



# Environmental Land Management and Public Money for Public Goods



Department  
for Environment  
Food & Rural Affairs



Government  
Statistical Service

# What is the environmental opportunity of agriculture?

A number of public goods arise from a well-managed landscape, including recreational and environmental benefits.

Public goods are goods or services that no one can be stopped from using and where one person's use does not affect another's. For the environment, this includes such goods as an attractive landscape or a public park. If left to the market alone, the benefits to society provided by these goods would be underprovided or not provided at all, due to a lack of profit incentive.

Farming and forestry can safeguard natural capital and provide public goods such as the provision of beauty, heritage and engagement. Farmland and woodland can provide thriving plants and wildlife as well as contributing to the provision of cleaner air and water.

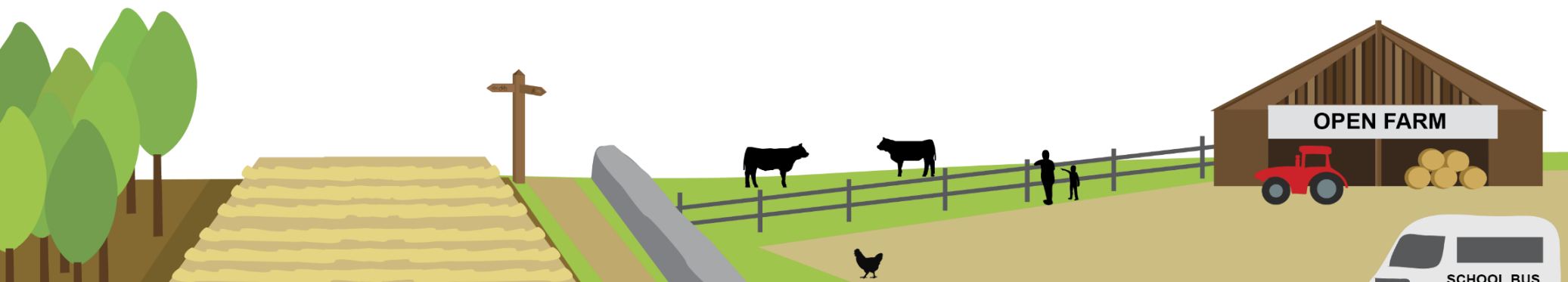
Government can use policy to provide incentives for the delivery of public goods. Policies such as environmental stewardship schemes can reward the delivery of public goods by incentivising farmers to adopt beneficial practices or measures.

## Natural Capital

refers to the elements of the natural environment that provide valuable goods and services to people, such as water, food and recreation.

**Around £4bn\* worth of environmental benefits from farmland, forestry, woodland and trees per year in the UK, including:**

- More than 116 thousand miles of rights of way in England, as footpaths, bridleways and byways.
- Farmland is the destination of around 48% of all visits to the natural environment in England, around 4.1 billion visits every year.
- Farmland management contributes to the protection of iconic landscape features, such as dry stone walls.
- The value of educational visits to farmland (UK) is estimated at £1.86m\*
- £182m\* of air filtration benefits from farmland in the UK .
- \*2015 value in 2017 prices



# Summary

## 1.1

### **What is the environmental challenge of agriculture in relation to water quality?**

Water quality can be adversely affected by farming through run-off of fertilisers, pesticides and slurry and through erosion of soil, which is washed off farmland.

## 1.2

### **What is the environmental challenge of agriculture in relation to soil health?**

Soil is an essential natural resource, with poor management causing erosion, compaction, and depletion of nutrients, organic matter and biodiversity.

## 1.3

### **What is the environmental challenge of agriculture in relation to greenhouse gas emissions?**

Agriculture is responsible for 10% of the UK's greenhouse gas emissions, mainly through emissions of methane and nitrous oxide from grazing livestock and fertilisers.

## 1.4

### **What is the environmental challenge of agriculture in relation to ammonia emissions?**

Agriculture was responsible for 87% of UK emissions of ammonia in 2017, mainly from livestock farming and fertiliser use.

# What is the environmental challenge of agriculture in relation to water quality?

Water quality can be adversely affected by farming through run-off of fertilisers, pesticides and slurry and through erosion of soil, which is washed off farmland.

Soil and Sediment

Soil and sediment enter water when rain and wind erode soil, leading to nutrient enrichment and siltation, which impact fish and invertebrates and cause ecological damage.

Nutrients from Fertilisers

Nitrogen and phosphorus enter the water cycle via groundwater and run-off, causing harmful blooms of plant life that deoxygenate rivers and lakes.

Pesticides & Ammonia

Pesticides and ammonia can be toxic to many aquatic plants & animals, killing fish and invertebrates.

**64%**

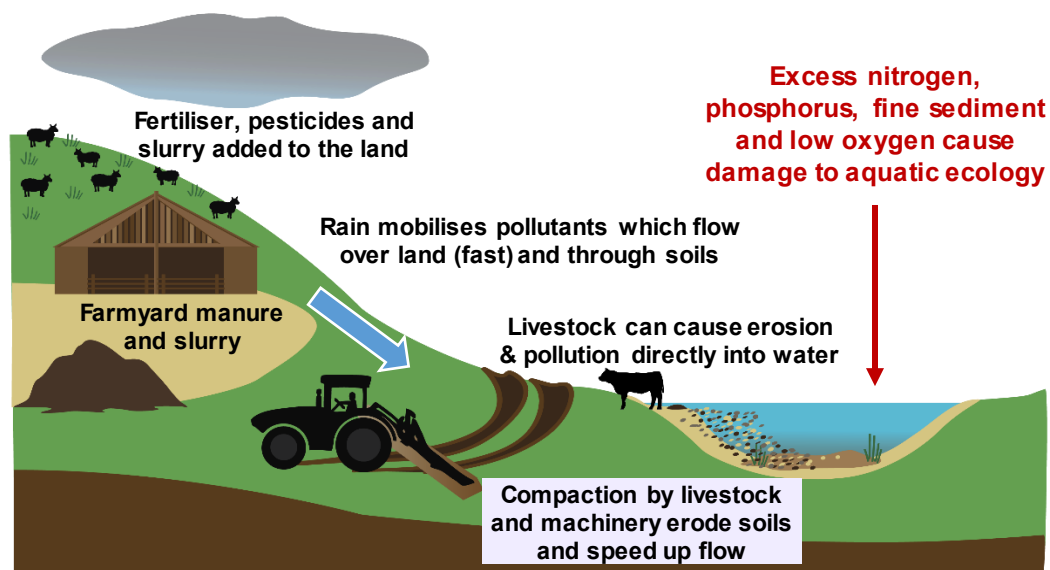
of all surface and groundwater bodies in the UK failed to achieve good or high status in 2017.

