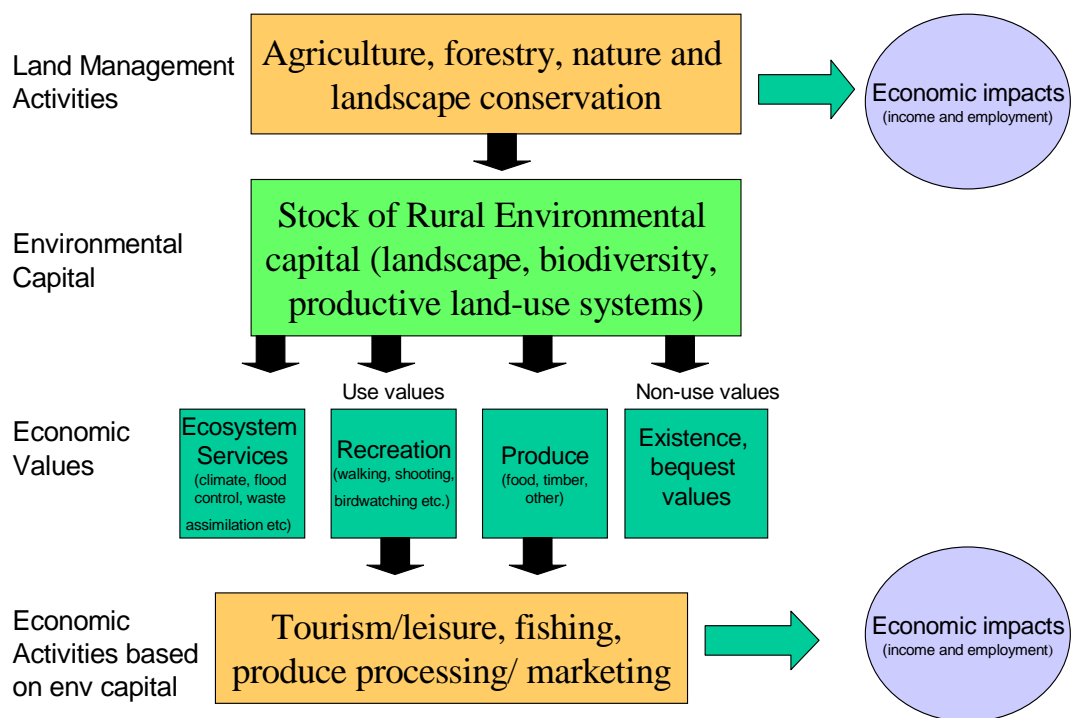


Figure 1 presents a framework for categorising “environmental economy” activity in this way.

These activities impact on the economy by supporting employment and providing incomes.

Figure 2 demonstrates the relationship between the management of natural capital, and the economic values and economic impacts that this produces. Various rural activities have a role both in managing the stock of natural capital, and in supporting economic activity by providing incomes and employment. In turn the stock of natural capital provides a variety of services to society, reflected in use values (as a recreational resource; source of food, timber and other produce; and provider of ecosystem services) and non-use values (including existence and bequest values). People derive value from these various uses of natural capital. In turn these also generate impacts on the economy by supporting activities such as tourism, fishing, and the harvesting and marketing of produce, all of which support employment and incomes.

Figure 2: Natural Environment – Economic Values and Impacts



In analysing environment-economy relationships it is helpful to recognise these different types of linkage between economic activities and the environment. Understanding these linkages is also useful in programming future environmental economy activity.

However, in practical terms, when seeking to quantify the economic impacts of the environment, it is often more convenient to adopt a sectoral approach, since most economic data is available at the sectoral level. Collation of data on the economic significance of different sectors provides a starting point for examining that portion of activity linked to the quality of the environment.

Valuing the benefits of the natural environment can be approached by identifying different components of natural capital (e.g. wildlife, landscapes), describing the types of benefits and services they provide, and seeking to value these using either market prices or non-market valuation methods.

3 ECONOMIC IMPACT OF THE RURAL ENVIRONMENT IN ENGLAND

3.1 Methodology

3.1.1 *Use of Existing Literature*

A variety of studies are available examining the linkages between the environment and the rural economy, at different spatial scales and for different sectors.

This report combines a variety of previous studies and published sources to estimate the economic impacts of different types of rural environmental activity in England. While in a few cases national estimates of the impact of environmental activities are available, the bulk of the information obtained is of two types:

- regional or local level estimates of the impacts of environment related activity;
- national estimates of the significance of different sectors, without separating the effects of specific activities related to the environment.

It follows that national estimates can be made in two different ways:

- Aggregating, and where necessary, scaling up local and regional estimates – a “bottom up” approach;
- Estimating the proportion of national level economic activity in each sector that is environment-related – a “top down” approach.

3.1.2 *Regional environmental economy studies*

Environmental economy studies have now been completed for all of the English regions. Most of these examine a wide range of environmental economy linkages, urban and rural, and provide overall estimates of the contribution that environment-linked activity makes to regional employment and GDP.

These studies provide a wealth of information about the links between the environment and the economy in different English regions. One of the purposes of this current study is to collate and aggregate this information and to summarise data on economic impacts at the national level. However, it is not a simple case of summing the data presented in the regional studies, because:

- Different studies use different definitions, methodologies and assumptions – there is therefore a need to adopt a consistent methodological approach, and to test and update the methodologies used in previous studies;
- Care is needed in dealing with aggregated data – issues of additionality and displacement mean that it is not correct to assume that national impacts are merely the sum of local or regional level impacts;
- Data gaps mean that simple summation of available data is rarely possible.

This report therefore combines data available from the regional environmental economy studies with other evidence of rural environment/economy linkages, and uses this information to define a consistent methodology for estimating these linkages at the national level. In doing so, it is clear that there are significant data gaps, so that it is necessary to make a number of assumptions in order to enable

national estimates to be made. The report aims to set out clearly the methodologies employed, and to identify areas in which further research can help to strengthen them.

3.1.3 **Sectoral Information Sources**

As well as the regional environmental economy reports, a number of national studies and reports help to document the economic impacts of rural environmental activity, many of them dealing with particular sectors. These include published Government statistics for key sectors such as agriculture, forestry and fisheries, periodic surveys of forestry employment and rural tourism, and one-off studies by Government departments and NGOs. Relevant studies are listed in the Bibliography.

3.1.4 **Key Issues**

A number of key issues need to be considered when assessing the economic impact of environmental activity in England. Prominent amongst these are **additionality and displacement**. A key issue in economic terms is whether activity generates net additional impacts, rather than displacing activity elsewhere in the economy. For example, when assessing the economic impacts of an agri-environment or wildlife tourism initiative, it is important to consider the economic effects in the absence of the initiative, and the effects of redeploying resources elsewhere in the economy.

Displacement may occur for a variety of reasons. Examples may include:

- Land Use – where one land use replaces another. For example, creation of a new woodland may generate employment, but at the same time lead to the loss of jobs supported by a previous land use such as agriculture.
- Use of Resources - where an initiative consumes resources that have other productive uses. For example, a new agri-environment scheme may support employment and farm incomes, but divert resources from other types of expenditure that have similar effects.
- Visitor Patterns - where a site attracts visitors who would otherwise visit other areas. For example, some of the visitors to a new nature reserve may not be additional visitors to the region, but people who would otherwise have visited other sites. Care is therefore needed in assessing the net economic impacts of tourism activity.
- Production Impacts – where an environmental activity reduces levels of rural output and, consequently, downstream processing activity. For example, conservation schemes in agriculture and forestry may lead to less intensive production methods, reducing output, with effects on processing and marketing activity.

A related issue is the **scale at which economic impacts are measured**. For example, while a nature reserve may have impacts on a local economy by supporting employment and attracting visitor spending to an area, its net impacts at the regional or national level are likely to be less significant, because of displacement effects. In the absence of the reserve, expenditure and resources may be reallocated elsewhere in the regional and national economy, affecting only the distribution, and not the overall scale of economic activity.

Care is therefore needed in arguing that the environment has positive impacts on the national economy. This is only likely to be the case if it enhances overall levels of income and employment, for example by attracting overseas visitors, funding or

inward investment, encouraging the export of English produce, or retaining expenditure that would normally leak out of the economy on exports or foreign holidays. Where national estimates of employment and value added associated with environment-related activity are presented in this report, they should not necessarily be taken as implying that the environment brings net and additional benefits of a similar magnitude to the national economy.

3.1.5 *Approach Adopted*

For each sector, the following sections of the report present:

- An overview of its **economic significance** at the national level, and where possible a regional breakdown;
- A discussion of the **linkages between economic activity and the environment**;
- A **summary of available evidence** estimating the scale of these linkages;
- A **methodology** for quantifying the economic impact of environmental activity
- Estimates of the **economic impact of the environment** in England.

3.2 **Nature and Landscape Conservation**

3.2.1 *Economic significance*

A study by the RSPB (Rayment and Dickie, 2001) estimated that there were 8,790 FTE jobs in the “natural environment sector” in England in 2000. This sector was defined to include “the protection, enhancement, management and interpretation of natural habitats and landscape - and related survey, monitoring, environmental education and consultancy work.”

This total was arrived at by combining the results of individual regional environmental economy studies, and extrapolating across the missing regions according to land area. Most of these data gaps have since been filled by subsequent studies. The estimated total compares with an earlier study by CEAS (1993), which estimated that there were 7,666 FTE jobs in nature and landscape conservation in England in 1991/92. The authors considered that the difference could be explained by growth in employment in nature and landscape conservation between the two studies.

These jobs are located within a range of organisations, including:

- Government departments and agencies (e.g. DEFRA, English Nature, Countryside Agency, Environment Agency)
- Local authorities
- Voluntary organisations (Wildlife Trusts, RSPB, WWF, Plantlife, Wildfowl and Wetlands Trust etc.)
- Private sector firms, e.g. ecological consultancies, equipment manufacturers.

The figures exclude most activities concerned with pollution control, waste management, water management, the built environment, urban landscaping, forestry, agriculture, and tourism jobs dependent on the natural environment. The latter three categories are dealt with elsewhere in this report.

Employment in conservation involves a wide range of occupations requiring different skills, such as countryside management, biological and environmental sciences, visitor services and environmental education, as well as managerial, administrative and support functions. Conservation organisations often find it difficult to recruit local people with the specialist skills and experience required, and therefore jobs are frequently filled by incomers (Rayment, 1997).

In addition to direct employment, expenditures by conservation organisations on other inputs generate activity in the local economy and support employment for suppliers and contractors. Expenditures incurred in the management of conservation sites vary considerably by type of habitat, being highest for intensively managed habitats such as wet grassland, lowland woodland and heathland, and lower for upland and estuarine habitats (Rayment, 1995). In a survey of organisations involved in nature and landscape conservation, CEAS (1993) found that £384 million was spent on conservation in England in 1991/2, equivalent to £485 million in 2000 prices.

No estimates are available from previous studies of the contribution of nature and landscape conservation to GDP at the national level.

3.2.2 *Linkages to the environment*

By definition, all of the economic impacts of the nature and landscape conservation sectors are related to the management of the natural environment.

3.2.3 *Summary of available evidence*

Table 1 updates the RSPB estimates mentioned above, combining evidence summarised by Rayment and Dickie (2001) with estimates provided by subsequent regional studies in the East Midlands, South East and Yorkshire & Humber regions. Many of the regional studies do not provide direct estimates of the size of the nature and landscape conservation sector, but contain data on employment in various public, private and voluntary sector environmental organisations. It is therefore often necessary to estimate levels of relevant employment by extracting data from the tables contained within the reports. One of the difficulties of relying on the regional studies is that they are variable both in their methods of presentation and degree of completeness. Nevertheless, they present a reasonably accurate picture of overall employment in the natural environment sector.

Table 1: Estimated Employment in the UK Natural Environment Sector

	FTE Jobs	Source/Method
Eastern England	c.1,750	SQW (2001)
NW England	1,193	RSPB (2001), ERM (2000)
SW England	1,200	Mackridge et al (1998)
W Midlands	420	ERM (2001a)
NE England	c.700	RSPB estimate from ERM (2001b)
East Midlands	c.820	GHK estimate from EMDA (2002)
South East	c.1100	GHK estimate from LUC <i>et al</i> (2002)
Yorkshire & Humber	c.800	GHK estimate from ERM/ Yorkshire Forward (2002)
London	c.600	GHK estimate from LDA (2003)
England	8,580	

The largest number of jobs is in the East of England, the region that houses the headquarters of English Nature, the RSPB, the British Trust for Ornithology, BirdLife International and other conservation organisations.

As well as direct employment, nature and landscape conservation activities also involve large numbers of volunteers. Volunteering not only provides environmental benefits but also contributes to improvements in health, community development, social inclusion and skills development. Regional studies quantify volunteer inputs as follows:

- North West - At least 4,095 volunteers complete 19,834 hours of work per week.
- West Midlands - 2,400 volunteers carry out 5,100 hours of conservation work per week.
- North East – 2,970 volunteers undertake work estimated to be worth £59 million annually.
- South East – the Wildlife Trusts alone have 4190 volunteers.
- South West – volunteers complete 7772 hours of natural environment related work per week.
- Yorkshire & Humber – more than 3,000 contribute in a voluntary capacity to environmental enhancement and conservation.

Purchases of goods and services by nature and landscape conservation organisations also have impacts on the economy. Regional studies have estimated expenditures by the natural environment sector, excluding grants, to total £43 million in South West England in 1997/98 (Mackridge et al, 1998), and £60 million in North West England in 1999/2000 (ERM, 2000).

A study of the economic impacts of RSPB reserves estimated that they supported more than 1000 FTE jobs in the UK in 2002 (Shiel et al, 2002). This total included:

- 268 FTE jobs through direct employment;
- 101 FTE jobs through expenditures on goods and services;
- 101 FTE jobs through grazing lets and agricultural tenancies;
- 123 indirect FTE jobs as a result of farming operations;
- 335 FTE jobs through visitor spending.

Some studies have examined the economic impact of the management of different habitats. For example:

- Conservation management of reedbeds is estimated to support 90 direct FTE jobs and further contract work to a value of up to £4m per year, in the UK. Commercial harvesting of reeds provides further direct employment, and this helps to support the thatching industry. Major reedbed sites such as Titchwell, Minsmere and Leighton Moss RSPB reserves are also important for wildlife tourism. There is strong demand for quality UK produced thatching reed, and other fen products (such as biofuel and pet litter) can be viably produced in association with sensitive wildlife management. Reedbeds can also provide other indirect benefits, such as water management functions (Rayment and Dickie, 2001).
- Management of Heathlands in Dorset involves local expenditure of more than £1.2 million per annum, providing 38 FTE jobs directly and an estimated 67 FTE jobs in total (Rayment, 1997).

3.2.4 *Methodology for quantifying economic impact*

Estimates for direct employment by region have been extracted from the regional studies and are presented in Table 1 above.

Since nature and landscape conservation are dominated by public and voluntary sector, non-profit making activities, wage costs are a good approximation to their Gross Value Added. Reference to regional environmental economy studies suggests an average value added per employee of £26,000 at 2004 prices and incomes.

3.2.5 *Estimated economic impact of environment*

Employment in nature and landscape conservation is estimated at 8580 FTE jobs in England. The sector is estimated to contribute £223 million to England's GDP.

3.3 *Agriculture and Food*

3.3.1 *Economic significance*

Farming accounts for 0.8% of gross domestic product and 1.9% of total employment in the UK. Inclusion of the food processing industry increases these figures substantially. Nationally the food chain employs 12.5% of workers and accounts for 8% of the UK economy (Strategy for Sustainable Farming and Food, 2002) and 4.8% of all exports leaving the country (HM Customs and Excise, 2003).

Table 2: Food and Agriculture in the UK economy

	2002
AGRICULTURAL GDP	
Agriculture's contribution to total economy - Gross Value Added at current prices (£ million)	7,117
<i>% of total economy Gross Value Added (current prices)</i>	<i>0.8</i>
AGRICULTURAL EMPLOYMENT	
Workforce in Agriculture (000 persons)	550
<i>% of total workforce in employment</i>	<i>1.9</i>
FOOD EXPENDITURE	
Household final consumption expenditure on food and drink at current prices (£ million)	140,978
<i>% of total household final consumption expenditure</i>	<i>21.2</i>
AGRICULTURAL & FOOD EXPORTS	
Exports of food, feed and drink (£ million)	8,950
<i>% of total UK exports</i>	<i>4.8%</i>

Source: Agriculture UK National Statistics (Defra, 2003)

There is large regional variation in agriculture's contribution to GDP, with over 20% accounted for by the East of England. In terms of the contribution to regional employment, however, agriculture is of greatest importance in the South West (Table 3).

Table 3: Economic Significance of Agriculture in England

	2002
Gross Value Added at basic prices (£ million)	
United Kingdom	7,117
England	5,496
% Share by region	Year 2000
North East	2.9%
North West	8.8%
Yorkshire and Humberside	14.1%
East Midlands	13.9%
West Midlands	11.6%
East of England	20.1%
South East and London	13.0%
South West	15.5%
Agriculture's share of gross employment %	2002
United Kingdom	1.9
England (372,000)	1.5
Agriculture's share of gross regional employment %	Year 2000
North East	1.1%
North West	1.3%
Yorkshire and Humberside	1.7%
East Midlands	2.3%
West Midlands	1.8%
East of England	2.1%
South East and London	0.7%
South West	3.4%

Source: *Agriculture UK National Statistics (Defra, 2003)*

Agriculture in England supports 372,000 jobs, or approximately 272,000 full time equivalent jobs.

The food chain in the UK, excluding agriculture, is estimated to support 3.2 million jobs and to contribute £61 billion in Gross Value Added. Figures for the food chain in England, excluding agriculture, amount to approximately 2.8 million jobs and £53 billion in Gross Value Added (Defra, 2003).

3.3.2 *Linkages to the environment - Agriculture*

Agriculture occupies 70% of total land area in England and has a significant impact on the natural environment. The countryside we appreciate today is the product of farming over many generations and is dependent upon the continuation of farming activity. However the relationship between agriculture and the natural environment is complex, with positive and negative impacts of different kinds and at different levels.

Positive impacts of agriculture on the natural environment include the maintenance of the countryside through normal farming practice (for example, the management of hedgerows and crop rotations providing habitats for birds); the maintenance and enhancement of specific habitats, landscapes and other features through agri-environment schemes or similar; the protection of watersheds and provision of areas for flood relief; and carbon sequestration, to name a few.