The majority of these water body failures are due to urban and other non-agricultural pollution, but around

**1/4**

failed for a reason related to agriculture and rural land management. Increased nutrients and sediment in water increase the cost of water treatment, and negatively impact bathing water quality.

More than 50% of nitrate pollution, 25% of phosphate in UK waters and 75% of sediment pollution comes from farming.



Pollutants can enter groundwater, affecting drinking water supplies and taking decades to wash away. Some of the pollution affecting UK waters is a **legacy of previous agricultural practices**, which heavily focussed on increasing production.

Excess Nitrogen and Phosphorous from manure, slurry and fertiliser application can make its way into surface waters and aquifers. Improvements in nutrient management practices and slurry and manure storage can help to reduce water pollution.

↓ **33% Nitrogen** reduction in total nitrogen fertiliser application in Great Britain between 1990 and 2019.

↓ **59% Phosphorus** reduction in phosphorus fertiliser applications between 1990 and 2019 in Great Britain.

## What is the environmental challenge of agriculture in relation to soil health?

Soil is an essential natural resource, with poor management causing erosion, compaction, and depletion of nutrients, organic matter and biodiversity.

### Why are soils important?

## One quarter

of the planet's biodiversity is found in its soils. Soil and its organisms play vital roles in supporting food production, plant and tree health, nutrient cycling, carbon storage and sequestration, water storage and quality, and flood prevention.

Poor soil management can lead to:

- Compaction from livestock and machinery, leading to increased flood risks for downstream areas and reduced crop yields.
- Increased greenhouse gas emissions and loss of the carbon stored in soils.
- Erosion by wind and water, leading to less fertile soils and pollution in surface and coastal waters.
- Poor soil structure and nutrient balances, reducing fertility and provision of public goods.
- Loss of soil biodiversity.

### What is the current state in the UK?

**33%** of UK soils are thought to be degraded with 1 million hectares (6% of the UK's agricultural land and 36% of cropland) at risk of erosion.

## 2.9m tonnes

of topsoil estimated to be lost through water and wind erosion every year in the UK, which may take centuries to replace.

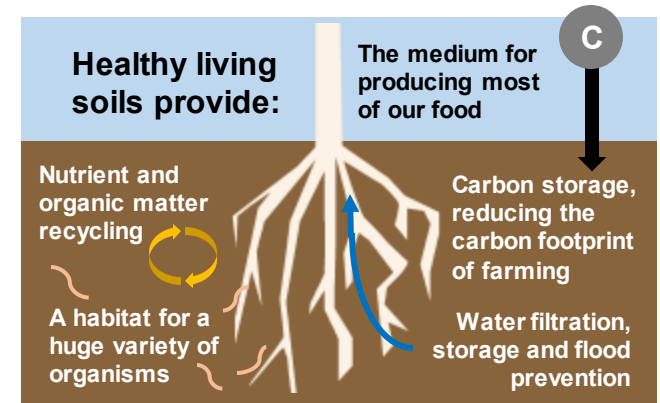
## 30 to 60 years

estimates of how quickly we could lose our fertile soils in some parts of the country.

## £0.9bn to £1.4bn

estimates of cost of soil degradation per year for England and Wales.

More than **95%** of the UK land carbon stock is held in our soils.



### How can agriculture help soils?

Careful management is needed to make the use of soil resources by agriculture sustainable.

Zero tillage systems may increase organic matter in the root zone, helping nutrient and water retention, and also reduce fossil fuel use.

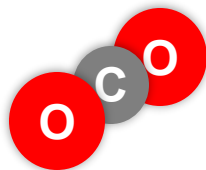
Planting cover crops and careful management of hillside fields can reduce erosion rates.

Reducing compaction leads to increases in soil fertility and farm productivity, and helps to retain water in upland catchments.

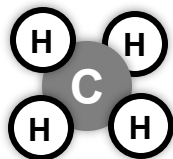
Organic farming and other agroecological approaches can protect and enhance the health of agricultural soils, for example, through the use of legumes, crop rotations and organic manures.

# What is the environmental challenge of agriculture in relation to greenhouse gas emissions?

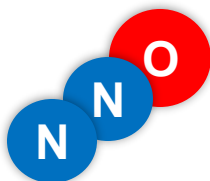
Agriculture is responsible for 10% of the UK's greenhouse gas emissions, mainly through emissions of methane and nitrous oxide from grazing livestock and fertilisers



**Carbon dioxide** ( $\text{CO}_2$ ) is a major greenhouse gas, but agriculture is only responsible for around 1% of UK  $\text{CO}_2$  emissions. These are mainly through use of energy and fuel, which can be reduced by improving efficiency, and by generating energy from renewable sources on-farm.



**Methane** ( $\text{CH}_4$ ) is a more potent greenhouse gas than  $\text{CO}_2$ , particularly over short timescales. Agriculture is responsible for half of the UK's total emissions.



**Nitrous oxide** ( $\text{N}_2\text{O}$ ) is the most potent greenhouse gas that agriculture emits, having a warming effect that is around 300 times stronger than  $\text{CO}_2$ . Agriculture emits 70% of the UK total.

## Carbon sequestration:

Land managers can and do help mitigate climate change by increasing carbon storage through the creation of more forests and woodland, and to a lesser extent, through good management to restore the organic carbon content of soils to its natural maximum. These practices can also improve the nutrient and water holding capacity of soils, which provides agronomic benefits. There is also potential to reduce the contribution of degraded peatlands to GHG emissions through restoration activities

£3.1bn

cost of UK greenhouse gas emissions in 2015 from agriculture

17%

estimated fall in nitrous oxide emissions from agriculture since 2000

16%

estimated fall in methane emissions from agriculture since 2000



## Fertilisers

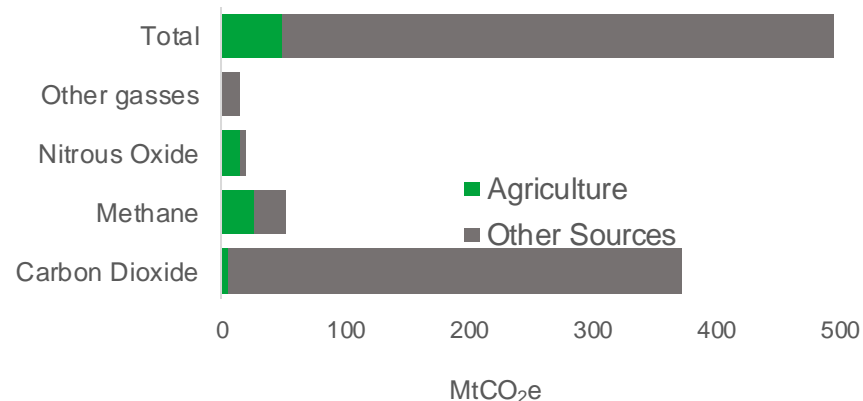
90% of agricultural  $\text{N}_2\text{O}$  emissions are a result of nitrogen fertiliser application



## Grazing livestock

are responsible for nearly 90% of methane emissions

UK Greenhouse Gas Emissions (2017) in  $\text{CO}_2$  Equivalents



# What is the environmental challenge of agriculture in relation to ammonia emissions?

Agriculture was responsible for 87% of UK emissions of ammonia in 2017, mainly from livestock farming and fertiliser use.

**17%**

overall fall in agricultural emissions of ammonia between 1990 and 2017, due partly to declining cattle numbers, better manure and slurry management, and reduced fertiliser use, although this trend has reversed in recent years.

Ammonia emissions affect human health, reduce air quality, can cause soil acidification, harm vegetation and contribute to air pollution.

**87%** of UK ammonia emissions came from agriculture in 2017, mainly from livestock farming and mineral fertiliser use.

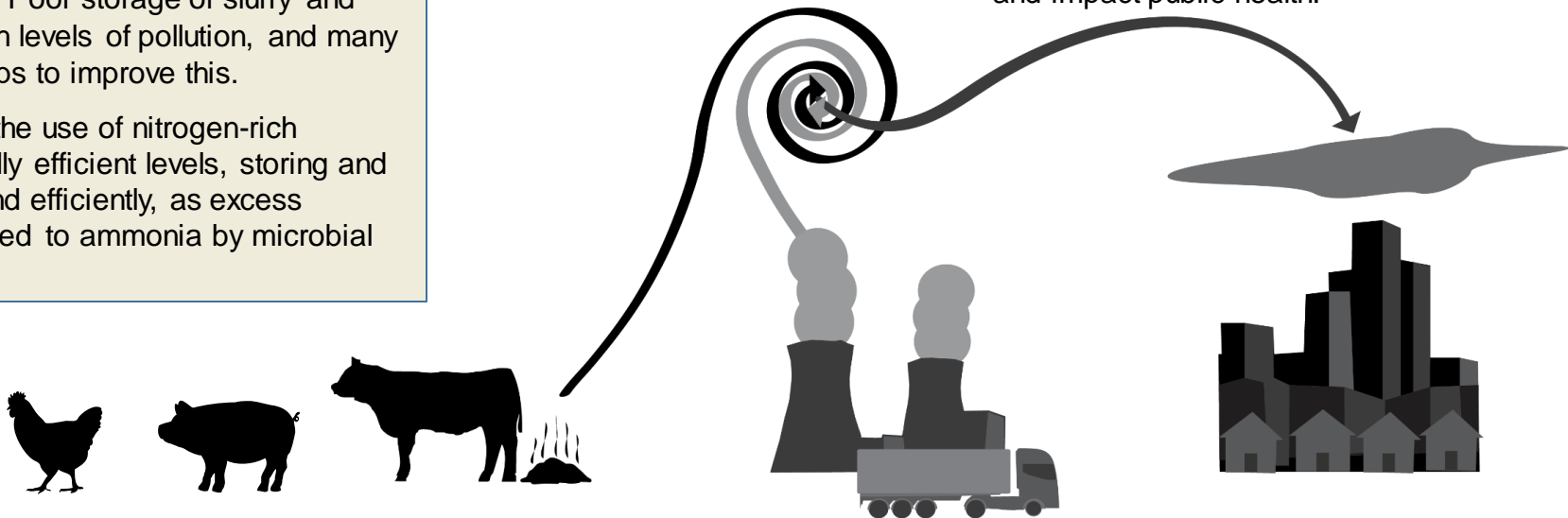
**£1.48bn**

costs to human health and the environment from UK agriculturally-produced ammonia in 2015 (in 2017 prices)

**Cattle** are the largest source of ammonia, but it is also associated with chicken and pig farms, and with slurry and fertiliser use. Poor storage of slurry and manure can lead to high levels of pollution, and many farmers have taken steps to improve this.

Farmers can also limit the use of nitrogen-rich fertilisers to economically efficient levels, storing and applying them safely and efficiently, as excess nitrogen can be converted to ammonia by microbial processes.

Ammonia emissions can combine with industrial and transport emissions, forming harmful fine particulates which cause smog in urban areas and impact public health.



# Summary

## 2.1

### **What is the environmental opportunity of agriculture in relation to maintaining landscapes?**

Farming is important to the maintenance of our diverse and distinctive landscapes, including the historic environment and archaeological features.

## 2.2

### **What is the environmental opportunity of agriculture in relation to flood risk?**

There are many land management practices that can reduce flood risk as well as provide wider environmental outcomes.

## 2.3

### **What is the environmental opportunity of forests/woodland?**

Forests and woodlands provide economic, environmental and social benefits, including £1.2bn worth of carbon sequestration and £1.1bn worth of recreation and landscape benefits.

## 2.4

### **What is the environmental challenge of agriculture in relation to biodiversity?**

Farming practices can have many impacts that can lead to a reduction in wildlife biodiversity (including loss of habitats and food sources). The UK farmland bird index, an indicator of the state of wildlife generally, has fallen to less than half its 1970 value.

## 2.5

### **What is the environmental and public goods opportunity of poor animal welfare?**

The public values high animal welfare standards and wants government to support farmers to improve animal welfare. 78% of UK consumers said it is 'very important' to protect the welfare of farmed animals.

## 2.6

### **What is the environmental and public goods challenge of poor animal welfare?**

As well as being detrimental to the welfare of animals on the farm, livestock diseases can impact on wildlife and human health and is detrimental to the environment, due to factors such as higher greenhouse gas emissions from diarrhoea.