Negative impacts have resulted, in particular, from changes in farming practices driven by government policies, new technologies and market demands and include:

damage to and loss of previously common habitats and species; damage to and loss of landscape features including hedgerows and ditches; damage to and loss of archaeological and historic features; and water pollution arising from nitrates, phosphorus, silt, organic waste, pesticides, veterinary medicines and micro-organisms.

There is now increasing emphasis on achieving agriculture that is economically, environmentally and socially sustainable in the long term. A variety of policy and market mechanisms exist that, one way or other, aim to reduce the adverse impact of agriculture on the environment and/or enhance the positive aspects. Aside from agri-environment schemes these include the promotion of organic farming and food; the growth of local and environmentally-branded foods; and farm assurance schemes. Forthcoming cross-compliance standards linked to the Single Farm Payment under Common Agricultural Policy reform are expected to increase the environmental return from farming, although to what extent is presently uncertain.

Research has indicated that there is significant evidence of gains in environmental capital from organic farming, such as substantial biodiversity benefit, particularly for birds. Other Defra funded research has shown that organic farming reduces nitrate leaching to similar levels achieved in Nitrate Vulnerable Zones and that organic farming is more energy efficient than non-organic both on an area and yield basis. In addition there is a large body of scientific evidence indicates that organic food is safer and healthier than non-organic food (Soil Association, 2003).

3.3.3 Summary of available evidence - Agriculture

There is limited evidence relating to the economic impacts of environmental activities linked to agriculture.

Agri-environment schemes

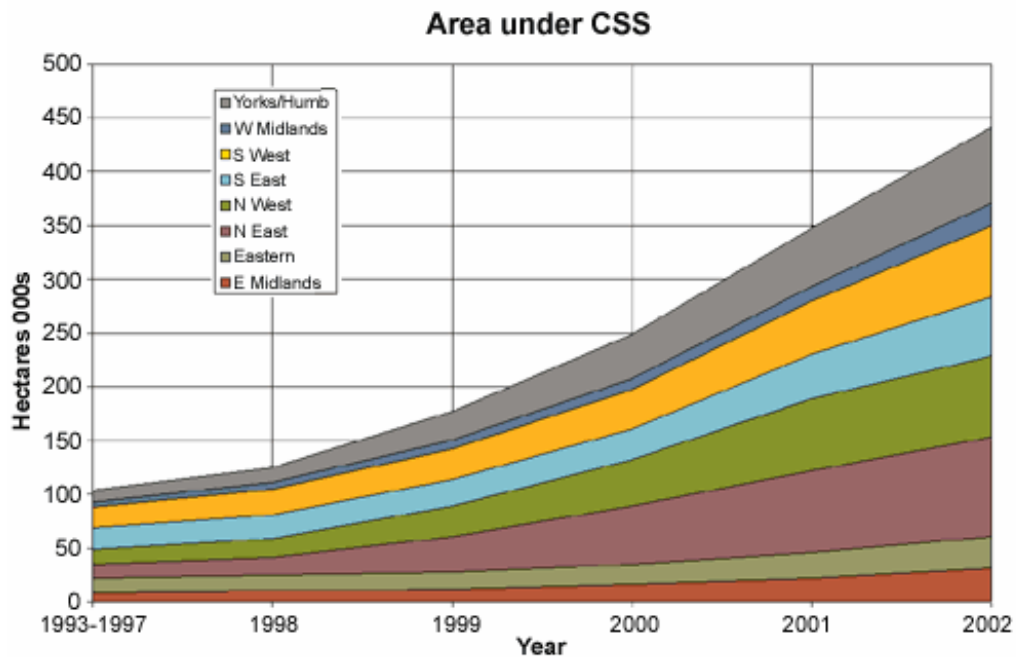
Agri-environment schemes now cover over 1 million hectares of countryside in England - around 11% of rural agricultural and open grazed land - and have a significant impact on the environmental quality of the countryside.

Provisional 2002 levels of expenditure on agri-environment schemes in England were about £119 million, with £58 million being spent on Countryside Stewardship Scheme (CSS) and £48 million being spent on ESAs. The balance was spent on smaller schemes including the Arable Stewardship Scheme, Nitrate Sensitive Areas Scheme, Habitat Scheme, Moorland Scheme and English Nature schemes and agreements (Defra, 2003).

By the end of 2002, there were over 15,000 CSS agreements covering 440,000 hectares, 45,000km of arable margins and 21,000km of hedging and stone walls. The growth in the area under CSS since 1995 and regional breakdown is shown in Figure 3.

Also at the end of 2002, there were over 12,000 ESA agreements covering 571,500 hectares of land across 22 ESAs. These 22 ESAs cover in total some 10% of agricultural land in England.

Whilst a number of economic and socio-economic evaluations of agri-environment schemes have been completed for MAFF and Defra, these have virtually no reference to impacts on employment or income arising from such schemes, although they do refer to the value of benefits.

Figure 3: Growth in Area in Countryside Stewardship

The few studies that have considered the socio-economic impact of ESAs include the following:

- ADAS (1991) showed that Stage I ESAs achieved increases in net incomes (per year) of farmers that had joined the scheme by between £1,050 (Somerset Levels & Moors) to £1,751 (The Broads). On-farm employment had increased by between 3% and 38%.
- CEAS (1997,1998) showed that Stage II, III, and IV ESAs, if closed, would result in a net income loss of £85/ha (Stage II and III ESAs) and £52/ha (Stage IV ESAs). The study also found that additional income from participation had enabled a sizeable proportion of participants to stay in farming with associated environmental benefits arising from slowing down restructuring.

Other evidence relating more specifically to employment impacts includes a socio-economic evaluation of the Countryside Stewardship Scheme carried out before its transfer to MAFF in 1996 (Countryside Commission *et al*, 1996). Based on December 1994 data, when there were 3,883 CSS agreements in place, the study concluded that 50 FTE jobs had been created on farms as a result of CSS and 220 FTE jobs had been created through additional use of contractors and advisers. The study also used an input-output model to estimate employment changes resulting from farm input changes – a gain of 479 FTE jobs – and employment changes resulting from farm output changes - a loss of 509 FTE jobs. It was also noted that while the job gains were mainly in rural areas, on farms or in farming areas, the job losses were likely to be dissipated in urban areas and amongst capital-intensive agricultural supply and food industries.

A socio-economic assessment of Tir Cymen in Wales (ADAS, 1996) provided further evidence of employment and income impacts arising from agri-environment schemes. The study used data from 1994/1995, when there were 391 agreements in the scheme. The study concluded that the scheme over the preceding two years

had created 62 person years of environmental work and 204 casual jobs on farms. The net effect on farm income was an average increase of £1,616 per farm. In the local economy, the study concluded that 10 FTE jobs had been created and 6 FTE jobs had been retained in local businesses.

Various regional environmental economy studies include statistics on environment-related jobs, including those relating to agri-environment schemes. These include estimates of 1,918 FTE jobs in the North East over 83,631ha of land in agri-environment schemes and 3,300 FTE jobs in the West Midlands over 61,889 ha of land in similar schemes. These employment estimates include created jobs (5%) but also secured jobs (95%). Estimates of jobs created were based on area extrapolations of the findings of the CSS socio-economic evaluation (Countryside Commission et al, 1996). Estimates of secured jobs were based on an estimate of average total employment in agriculture of 1 job for every 20-46 hectares (West Midlands and North East figures). These include part-time, full-time, casual and seasonal jobs.

Organic Farming

Fully converted organic farming now accounts for 534,300 ha in the UK. Including land in conversion increases this total to 726,400 ha. This is equivalent to 4% of the agricultural area in the UK. In terms of value at the farm gate, UK organic production increased from £149 million to £181 million in 2003. Distribution across the regions is illustrated in Table 4.

Table 4: Organic Farming in England

Region	Number of producers (2002)	% share of England producers
South West	990	42.3
South East	402	17.2
West Midlands	317	13.6
East Midlands	200	8.6
North West	209	8.9
North East	165	7.1
Yorkshire and the Humber	56	2.4
Total England	2,339	100
Total UK	3,865	-

Source: Soil Association (2003)

The significance of organic farming can also be broken down by type of land use as shown in Table 5.

Table 5: Organic Farming Area, by Land Use (2002)

Agricultural Land Use	Ha (2002)	%
Permanent Pasture	369,766	80.5
Temporary Ley	54,500	12
Woodland	1,600	0.3
Arable	26,400	5.8
Horticulture	6,334	1.4
Total	458,600	100

Source: Soil Association (2003)

A recent study found that, during the process of conversion, 28% of farmers reported that the switch to organic production resulted in a financial improvement, while 38% felt that their financial situation had deteriorated. After completion, however, nearly half of the respondents (48.6%) noticed an improvement. 64% felt that their financial situation had been 'strong' or 'OK' before they chose to convert, which may be seen to indicate that farmers do not tend to convert to organic due to financial hardship, although for some this is clearly the case. Many livestock farmers remarked that they were reliant on organic aid payments (CRER, 2002).

Results of surveys demonstrate that organic farming is more labour intensive than conventional agriculture, and therefore makes a positive contribution to rural employment. Conversion has led to significant increases in casual and part time labour. Estimates of this increase vary widely between studies, including 10-25% (Padel and Lampkin, 1994), 10-30% (Hird, 1997) and 20-100% (DTZ Piedad, 2000). Reasons behind such wide variations in labour requirement include diversity of the enterprise, extent of on-farm marketing and processing activity and crop type. The lower estimates compare similar types of organic and conventional systems, while the higher figures reflect the fact that organic farms often differ from conventional ones in their structure and cropping patterns.

Some 29% of organic farms have developed value-added initiatives, ranging from box schemes and small-scale food processing operations to farm shops. Value added activities were found often to be the trigger in encouraging conversion to organic farming (CRER, 2002).

Various regional environmental economy studies include estimates of employment relating to organic farming. These estimates include 46 additional FTE jobs in the North East over 3,517 ha of land in organic farming schemes, and 157 additional FTE jobs in the West Midlands over 6,319 ha of land in similar schemes. These figures exclude existing jobs secured by organic farming. These employment estimates are based on taking an average of 50-60% more labour being required on organic farms compared to non-organic farms and regional averages for the agricultural sector as a whole of 1 'job' per 20-46 hectares (West Midlands and North East figures). These include part time, full time, casual and seasonal jobs.

3.3.4 *Methodology for quantifying economic impact of agriculture*

Section 3.3.1 noted that agriculture in England is estimated to support 272,000 FTE jobs and contribute £5,496 million in Gross Value Added.

Section 3.3.2 noted that all of this agricultural activity is in some way linked to the environment, but that the relationship is complex with positive and negative impacts of different kinds and at different levels. 'Sustainable agriculture' is increasing in area terms although still represents a relatively small percentage of total farming.

For the purposes of this report, it is assumed that, in general, activity concerned with agri-environment schemes and organic farming contributes positively to the management of the natural environment, whilst other activity does not. This is a simplification, as some conventionally managed agricultural land is managed along sustainable principles, for example through integrated farm management, while certain organic farming practices could be considered to be of low environmental value, for example certain intensively managed grasslands used for organic dairy or beef stock. However, given the statistics available, the split between agri-environment/organic farming and the remainder appears to be the best proxy for distinguishing between the environmental contribution of agricultural systems.

For the purposes of this study, it is assumed that employment related to environmentally beneficial farming is proportionate to its share of agricultural area. This approach assumes that all employment on the relevant farmland area (and not just activity supported by the scheme itself) is positively linked to the environment. It also reflects the role of agri-environment schemes in safeguarding employment over the whole farm. Defra statistics indicate that there are 1,011,500 hectares of land in England entered into the main agri-environment schemes - CSS and ESA, equivalent to around 11% of the farmed area. There are approximately 249,000 hectares of land in organic production or conversion in England. Altogether this represents approximately 14% of England's agricultural area, although in reality there will be an overlap between agri-environment scheme participation and organic farming. A further scaling factor can be applied when estimating employment in organic farming to reflect its added labour intensity compared to conventional agriculture - a factor of 1.5 is applied in this case.

An alternative approach might be to assume that employment relating to environmentally beneficial farming is proportionate to its share of agricultural output. In 2002, around £119 million were spent on agri-environment schemes in England, which amounts to around 1% of total agricultural output of £11,493 million. In the same year, £42 million was spent on organic farming/conversion schemes in England and the value of the organic market at farm gate in England was £60 million, which in total amounts to £102 million or around 0.9% of total agricultural output.

3.3.5 *Estimated economic impact of environment*

Using the area-based approach outlined in the previous section, employment on farmland participating in agri-environment schemes is estimated at 30,240 FTE jobs (of which around 1,500 are additional jobs supported by the agri-environment activities themselves), while employment supported by organic farming is estimated at 11,165 FTE jobs. In total employment supported by environmentally beneficial farming is estimated at 41,405 FTE jobs.

Using the alternative output-based approach, employment supported by agri-environment schemes is estimated at 1% of 272,000 or 2,720 FTE jobs and

employment supported by organic farming is estimated at 0.9% of 272,000 or 2,448 FTE jobs. The total figure using this approach amounts to 5,168 FTE jobs.

The large differences in these estimates reflect the different assumptions adopted. The lower figure reflects the relatively small significance of agri-environment schemes in agricultural output, while the higher (and preferred) one acknowledges the influence of these schemes over a relatively more substantial farmed area. Unfortunately it is not possible to provide a regional breakdown of employment due to incomplete regional data, for example ESA data relating to area or payments by region is not available.

If it is assumed that their contribution to GVA is proportionate to their contribution to employment, it can be estimated that the environmentally beneficial farming produces a GVA of around £837 million, based on the higher employment figure of 41,405 FTE jobs.

3.3.6 *Linkages to the environment – Food*

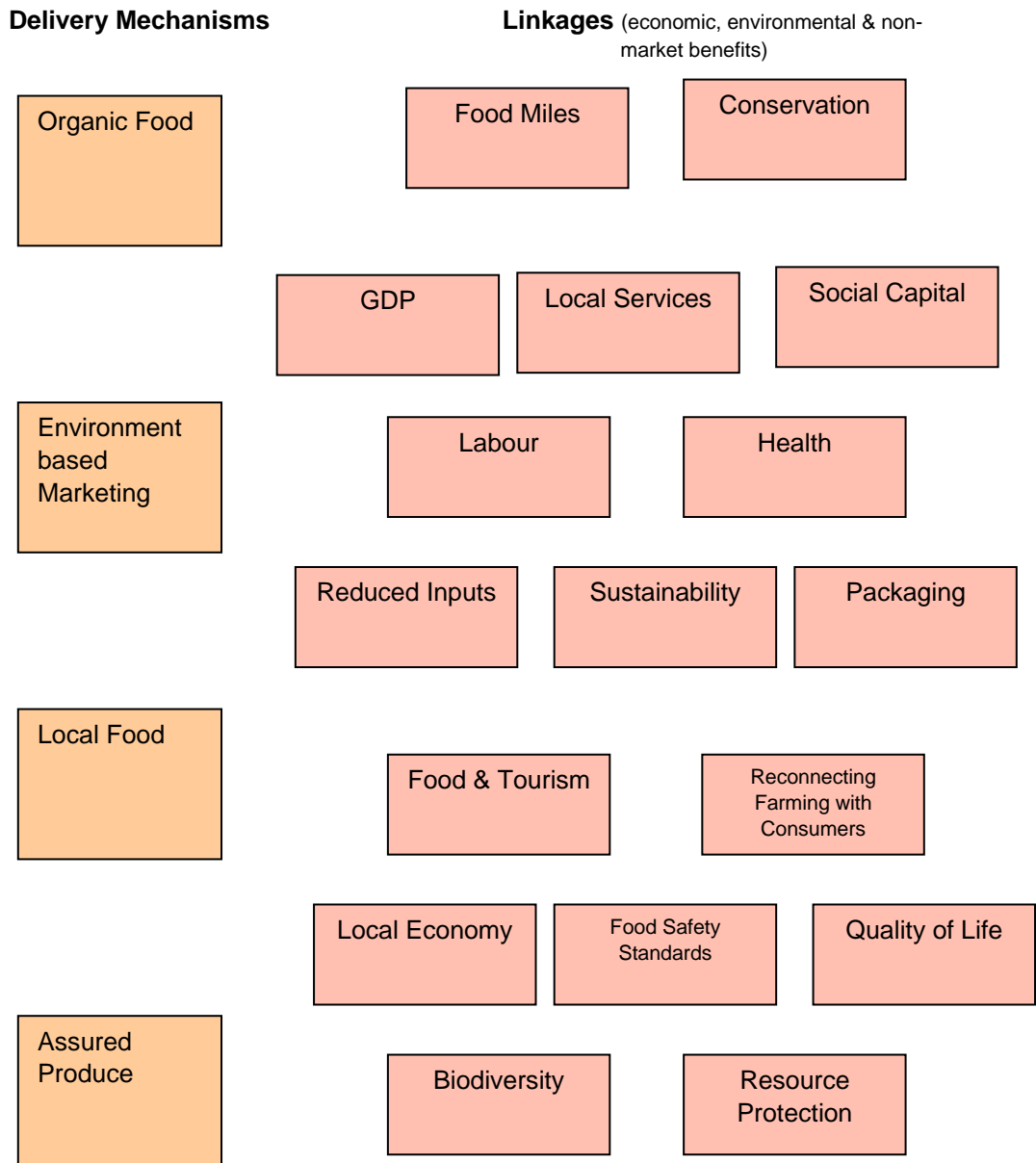
The food industry, whether production, processing, manufacture, distribution or retail is an important part of the economy and can also have numerous environmental impacts at national, regional and local levels (A Vision for Sustainable Agriculture, 2001).

Demographic and consumer lifestyle trends, combined with an increased transparency in the food chain, are making food choices more preference than necessity driven. In particular UK consumers have increasing demands and expectations for quality in the areas of:

- Food safety
- Product consistency, guarantees and high quality
- Freshness and taste

This has opened the door for increased economic gain and opportunity from the marketing of food directly linked to the environment including organic production, individual and collaborative marketing schemes, local food and assured produce. Figure 4 illustrates agri-food linkages to the environment and the economy.

Figure 4: Linkages between the Agri-Food Sector, the Environment and the Economy



3.3.7 Summary of Available Evidence - Food

Organic food sector

UK organic food sales increased 10.4% from £920 million in 2002 to £1,015 million in 2003, of which imports accounted for 56%. The organic market accounted for 1% of the total food and drink market in the UK in 2003 (DEFRA, 2004).

The retail value can be broken down by individual products, as illustrated in Table 6. The importance of individual products in the organic market differs to that of the non-organic market.

Table 6: Share of Different Foods in Retail Value of the Organic and Non-Organic Market

	Organic 2002/2003	Non-Organic 2001/2002 excl. alcohol
Fruit and Vegetables	32%	21%
Dairy & Eggs	23%	12%
Bread & Baked	12%	15% incl. cereals
Beverages	10%	13%
Meat & Fish	8%	24%
Baby Food	7%	-
Cereals	3%	-
Other	5%	15%

Source: DEFRA (2004) & Soil Association (2003)

The value of the market at processor level is £791 million with the number of businesses registered to process organic food down 20% from 1,977 to 1,585 (Soil Association, 2003).

Environment based marketing

There is currently no formal statistical data available on the likely economic value of products marketed on their environmental attributes.

Supporting data suggests that a market premium of 8-12% can be achieved but this is most likely to be achieved when marketed at a local/niche level rather than in the mainstream market. Job creation varies according to the nature of enterprise.

Two case studies of such businesses are given in Boxes 2 and 3 on the next page.

Box 2: CASE STUDY – White & Wild

White & Wild milk, produced by WildCare Dairy Products Ltd. Based in Bishops Auckland, was launched in April 2002. The environmentally friendly brand of milk was created to help restore habitats on supplying farms, to help reverse the trend of decline in farmland wildlife.

White & Wild milk is available in both standard and organic milk brands, currently sold through Sainsbury, Asda, BP forecourts, Budgens and some Co-op outlets. The standard semi-skimmed milk brand retails at a premium of 7p per litre more than conventional milk. A 3p premium goes to the farmer to help fund wildlife-friendly improvements on their land and a further 2p goes to the Wildlife Trusts to help conservation projects across the UK.

The objective of the White and Wild brand is to use the consumer market to give dairy farmers a significant financial incentive to conserve and enhance biodiversity on their farms. If the scheme is successful, there are plans to expand it nationwide with a thousand farms across 300,000 acres of farmland supplying 672 million litres of White & Wild milk per year.

Box 3: CASE STUDY – Chilterns Choice

The Chiltern Hills AONB covers 833 square kilometres, providing a living for over 200 farmers. Chilterns Choice has been driven by the AONB Conservation Board, supported by English Nature and The Countryside Agency, as a means of conserving the chalk downland habitat. Each participant agrees to a Green Farm Plan administered by FWAG and in addition is a member of a Farm Assurance Scheme. Launched in 2002, Chilterns Choice branded meat products currently have 15 producers selling through local butchers. They receive a 12% premium for their livestock. The scheme participants are now looking to expand their enterprise to include a processing operation.

Local food

Much of regional produce is branded on the quality of the environment. About half of local food sector (LFS) producers are involved in a land management scheme such as organic farming, ESA or CSS, slightly more than those outside the sector. 29% of LFS enterprises are involved in waste reduction practices, over twice as many as enterprises outside the sector. Traditional breeds and varieties have been introduced by 18% of LFS farmers/growers, nearly twice as many as those outside the sector (Flair report, 2003).

As the local food sector is so diverse, assessing its size and economic scope is problematic. Consumer demand for locally produced food is increasing, which is evident from the growth in farmers markets and the new focus of multiples on sourcing British, and increasingly sourcing locally. A research review for the Council of Protection for Rural England (CPRE), estimated that local food currently makes up only a very small proportion (1-5%) of the total grocery market share. There are, however, no reliable figures available.

An indication of sector activity is given in Table 7 below.

Table 7: Business Numbers and Sales Value within the Local Food Sector

LFS Business Type	Number of businesses	Sales Value
Farm Shops	2,500 - 3,000 (Farm Retail Association, 2002)	£1.5 billion (FRA, 2002)
Farmers Markets	450 farmer market locations in England running around 7,500 individual markets (NFU Farmers Market Business Survey, 2002)	£166.3 million (NFU, 2002)
Box Schemes	310 (Soil Association, 2003)	£34 million (Soil Association, 2003)
Pick Your Own	1000 farms (FRA, 2002)	
Community Food	65 city farms in the UK and 520 community gardens in England (Soil Association, 2003)	combined turnover of about £8 million (Soil Association, 2003)

According to the Flair report (2003), 24% of LFS enterprises created jobs during the last year compared to 1% of non-LFS enterprises. The average number of FTE employees is nearly three times greater in LFS enterprises than non-LFS (12.8 compared to 4.2).

There is some evidence of a cumulative effect, which stimulates the rural economy (and less so the urban economy) (Working group on local food, 2003). 24% of LFS enterprises increased the value of their local purchases over the last year compared to 4% of non-LFS. 43% increased the value of their local sales compared to 4% of non-LFS. Over half of LFS sales are through local shops and markets. Nearly 75% use local suppliers compared with about half of non-LFS (Flair report, 2003). Feedback from retailers adjacent to Farmers Markets is that this increases their takings by as much as 30% (farmersmarket.net)

Research carried out in Cornwall estimated that, for every £10 spent on locally sourced food, £26 was received by local businesses. In contrast the study estimated that £10 spent at the supermarket resulted in £14 benefiting local business. If every consumer, tourist and business switched 1% of their spending to Cornish products, the authors estimated that the county's economy would benefit by an extra £1 million each week (New Economics Foundation and the Countryside Agency, 2001).

Over 50% of local food enterprises believe that their involvement in the sector has improved their local community's access to fresh produce. About one third provide information on the health benefits of eating fresh produce (Flair report, 2003).

Box 4: CASE STUDY – Devon Food Links

Devon Food Links is a local food initiative based in the Economy and Regeneration department of Devon County Council in Exeter. Their purpose is to contribute to sustainable development in the county by creating jobs, business opportunities and wealth within the local economy at the same time as encouraging sustainable agriculture and food distribution practices.

- 65% of Devon food link members are members of environmental land management schemes, 48% are organic
- Devon links members average 3.4 full time jobs per farm compared to an average in the South West of 2.34 jobs/farm
- 38% of businesses recently created new jobs, an average of 0.5 full time jobs per farm, and 171 new jobs in total
- Businesses on average spend £30,000 per year in the local economy (a total of £27 million annually)
- Devon Food Links has helped create 15 farmers markets, 18 box schemes, 19 links with local shops and 150ha of organic land.
- 52% of the businesses expect their turnover to increase in the future and 45% want to invest to expand.

Assured produce

All top UK retailers claim to include environmental protection conditions as part of their trading relationships with suppliers. They believe that this is achieved through one or all of the following pathways:

1. Through producer membership of farm assurance schemes and compliance with the environmental conditions within these schemes. These schemes include only selected environmental protection measures and independent auditors make scheme assessments.
2. Through retailers' own additional technical standards that include references to such issues as supplier waste management and pollution prevention. Some require their suppliers to actively address biodiversity management.
3. All of the multiple retailers support the implementation of integrated crop management for fresh produce. This type of crop management is generally considered to be more wildlife friendly compared to conventional farming practices.

Increasingly in many cases in the agri-food chain, a premium may not be identified for taking part in environmental practice but failure to do so will exclude producers from the market. A higher level of environmental management combined with quality product, however, has the potential to add value.

Box 5: CASE STUDY – Tesco Nature’s Choice

Under the Nature’s Choice code, direct suppliers of fresh produce to Tesco are required to take account of biodiversity management through the development of a wildlife and nature conservation plan. Nature’s Choice produce accounts for over 65% of sourcing by Tesco. The cost of these additional biodiversity checks is borne by the supplier and Tesco does not pay any premium for the product as it sees Natures Choice as a vehicle to raise industry standards to the level of consumer expectations, including the biodiversity conditions.



Tesco Nature’s Choice
(Source: Tesco, 2002)

Tesco supplier G’s Marketing

Employing up to 2000 people, G’s has grown its fresh produce business with Tesco by 700% over the last 10 years. At the core of its business is its approach to food safety and environment, in particular Natures Choice.

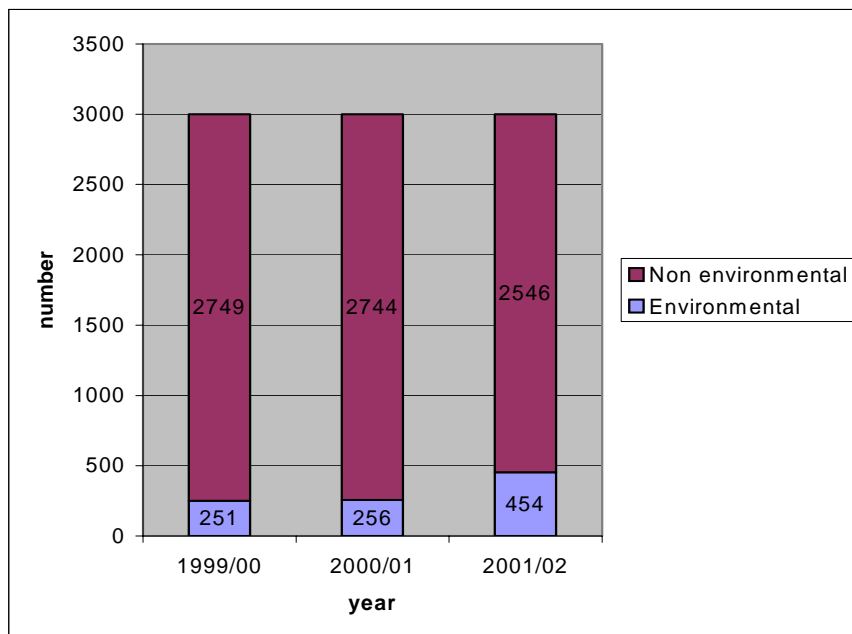
Box 6: CASE STUDY- Sainsbury's Environmental Initiative

Five years ago Sainsbury's and the Farming Wildlife Advisory Group launched a Farm Biodiversity Action Plan. The aim was to engage UK farmers in protecting 106 species and 11 habitats in the UK Government's Biodiversity Action Plan. The scheme now embraces over 300 farms, in both horticultural and livestock sectors, covering 44,000 hectares (0.24% of UK agricultural land). Sainsbury's does pay premium suppliers a higher price for their produce; however, this mainly reflects the higher quality or specification as opposed to reward for the FBAP.

The number of Sainsbury's suppliers engaged in environmental initiatives is on the increase. All farms supplying premium range meat should have biodiversity action plans by 2006. The company has been named the leading food retailer for the third year running in the Index of Corporate Environmental Engagement. One key achievement was the "raising the standard" brochure issued to own brand suppliers as part of a programme to increase environmental best practice among the supply chain. The company has partly funded supplier development in this area.

Sainsbury's Suppliers Involved in Environmental Initiatives

(Source: Sainsbury's, 2002)



3.3.8 Methodology for Quantifying Economic impact, Food

Section 3.3.1 noted that the food industry in the UK supports 3.2 million jobs and contributes £61 billion in Gross Value Added. The number of FTE jobs in the UK is approximately 2.34 million (estimated from Defra, 1999). Figures for the sector in England amount to approximately 2.06 million FTE jobs and £53 billion in Gross Value Added.

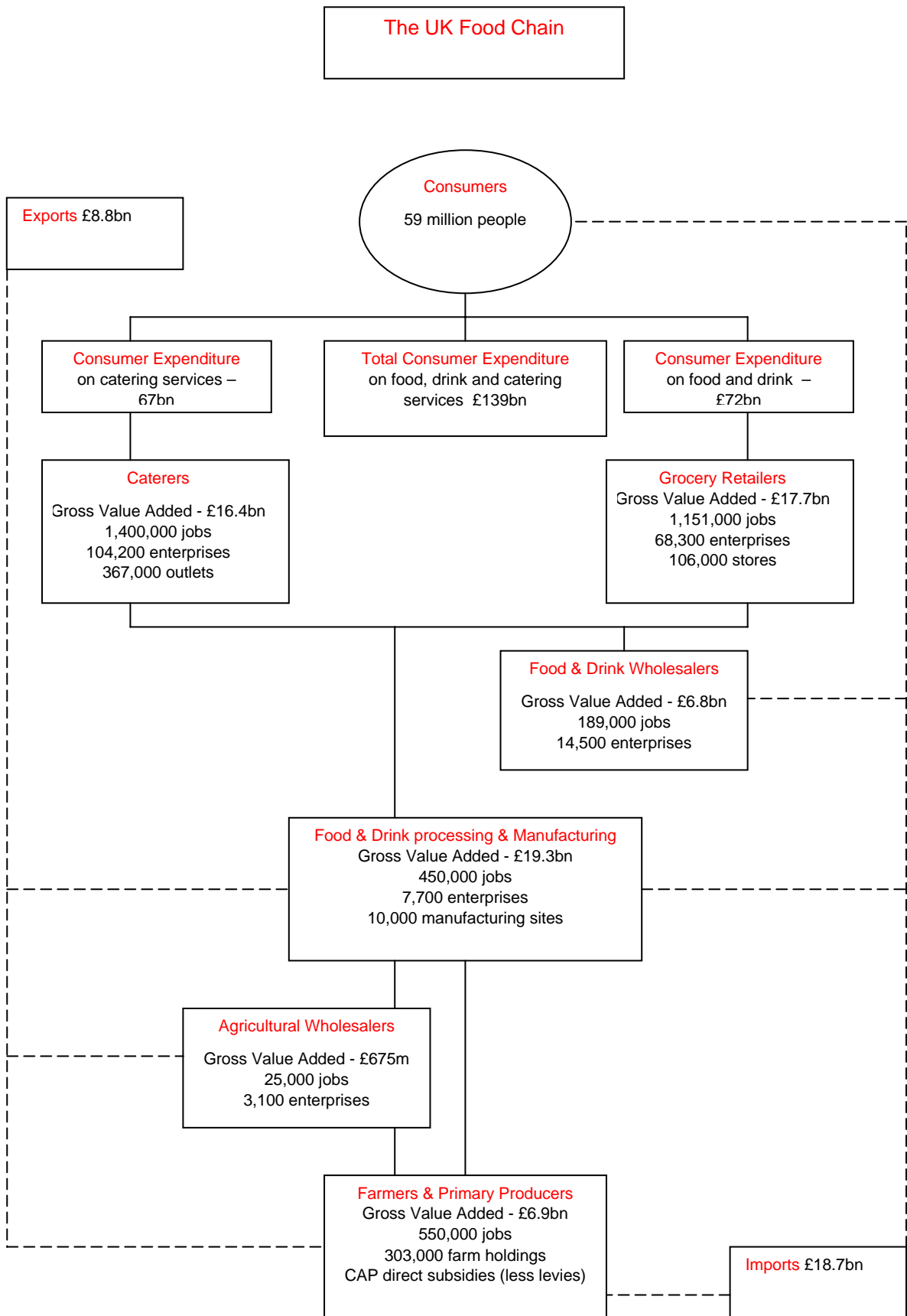
Section 3.3.6 noted that the food industry, as an important part the economy, has numerous environmental impacts at national, regional and local levels. Increasing consumer demands and expectations for quality of life, together with the government's policies promoting sustainable farming, have led to the marketing of

food production systems directly linked to the environment. The proportion of food produced/sold in this category, whilst still small, is growing.

For the purposes of this report, it is assumed that activity concerned with the production of domestically produced organic food and drink, products marketed on their environmental attributes, and some local food and drink contribute positively to the management of the natural environment, whilst other activity does not. This is a simplification as, for example, some local products may not always be produced in a particularly environmentally beneficial way.

Extracting figures to provide an estimate of employment and gross value added is challenging, given the complexity of the food chain (Figure 5).

Figure 5: The UK Food Chain



For the purposes of this study we have based employment and gross value added estimates for environmentally beneficial food and drink upon estimates of:

- The domestically produced (not imported) organic market;
- The 'environmental' product market;
- a proportion of the local food and drink market.

3.3.9 *Estimated economic impact of environment*

Our estimate of the total economic significance of environmentally beneficial food and drink production in the UK is shown in Table 8.

Table 8: Economic Significance of Environmentally Based Food and Drink Production

	Basis	Factor	Market Value (£)
Organic Produce	£1,015 million retail of which 56% imported. UK organic produce £446.6 million	100%	£447 million
Environmentally Marketed Produce	No statistical evidence of current market size Maximum potential in short term 1% total market	100%	£1,390 million
Local Produce	Based on local retail £1,708m Based on 1-5% of total market £1,390 - £6,950m	50% (note, 50% of local producers are involved in land management schemes)	£854 million
Total			£2,691 million

These figures need to be treated with caution, particularly given their size and the fairly crude assumptions used to estimate them, given lack of data available.

In order to convert this figure to gross value added, it is possible to apply the same percentage for the food industry nationally. Total consumer expenditure on food is £139 billion and total gross value added for the food chain, excluding agriculture, is approximately £61 billion (44%). Applying this percentage to £2,691 million, our assessment of gross value added for the environmentally beneficial food and drink sector in the UK is £1,184 million.

For England's GVA, we have assumed the same proportion for environmentally beneficial food as for total food, when comparing England and the UK. We estimate

therefore that the GVA for the environmentally beneficial food and drink sector in England is around £1,029 million.

To obtain employment figures, we have applied the same proportion of environmentally beneficial food and drink GVA against total food GVA in England (1.9%) to total employment in the food chain in England (2.06 million FTE). This provides an estimate of employment in environmentally beneficial food and drink in England of approximately 40,000 FTE jobs. This could be considered a conservative estimate as the average number of FTE employees in local food enterprises is nearly three times greater than in non local food enterprises, although these are primarily small scale operations.

3.4 Forestry and Forest Products

3.4.1 *Economic significance*

The latest estimates of employment in the forestry sector relate to 1998/99, when the last Forest Employment Survey was conducted (Forestry Commission, 2001).

This estimated that there were a total of 14,700 FTE jobs in forestry and primary wood processing in England.

Table 9: Forestry Employment, England, 1998/99

Activity	Employment (FTE)
Forest Nurseries	421
Establishment	1,088
Maintenance	1,680
Harvesting	2,330
Road Construction	181
Other Forest	466
<i>Total Forest</i>	<i>6,166</i>
Haulage	326
Processing	5,952
Other Non-Forest	2,295
<i>Total Non-Forest</i>	<i>8,573</i>
TOTAL	14,739

Source: Forest Employment Survey, 1998/99 (Forestry Commission, 2001)

A breakdown of this employment by sub-sector is given in Table 10. This indicates that the majority of employment is in the private sector, with 38% in wood

processing industries, 29% among private woodland owners, and a further 14% in forestry companies and contractors.