## What is the environmental opportunity of agriculture in relation to maintaining landscapes?

Farming is important to the maintenance of our diverse and distinctive landscapes, including the historic environment and archaeological features.

The historic environment can be seen everywhere, and provides a wide range of tangible and intangible benefits. These include socio-economic benefits, such as health and well-being, tourism, local distinctiveness, sense of place and community.

It is a non-renewable resource that, once lost, cannot be re-created. Changes in agricultural policy, technology and practice has resulted in a steady degradation of our cultural heritage.

In addition, monitoring of landscape change since the 1970's shows how underlying trends in agricultural intensification and a general decline in traditional farming practices have resulted in a simplification of landscape pattern and structure in many places.

Environmental stewardship schemes have a key role in helping to restore the complexity of features that contribute to a distinctive sense of place, revealing our past in the present landscape, and provide a wide range of other benefits for people.



From archaeological sites, to field patterns, to parkland and to traditional buildings, the historic environment tells us the story of our past. England's farmers are the guardians of our shared heritage.

Due to changing agricultural practices, traditional farm buildings are vulnerable to neglect and decay. Agri-environment schemes have funded the maintenance and restoration of over 14,000 buildings.

Agri-environment schemes also support the management and restoration of archaeological sites on farmland, ensuring their preservation for future generations.

Over 355,000 hectares are under positive management. Key practices conserve:

- field trees
- boundary features
- wet and rough grasslands
- woodlands and orchards

A combination of options working together have delivered most for landscape character.

## What is the environmental opportunity of agriculture in relation to flood risk?

There are many land management practices that can reduce flood risk as well as provide wider environmental outcomes.

Natural Flood Management techniques can be adopted by farmers to help manage flood risk by using land management practices that slow or store water in the landscape. When properly targeted, Natural Flood Management (NFM) techniques can provide excellent value for money, with cost-benefit ratios of around 5:1 and benefits of around £100 per m<sup>3</sup> of water stored for flood risk reduction alone.

### Leaky woody dams

Provide floodwater storage and have been shown to increase habitat diversity by as much as 46%.

Leaky woody dams can also result in decreases of in stream Phosphate concentrations, which can cause harmful blooms of plant life that deoxygenate rivers and lakes.

### Riparian (riverbank) planting

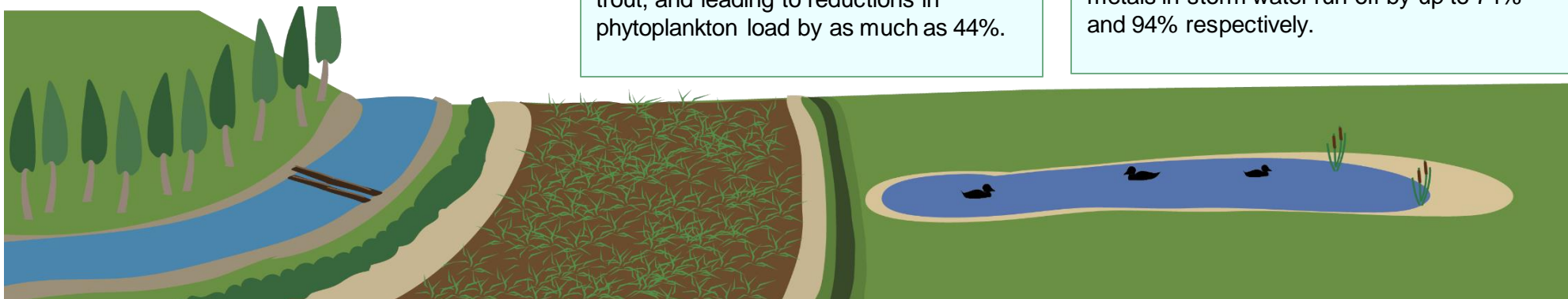
Can reduce peak flow by up to 19%, as well as removing over 20% more nitrates than channel management of rivers.

Planting trees on the river bank increases shade, benefitting biodiversity by preventing water temperature from rising to lethal limits for species such as brown trout, and leading to reductions in phytoplankton load by as much as 44%.

### Swales

Swales are shallow, broad and vegetated channels that can reduce run-off by 40%, peak flow by 50%, and increase flood lag time by 16%.

Swales can also result in sediment delivery being reduced by 90-100%, and reduce the concentrations of phosphorus and heavy metals in storm water run-off by up to 74% and 94% respectively.



### Buffer strips

Are areas of permanent vegetation that can reduce run-off by over 50%, and contribute to reductions in water pollution. They can also aid biodiversity, such as increasing numbers of invertebrates compared with normal cropped margins.

### Cover crops

Can reduce surface run-off by 80% and both nutrient and sediment losses from the soil by up to 80%, and nitrate leaching losses by 60%.

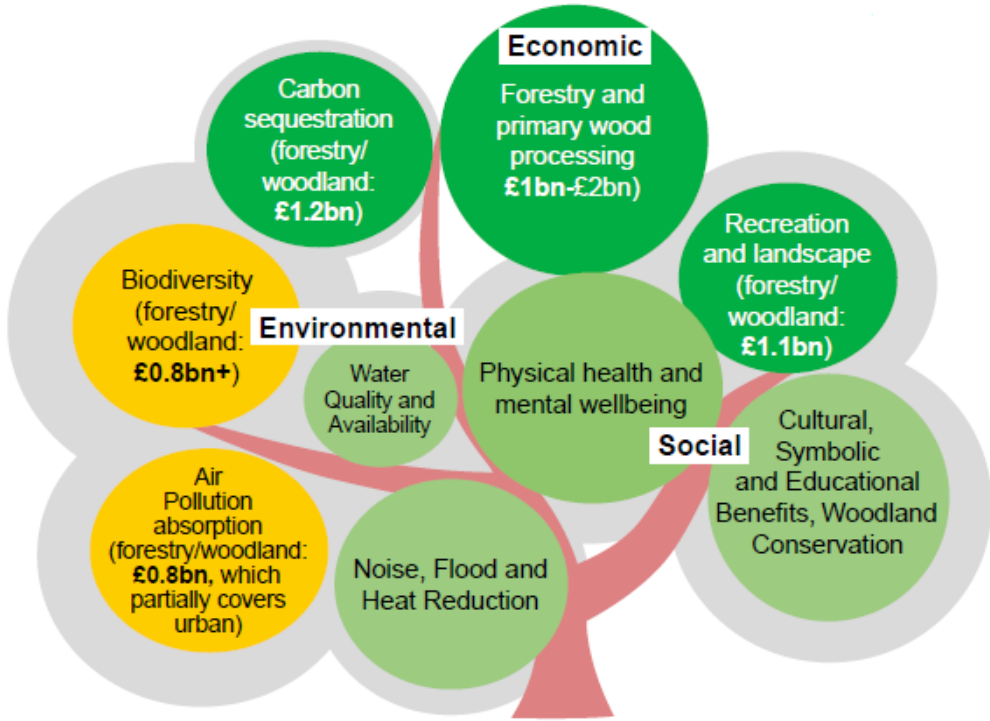
### Ponds and reservoirs

Can reduce the risk of flooding by between 4 and 25% in any one year. They also have the benefit of reducing both downstream phosphorus and nitrate concentrations during storms by 25% and 15% respectively.