Table 10: Forestry Employment by Sub-Sector, England, 1998/99

Sub-Sector	Employment (FTE)	% of employment
Forestry Commission	1,331	9
Private Woodland Owners	4,242	29
Forestry Companies and Contractors	2,077	14
Wood Processing Industries	5,581	38
Other Employers	1,508	10
Total	14,739	100

Source: Forest Employment Survey, 1998/99 (Forestry Commission, 2001)

The survey found that, in Great Britain as a whole, employment fell from 41,050 FTE jobs in 1988/89 to 34,820 FTE in 1993/94 and 29,532 FTE in 1998/99, a decline of 28% over 10 years. The main reason for the decline was a fall in the number of jobs in harvesting and haulage of timber.

A separate report (Forestry Commission, 2001b) estimated regional employment in forestry and wood processing (Table 11). The South West region supported most forestry jobs in 1998/99 (17% of the total) and the East Midlands the fewest (6% of the total).

PACEC (2000) estimated that the gross output generated by the forestry and wood processing industries was £2,939 million in England in 1997/98. Of this, 37% (£1085 million) of output was directly attributable to the forestry and wood processing industries, with the remainder being indirect and induced effects, giving an estimated output multiplier of 2.71. The direct net output of the industry was put at £380 million, with a multiplier of 2.63, suggesting a total impact on net output of £1,000 million. The total employment multiplier was estimated at 1.84, suggesting that a total of over 34,000 FTE jobs (1993/94) were supported by forestry and wood processing activity in England. Applying a similar multiplier would suggest a total of 27,120 FTE jobs in 1998/99.

Table 11: Forestry Employment by Region, 1998/99

Region	Employment (FTE)	% of English Total	% of National Inventory Woodland Area
South East	2,360	16.0	30
South West	2,571	17.4	21
East Midlands	914	6.2	7
West Midlands	1,602	10.9	9
East of England	1,249	8.5	11
Yorkshire & Humber	1,840	12.5	9
North West	2,187	14.8	6
North East	2,017	13.7	7
Total	14,740	100.0	100

Source: Regional Employment in Forestry and Primary Wood Processing in GB (Forestry Commission, 2001b)

Employment multipliers were found to be higher for processing (2.49) than for forestry activities (1.4). In the latter category, harvesting activity was found to have a higher multiplier (1.49) than establishment (1.38) and maintenance (1.29). The study went on to estimate the impacts of different changes in forestry activity at the national level.

3.4.2 Linkages to the environment

All forestry activity plays a role in shaping England's landscape and wildlife habitats, so is in some way linked to the management of the natural environment. However, it would be misleading to suggest that these linkages are universally strong or positive. Forestry in England takes a variety of forms and is motivated by a range of objectives – from systems dominated by fast growing, non-native conifers, designed to maximise timber production, to activities concerned with the management and regeneration of semi-natural broadleaved woodlands for conservation and amenity uses. Initiatives to encourage the harvesting, processing and marketing of timber are often linked to the management of the environment, in that they can help to sustain the future of England's semi-natural woodlands.

Given that forestry in the UK is now increasingly regarded as unviable on commercial grounds alone, increasing importance is now placed on multi-purpose forestry systems, which place greater emphasis on conservation, landscape and amenity uses. As a result, the economic impacts of woodlands are increasingly dominated by conservation, sporting and tourism related activity.

3.4.3 Summary of available evidence

Overall, studies tend to suggest that the employment benefits of afforestation compared to alternative land use activities such as agriculture are questionable,

especially given the long timescales associated with forest rotations (Thomson and Psaltopoulos, 1993; Mather and Murray, 1987; Price, 1997; Laxton and Whitby, 1986). Typically, afforestation schemes create employment in planting, after which labour requirements are limited until timber is harvested after 40 or more years. However, forestry may have a role in helping to diversify the rural economy and reduce under-employment in agriculture.

Management of existing woodlands can create new sources of employment and income, especially on farms, without displacing agricultural labour. For example, Bateman and Midmore (1993) showed that potential employment gains from expanding the Coed Cymru project – promoting the management of broadleaved woodlands in Wales - exceeded those from similar levels of spending on coniferous afforestation. There are substantial areas of under-managed woodland in England. While there are significant technical and economic barriers to bringing this resource into management, this has the potential to provide a variety of economic, conservation and landscape benefits.

Examples of regional woodland initiatives supporting both environmental benefits and positive economic impacts include:

Working Woodlands Initiative. This £3 million EU/UK funded programme was estimated to safeguard or create 212 jobs by improving the management of small, neglected semi-natural woodlands in Cornwall, Devon and Somerset (SW Environmental Prospectus Group (1999).

Wessex Coppice Project. Hazel coppicing in southern England is capable of supporting ten times as much employment per hectare as modern commercial forestry, as well as providing substantial conservation benefits (Rayment, 1997). In 1995, the Wessex Coppice Group estimated that restoration of 16,000 acres (6400 ha) of derelict coppice in Hampshire could create 500 jobs, and that there was potential to create up to 2000 new jobs in southern England as a whole.

Marches Woodland Initiative. This project aims to “expand and improve the management of woodlands in the (English) Marches in order to develop economic benefits and enhance their environmental value”. The initiative comprises a network of consultants providing woodland owners with subsidised advice and capital grants for forestry and timber related enterprises. By March 2000, 840 ha of woodland had been brought into sustainable management, providing not only timber but educational and access benefits for local communities and supporting 29 jobs in woodland related industries (Dickie and Rayment, 2001).

National Forest. The National Forest project aims to increase woodland cover from 6% to 30% in a 500 sq mile area of Leicestershire, Derbyshire and Staffordshire, and in doing so improve the environment, regenerate former coalfield areas, stimulate new economic opportunities, and encourage tourism and recreation. Since 1995, it is estimated that an extra 330,000 visitors have entered the area, spending £128 million annually, and that more than 500 new jobs have been created (EMDA et al, 2002).

Greenwood Community Forest, Nottinghamshire. This project aims to regenerate a former coal-mining area, creating 8640 ha of new woodland as a means of improving the environment, thereby attracting inward investment and enhancing recreational opportunities (EMDA et al, 2002).

Forest of Mercia. This project in the West Midlands supported 33 Environmental Task Force Placements between October 1998 and April 2000, involving young people in activities such as tree planting, public access improvements, development of tree nurseries, and timber harvesting and utilisation. Half of these placements led to subsequent full time employment (ERM, 2001b).

Yorkshire. The South Yorkshire Community Forest and the White Rose Forest are both initiatives that aim to promote regeneration and environmental improvement by the expansion and management of woodlands (Yorkshire Forward, 2002).

Coed Cymru. This initiative, which aims to promote the profitable management of native broadleaved woodlands in Wales, was estimated to support 290 FTE jobs in advisory, management, contracting and processing activities in 1995 (Rayment, 1997).

3.4.4 *Methodology for quantifying economic impact*

Section 3.4.1 noted that forestry activity in England is estimated to support 14,740 FTE jobs directly and 27,120 in total, and contribute £380 million to net output directly and £1,000 million in total.

Section 3.4.2 noted that all of this activity is in some way linked to the environment, but that there is a broad spectrum of linkages, from schemes that aim specifically to enhance the nature conservation and landscape benefits of woodlands, to coniferous afforestation projects that are widely regarded as environmentally damaging.

For the purposes of this report, it is assumed that activity concerned with the planting, management and harvesting of semi-natural broadleaved woodlands generally contributes positively to the management of England's natural environment, while activity focusing on non-native species, especially conifers, does not. This is something of a simplification, since it is not impossible for coniferous woodland to provide landscape and wildlife benefits, while native broadleaved woodlands may be managed intensively for commercial timber production and sometimes offer relatively few environmental benefits. Nevertheless, given the statistics available, this split appears to be the best proxy for distinguishing between the environmental contribution of forestry systems.

Forestry Commission statistics indicate that 648,000 hectares (65%) of England's woodland were broadleaved in 1995-99. Semi-natural woodland covered 416,000 hectares (38% of woodland area), and ancient semi-natural woodland 206,000 hectares (19% of woodland area). Broadleaves accounted for 91% of new planting and 26% of restocking, by area, in 2002/3, or a combined total of 68% of the land area planted. This follows a significant shift towards the planting of broadleaves in recent decades. In Great Britain as a whole, broadleaved species accounted for 41% of the forested area in 1995/99, reflecting the greater prominence of conifers in Scotland and Wales.

Broadleaves account for a smaller proportion of timber production than woodland area. Hardwoods (provided primarily by broadleaved trees) are forecast to make up only 8% of wood production, by volume, in Great Britain between 2002 and 2006. This proportion is likely to be slightly higher in England.

This study assumes that employment related to management of semi-natural woodlands is proportionate to their share of forest area (38%), that employment in establishment of semi-natural woodlands is proportionate to the share of new

planting accounted by broadleaves (i.e. 68%); and that employment in harvesting and processing activities is proportionate to the share of hardwoods in total timber output (c.10%).

These assumptions are rather crude. For example, it is unlikely that employment in primary wood processing is proportionate to timber output, given variations in the labour intensity of timber processing activities.

3.4.5 *Estimated economic impact of environment*

Employing the assumptions outlined in the previous section, employment supported by semi-natural woodlands in England is estimated at **3,590 FTE jobs**. These include:

- 2,090 FTE forestry jobs
- 1,500 FTE jobs outside the forest (including haulage, processing and administrative functions).

The share of employment accounted for by semi-natural woodlands is less than their share of forest area, because of the relatively low volumes of wood harvested from them.

An estimated breakdown of employment by region is given in Table 12.

Table 12: Estimated “Environmental Forestry” Employment by Region

Region	Employment, FTE
South East	575
South West	626
East Midlands	223
West Midlands	390
East of England	304
Yorkshire & Humber	448
North West	533
North East	491
Total	3590

If it is assumed that their contribution to GVA is proportionate to their contribution to employment, it can be estimated that the forestry and primary wood processing activities relating to semi-natural woodlands contribute £93 million in GVA.

If the multipliers suggested by the PACEC study are applied, this suggests that semi-natural woodlands contribute a total of £164 million to England’s GVA and 4920 FTE jobs, including direct, indirect and induced effects. These figures include

the impacts of recreational provision by forest managers, but exclude the impacts of woodland related tourism, which are dealt with in section 3.6 of this report.

3.5 Commercial Fisheries

3.5.1 *Economic significance*

This section deals with the economic impact of commercial sea fisheries in the UK. Recreational fisheries are dealt with in the section on tourism and leisure.

Table 13 presents statistics on the economic significance of sea fisheries in the UK.

Table 13: Sea Fisheries in the UK – Key Economic Statistics

	UK
Number of vessels	7033
Landings of sea fish (000 tonnes)	686
GDP/Value of landings (£m)	546
Regular Fishermen	10,524
Part Time Fishermen	2,222
Total Fishermen	12,746
Number of fish processing businesses	527
Fish processing employment	22,500

Source: Sea Fisheries Statistics 2002 (DEFRA, 2003)

Figures for fisheries employment in England are given in Table 14, by fisheries region.

Table 14: Numbers of Fishermen, England

	Regular fishermen	Part time fishermen	Total fishermen
NE	467	156	623
Yorkshire & Humber	811	55	866
Eastern	575	58	633
SE	1161	145	1306
SW	874	42	916
Western	973	181	1154
NW	150	18	168
England	5011	655	5666

Source: Sea Fisheries Statistics 2002 (DEFRA, 2003)

Estimates of FTE employment and contribution to GDP by main English administrative region are given in Table 15. These estimates are based on an assumption that each part-time job is equivalent to 0.5 FTE, and that the share of fisheries GDP accounted for by each region is proportionate to its share of employment.

Table 15: Estimated Employment and GVA for Sea Fisheries, by Region

Region	Total Employment	FTE	GDP (£m)
NE	623	545	26
Yorkshire & Humber	866	838	39
Eastern	633	604	28
SE	1306	1233	58
SW	2070	1959	0
NW	168	159	7
England	5666	5338	159

The contribution to GDP of the fish processing industry in the UK is approximately £430 million (from DEFRA, 2001, 2003).

Annual Business Inquiry data suggest that there were 9,112 jobs in fish processing in England in 2001, of which 65% were in the Yorkshire and Humber region (Table 16).

Table 16: Employment in Fish Processing

	Total	FTE (estimate)
East Midlands	31	30
Eastern	279	244
London	189	178
North East	832	791
North West	813	799
South East	83	76
South West	789	754
West Midlands	187	173
Yorkshire and The Humber	5909	5266
England	9112	8309

Source: Annual Business Inquiry/NOMIS

3.5.2 Linkages to the environment

Fisheries employment and output are heavily dependent on the management of the marine environment, and the management of fisheries themselves.

At the same time fisheries exert substantial pressures on the marine environment on which they depend. A review of the state of sea fish stocks by Bannister (in DEFRA, 2003) concluded that many species are being fished unsustainably, and are suffering from depleted and/or declining stocks, including North Sea cod, haddock, Northern hake, Western cod, and Irish Sea cod and whiting. Further limitations on fishing effort are required if stocks of these species are to recover to above precautionary levels.

3.5.3 Summary of available evidence

Commercial fisheries do not appear to feature in any of the regional environmental economy studies, and the best source of economic data appears to be the UK Sea Fisheries Statistics.

3.5.4 Methodology for quantifying economic impact

In the long term, all employment and output of commercial fisheries in England is dependent on the management of the marine environment. The employment and output figures presented in Section 3.5.1 above can therefore be taken to be environmentally dependent.

The management of the marine environment also determines the future of fish processing activity in England, which currently supports approximately 8,300 FTE jobs and contributes £175 million to GDP.

3.5.5 Estimated economic impact of environment

An estimated 5,670 FTE jobs and £159 million contribution to GDP in commercial fisheries, and 8,300 FTE jobs and £175 million GDP in fish processing, are dependent on the sustainable management of the marine environment. Current evidence suggests that catches of a number of species are unsustainable, and that

jobs and output are therefore at risk. The long-term future of economic activity and employment associated with commercial fisheries and fish processing activities depends on the adoption of sustainable management practices.

3.6 Tourism and Recreation

3.6.1 *Economic significance*

Tourism is now widely recognised as the world's largest industry. In the UK, the industry has been growing steadily for the last 25 years and now generates revenues of approximately £75.9 billion (www.staruk.co.uk). It plays a significant role in our economy, contributing 4.4% to the total GDP and making up 7% of total employment in the UK (www.staruk.co.uk).

Estimates of the value of and impact of tourism spending in the English countryside are published periodically by the Countryside Agency, based on national surveys such as the UK Tourism Survey and UK Day Visits Survey.

The Countryside Agency (2002) estimated that rural tourism in the English countryside is worth nearly £14 billion a year and supports 380,000 jobs. A previous estimate based on 1998 data concluded that visitors to the English countryside spent £11.5 billion, supporting 340,000 jobs, including 290,000 direct, 22,000 indirect and 16,000 induced jobs (Countryside Agency, 2001). Visitor spending was estimated to have increased by 14% in real terms between 1994 and 1998. Some 77% of spending was estimated to have been made by day visitors, 17% by UK tourists and 6% by overseas tourists (Countryside Agency 2001).

A regional breakdown of estimated spending and employment based on 1998 data is given in Table 17.

Table 17: Visitor Spending and Employment in the Countryside, by Region, 1998

Region	Spending (£m)	Estimated Total Employment
North East	266	8,790
North West	1,162	34,230
Yorkshire & Humber	1,047	33,200
East Midlands	1,065	32,920
West Midlands	1,176	34,660
Eastern	1,755	48,490
London	184	4,420
South East	2,779	76,470
South West	2,111	66,360
England	11,545	339,600

Source: *The Economic Impact of Recreation and Tourism in the English Countryside*, Countryside Agency (2001)

Visitor spending by sub-sector in 1998 is shown in Table 18 below.

Table 18: All visitor spending by sector in the countryside 1998 (£ million)

	Accommodation	Retail	Catering	Attractions	Travel	All
Total Spending £ Millions	£945	£1,310	£5,275	£1,718	£2,298	£11,545

Source: *Countryside Agency (2000)*

Spending is lower in small towns, villages and the countryside than in cities or the seaside. The overall average visitor spend was £175.50 per trip in 2000, with comparative totals of £234.10 for cities, £156.90 for open countryside and £137.90 for market towns (Countryside Agency, 2002).

However going to the countryside (32.9 million trips) and its small towns and villages (26.6 million trips) together account for 42% of all trips taken in England in 2000 (140.4 million trips). Countryside, small town and village visits combined are double the number going to the seaside and 5% more than city visits (Countryside Agency, 2002).

The Countryside Agency survey undertaken in 1998 also estimated that there were 1,253 million day visits from home to the countryside. The Countryside Agency

(2002) states that evidence from the UK Day Visits Survey shows that, on average people visiting the countryside spent money on only 6 visits out of 10 (61%). However, informal day trips to the countryside involved spending of £9 billion, which represents 14% of total tourism expenditure in England (£64 billion).

3.6.2 *Linkages to the environment*

The Rural White Paper (2000) recognised tourism as a key rural industry, especially well placed to build on the countryside's inherent strengths and character. The appeal of the countryside as a holiday destination is complex, linked to opportunities for a variety of sports and activities, peace and quiet, space, nature and traditional ways of life.

All rural tourism is, to some extent, linked to the environment. The concept of sustainable land management recognises that the land should be managed not only for the production of food and fibre, but for a range of other benefits, including the maintenance of attractive landscapes and biodiversity and support for local communities and the wider rural economy. Tourism is therefore recognised as a powerful tool in stimulating and supporting this approach (Countryside Agency, 2003).

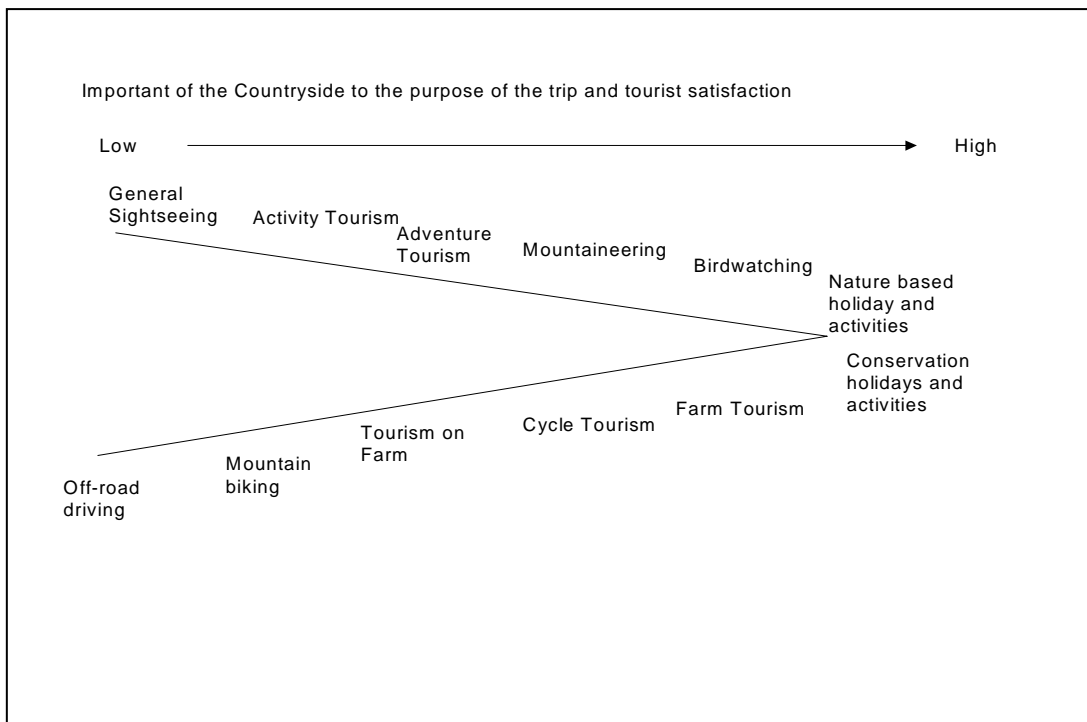
Land managers can be involved in tourism, directly or indirectly, through the provision of tourist facilities on their land, supplying distinctive local produce and/or an attractive, accessible landscape.

Some rural areas, such as National Parks, Areas of Outstanding Natural Beauty and coastal areas have higher tourism and recreational value than others. There is often a close correlation between areas of high scenic or environmental value and more marginal agricultural areas. Changes in farming circumstances can have a direct impact on tourism, both in terms of access to the land (as evidenced by the closure of public rights of way during the Foot and Mouth Disease outbreak) and the scenic and environmental quality of the land. It is also worthwhile noting the attractiveness of a functional, living landscape.

Wildlife and geology are major assets to tourism, but can also be at risk from inappropriate development. Specific negative environmental effects relating to tourism include: disturbance; litter; traffic congestion; parking problems; and damage to vegetation.

For some visitors, the natural environment simply provides the backdrop, while for others it provides the basis for an entire holiday or leisure activity. Different activities depend on the natural environment or countryside to different extents (Figure 6).

Figure 6: Importance of the Environment in Different Forms of Countryside Recreation



Source: Roberts and Hall (2001)

Tourism is a growth industry. Although there have been some recent set backs - notably the negative impact of Foot and Mouth disease on rural tourism and the effects of a strong pound, SARS and terrorist uncertainties on international visitors - increases in individual time, mobility, disposable income, and trends in health and fitness encourage greater participation in recreation and travel in the countryside. (www.ruraltourism.org).

3.6.3 Summary of available evidence

Regional Examples

Examples of the economic impact of tourism and recreation in the countryside from the English regions are set out below:

North East

Analysis shows that at least 27,000 jobs in the tourism sector of the North East are dependant on a high quality natural environment and historic built environment - 40% of the total 67,000 employed in tourism in the region. Of these, some 10,460 jobs are in rural areas (ERM, 2001a).

Analysis of visits to tourism sites in the North East shows that 8.9 million (62%) of a total 14.4 million visits to attractions were clearly based on the quality of the environment (ERM, 2001a).

Continued maintenance of the region's high quality environment will be central to tourism's competitive advantage. A survey for the National Trust (2000) shows that 44% of interviewed visitors to the North East stated that their primary reason for visiting the North East was the quality of the natural or built environment (ERM for Regional Partners in the North East, 2001a)

North West

The North West Development Agency estimates that tourism employs 250,000 people in the Region - 6% of the workforce, generating, at £3.14 billion, 5% of the Region's GDP (Defra, 2002).

Tourism spending in the region has been estimated at £938 million, and is likely to provide almost 40,000 jobs rural areas. More recent research by the North West Development Agency estimates that as much as 20% of Cumbria's population is involved in tourism, most of which is in rural areas (Defra, 2002).

The region has approximately 2,500 hectares of land in major country parks, supported by a network of picnic sites that are clustered in North Lancashire and Central Cheshire. Delamere Forest in Cheshire is also used extensively for sport and recreation. The North West enjoys excellent freshwater fisheries and this pastime generates approximately £1.5 million in revenue for the region (Defra ERDP Regional Chapter).

The National Trust is the most significant property and landowner in Cumbria, and it estimates that its activities are likely to support between 8% and 11% of all employment in Cumbria (SQW, 2001). Many of these jobs are to be found in the farming and tourism sectors.

Yorkshire and the Humber

The rural landscape of the region, and particularly the areas designated on the basis of their landscape quality, provides an established tourist attraction. Grouse shooting plays a significant part in the management of the heather moorlands of the region, and makes a substantial contribution to rural economies (Defra ERDP Regional Chapter).

Tourism based on a high quality environment employs 35,000 people and generates an annual contribution of £640 million to the regional GDP (Yorkshire Forward, 2002). In 2000, an estimated 9.3 million people visited an environmental or heritage site in the region, with more than 15 million people visiting the Yorkshire Dales and North York Moors National Parks.

East Midlands

In the East Midlands, over 97,000 (6.2% of total employed) people work in a tourism related industry and of these, just under 40% work in a rural area. From 1991 to 1996 there was an overall rise of 10% in the numbers employed in tourism, with the rural area showing a greater rise of 13%. Both are significant changes when compared to the GB figure of 3% (Defra, 2002).

The most popular districts for tourists visiting attractions in the region are:

- Newark and Sherwood in Nottinghamshire (ranked 28 out of all districts in England in 1997) - key national attraction - Major Oak

- High Peak, North Derbyshire (55) - key national attraction - Peak District
- South Derbyshire (73) - key national attraction - Alton Towers (situated in adjacent West Midlands Region)

Research suggests that interest in visiting or staying on a farm is growing in all market sectors. However, farm tourism is subject to the same problems that all tourism operators face, particularly weather and the economic climate. The tourism industry is volatile and very competitive (Defra ERDP Regional Chapter).

West Midlands

The West Midlands region, discounting the mainly urban West Midlands Metropolitan County, has a tourist industry worth £419m annually (Defra ERDP Regional Chapter)

Rural recreation and tourism activities are clearly dependent on a high quality environment and the West Midlands region has much to offer. Recreational use of the West Midlands countryside has increased considerably and the expenditure generated by trips to these areas has contributed significantly to the income of rural businesses and local employment (Countryside Agency, 2003c).

The report for Advantage West Midlands, the Environment Agency and Regional Partners in the West Midlands (ERM, 2001) states that tourism based on a high quality environment supports 51,000 jobs (24% of total tourism employment), and accounts for approximately £670 million of GDP.

East of England

Rural tourism is an important feature of the region's economy. In 1997, the East of England received 16.5 million tourist trips, contributing £3.4 billion to the region's economy. Much of this activity involved visits to the countryside and coast, including woodlands and nature reserves (Defra, 2002).

South East

Tourism is an important economic activity in the South East, with expenditure of £5.1bn in 1997, and the sector accounting for 5% of regional GDP. The region has a strong rural tourism product, with visitors attracted by the diverse and nationally important landscape, attractive market towns and villages, seaside resorts and coastal scenery, high quality paths and trails, along with a wealth of historic sites and properties (Defra, 2002).

Local surveys provide more information on day visits including: 52m visits to the Chilterns AONB and 32m to the Sussex Downs AONB; average tourist spending along the four National Trails ranges from £2.20 to £9.03/day for over half a million visitors; and the approximately £18m economic value of leisure on the River Thames (Defra ERDP Regional Chapter).

South West

The tourism sector is an important one in the South West economy, with tourists and visitors to the region spending a total of £5,571 million in 1997, equivalent to more than 10% of regional GDP. The sector as a whole provides employment for more than 120,500 people in the region, though employment has declined slightly since 1991 (-1.2%) (DEFRA, 2002).

The region is fortunate in the strength and diversity of its natural and built resources. The region has the longest coastline, relative to its area, of any in England, as well as being varied and attractive. Inland the countryside includes such diverse areas as lowland heath, limestone uplands (the Mendip and Cotswold Hills) and moorland (Bodmin Moor, Dartmoor and Exmoor). The South West rivers (for example the River Tamar, the River Severn and the Upper Avon tributaries in Wiltshire) provide many opportunities for angling, both for salmon and coarse fishing. The historic environment includes prehistoric sites of international importance such as Stonehenge and Avebury, castles and stately homes, and historic towns including the World Heritage site of Bath and various cathedral and spa towns.

Analysis of the region shows that conserved landscapes in the South West attract spending of £2,354 million from holiday trips and support 97,200 jobs, or 43% of all tourist related jobs in the region (National Trust, 2000). The National Trust study found that that 78% of all holiday trips to the SW are motivated by conserved landscape.

Tourism Activities

Examples of rural tourism relating to specific activities or locations are set below:

Walking

Walking is the main activity undertaken by day visitors to the countryside (Countryside Agency, 2001). It is estimated that annually there are 527 million walking trips to the English Countryside. Expenditure associated with these trips is in the region of £6.1 billion (Christie and Matthews, 2003). Spending by walkers provides significant benefits to local economies in terms of income and job creation. Such expenditure includes purchases of food, accommodation and transport, and helps to stimulate an increase in the level of economic activity that, in turn generates additional income and employment in the area. It is estimated that walking in England generates between £1,473 million and £2,763 million of income in rural areas. In terms of employment, it is estimated that between 180,558 and 245,560 FTE jobs are supported as a result of walkers' expenditure (Christie and Matthews, 2003). Survey data from Yorkshire Forward (2002) indicates that that up to 60% visit for short walks and 30% for walks over 2 miles.

Wildlife Tourism

Specialist 'green tourism' is a growing part of the tourism economy (Box 7).

Box 7: Economic Impacts of Wildlife Tourism

RSPB nature reserves in the UK receive more than one million visits each year, with visitors estimated to spend £12 million in local economies, supporting 300 FTE jobs in 2000 (Shiel *et al*, 2002). In England spending was approximately £8 million, supporting 200 local FTE jobs.

National Nature Reserves. Over 200 NNRs attract an estimated 13 million visits each year.

Norfolk Coast - A study of visitors in 1999 estimated that visitors to six sites spent £21 million per year in the local economy, of which £6 million could be attributed to birds and wildlife (supporting 135 FTE jobs), and a further £2.7 million to scenery/landscape (supporting 59 FTE jobs) (Rayment and Dickie, 2001).

Minsmere RSPB reserve, Suffolk. 80,000 visitors were estimated to spend £1.1 million in the local economy in 2000, supporting an estimated 27.5 FTE tourism jobs (Rayment and Dickie, 2001).

Symonds Yat, Forest of Dean. A peregrine falcon nest protection and viewing scheme attracted 50,000 visitors and £550,000 of spending to the local economy in 1999, supporting an estimated 18 FTE jobs (Rayment and Dickie, 2001).

Leighton Moss RSPB Nature Reserve, Lancashire attracts over 90,000 visitors per year, including 4,000 schoolchildren. The area's wildlife was estimated to attract local spending of at least £0.95 million in 1999, supporting at least 27 FTE jobs, while a further 20 FTE jobs were supported by spending by visitors attracted to the area by its scenery (Rayment and Dickie, 2001).

A nesting pair of Ospreys was estimated to attract additional spending of £420,000 to the Lake District in 2003, from 70,000 visitors, supporting 11 FTE jobs (RSPB estimates, unpublished).

Forest Tourism

Forest related tourism expenditure associated with tourism day visits is estimated to be around £2.3 billion, over 3% of total tourism expenditure in the UK. On average, around 13% of total tourism expenditure incurred by visitors to the six countryside areas surveyed in a recent study could be considered to be "forest associated expenditure" (Forestry Commission 2003). It is estimated that around 355 million day visits were made to woodland in Great Britain in 1998, of which 321 (90%) originated in England (Forestry Commission, 2003). The 12 Community Forests in England have helped to revitalise areas around England's towns and cities, delivering economic, social and environmental benefits to local communities.

Recreational Fishing

Box 8 summarises examples of the economic impacts of recreational fishing, taken from the regional environmental economy reports.

Box 8: Economic Impact of Recreational Fisheries

The regional environmental economy studies document various examples of the economic impact of recreational fisheries in different regions:

England and Wales – total annual expenditure by game anglers is put at £545 million per year, based on an estimated 0.8 million anglers and average annual spending of £682/angler (EMDA, 2002).

Eastern England – the report quotes “ball park” estimates by the Environment Agency that put expenditure on angling in the region at £432 million (SQW/LUC, 2000)

East Midlands – sale of rod licences generates revenues of between £3.15 million and £9 million per year (EMDA, 2002).

North East – the River Tyne generates £156,000 per year from the sale of fishing rights, with additional spending in the rural economy on food and accommodation by visiting anglers. Anglers spend an average of £50 per day over 15,875 days (ERM, 2001a).

North West – 130,000 rod licences were sold in the region in 1998, generating revenue of £1.6 million to the Environment Agency, which was spent on a range of fisheries management, enforcement and habitat improvement measures (ERM, 2000)

West Midlands – fisheries generate at least £2.6 million in licence revenues, including £1.6 million from salmon fishing on the Severn, and £1.0 million from coarse and trout fishing (ERM, 2001b)

Yorkshire and Humber – an estimated 1340 jobs are estimated to depend on the sale of fishing tackle alone. Total expenditure by game anglers was estimated at £60 million annually. The sale of rod licenses brought revenue of £1.4 million to the Environment Agency (Yorkshire Forward, 2002).

Countryside Sports

Countryside sports make an important contribution to the rural economy, both by providing direct employment and attracting visitor spending to rural areas, while complementing the primary land uses of farming and forestry and their contribution to landscape and wildlife conservation. According to the Countryside Alliance, countryside sports are perceived as vital to the rural economy in some areas (www.countryside-alliance.org).

The Countryside Alliance (2002) states that country sports - including shooting, hunting and fishing - are the fifth most popular recreation and leisure activity in the Britain (based on participation figures). Total direct expenditure is estimated to exceed £3.8 billion per annum and this expenditure is estimated to support direct employment equivalent to 60,150 full time jobs in Great Britain (Countryside Alliance, 2002 but based on 1996 data).

A breakdown is given in Table 19.

Table 19: Countryside Employment and Expenditure, Great Britain

	Shooting	Hunting	Fishing	Other	Total
Direct employment (FTE jobs)	26,000	6 – 8,000	17,750	9,250	Approximately 60,000
Total annual expenditure	£419 million	£243 million	£2,300 million	£838 million	Approximately £3.8 billion

(Source: Countryside Alliance, 2000 - based on Cobham Resource Consultants, 1997; Produce Studies, 1998; CA Research 1999; and Burns Report, 2000)

Box 9 gives examples of the economic impact of countryside sports in England.

Box 9: Economic Impact of Countryside Sports

- GFA-RACE Partners and The Macaulay Institute (2003) cited a number of studies that assessed grouse shooting specifically in terms of its economic contributions. On the basis of a survey amongst its members, the Moorland Association (2001) has claimed the 'direct injection of over £12.5 million into the English rural upland economy' in 2001 (the year of foot-and-mouth disease, when shooting was somewhat restricted). Grouse shooting in England and Wales is claimed to support a wages bill for keepers (279 FTEs) and beaters of £4.4 million. Potential indirect expenditure in local hotels was put at £2-4 million. Keepers play an important role in the management of heather moorland.
- In the Yorkshire and Humberside Region, Grouse Shooting plays an important part in the management of the heather moorlands of the region. The Game Conservancy Trust (1999) estimates that the region yields approximately £1.6 million per annum (Defra).
- The Countryside Alliance (2000) estimate that "somewhere between 6,000 and 8,000 full-time equivalents [FTE] presently depend on hunting ". However, "Applying the principle that two part-time or part-year employees equates to one FTE, the total number of people employed by hunts' followers may be some 70% higher than the number of FTEs ".

3.6.4 Methodology for quantifying economic impact

Section 3.6.1 noted that rural tourism is estimated to support 380,000 jobs in England and that visitors to the countryside spent £14 billion (Countryside Agency, 2002). The corresponding total of FTE jobs is approximately 320,000.

Section 3.6.2 noted that all rural tourism is to some extent linked to the rural environment. There are different degrees of relationship between activity and the rural environment from nature-based and conservation holidays and activities on the one hand to general sightseeing on the other. The relative importance of these different activities in terms of number of trips is shown in Table 20.

Table 20: Activities carried out while on tourism trips to English Countryside in 2000

	Number of Trips (millions)	%
Any activity	25.4	77
No activity	7.5	23
<i>Total</i>	<i>32.9</i>	<i>100</i>
Short Walks (up to 2 miles)	16.1	49
Long walks (more than 2 miles)	8.4	25
Swimming	5.2	16
Visiting traditional regional music event	1.0	3
Golf	1.1	3
Field study/nature study/ bird or wildlife watching	5.1	15
Cycling	2.5	7
Visiting heritage sites	7.8	24
Visiting artistic or heritage exhibits, eg museums or galleries	4.6	14
Visiting theme park or activity park	2.5	8
Watching performance art – theatre, cinema, concert, opera, ballet	3.0	9
Watching any sporting event	1.1	3
Total	58.4*	*

* some multiple trips mean that the total exceeds 32.9 million trips or 100%

Source: *The Countryside Agency 2002, UKTS*

The table shows that around a quarter of staying visits to the countryside involve no stated activity at all. Of the remainder, activities closely related to a high quality natural environment – walking, cycling, field study/nature study/bird or wildlife watching and visiting heritage sites (the majority of which are small sites “intimately connected with their rural surroundings - Countryside Agency, 2001) amount to 68% of all trips (including multiple trips). Taking account of trips that involve no stated activity, and allowing for other leisure and tourism activities linked to the natural environment, especially countryside sports, we estimate that an overall total of 60% of trips are linked to a high quality natural environment.

Impacts associated with countryside sports are treated as falling within the tourism and recreation sector. The direct employment identified in section 3.6.3 is not counted separately, to avoid the risk of double counting, since a large proportion of this activity is funded by visitor spending. This approach could be regarded as conservative, given that some of this employment may not be captured in the tourism estimates.

The regional environmental economy studies provide figures ranging from 24% (West Midlands), to 40% (North East) and 43% (South West) of total (rather than countryside) tourism employment in these regions.