# What is the environmental opportunity of forests/woodland?

Forests and woodlands provide economic, environmental and social benefits, including £1.2bn worth of carbon sequestration and £1.1bn worth of recreation and landscape benefits.

## Summary of the Value that Our Forests and Trees Provide to Society



The Government is committed to planting 11 million trees through the 25 Year Environment Plan (2018) and manifesto commitments.

*The forestry social and environmental value estimated above totals £3.9bn.*

The woodland area of the UK in 2018 was 3.17 million hectares, covering 13% of total UK land area. There is 1 million hectares of woodland on agricultural land.

Incorporating trees and woodlands into agricultural systems has a number of benefits, including:

- Reduced soil erosion rates
- Carbon sequestration
- Shelter for livestock
- Biodiversity gains and habitat connection and creation
- Reduced flooding risk for downstream communities
- Agroforestry incorporates trees into productive farming systems

Well managed and diverse woodlands help to increase resilience against pests and diseases as well as wild fire events. Measures are in place to prevent and address disease and pest outbreaks quickly and effectively, and we work with land owners to remove diseased trees and pests on detection.

# What is the environmental challenge of agriculture in relation to biodiversity?

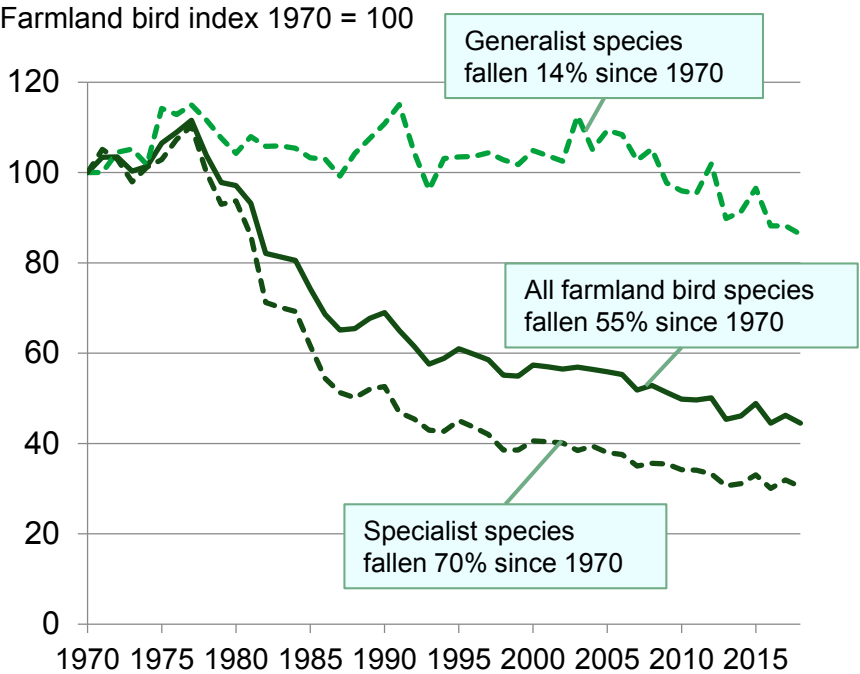
Farming practices can have many impacts that can lead to a reduction in wildlife biodiversity (including loss of habitats and food sources). The UK farmland bird index, an indicator of the state of wildlife generally, has fallen to less than half its 1970 value.

Bird populations are often used as indicators of the state of wider wildlife biodiversity, as they occupy a wide range of habitats, respond to environmental stresses that affect other groups of wildlife and are often high up their respective food chains.

Some farming practices have negative impacts on bird populations, and on wildlife more generally. The vast majority of England's wildlife depends on the remaining areas of semi-natural habitat that are less intensively farmed within the countryside.

However, many farmers and land owners are actively playing their part to conserve and enhance the countryside's wide network of trees, hedgerows, ponds, ditches and other watercourses. Many options to do so are included within agri-environment agreements.

The index measures the average rate of change in relative abundance for 19 species of wild birds which live in agricultural landscapes, against a 1970 baseline.



## Agriculture and Biodiversity

There have been historic trade-offs between farming and biodiversity, with the conversion of natural habitats into intensively managed farmland.

*Land sharing* integrates delivering environmental benefits and producing food on the same land, for example through current agri-environment schemes.

*Land sparing* protects natural habitats by separating them from intensive agriculture, for example through nature reserves. Sparing of land is then balanced by sustainable intensification of farming on agricultural land.

These two models benefit biodiversity on different scales, and a combination of different approaches will be needed in different landscapes and habitats.

# What is the environmental and public goods opportunity of improving animal welfare?

The public values high animal welfare standards and wants government to support farmers to improve animal welfare. 78% of UK consumers said it is 'very important' to protect the welfare of farmed animals.

There are five aspects of animal welfare outlined by the Farm Animal Welfare Committee:

- Freedom from hunger and thirst
- Freedom from discomfort
- Freedom from pain, injury and disease
- Freedom to express normal behaviour
- Freedom from fear and distress

There is strong public support for the government to **support farmers to improve animal welfare:**

**68%** respondents to the Health and Harmony consultation said there is a strong case for government funding pilots to incentivise and deliver improved welfare.

**82%** of respondents to a YouGov poll said they support farmers being rewarded for delivering enhanced animal welfare standards.