For the purposes of this report, it is assumed that employment and GVA in the tourism sector that is dependent on a high quality rural environment is directly linked to the percentage of relevant trips. This assumption is crude given the varying nature of the activities and different expenditure patterns, and might be considered to be conservative, particularly in the light of survey results from regional studies which suggest that a high quality natural environment is an important draw for the majority of visitors not just those undertaking specific activities such as walking or birdwatching. For example, 78% of all holiday trips to the SW are motivated by conserved landscape, according to the National Trust, (2000).

3.6.5 *Estimated economic impact of environment*

Applied against the total of 320,000 FTE jobs in rural tourism in the English countryside, it is estimated that at least 192,000 FTE jobs are dependent on a high quality natural environment.

This translates across to £8.4 billion of visitor expenditure being dependent on a high quality natural environment. Using the Department of Culture Media and Sport guidance, which suggests GVA forming around 60% of expenditure, this suggests a GVA for tourism dependent on a high quality natural environment of £5.0 billion.

3.7 Cross Sectoral Impacts – The Role of Quality of Life in Economic Development

Quality of life factors are becoming increasingly prominent in the regional development agenda in the UK. Regional economic strategies now recognise the importance of the environment in attracting and retaining businesses and workers to the regions. For example, in the South West, the Regional Development Agency has used the region's environment and quality of life in a major marketing campaign promoting South West England as a place to live, work, visit and do business. The campaign has employed the slogan "It's in our Nature" to promote the region.

Though their economic impact is difficult to measure, it is clear that environmental factors have the potential to have a profound impact on local and regional economic development, potentially affecting major sectors with little direct connection to the rural environment.

4 ECONOMIC VALUE OF ENGLAND'S RURAL ENVIRONMENT

4.1 Types of economic value

In a market economy, the price mechanism allocates goods. People's preferences for goods are expressed by the price they pay for them. The price of a good thus reflects buyers' willingness to pay (WTP) and sellers' willingness to accept (WTA) compensation.

Some products derived from the rural environment – such as fish and timber - are traded in markets, and their value can therefore be observed from market transactions. However, markets do not exist for many environmental goods, such as landscape, wildlife, fresh air and the marine environment. There is therefore no price mechanism that enables us to assess the value of these environmental resources, or to evaluate changes in their availability.

Nevertheless, the absence of a market should not be taken to suggest that these resources lack value. Maintaining the stock of environmental resources – such as clean air, water and soil – is fundamental to our existence. The environment provides a range of valuable services such as climate regulation, food production and waste treatment. Biodiversity offers a range of opportunities for producing food, medicines and other products. Even materially unproductive environmental resources are valuable. Wildlife and landscapes offer recreational and amenity benefits, and are often valued for their very existence.

The economic values of the natural environment consist of:

- Use values – including harvesting of food and timber, recreational values and ecosystem services;
- Non-use values – including existence, option and bequest values (Turner *et al.*, 1994).

4.2 Valuing the Natural Environment

In the absence of markets for environmental goods, non-market valuation methods have been developed that allow their values to be estimated through the creation of a hypothetical market. Valuation methods include contingent valuation methods (CVM), contingent ranking/rating (CR) and choice experiments (CE), which are used to estimate the value of environmental resources where non-use values make up a significant portion of their total. Other methods include the hedonic pricing method, travel cost method and production function approaches (Clinch, 2000).

In the UK, the use of valuation techniques for securing money values for environmental benefits/damages began in the late 1960s and early 1970s, following a large body of work in North America. Since the 1980s a number of studies to value non-market benefits in the English environment have been carried out (Turner *et al.* 1992). In particular, CVM has become widely used in public-decision making in the UK and has been applied to wildlife conservation, landscape and habitats.

The following sections provide a review of studies that have attempted to value wildlife/biodiversity, landscapes and habitats, agri-environment benefits and ecosystem services.

4.3 Valuing Wildlife and Biodiversity Conservation

Biological resources can be described in terms of the diversity within natural habitats. Several studies have shown that the British public is prepared to pay for the conservation of individual species, as well as variety of species supported by particular habitats (Table 21).

In a CVM study of public willingness to pay (WTP) for four UK mammal species, White *et al* (1997 and 2001) concluded that charismatic animals such as the otter attract higher WTP values than less charismatic ones such as the hare. This was true even where less charismatic species were under a relatively greater threat or of greater biological significance in the ecosystem. The authors also highlighted factors that influenced the public's WTP. These include membership of an environmental organisation, awareness of threats to mammals and frequency of walking in the countryside.

Bosetti *et al.* (2001) investigated the economic value of seals in South West England, and found that there is a higher WTP to see seals in the wild than in a sanctuary.

There are also examples of studies that have attempted to place a value on general increases in biodiversity by eliciting WTP for its conservation, enhancement and restoration. ERM (1996) examined the value of management for biodiversity in British Forests, finding differing willingness to pay for different options with different levels of biodiversity. Garrod and Willis (1994) examined the WTP of members of the Northumberland Wildlife Trust for a range of UK habitat types, and found a positive WTP for new nature reserves.

A study carried out by Garrod and Willis (1997) estimated the passive use values for biodiversity improvements in remote upland coniferous forest in the UK. The improvements in forest biodiversity were described in relation to a variety of forest management standards that increased the quantity of broad-leaved trees planted and the area of open spaces in the forest. Hanley *et al* (2002), who extended this work in "Non-market Benefits of Forestry Phase 2", examined public values for biodiversity across a variety of woodland types, concluding on the difficulties associated in capturing non-use biodiversity values and respondent understanding. Similarly, in Bateman *et al* (1994), an examination of the primary and secondary values of wetland ecosystems in the Broadlands concluded that only part of the total value of wetlands can be measured in money terms, as a good understanding of the functioning of the ecosystem is needed.

Table 21 – Studies Valuing Biodiversity/Wildlife

Authors	Title	Study area	Valuation Method	WTP Results
Bateman,I. Turner,K. Folke,C. and Gren, I. (1994)	Primary and secondary values of wetland ecosystems	Broadlands	CVM	Residents: £12.45 per household. Aggregate non-use value £32.5 million Non Residents: £4.08 per household. Aggregate £7.3 million
Bosetti,V., and Pearce,D., (2001)	A study of environmental conflict: the economic value of grey seals in South West England	South West England	CVM	Recreational Use (Seal Watching): Mean WTP about £8 per person. Aggregate £507,032 per year In the wild: Mean willingness to pay £9 per person
ERM. (1996)	Valuing Management for Biodiversity in British Forests: Final Report for the Forestry Commission	UK	CVM and Contingent Ranking Surveys (CRS)	The overall WTP based on the quantitative survey was £10 per household per year. Different Options yielded different results (Mean WTP per household) Option 1 ¹ : £11.27 Option 2: £6.62 Option 3: £13.15
Garrod, G.D. and Willis, N.D. (1994).	Valuing biodiversity and nature conservation at a local level	Northumberland	CVM	The combined WTP for one extra reserve for each habitat type was £10.50 per person.
Garrod, G.D. and Willis, K.G. (1997).	The non-use benefits of enhancing forest biodiversity: a contingent ranking study	UK	CRS	Estimated WTP per household for an additional unit (1% of forest cover) Standard A: 30.3 – 33.4 pence per year; Standard B: 51.7 - 56.4 pence per year; Standard C: 18.5 - 20.7 pence per year.
Hanley, N.Willis,K., Powe, N. and Anderson, M. (2002)	Non-market benefits of forestry Phase 2: Valuing the benefits of biodiversity in forests. Report to Forestry	Surveys conducted in Birmingham, Bridgend, Croydon, Manchester and	CVM	Absolute WTP values per household for an increase in 12,000 h.a. Upland Conifer Forest - £0.25 Lowland conifer forest - £0.33 Lowland ancient semi-natural

¹ The options were management standards. The standards are based on different proportions of conifers, broadleaved species, open spaces and areas of old wood. Standard A (basic standard of biodiversity conservation, Standard B (desired amount of biodiversity conservation) and Standard C (conversion to native woodland) For example Option 1=Standard A 70%, B20% and C10%, Option 2 standards A 10%, B 80% and C 10% and Option 3 standards A 70%, B 0% and C30%.

Authors	Title	Study area	Valuation Method	WTP Results
	Commission.	Newcastle		broad leaved - £1.13 Lowland New Broadleaved Native Forest - £0.84 Upland Native - £0.90 Upland New native - £0.61
White, P.C.L., Gregory, K.W., Lindley, P.J. and Richards, G. (1997).	Economic values of threatened mammals in Britain: A case study of the otter <i>Lutra lutra</i> and the water vole <i>Arvicola terrestris</i>	North Yorkshire	CVM	WTP a specified amount as a single addition to tax for the conservation of: Otter: £11.91 Water Vole: £7.44 Both: £10.92 Aggregate: Otter: £6.4 million Water Vole: ±£4.0 million Both: £5.8 million
White, P.C.L., Bennett, A.C. and Hayes, E.J.V. (2001).	The use of willingness-to-pay approaches in mammal conservation.	UK	CVM	Single sum WTP for conservation (of a proposed 25-50% increase in population) Red squirrel: £2.50 Brown Hare: £0 Otter: £11.88 Water vole: £7.50

4.4 Valuing Landscape and Habitats

A variety of studies have also attempted to place a value on landscapes and habitats (Table 22). For example, a study by Bateman et al. (1993) placed a value on wetland areas in the North Broads, Garrod and Willis (1995) valued chalk grasslands in the South Downs, while Klein et al. (1999) examined the recreational value of Cley Marshes Nature reserve in North Norfolk. White *et al* (1999) examined the willingness to pay for nature conservation in the North Yorkshire Moors National Park.

A CV study by Willis and Garrod (1993) examined public willingness to pay for landscapes in the Yorkshire Dales, related to agricultural intensity. It presented 8 different landscape options to respondents and found a public preference for the current landscape, and estimated a WTP of £24 per hectare per year to preserve "today's landscape". The next most favoured landscape was a "conserved" landscape, involving traditional farming practices plus dry stone walling and barn maintenance. WTP was considerably lower than that to protect the Norfolk Broads ESA (£76-£84 per household per year). In another study by Willis et al. (1988) use values for forest recreation in England and Scotland were estimated. It was found that the wildlife in the forest was the aspect of the recreational experience that respondents were most willing to pay for, followed by the forest landscape quality.

A study by Taylor *et al* (1997) provides a good insight into what shapes respondent WTP. The purpose of this study was to estimate the public's WTP for several forest characteristics using CV and CE methods. It was found that rural dwellers gave higher WTP amounts than urban dwellers, for organic forest shape and diverse species mix, but that both groups stated the same WTP for type of felling. The authors conclude that there are significant differences in WTP between respondent sub-groups but that in general more 'natural looking' forests were preferred by respondents.

As demonstrated by a study by White *et al* (1999), it is also important to acknowledge that the public perception of value may not always reflect policy needs and scientific evidence. In this instance, the general public valued heather moorland as a habitat type in the North Moors National Park more highly than traditional grazing pasture because of its recreational and scenic value, although ecological evidence suggested that traditional grazing pasture supported more biodiversity.

Table 22 – Studies Valuing Landscape and Habitats

Authors	Title	Study area	Valuation Method	WTP Results
Bateman, I., Willis, K. and Garrod, G. (1993)	Consistency between contingent valuation estimates a comparison of two studies of UK National Parks	Norfolk Broads and Yorkshire Dales	CVM	Mean visitor WTP for the Yorkshire Dales was £24.56 Annual household mean WTP for the Norfolk Broads ranged from £ 76.74 - £83.67
Benson and Willis (1991)	The demand for Forest for Recreation. Forestry Expansion: A Study of technical, Economic and Environmental Factors.	New Forest	CVM	Consumer Surplus per hectare per year over £400 Values per visit ranged from £1.26 (Grizdale Forest) to £2.51 (Thetford Forest)
Bishop, K. (1992),	Assessing the Benefits of Community Forests: An Evaluation of the Recreational Use Benefits of Two Urban Fringe Woodlands	Derwent Walk (DW) Whippendell Wood (WW) - England	CVM	Mean individual WTP for a visit: Derwent Walk: £0.42 -£0.97/ Total annual user benefits ranged from £1,789 per hectare Whippendell Wood: £0.54 to £1.34/Total annual user benefits ranged from 1,596 per hectare
Hanley,N. and Spash,C., (1993)	Lowland Heaths	Avon Forest Park, Dorset	CVM and TCM	CVM study estimates the annual user benefit to be £30.74 TCM study estimated annual user benefit to be £317.90 WTP into trust fund is estimated to be £25.57 per respondent

Revealing the Value of the Natural Environment

Authors	Title	Study area	Valuation Method	WTP Results
Hanley, N., Oglethorpe, D., Wilson, M. and McVittie, A. (2001).	Estimating the value of environmental features, Stage 2 – Draft Final Report to MAFF	Cambridgeshire, E Yorkshire, Devon and Hereford	CVM	WTP per household per annum for increases in field margins Cambridgeshire: £11.53 to £16.70 East Yorkshire: £12.90 to £18.40 WTP per household per annum for protection of hedgerows from losses Devon: £14.70 to £26.40 Hereford: £10.70 to £26.10
Klein, R.J.T. and I.J. Bateman, 1998	The recreational value of Cley Marshes Nature Reserve: an argument against managed retreat?	North Norfolk	CVM and Travel Cost Methods (TCM)	Annual recreational value: £40 000-£120 000 per annum (assuming 25,000 visitors) £150 000- £480 000 per annum (assuming 100,000 visitors)
Maxwell, S (1994)	Valuation of Rural Environmental Improvements Using Contingent Valuation Methodology: a Case Study of the Marston Vale Community Forest Project	Bedfordshire	CVM	£662 per hectare for the entire forest Annual WTP, through: Boat Hire: £530,000 National Trail: £387,000 Entrance Fee: £589,000 Trust Fund: £768,000
Taylor, K., P. Reaston, N. Hanley, R. Wright and K. Butler (1997)	Valuing Landscape Improvements in British Forests	UK	CE and CM	Mean WTP to pay per household per year CE/CVM results: Selective felling: £12.89 / £10.97 Organic forest shape: £13.90 / £12.75 Diverse species mix: £11.36 / £11.24 Ideal forest: £38.15/£29.16
White.P.C.L Lovett,J.C, (1999)	Public preference and willingness to pay for nature conservation in the North Yorkshire Moors National Park	North Yorkshire		Mean value of £3.10 per individual per year to conserve Moors National Park
Willis and Garrod (1993)	Valuing landscapes: a contingent valuation approach	Yorkshire Dales	CVM	Mean WTP Visitors: £26.03 Residents: £22.12 General Public: £22-27

Authors	Title	Study area	Valuation Method	WTP Results
Willis, K. G. and G. Garrod (1991)	Valuing Open Access Recreation on Inland Waterways: On-site Recreation Surveys and Selection Effects	England	CVM/TCM CVM TCM	WTP for canals £36.2 per visit or £40.8 million total consumer surplus per year Consumer surplus for all canals of £62.0 million
Willis, K.G., Garrod, G.D. and Saunders, C.M. (1995).	Benefits of Environmentally Sensitive Area Policy in England: Contingent Valuation Assessment	South Downs Somerset Levels	CVM	Mean annual WTP additional taxes for the entire ESA landscape ranged from £13.51 -£36.65 per household Per person/Aggregate Residents: £27.2 / 263,177 Visitors: £19.47/ 60,372,650 General Public: £1.98/ 31,153,996 Residents: £17.53 / 101,422 Visitors: £11.84 / 12,213,397 General Public: £2.45 / 41,879,240
Willis, K.G., J.F. Benson and M.C. Whitby, 1988	Values of user-benefits of forest recreation and wildlife	England and Scotland	CVM	WTP £0.65 per person

The recently developed ELF (Environmental Landscape Features) model in the UK uses benefits transfer (BT) techniques to value biodiversity in the context of farmland and landscape features, predicting the per-hectare WTP values for a range of landscape features. BT is a method for taking value estimates from original studies and adjusting them for use in a new context (Christie *et al*, 2004), incorporating socio-economic data such as household incomes. To date, no BT model has been developed to value biodiversity per se (Christie *et al*, 1999).

Bateman *et al* (1997) used Geographical Information Systems to model the demand for woodland recreation. Data for a survey of visitors to a woodland site in Eastern England were used to estimate an arrivals function, which was then utilised to predict visits to other locations. The validity was tested out in Wales.

4.5 Economic Value of Agri-Environment Activities

Recent studies looking at the external benefits and costs of agriculture, relating to the environment have estimated that:

- The overall value of environmental services delivered by agriculture in the UK is around £900 million (Environment Agency, 2002)
- The overall external environmental cost of agriculture in the UK is between £1 - 1.5 billion (Hartridge & Pearce, 2001; Pretty, 2000; Environment Agency, 2002).

Several economic evaluations of agri-environment schemes have attempted to value the economic benefits of changes in landscape and biodiversity. A review of these by CRER/CJC (2002) made the following points:

- The evaluations of economic benefits were based on *assumed* environmental impacts although there has been little by way of assessment of actual outcomes (i.e. success in protecting and enhancing natural capital) and no assessment of additionality.
- There are questions relating to the contingent valuation approach used in the studies, in particular disparities in estimates, reliability and information used.
- Willis *et al* (1993), looking at ESAs, concluded that user and non-user benefits were very substantial and greatly exceeded exchequer costs associated with operating the ESAs considered, and that ESAs represented 'extremely good value for money'. However this study did not raise questions whether the same could have been achieved for less. The study made the following estimates of net annual costs and benefits of ESA landscapes (Table 23).

Table 23: Comparison of Benefits and Costs for Two ESAs (£000)

	User Benefits (visitors and residents)	Non-user Benefits (general public)	Public exchequer costs
South Downs	48,682	31,153	970
Somerset Levels and Moors	10,758	41,789	1,859

Source: Willis *et al* (1993)

- Stewart *et al* (1997), looking at all agri-environment schemes including some Scottish ESAs, emphasised that results from environmental valuation are only *indicative* of the magnitude of the benefits because of imprecision in methods used. However they still concluded that ESA schemes are highly valued by the

public for the environmental goods they produce and that the value of benefits exceeds costs for all schemes where valuation data are available.

- There has been a tendency for these and other studies to assume that greater changes in farm management and land use have been achieved through agri-environment schemes than has been the case on the ground, as evidenced by monitoring. Hodge and McNally (1998) concluded that the valuation results severely overstate the actual value arising from the schemes.