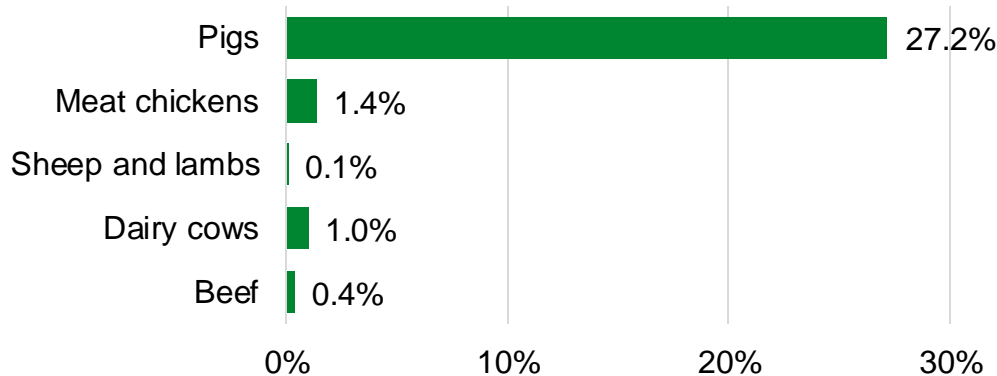
**78%** of UK consumers responding to a EU Survey said it is 'very important' to protect the welfare of farmed animals and 76% said farm animal welfare in the UK should be **better protected** than it is now

Despite this, studies show **low** willingness to pay for higher welfare products.

Improving aggregate levels of animal welfare can lead to benefits to farmers and social benefit to the public who value high welfare but also other benefits such as improvements in animal health and better meat quality.

RSPCA Assured is the RSPCA's ethical food label dedicated to farm animal welfare. It has seen increasing sales in recent years but the market share is still **low** for many species. The RSPCA Assured welfare standard covers the whole of the animal's life, from their health and diet to environment and care. This includes things like space, light, bedding, transport and humane slaughter. The RSPCA inspects both indoor and outdoor farms, including free range and organic.

Proportion of farms in RSPCA Assured scheme



The RSPCA assured scheme is only one measure of animal welfare being undertaken by farm businesses; many will also be undertaking good animal welfare practices outside of assurance schemes.

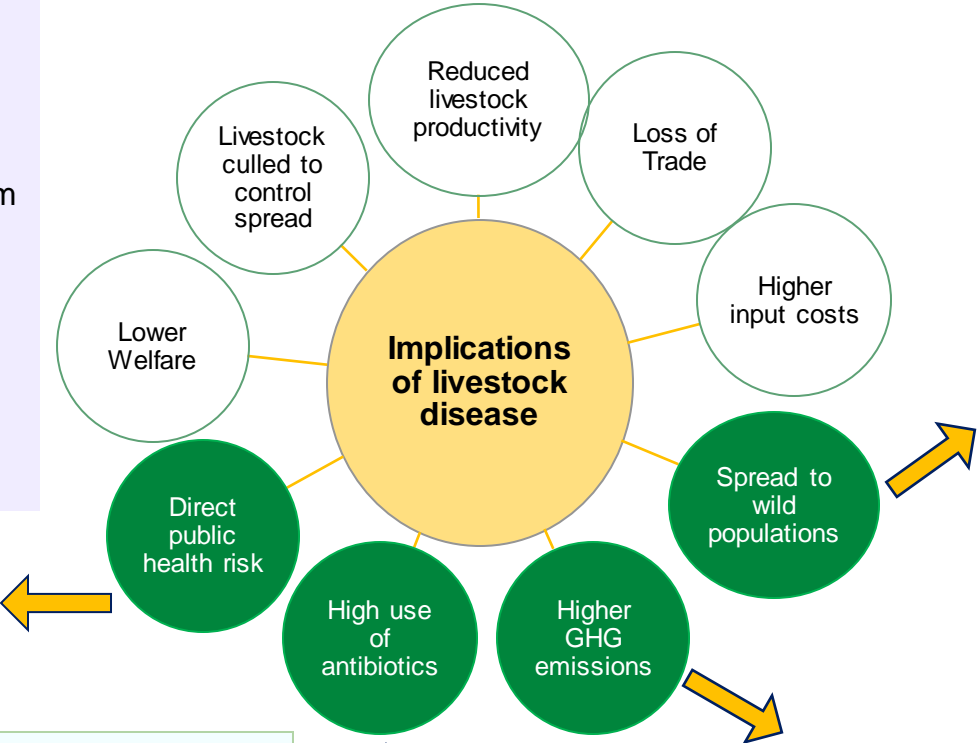
# What is the environmental and public goods challenge of poor animal welfare?

As well as being detrimental to the welfare of animals on the farm, livestock diseases can impact on wildlife and human health and is detrimental to the environment, due to factors such as higher greenhouse gas emissions from diarrhoea.

According to the Farm Animal Welfare Council animal welfare encompasses both physical and mental health for farmed animals.

Good welfare is largely determined on a daily basis by the skills of the stock people, the system of husbandry and the suitability of the genotype for the environment.

External factors may have a sudden impact on animal welfare, for example, infectious disease epidemics, adverse weather conditions and the mental and physical wellbeing of those responsible for their care.



The inter-relationship between wildlife and other animals is an important risk factor for changes in disease distribution.

Zoonotic diseases are diseases carried by animals that can be transmitted to humans, and are a direct public health risk. 2/3 of animal diseases are zoonotic.

**Anti-microbial resistance** Increased use of antimicrobials reduces the effectiveness of medicines for both animal and human use. AMR infections are estimated to cause 700,000 deaths each year globally. That figure is predicted to rise to 10 million, alongside a cumulative cost of \$100 trillion, by 2050 if no action is taken.

**Poor animal health increases GHG emissions** for example diarrhoea causes more emissions. Research by Defra found that animal disease results in an increase of greenhouse gas emissions compared to healthy animals, with increases of up to 130% emissions per unit of beef carcass due to BVD, 40% for Johne's disease and 20% for Salmonella, infertility and Infectious Bovine Rhinotracheitis.

# Summary

## 3.1

### **What environmental stewardship schemes have there been in England?**

Countryside Stewardship is open to all farmers and land managers and allows them to select from a range of options that can be tailored to different farm types and desired outcomes.

## 3.2

### **What positive impacts have environmental stewardship schemes had to date in England?**

Environmental stewardship schemes have been beneficial to habitats and species, landscape character and water quality, with at least £3.20 of public goods returned for every £1 put in.

## 3.3

### **What issues have there been with environmental stewardship schemes in England?**

Environmental stewardship schemes have had a number of issues impacting on environmental outcomes delivered, related to the coverage of schemes and management options, the effectiveness of management options and the effectiveness of schemes.