4.6 Value of Ecosystem Functions and Services

Ecosystem functions and services include a variety of life support systems that the environment provides us. These include waste assimilation, flood control, soil and wind erosion and water quality. Many of these functions and services are complex and it is likely that members of the public have a limited understanding of the issues. As a consequence attempts to value ecosystem functions are difficult, requiring respondents to make value judgements. Analysts often use techniques such as averting behaviour, replacement costs and production function to measure indirect values of ecosystems (Christie *et al*, 2004).

Presently the value of ecosystem functions is not fully studied in England, and there is clearly a gap in the literature. There have been studies that look at the role of certain ecosystem functions but do not go very far in terms of valuing them.

A study by Brainard *et al* (2003) investigated carbon sequestration benefits of woodlands in England. It included different estimates of the social price of carbon and concluded that even at the highest discount rate (6%²) and the lowest social value³ (£6.67 per tonne), carbon sequestration in British trees is worth at least £1.7 billion. Valuations using the median social value of carbon (£14.70/tonne) and a discount rate of 3.5%⁴ estimated the total value of carbon sequestration in British woodlands at £5.92 billion, of which almost one half (£2.6 billion) is in Scotland.

Other examples include Willis (2002), who provided a detailed review of the water quality impacts on forests and Powe and Willis (2002) who provided a detailed review of pollution absorption in trees.

Table 24, adapted from English Nature (2002), summarises the main UK habitats highlighting the vital environmental services they provide.

² The interest rate used in calculating the present value of expected yearly benefits and costs (<http://www.nps.navy.mil/dirmi/definition.htm>). This is based on the principle that money in the hand today is worth more than money in the hand tomorrow.

³ This can be defined as the benefit in savings from damage avoidance. The benefits are difficult to observe directly but can be calculated by observation of compensatory costs to reveal the cost to society (Brainard *et al*, 2003).

⁴ 3.5% is the revised UK Treasury Green Book discount rate for public sector projects with social benefits from 2003: 6% is the previous Treasury Book Discount Rate (Brainard *et al*, 2003)

Table 24: Summary of main UK habitats and environmental functions they provide

Habitat	Ecosystem Function
Woodland	Climate regulation through carbon fixing, microclimate regulation through evapotranspiration, flood protection , water quality by preventing agricultural run off, and pollution control and soil protection via minimising erosion risk.
Wetlands	Wetlands aid flood attenuation , retain sediment , recycle nutrients and act as natural filters providing valuable supplies of clean water .
Upland habitats	Sustainable land management in the uplands can provide water resource management benefits and pollution filtering
Urban habitats	Pollution filtering , noise prevention , reduced surface run off , climatic benefits such as increased shade and moisture, indicators of invisible pollution , waste disposal
Coastal habitats	Mudflats help recycle nutrients and cope with sewage effluent and agricultural run-off, coastal systems shift sediment across the coast, intertidal habitats provide costal protection and provide nursery habitats for some species, plankton provide important carbon sink functions helping to maintain a health global atmosphere and climate.

Adapted from *Revealing the Value of Nature*, English Nature (2002)

Global studies place some very large numbers on the value of ecosystem functions and services. A study by Costanza *et al* (1997) published a synthesis of more than 100 attempts to value ecosystem goods and services using a variety of techniques.⁵ Case studies were used to derive average values per hectare for each of 17 services across 16 biomes and then extrapolating to the globe. It was estimated that the aggregate annual value of nature's services (updated to 2000 US\$) lie in the range of \$18 trillion to \$61 trillion US, an average of ~\$38 trillion.

A study by Balmford *et al* (2002) took forward previous work by Costanza *et al*, by considering the extent to which global ecosystem services are dependent on biodiversity, and the extent to which the provision of these services is affected by human conversion of natural ecosystems. The RSPB/BirdLife International (2002), participants in the study, concluded that more than half of the value of these services – around \$20 trillion per year – is lost when nature is converted to unsustainable human uses. The authors estimated that current rates of habitat conversion cost the world \$250 billion per year in lost annual services. They also estimated that an investment of \$50 billion per year would be sufficient to secure ecosystem services worth \$5 trillion per year, a benefit cost ratio of 100:1. Information and market failures were suggested as reasons for these losses.

4.7 Conclusions and caveats

The natural environment is valuable in its own right. Many of nature's services are fundamental to our existence, yet their importance to our lives is often unrecognised (English Nature, 2002). Landscapes and biodiversity have a variety of use and non-

⁵ These included hedonic pricing method, CVM and replacement costs methods

use values. They provide us with recreational opportunities, natural resources and ecosystem services, as well as being valued simply for their existence.

Many studies have attempted to assess the value of different parts of the natural environment by estimating individual and aggregate WTP for a variety of habitats, ecosystems, species and biodiversity improvements. This review gives an idea of the order of magnitude of people's WTP for these. Though the review gives little indication as to the likely overall value of landscape and biodiversity in England, the studies reviewed demonstrate that it is substantial, amounting to many millions of pounds.

The studies have shown that people tend to place more value on charismatic species, and species in their natural habitats, and on scenically valuable and natural looking landscapes.

Clearly there remains a gap in the literature concerning the value of ecosystem functions in England, although international studies suggest that these are potentially very large. Given their significance, the valuation of ecosystem services is perhaps an area of research that merits more attention.

Biodiversity is one of the most difficult and perhaps most controversial areas to value, not least because of the methodological drawbacks, which include the difficulty of conveying the concept to the general public. People find it difficult to trade off species importance and the changes in the number of species in a habitat. Hanley *et al.* (2002) highlighted the fact that people have vastly different preferences for wildlife, giving rise to a large WTP variance. In addition, while people's WTP for biodiversity is a very small fraction of their income, WTP variations are shaped by people's tastes more than their income. This is echoed in the literature review, in particular the Taylor *et al.* (1997) and White *et al.* (1997 and 2001) studies. These studies show that respondent WTP is dependent on several factors such as ethical and moral values, knowledge, tradition and background (i.e. urban or rural dweller, member of environmental group). In addition, Bateman *et al.* (1996) commented on the extreme practical difficulties facing researchers attempting to estimate non-use values, recognising that WTP can at best approximate estimates. At worst it can motivate respondents to support a good cause (warm glow) causing a distortion to the values. Lastly, these studies also suffer from hypothetical bias (difference between real and hypothetical WTP), information bias and interviewer bias (Clinch 2001).

Despite these caveats, valuation methods remain a valuable tool in environmental economics providing some insight into the value of nature. White *et al.* (2001) argued that these tools should be used in addition to, rather than in place of expert judgements. As long as their drawbacks and limitations are borne in mind, environmental valuation methods have an important role to play in understanding the value of the natural environment.

5 WIDER INDICATORS OF THE VALUE OF THE NATURAL ENVIRONMENT

Further evidence of the value people derive from the natural environment is available from a variety of non-monetary data collected from attitude surveys, membership rates for environmental organisations, and participation rates in environmental activities.

Firstly, the Government's 2001 Survey of Public Attitudes to the Quality of Life and to the Environment (Defra, 2001) shows that a high proportion of the population value the rural environment. Nearly three quarters, 73%, of those questioned had visited local green spaces or the local countryside in the 12 months prior to the survey. Over a third, 35%, said that they had visited them once a week. The five most positive features of the countryside identified by the respondents were: tranquillity (58%); scenery (46%); open space (40%); fresh air (40%); and plants and animals (36%).

People's concern for the environment can be illustrated by the membership figures for environmental organisations in the UK (Table 25).

The table shows that the largest environmental organisations have significant support from the public - The National Trust has over 3 million members and the Royal Society for the Protection of Birds has over 1 million members. The total number of members of environmental organisations now stands at almost 6 million, although this figure hides the fact some people will be members of more than one environmental organisation.

The table also illustrates the public's growing interest in the environment. 1971-2002 is a period when church attendance fell steadily, when membership of political parties dropped away and even community groups like the Scouts saw significant declines in membership. However membership of environmental organisations grew steadily in the 1970s and 1980s. Note, however, that there has also been a similar growth in support for human rights groups like Amnesty International.

The public's concern for the natural environment can also be shown through the numbers that volunteer for environmental organisations or environmental causes. Working to protect our nature can provide local employment opportunities, help personal development through volunteering, and help build both community spirit and personal well being (English Nature, 2002).

Table 25: Membership of Environmental Organisations

Membership of selected environmental organisations						
United Kingdom						Thousands
	1971	1981	1991	1997	1999	2002
National Trust ¹	278	1,046	2,152	2,489	2,643	3,000
Royal Society for the Protection of Birds	98	441	852	1,007	1,004	1,022
Civic Trust ²	214	..	222	330	..	330
Wildlife Trusts ³	64	142	233	310	325	413
World Wide Fund for Nature	12	60	227	241	255	320
The National Trust for Scotland	37	105	234	228	236	260
Woodland Trust	63	60	63	115
Greenpeace	..	30	312	215	176	221
Ramblers Association	22	37	87	123	129	137
Friends of the Earth	1	18	111	114	112	119
Council for the Protection of Rural England	21	29	45	45	49	59
Total	747					5,996
<i>1 Covers England, Wales and Northern Ireland.</i>						
<i>2 Latest Civic Trust data is for 2001.</i>						
<i>3 Includes the Royal Society for Nature Conservation.</i>						
<i>Source: Organisations concerned</i>						

The British Trust for Conservation Volunteers is the country's largest practical conservation charity, supporting more than 95,000 volunteers annually in activities to promote and improve their environment (English Nature, 2002). These volunteers carry out conservation work valued in excess of £1 million each year (Heritage Link, 2003). In addition to this volunteering activity, the BTCV held 383 UK Natural Breaks / Action Breaks and 73 International Holidays in 1999/2000. Altogether, these schemes contribute 330,000 workdays to conservation, focused on the natural environment (Heritage Link, 2003).

The National Trust runs 470 separate projects a year and calculates that the value of work completed by volunteers on working holidays is £1,175,000. The National Trust supports around 40,000 volunteers each year.

Heritage Link (2003) argued that without volunteers working on the 1,000 plus projects organised by the BTCV, the National Trust and the Wildlife Trusts every year, historic landscape features such as dry stone walls, hedges and woodlands would deteriorate, and footpaths and stiles that enable people to enjoy the landscape would not be maintained and repaired.

The National Survey of Volunteering cited by Heritage Link (2003) stated that:

- 22 million adults are involved in formal volunteering each year (37% per cent of the UK population of 59 million).
- 90 million hours of formal voluntary work take place each week.
- The economic value of formal volunteering is in the region of £40 billion per year (i.e. 18% of UK Gross GDP of £218 billion).

Further evidence of volunteering, at the regional level, is given in Section 3.2.

17 Field Studies Centres across England host more than 70,000 people on courses relating to the natural environment. For example, Slapton Ley, located adjacent a National Nature Reserve in Devon, has hosted a large number of students ranging from aged 11 biology and geography students to undergraduates and graduates from Exeter, Oxford, Plymouth and Sheffield Universities.

The public's interest in the rural environment can also be shown through the viewing figures for BBC Natural History Programmes. Approximate average audience figures for UK-focused television broadcasts are 5-6m for series such as 'Living Britain', 2m for short programmes such as 'Wild Britain', and 3-4m for individual features such as 'The Timeless Thames' (Revealing the Value of Nature, English Nature, 2002).

There is good evidence linking health and well-being to the natural environment, as indicated in the 2002 World Summit. Stone (2003), addressing the Rural Affairs Forum, commented that the health benefits of nature go beyond vital ecosystem services. Within the context of rural England, contact with nature can contribute to physical and mental well-being of individuals, and the development of social capital. The Rural White Paper adds "The beauty of the countryside is, of course, important for those who live there. And it is equally important for many in the towns, for leisure and relaxation, for mental and physical well-being." Ashton (2002) cited the 1999 British Attitudes Survey, which stated that 90% of those questioned believed that the countryside provided a healthier environment to live in. This assertion appears to be supported by figures that show that only 18% (305) of the 1,683 wards in England suffering the poorest health were rural wards (Countryside Agency, 2001)

A clear indicator of the importance people place on the rural environment is reflected in decisions on inward investment and in the value of property and land. English Nature (2002) has identified that house prices seem to be higher proximal to green spaces, especially parks and woods and 'quality' open rivers. Desirable neighbourhoods are often close to areas of significant 'quality' green space – these are generally closely correlated with relict spaces and older town centres (eg. Richmond/Richmond Park).

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 England's Natural Environment - Values and Impacts

6.1.1 *The Economic Impact of the Natural Environment*

Tables 26 and 27 summarise the findings of the sectoral sections regarding employment and gross value added of sectors linked to the management of the natural environment.

Table 26 presents the total economic activity in these sectors. It shows that these sectors collectively provide 2.7 million FTE jobs and gross value added of £68 billion. Of this, 295,000 FTE jobs are in sectors with potential to contribute to the management of the rural environment, while a much larger number, 2.4 million FTE jobs, are in sectors such as food and tourism that potentially benefit from the quality of the rural environment.

Table 26: Economic Significance of Sectors Connected with the Natural Environment

	Employment (FTE)	GVA (£m)
Management of the rural environment:		
Nature and Landscape Conservation	8,600	223
Agriculture	272,000	5496
Forestry and wood processing	14,700	380
<i>Sub Total</i>	<i>295,300</i>	<i>6,099</i>
Sectors that benefit from the rural environment:		
Tourism and Recreation	320,000	8,400
Food processing and marketing (including fish)	2,060,000	53,000
Fisheries	5,300	159
<i>Sub Total</i>	<i>2,385,300</i>	<i>61,559</i>
Total	2,680,600	67,658

Table 26 includes all economic activity in the relevant sectors. However, as the sectoral sections point out, not all of this activity is linked closely to, or contributes positively to, the quality of the environment. For example, intensive agriculture and commercial forestry, though they play a role in shaping the landscape and providing habitats for wildlife, may be regarded as contributing to a low value natural environment. Because of this, environmental factors are unlikely to play a role in the processing and marketing of their output. At the same time a proportion of rural tourism activity (for example visits to indoor events and attractions) is only tenuously linked to the environment. As a result it would be misleading to suggest that all of these 2.7 million jobs are positively linked to the quality of the natural environment.

Table 27: Impact of Activities Contributing to/Benefiting from a High Quality Natural Environment

	Employment (FTE)	GVA (£m)
Management of the rural environment:		
Nature and Landscape Conservation	8,600	223
Agriculture	41,400	837
Forestry and wood processing	3,600	93
<i>Sub Total</i>	<i>53,600</i>	<i>1,153</i>
Activities that benefit from the rural environment		
Tourism and Recreation	192,000	5,040
Food processing and marketing	40,000	1,029
Fisheries	5,300	159
Fish Processing	8,300	175
<i>Sub Total</i>	<i>245,600</i>	<i>6,403</i>
Total	299,200	7,556

Table 27 estimates the portion of economic activity in these sectors that is strongly and positively linked to the quality of the environment. **A total of 299,000 FTE jobs and £7.6 billion of GVA in England are estimated to result from activities that contribute to, or benefit from, a high quality natural environment.** This is approximately 11% of the overall economic activity in these sectors, though the

proportion varies greatly from less than 2% in food processing and marketing to 100% in nature conservation and fisheries.

It is notable that the majority (80-85%) of this activity is in sectors that benefit from, rather than directly contributing to, the management of the natural environment. These include organic and environmentally marketed food, and rural tourism. The greater economic significance of these sectors is due largely to their sheer absolute size, rather than the strength of their linkage with the environment. Strengthening the environmental linkage within tourism and (particularly) the food industry offers substantial opportunities for future growth in environment-linked economic activity.

At the same time, it is important to note the importance in land management activities – conservation, agriculture and forestry – in shaping the environment on which tourism and environmentally marketed food production depend.

6.1.2 *Economic Value of the Natural Environment*

It is important to distinguish between the economic value of the natural environment, and its impact on the economy. As well as supporting employment and contributing to economic output, the environment provides a wide range of services to society, many of which are not valued in the marketplace. The natural environment provides a range of vital ecosystem services, offers a resource for leisure and recreation, and is valued by people in its own right. Though no overall estimates are available for these values at the national level, available evidence suggests that they are very substantial. Further evidence of the value to people is available from information about participation rates in environment-related activities, and the membership of environmental organisations.

Clearly therefore, it is important that policy makers recognise the scale and range of values that people derive from England's natural environment, as well as its role as a driver of economic activity.

6.2 Comparisons with Other Sectors

Our estimates suggest that 299,000 FTE jobs are supported by economic activities linked positively to England's natural environment. This is a larger number of jobs than are supported by each of the chemicals manufacturing, rubber/plastics products manufacturing and motor vehicles manufacturing sectors (Table 28).

Table 28: Comparison of Economic Activity Linked to Natural Environment with Other Sectors, England

	Employment
Publishing and Printing	320,000
Economic Activity Positively Linked to Natural Environment (FTE)	299,000
Manufacture of Chemicals and Chemical products	203,000
Manufacture rubber and plastic goods	192,000
Manufacture of motor vehicles and trailers	190,000

Source: Annual Business Inquiry/NOMIS

6.3 Policy Implications

Conserving and managing the rural environment is not only important in its own right, but also in securing the range of benefits that the environment provides for society and the economy. The natural environment provides valuable services to society, as well as being an important recreational resource. This report demonstrates that the rural environment is also a significant driver of employment and economic output. Future policy decisions need to recognise the economic opportunities that the environment offers, and not regard it as merely a constraint to economic development.

The economic significance of the natural environment is increasing, especially as environmental objectives are becoming increasingly central to the development of the main rural sectors such as agriculture, forestry, fisheries and tourism. Sustainable development depends on further integrating environmental concerns into these sectors. As a result, the rural environmental economy is likely to grow further. Increasing environmental activity in the larger sectors such as food and tourism offers particularly strong growth opportunities, and depends in turn on further development of environmental land management activities.

The positive links between the environment and rural economies mean that new environmental activities can offer economic opportunities to rural areas, and this is increasingly being recognised by economic development programmes and funding schemes. However, care is needed in programming future activity, since it does not follow that new environmental projects will always bring economic gains. To date more attention has been paid to describing the environmental economy than considering opportunities for its future development, though one recent study in South West England developed a framework for programming future activity (GHK, 2003). There is a need to understand the nature of the different linkages between the environment and the economy, to consider key issues such as additionality and displacement, and to be able to identify the impacts of new activity at the margin.

6.4 Implications for Future Research

A considerable body of evidence now exists documenting the positive linkages between the environment and the economy in rural areas in England. This report has reviewed that evidence and used it to develop estimates, for the first time, of the economic significance of activities contributing to, and dependent on, the management of England's natural environment.