## 3.4

### **How will a new Environmental Land Management scheme contribute to the delivery of key environmental public goods?**

The Environmental Land Management scheme (ELM) will contribute to the delivery of the six key environmental public goods set out in the 25 Year Environment Plan by encouraging positive farming practices.

# What environmental stewardship schemes have there been in England?

Countryside Stewardship is open to all farmers and land managers and allows them to select from a range of options that can be tailored to different farm types and desired outcomes.

The current environmental stewardship scheme, Countryside Stewardship was launched in 2015. This targeted and competitive scheme aims to conserve/restore habitats, manage flood risk, reduce water pollution, maintain the character of the countryside, preserve historic features, encourage educational access, mitigate and adapt to climate change, and create and manage woodland. The scheme is delivered at two levels (tiers):

- The Mid Tier are simple, but effective agri-environment agreements,
- The Higher Tier covers the most environmentally significant sites, commons and woodlands.

Countryside Stewardship is open to all farmers, woodland owners, foresters and land managers. Farmers and land managers can choose from a wide range of options, depending on the outcomes they want to deliver and the priorities for the land that is being managed

In 2018, four new option bundles for wildlife are being offered in addition to the original application routes. This provides a simplified application process which is tailored to different farm types.

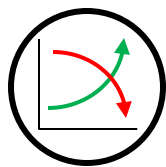
The area of land that is under specific management options is typically low and is split between:

- Maximising the environmental benefit of non-productive features, such as hedgerows;
- A small amount of land taken out of agricultural production, for example buffer strips against water courses;
- A somewhat larger area of land that is farmed subject to management constraints, for example grassland with low fertiliser inputs.

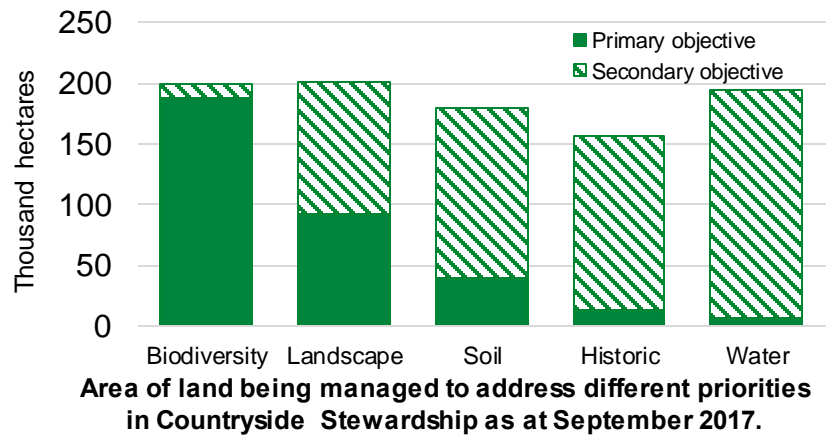
Management is designed to address multiple aspects of natural capital, but different options receive varying levels of uptake. While an option may have a primary objective (e.g. Biodiversity improvements), it will typically deliver additional benefits.



Payments are made as reimbursements for earnings farmers and land managers could have earned alternatively if they had not carried out the work.



A monitoring and evaluation programme informs policy and future scheme development. Research projects investigate the impacts of land management practices.





# What positive impacts have environmental stewardship schemes had to date in England?

Environmental stewardship schemes have been beneficial to habitats and species, landscape character and water quality, with at least £3.20 of public goods returned for every £1 put in.

## The impact of current environmental stewardship schemes

### Habitats and species

23,000 hectares of food sources for farmland birds.

189,000 hedgerow trees and in field trees protected.

19,000 hectares of planted areas providing pollen and nectar sources for pollinators.

Significant, positive effects at the farm-scale were recorded for 6 out of 15 farmland bird species, on Higher Level Scheme agreements in just three years (2008-2011).

Higher Level Scheme management for pollinators can significantly increase the size of wild bumblebee populations.

### Landscape character and historic environment

820 designated scheduled monuments removed from the Heritage at Risk Register.

280,000 km maintenance, management and restoration of hedgerows, ditches and stonewalls.

A positive/strongly positive effect on the landscape in 77% of National Character Areas in England.

### Water Quality

£29 million of farm improvements coordinated through Catchment Sensitive Farming.

1.2 million hectares of land and 14,000 farmers actively engaged with Catchments Sensitive farming.

47,000 hectares of buffer strips protecting water courses and features from agricultural impacts.

Catchment Sensitive Farming activity up to the end of May 2013 predicted (from modelling) to reduce agricultural losses of key pollutants by 4 to 12% in Catchment Sensitive Farming target areas.

A cost-benefit ratio can be calculated by monetising the environmental improvements and public goods delivered by schemes, and comparing that with their cost.

Cost benefit ratios for past environment management schemes are:

<b>Countryside Stewardship</b>	<b>£3.60</b>
<b>Forestry Creation</b>	<b>£3.20</b>
<b>Forestry Management</b>	<b>£5.60</b>

For every £1 of support put into a scheme, this is the value of the benefits the public receive back.

## What issues have there been with environmental stewardship schemes in England?

Environmental stewardship schemes have had a number of issues impacting on environmental outcomes delivered, related to the coverage of schemes and management options, the effectiveness of management options and the effectiveness of schemes.

### The impact of current environmental stewardship schemes

#### Coverage of schemes and management options

Even at peak scheme uptake (2013/14), when over 70% of agricultural land was entered into the Environmental Stewardship scheme, less than half of this area (equating to just 30% of total agricultural land) was subject to changes in land management practice.

Non-productive features under scheme management (e.g. hedges) and land taken out of production for environmental purposes (e.g. buffer strips) accounted for less than 2% of the total agricultural land area at peak scheme participation (2013/2014).

Free choice scheme designs can result in take up of very limited number of management options, restricting the potential environmental benefits. For example in the Entry Level Schemes ( ELS), the six most popular management options accounted for 49% of all points scored and the 20 most popular options accounted for 90% of all points scored in the scheme

#### Management option effectiveness

Effectiveness of management options can be compromised by poor site selection, selection of the wrong option, or poor management. For example, a study of Higher Level Schemes ( HLS) found that 1/3 of grassland sites had been selected for the wrong management option. Some scheme management options are subject to considerable variability in the quality of their delivery. For example, food patches for farmland birds was rated 'poor' with no visible signs of seed at 25% of sampled sites.