One of the conclusions of our review is that the evidence documenting these linkages is fragmented, referring often to individual sectors and localities, and employing varied methodological approaches. The task of pulling it together to produce overall conclusions, and in particular numerical estimates at the national level, has been a challenging one, particularly within the very brief timescale in which this study was conducted. As a result it has been necessary to use a number of (sometimes bold) assumptions to produce these national estimates.

Future attempts to quantify the economic impacts of rural environmental activity would therefore benefit from further research, particularly at the national level. Key areas for research include:

The economic impact of England's rural environment. This report has been able to produce only broad estimates of environment-linked activity at the national level, based on a brief (one month) but intensive review of the literature. There would be value in undertaking more detailed research to address some of the gaps identified, and to develop and refine the methods used to assess the economic impact of environmental activity. This could form the basis for monitoring these linkages over time.

The economic impact of the nature and landscape conservation sector. This study has collated evidence from regional economic studies. Though a large amount of information is available, different studies vary in their definitions and completeness of coverage. A more systematic survey of employment in, and expenditures by, the different organisations involved in nature and landscape conservation, along the lines of the now out of date CEAS (1993) study, would be welcome. There would be further benefit in developing approaches to assessing the indirect and induced effects of conservation activity, through organisational and employee expenditures.

The economic impacts of agri-environment schemes. With agri-environment expenditure accounting for an increasing proportion of the agricultural budget, it is surprising that there is relatively little general information about its impacts on employment, farm incomes and agricultural output. Further national level studies, along the lines of the early evaluation of the economic impact of the Countryside Stewardship Scheme (Harrison Mayfield *et al*, 1997) would be welcome, incorporating ESAs and updating evidence of the impacts of CSS.

The economic significance of organic agriculture. Little evidence is available of employment and output from organic farms. Given the growing significance of organic agriculture, there is a strong case for documents such as *Agriculture in the UK* to include this type of information. Further economic evaluations of support for organic farming should also seek to provide more information about its socio-economic impacts.

The economic significance of environmental forestry. Given the increasing significance of environmental objectives in the forestry sector, there would be value in future sectoral economic studies and employment surveys devoting more attention to the economic impacts of environment related forestry activities.

The value of environment-related tourism. It has been difficult to segment the rural tourism market to identify the scale of different types of activity with different degrees of environmental linkage. National survey work to establish the economic significance of tourism dependent on wildlife and landscape would be valuable.

The value of environmentally marketed food. Following prominent initiatives such as “Eat the View”, there would be value in researching the role of the environment in food marketing. A national overview of the role of the environment in food marketing could provide information on the commercial and economic role of the environment, and inform future standards, labelling and certification initiatives.

The role of environmental factors in influencing inward investment and relocation decisions. There is increasing emphasis on the importance of quality life factors in regional development, and the role of the environment in influencing location decisions among companies and individuals. However, there is very little firm evidence about the strength of these relationships. Research in this area would be productive.

The value of ecosystem services in England. In spite of evidence suggesting that their value could be very substantial, we have been able to find very little information about the role of ecosystem services provided by England’s rural environment. Information of this nature could be valuable in helping to inform future land use and environmental management policies – such as the management of floodplains, woodlands and the marine environment.

BIBLIOGRAPHY

ADAS (1996a) Socio Economic Assessment of Tir Cymen. Report for Countryside Council for Wales. CCW, Bangor

ADAS (1996b) *Economic Evaluation of Stage 1 ESAs*. Report for MAFF Economics (Resource Use) Division. September 1996

Advantage West Midlands, the Environment Agency and Regional Partners in the West Midlands (2001) *The Environmental Economy of the West Midlands*. Accessed on 25/03/04. Available from http://www.rspb.org.uk/Images/env_wms_full_tcm5-31079.pdf

Ashton (2002) *Issues in Health Development – Farming and Public Health*. Health Development Agency, London.

Bateman D. and Midmore P. (1993) *Modelling the Impacts of Policy Change in the Less Favoured Areas*. Aberystwyth Rural Policy Paper No 93–01, Department of Economics and Agricultural Economics, University of Wales, Aberystwyth

Bateman S , Turner K & Bateman I (1990) *Socio-Economic Impact of the Change in the Quality of Thatching Reed*. University of East Anglia, Norwich.

Benson and Willis (1991) *The Demand for Forests for Recreation*. Forestry Expansion: A Study of the Technical, Economic and Environmental Factors. Occasional Paper No. 39. Forestry Commission, Edinburgh

Biodiversity among Bedfordshire Vegetable Growers www.j-sainsbury.co.uk Accessed 20/03/04

Brooke C and Rayment M (1999) *The Environment and the Regional Economy. Opportunities for the Regional Development Agencies*. RSPB, Sandy

Broom GF, Crabtree JR, Roberts D and Hill G. Socio-Economic Benefits from Natura 2000. Scottish Office Central Research Unit, Edinburgh

CCRU (2001) *Developing a Methodology to Review Socio-Economic Aspects of Protected Areas*. Report to the Countryside Agency. Countryside and Community Research Unit, Cheltenham and Gloucester College of Higher Education, Cheltenham.

CEAS (1993) *The Economy of Landscape and Nature Conservation in England and Wales*. CEAS Consultants (Wye) Ltd. Report to Countryside Council for Wales, Countryside Commission and English Nature. Unpublished.

Christie and Matthews (2003) *The Economic and Social Value of Walking in rural England*. A report for the Ramblers Association Accessed 22/03/04. Available from <http://www.ramblers.org.uk/campaigns/EconVal.pdf>

Cobham Resource Consultants (1997) Countryside Sports - Their Economic and Conservation Significance. Standing Conference on Countryside Sports, Reading

Cooper B and Rayment M (2000) *Leighton Moss RSPB Reserve and the Local Economy*. RSPB, Denby Dale

Coulthard N (2000) Natura 2000 Scoping Study. Scottish Executive Central Research Unit, Edinburgh

Countryside Alliance, 2000. Contribution to the Rural Economy. Accessed on 01/04/2004. Available from www.countryside-alliance.org/edu/edu2-5-2.htm

Countryside Alliance, 2002. Fact Sheet 2; Rural Britain : Vital Statistics. Accessed on 01/04/2004. Available from; <http://www.countryside-alliance.org/media-entre/nca/main/010921fact.pdf>

Countryside Agency (2003a) Rural Economies – Stepping Stones to Healthier Futures. Countryside Agency, Wetherby

Countryside Agency (2003b) The State of the Countryside, 2003. www.countryside.gov.uk

Countryside Agency (2003c). West Midlands Environmental Context. Accessed 25/03/04. Available from; <http://www.countryside.gov.uk/regions/WestMidlands/profile/Environment.asp>

Countryside Agency (2001) Increasing community benefits from rural tourism - CRN 30

Countryside Agency (2001) The Economic Impact of Recreation and Tourism in the English Countryside. Countryside Agency Research Note, CRN15, Cheltenham

Countryside Agency (2000) English Countryside Day Visits. Countryside Agency Research Note, CRN19, Cheltenham

Cox, Watkins & Winter (1996) Game Management in England. The Countryside and Community Press.

Crabtree J R, Leat P M K, Santarossa J, Thomson K J and Lee K M (1992). *The Economic Contribution and Potential of Nature Conservation*. Proceedings of a Conference, "People, Economies and Nature Conservation", UCL, London

CRER (2002) Report for Defra on the Economic Evaluation of the Organic Farming Scheme

CRER/CJC (2002) Report for Defra. Economic Evaluation of Agri-Environment Schemes

Cuff J and Rayment M (1997) *Working with Nature – Economies, Employment and Conservation in Europe*. BirdLife International/ RSPB, Sandy

Defra (1999) Working together for the food chain - Views from food chain group. London

Defra, 2002. ERDP Regional Chapter South West Region. Rural Tourism and Recreation. Accessed on 22/03/04 Available from; <http://www.defra.gov.uk/erdp/docs/swchapter/section14/ruraltourism.htm>

Defra (2002) ERDP Regional Chapter South East Region. Rural Tourism and Recreation. Accessed on 22/03/04 Available from

<http://www.defra.gov.uk/erdp/docs/sechapter/section14/tourism.htm>

Defra (2002) ERDP Regional Chapter East Midlands Region. Rural Tourism and Recreation in East Midlands. Accessed on 22/03/04 Available from

<http://www.defra.gov.uk/erdp/docs/emchapter/em14/em148.htm>

Defra (2002) ERDP Regional Chapter North East Region. Rural Tourism and Recreation. Accessed on 22/03/04 Available from

<http://www.defra.gov.uk/erdp/docs/nchapter/nesection14/nebus148.htm>

Defra (2002) ERDP Regional Chapter East Region. Rural Tourism and Recreation. Accessed on 22/03/04 Available from

<http://www.defra.gov.uk/erdp/docs/eastchapter/east14/tourism.htm>

Defra (2002) ERDP Regional Chapter North West Region. Rural Tourism and Recreation. Accessed on 22/03/04 Available from

<http://www.defra.gov.uk/erdp/docs/nwchapter/nesection14/NW148.htm>

Defra (2002) ERDP Regional Chapter Yorkshire and Humber Region. Rural Tourism and Recreation. Accessed on 22/03/04 Available from

<http://www.defra.gov.uk/erdp/docs/yhchapter/yhsection14/yh148.htm>

Defra (2002) ERDP Regional Chapter West Midlands Region. Rural Tourism and Recreation. Accessed on 22/03/04 Available from

<http://www.defra.gov.uk/erdp/docs/wmchapter/section14/recreation.htm>

Defra (2003) The Economic Position of the Agri-food Sector – Regional Analysis

Defra (2002) Agriculture in the United Kingdom – 2002

Defra (2002) Sustainable Farming and Food – Working Together

Defra (2002) The Strategy for Sustainable Farming and Food – Facing the Future

Defra (2002) Agri-environment Schemes Framework Document – a consultation on the future of agri-environment schemes

Defra (2003) Working with the grain of nature – a biodiversity strategy for England

Defra (2004) Survey of Public Attitudes to Quality of Life and to the Environment: 2001

DETR (2000) Our Countryside: the future

Dickie I and Rayment M (2001). Assessing the Economic Benefits of Forestry in the UK. Paper to the Forestry Commission's Advisory Panel, Environment Sub-committee. RSPB, Sandy

Dickie I (2001) *The Economics of Reedbed Management in the UK*. RSPB, Sandy

Dissing H (2002) Elaboration of a Business Model for Sustainable Rural Development in Areas with Abundance of Nature. Paper to CARE/DN Seminar, Copenhagen, 11 March 2002

DTZ Pidea Consulting (2000) Southern Pennines Environmental Economy Scoping Study for The Countryside Agency

Ecoscope (2003) Review of Agri-Environment Schemes – Monitoring Information and Research and Development Results

EKOS (2003) The Natural Environment, the Rural Region and Regional Economic Development. A draft working report for SWRDA and partners. Unpublished

EMDA and Regional Partners (2002) The Environmental Economy of the East Midlands. On www.rspb.org.uk

English Nature (2002) Rural Issues and Opportunities: Goss Moor and its Environs.

English Nature (2002) Revealing the Value of Nature

English Nature (2004) Position statement: Sustainable Tourism. Accessed on 22/03/04. Available from <http://www.english-nature.org.uk/news/statement.asp?ID=43>

Environmental Prospectus Group (1999) An Environmental Prospectus for South West England – Linking the Economy and the Environment. Environment Agency/RSPB, Exeter

Environmental Prosperity Partnership (2000) Environmental Prosperity – Business and the Environment in the East of England. RSPB, Norwich

ERM (1995) Valuation of Biodiversity on British Forests: Working Paper 3b. The Forestry Commission.

ERM (2001a) Valuing the Environment of the North East of England. Report for Regional Partners in the North East. On www.rspb.org.uk

ERM (2001b) The Environmental Economy of the West Midlands. Report for Regional Partners in the West Midlands. On www.rspb.org.uk

ERM (2000) The Environmental Economy of North West England. Report for Regional Partners in the North West. On www.rspb.org.uk

FarmersMarket.net Accessed 20/03/04

Flair (2002) Devon Food links summary of activities and benefits www.localfood.org.uk/devon Accessed 20/03/04

FLAIR (2003) Flair report 2003 – the development of the local food sector 2000-2003 and its contribution on sustainable development

Forestry Commission (2001a) Forest Employment Survey 1998/99. Employment in Forestry and Primary Wood Processing. Forestry Commission, Edinburgh.

Forestry Commission (2001b) Regional Employment in Forestry and Primary Wood Processing in GB, 1998/99. Forestry Commission, Edinburgh

Forestry Commission/Office of National Statistics (2003) Forestry Statistics 2003. FC, Edinburgh

GFA-RACE Partners Ltd (2003) Accommodation and lifestyle centre; Feasibility Study and Marketing Plan. Cirencester

GFA-RACE Partners Ltd (2002) A Sustainable Future for Agriculture in the Wider Economy of Wiltshire. Cirencester

GFA-RACE Partners Ltd and The Macaulay Institute (2003), Options for the Sustainable Land Use of Heather Moorland and Moorland Fringe in the United Kingdom

GHK Consulting (2003a) The Environmental Economy in Rural Areas of South West England. A Briefing Paper. Report to SWRDA, English Nature and the RSPB. GHK Consulting, Plymouth. Available on www.swrda.org.uk and www.rspb.org.uk

GHK Consulting (2003b) Environmental Capital Action Plan for the West Midlands – Translating Environmental Capital into Economic Benefits. Report to the Environmental Capital Partnership in the West Midlands. Unpublished

Grazing Animals Project (2003) Local Grazing Schemes Initiative. GAP

Harrison-Mayfield, Dwyer and Brookes (1997) The Socio-Economic Effects of the Countryside Stewardship Scheme. Journal of Agricultural Economics, Vol 49 No.2

Hawke & Jose (1996) Reedbed Management For Commercial and Wildlife Interests. RSPB, Sandy

Heritage Link (2003) Volunteers and the Historic Environment. London

Hewitt N and Robins M (2001) *Cirl Buntings and Countryside Stewardship Farmers*. RSPB, Exeter

Lampkin N H and Padel S (eds) (1994) *The Economics of Organic Farming. An International Perspective*. CAB International, Wallingford

Land Use Consultants, SQW and Cambridge Econometrics (2002) *The Environmental Economy of the South East*. On www.rspb.org.uk

Land Use Consultants (2002) *The SW England Woodland and Forestry Strategic Economic Study*. Report for Forestry Commission and SWRDA. www.landuse.co.uk

Laxton and Whitby (1986) *Employment in Forestry in the Northern Region*. A report by the Agricultural Environmental Research Group of the University of Newcastle-upon-Tyne for the Countryside Commission.

LDA (2003) *Green Alchemy: Turning Green to Gold – The Environment Sector in London*. LDA, London. On www.lda.gov.uk

Local food (2003) *Local Food – A snapshot of the Sector*. Report of the working group on local food

Mackridge R, Rayment M and Robins M (1998) *The Economic Importance of the Natural Environment Sector in South West England* – RSPB, Exeter

Mills, J. Winter, M. and Powell, J. (2000) *The Socio-Economic Impact of Implementing the UK Biodiversity Action Plan for Species Rich Hedges in Devon*, English Nature Research Report No. 397.

National Trust (1999) *Valuing our Environment – A study of the economic impact of conserved landscapes and of the National Trust in the South West, 1998*. National Trust, Exeter

National Trust and Partners (2001) *Valuing our Environment: The Economic Impact of the Environment in Wales*. On www.rspb.org.uk

New economics foundation and the Countryside Agency (2001) *Plugging the leaks*. NEF, London

PACEC (2000) *English Forestry Contribution to Rural Economies*. Report to Forestry Commission. PACEC, Cambridge.

Rayment M and Dickie I (2001) *Conservation Works...for local economies in the UK*. RSPB, Sandy

Rayment M (1997) *Working with Nature in Britain*. RSPB, Sandy

Roberts and Hall, 2001. *Rural Tourism and Recreation; Principles to practice*. CABI Publishing, Oxford.

Rayment M (1995) *Nature Conservation, Employment and Local Economies*. A Literature Review. RSPB, Sandy

RSPB website – www.rspb.org.uk - has a selection of material on the environmental economy including most of the regional environmental economy reports.

RSPB (2000) *Valuing Norfolk's Coast*. RSPB, Sandy

RSPB (2003) *Food – the Environmental Link*. RSPB, Exeter

Rural Tourism advice pack (2003). Rural Tourism Accesses on 24/03/04 Available from www.ruraltourism.org

Shiel A, Rayment M and Burton G (2002) RSPB Reserves and Local Economies. RSPB, Sandy. www.rspb.org.uk

Slee and Snowdon (1999) Rural Development Forestry in the United Kingdom. *Forestry*, Vol 72, No.3, 1999

Soil Association (2002) *Organic Food and Farming Report 2002*. Soil Association, Bristol.

Soil Association (2003) *Organic Food and Farming Report 2003*

Stark J and Mackell C (1991) *Forestry in the Rural Economy*. Forestry Expansion: A Study of the Technical, Economic and Environmental Factors, Paper No. 12. Forestry Commission, Edinburgh

Stone 2003. *Addressing inequalities in rural communities through nature*. English Nature

Sustainable Development Commission (2001) *A vision for sustainable agriculture*

SW Environmental Prospectus Group (1999) – *An Environmental Prospectus for South West England*. Linking the Economy and the Environment. Environment Agency and RSPB, Exeter.

South West Regional Assembly (2003) *Report of the SWRA Select Committee on the SW RDA's Support for the Rural Economy*. February, 2003

South West Food and Farming Strategy (2003) *Implementation Plan*. Unpublished

SWRDA (2003) *Regional Economic Strategy for the South West of England, 2003-2012*. SWRDA, Exeter

Tesco and Biodiversity, Natures Choice www.tesco.com Accessed 20/03/04

Thomson K J and Psaltopoulos D (1993) *The Rural Employment League: Agriculture versus Forestry*. Discussion Paper to Agricultural Economics Society 1993 Conference, Oxford

Tourism Associates (1999) *Valuing our Environment - A study of the economic impact of conserved landscapes and of the National Trust in the South West, 1998*. Tourism Associates/National Trust, Exeter

Visit Britain (2002) Value of UK Tourism. Available from www.tourismtrade.org.uk

Willis K and Garrod G (1992) Amenity Value of Forests in Great Britain and its Impact on the Internal Rate of Return from Forestry. *Forestry*, Vol **65**, No 3, 1992

Yorkshire Forward (2002) The Environmental Economy of Yorkshire and Humber. On www.rspb.org.uk