#### Scheme effectiveness

Many environmental issues require intervention/co-ordination at a scale larger than the individual agreement. For example, improving water quality depends on securing widespread changes in management practises at the catchment scale.

ELS has demonstrated limited environmental benefits compared to HLS, where 75% of agreements sampled were considered likely to be effective for all or most outcomes.

The evidence presented here is based on evaluation of the Environmental Stewardship Scheme, the current scheme – Countryside Stewardship – has not been in operation long enough for its environmental effectiveness to be evaluated.

# How will a new Environmental Land Management scheme contribute to the delivery of key environmental public goods?

The Environmental Land Management scheme (ELM) will contribute to the delivery of the six key environmental public goods set out in the 25 Year Environment Plan by encouraging positive farming practices.

In 2018, the Government set out its ambition to improve the environment in the 25 Year Environment Plan for England. A new ELM scheme will contribute to the delivery of the six key environmental public goods laid out in this plan:



Clean and Plentiful water



Thriving Plants and wildlife



Protection from and Mitigation of hazards



Clean Air



Beauty, heritage and engagement



Mitigation and adaption to Climate Change

## What is the Environmental Land Management Scheme?

The new Environmental Land Management scheme, underpinned by natural capital principles, will contribute to delivering against many of the key public goods inspired by the 25 Year Environment Plan. These include clean air; clean and plentiful water; thriving plants and wildlife; reduced risk of harm from environmental hazards such as flooding and drought; enhanced beauty, heritage and engagement for the natural environment and mitigating and adapting to climate change. The new scheme will be based around the provision of environmental benefits, with a flexible approach to tackling the differing environmental priorities across the country.

# References



# References

Slide	Data source
1.1	<a href="#">Agriculture in the United Kingdom 2019 [NS]</a> , <a href="#">Countryside Survey Report for Soils, 2007</a> ; <a href="#">UK Land Use and Soil Carbon Sequestration</a> (Ostle, Levy, Evans & Smith, 2009, Land Use Policy vol. 26) and Natural England
1.2	<a href="#">Agriculture in the United Kingdom 2019 [NS]</a>
1.3	<a href="#">Agriculture in the United Kingdom 2019 [NS]</a>
1.4	<a href="#">Agriculture in the United Kingdom 2019 [NS]</a>
2.1	<a href="#">Agriculture in the United Kingdom 2019 [NS]</a> , <a href="#">British survey of fertiliser practice 2018 [NS]</a>
2.2	Environment Agency, <a href="#">Flood Risk Reduction Benefit Valuation for Natural Flood Management</a> (Eftec, May 2017); <a href="#">Defra Mitigation Methods User Guide</a> ; <a href="#">Killer Facts</a> (EA document)
2.3	<a href="#">A Green Future: Our 25 Year Plan to Improve the Environment</a> , <a href="#">Forestry Statistics 2018 (1st release)</a> ; Forestry Commission and <a href="#">Tree Heath Resilience Strategy 2018</a>
2.4	<a href="#">Agriculture in the United Kingdom 2019 [NS]</a>

Slide	Data source
2.5	<a href="#">Attitudes of Europeans towards Animal Welfare</a> European Commission; <a href="#">Health and Harmony: the future for food, farming and the environment in a Green Brexit</a> ; <a href="#">Into the fold: Targeted financial support to improve farm animal welfare</a> RSPCA
2.6	<a href="#">Study to Model the Impact of Controlling Endemic Cattle Diseases and Conditions on National Cattle Productivity, Agricultural Performance and Greenhouse Gas Emissions</a> ADAS; <a href="#">Animal Health and Welfare Strategy for Great Britain</a> ; <a href="#">Livestock Disease POSTNote</a> The Parliamentary Office of Science and <a href="#">Technology and Tackling Drug-Resistant Infections Globally: An Overview of Our Work</a> , The Review on Antimicrobial Resistance
3.1	<a href="#">Rural Development Programme for England</a> and <a href="#">The Rural Development Programme for England 2014 to 2020: Final Impact Assessment</a>

# References

Slide	Data source
3.2	<p><a href="#">The Rural Development Programme for England 2014 to 2020: Final Impact Assessment</a>; <a href="#">Achievements of the 2007-2013 Rural Development Programme for England Environmental Stewardship Scheme (RDPE)</a>; Higher-tier agri-environment scheme enhances breeding densities of some priority farmland birds in England (Bright, Morris, Field et al., 2015, Ecosystems &amp; Environment vol. 203); Targeted agri-environment schemes significantly improve the population size of common farmland bumblebee species (Wood, Holland, Hughes and Goulson, 2015, Molecular Ecology); <a href="#">Catchment Sensitive Farming Phase 3 Evaluation Report (CSF156)</a>; <a href="#">Developing Indicators and Thresholds for Monitoring the Landscape Impacts of Environmental Stewardship (LM0429)</a> and <a href="#">Heritage Counts, The Historic Environment in 2017: An Overview</a></p>
3.3	<p>Unpublished; Natural England analysis of Environmental Stewardship uptake data; Unpublished; <a href="#">Natural England analysis of Environmental Stewardship uptake data, Environmental Stewardship Review of Progress (2008) Defra-Natural England</a>; <a href="#">Resurvey of HLS Baseline for options HK6 and HK7: Species-Rich Grassland Maintenance/Restoration (2013) (LM0443)</a>; <a href="#">Monitoring the outcomes of Higher Level Stewardship: Results of a 3-year agreement monitoring programme (2013) (NECR114)</a>; <a href="#">Economics of coordination in Environmental Stewardship (2012)</a> and <a href="#">Monitoring the Impacts of Entry Level Stewardship (NECR133) 2013</a></p>

Slide	Data source
3.4	<p><a href="#">A Green Future: Our 25 Year Plan to Improve the Environment</a></p>

## The Environmental Land Management and Public Money for Public Goods Evidence Pack: Voluntary Application of the Code of Practice for Statistics

This evidence pack is a compilation of official statistics, analysis and research drawn from a range of Government Departments and other public bodies. Many of the statistics are reproduced from National and official statistics sources. Where there are gaps in the evidence base, the best available unofficial sources are used.

Although the compendium itself is not an Official Statistic, this publication is voluntarily compliant with the Code of Practice for Statistics.

National and official statistic sources have been highlighted in the references with an [NS] or [OS] suffix.

Please see the accompanying voluntary compliance statement for further information on the voluntary application of the Code of Practice for Statistics.