General Council of English Nature:

Agriculture Sector Analysis

Paper by Alastair Rutherford, Head of Agriculture, Terrestrial Wildlife Team
Sponsoring Director: Sue Collins, Director Policy

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Sector Lead: **Alastair Rutherford**
Tel: **0207 340 4878**
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Introduction and the MRD context

Council agreed this revised sector analysis and endorsed the revised Priority Actions for the Agriculture Unit at its December 2004 meeting. The analysis draws together information on the key shapers and players, the main drivers and the influence that the 'sector' has had on the outcomes for nature conservation.

This fully revised sector analysis has been produced at a time of some major changes in both English and European Union (EU) agricultural policy, following a very difficult time for the sector, in particular the Foot and Mouth Disease outbreak. These changes, amongst others are reflected in the revised paper. As well as a very dynamic external policy environment, our work on agriculture and rural development will need to take into account and adapt to the consequences of English Nature becoming part of the new Integrated Agency (IA). The IA will become responsible for the deployment of the agri-environment schemes in addition to our current role of a statutory adviser seeking to influence policy and delivery which is currently the responsibility of others. To enable us to undertake this dual role English Nature will need to ensure that, as part of the Modernising Rural Delivery (MRD) process, Defra clearly sets out its policy objectives and priorities in response to consultation to ensure we can maintain the strength of advocacy for nature conservation as well as make an appropriate contribution to landscape and resource protection objectives.

During this process of establishing the role of the IA we need to be clear about our current relationships with a range of other agencies. With the Rural Development Service (RDS) and the Countryside Agency (CA) we will become equal partners in the IA confederation, eventually fully integrated, so we need to retain clarity about nature conservation targets within this arrangement. With English Heritage (EH), the Forestry Commission (FC) and the Environment Agency (EA) relationships will evolve, but as the body responsible for implementing agri-environmental schemes we will always face being seen as favouring IA priorities over others. This is where Defra's restated policy functions will need to set clear expectations of the IA as a delivery agent. A robust policy function for Defra will also need to be equally robust for framing the work of the Regional Development Agencies (RDAs) in deciding regional priorities for the socio-economic aspects of EU funded rural development schemes and eventually the successor to the current England Rural Development Programme (ERDP).

The capacity to integrate the project based schemes with the land management schemes will be different since the RDAs will take a leading role in directing the use of these funds. This opens up a new challenge that will be mediated through the Regional procedures, which include establishing a Regional Rural Delivery Framework (lead by the Government Office), consultation through the Regional Rural Affairs Forum and coordinating operational decisions through whatever each Region sets up as a Rural Priorities Board as recommended by Haskins.

The significance of our work (at both EU, UK and England levels), on influencing the current debate on EU funded rural policy for the period 2007 to 2013 through the new European Agricultural Fund for Rural Development (EAFRD) needs to be considered alongside the strong likelihood that it will be the Confederation then the IA that will be responsible for managing and drafting much of the subsequent successor ERDP.

Clearly this is an important time of institutional change for English Nature and our work on agricultural policy and taking forward the various Priority Actions identified in this Sector Analysis will need to be responsive to MRD developments.

Executive Summary

Scope

This sector analysis describes:

a. the characteristics and scale of the agriculture sector;

b. its impact upon the delivery of nature conservation objectives in England; and

c. English Nature's objectives for the sector and priority actions for the period 2000-2003.

It examines the key socio-economic and political factors that shape the agriculture sector:

a. the role of government and the European Union in setting policy for agriculture;

b. the importance of farm business decisions and the influence of markets for environmental outcomes;

c. the importance of a range of technologies in shaping farming systems; and

d. the consequences of agriculture being one of the last UK industries to be exposed to a more liberalised market environment.

It describes the roles of the key players within the sector. Other than farmers and those who work in the industry the dominant influence is shared between the public sphere and the role of EU and UK government in setting policy and public support and the private sphere and the role of markets. The sector is currently undergoing a period of major change and aligning itself to a new direction in both these public and private spheres.

Within the UK government, DEFRA (Department for Environment, Food and Rural Affairs) takes the lead on agriculture, although the DTI and FCO play some roles. The role of Treasury and the Cabinet Office have become increasingly important in shaping policy, setting targets and integrating agriculture with wider government policy.

The paper analyses the nature conservation impacts of the agriculture sector, both positive and negative. Farming is a dynamic industry with a diversity of practices, which both work in ways which sustain biodiversity on farms but which also threaten it. The industry overall has caused major destruction of environmental resources in the past 50 years or so. English Nature’s primary interest in the sector is to influence land management decisions so that they sustain, enhance and restore the quality of the farmed environment for biodiversity.

Overview

Over the last 15 years, the policies shaping farming have begun to change to establish a legitimate role for government in securing a more diverse range of public goods, other than food security, from agriculture. The extent of this shift and reform of policy, however, has so far has been too limited to reverse the serious past declines of wildlife on farms although there is some growing optimism for more positive trends in some areas over the next few years.

Traditionally, agriculture policy has been determined at EU and UK level. In recent periods of policy reform, however, a stronger degree of Member State and sub-national regional discretion has been introduced in to policy creating greater opportunity for both national and sub-national decision making. Although in many ways the extent of this 'devolution' (subsidiarity) is limited, it is important in the policy areas of most interest to English Nature (such as agri-environment schemes), this process is expected to continue in future reforms. However, despite the increasing subsidiarity of EU policy it remains absolutely critical that the right legal frameworks are established at the European level, both for English Nature's interests in nature conservation at home and across the rest of the Union.

The purpose and role of farms and farming has been the subject of considerable public and policy debate over the past two or three years. A very wide range of factors has stimulated this:

a. the influence of agriculture and agricultural policy in shaping the political and economic future of the European Union, through negotiations and treaties on international trade and the expansion of the Union;

b. the human, economic and social costs of a number of agricultural crises, particularly BSE and foot and mouth disease;

c. a range of food scares and growing consumer interest in food quality and safety;

d. the development of new technologies such as the use of biotechnology in crop breeding;

e. the cost to the taxpayer of the Common Agricultural Policy (CAP), and concerns over this cost following EU enlargement;

f. growing interest and concern about the impact of intensive farming systems on the environment, and concern over the environmental effects of intensification of agriculture in the new Member States that joined in 2004;

g. the impact of the CAP on the economies of developing countries and in promoting sustainable development across the globe;

h. the WTO agenda for liberalising agricultural trade;

i. the changing structure of the industry with a steady decline in the overall number of holdings, the growth of average farm size, the increase in part-time farm businesses,

and the expansion of farm contracting and the use of 1 year farm business tenancies; and

j. modern approaches to food security through the market, external relations and technology;

In particular the 2001 foot and mouth outbreak and the all-consuming operation to bring the spread of the disease under control and eventually eradicate it led to very serious reflection on the future of farming, the purpose of the countryside and the sustainability of our agricultural systems. It even disrupted the timing of the general election. From this intense public debate on the FMD outbreak, and its consequences, flowed a series of government policy reviews and consultations. The intention of these was to learn the lessons with regard to both the epidemiology and control strategies for serious disease outbreaks but also the wider issues concerning the future of farming and the economies of rural areas. For English Nature the most significant of these was the Policy Commission on the Future of Farming and Food, chaired by Sir Don Curry. The Commission was charged with the challenging task of finding how to make farming and food production both more competitive and environmentally sustainable. The subsequent Curry Report (*Farming and Food: a sustainable future*) succeeded in building a wide consensus around a new vision for the future of farming that has proven to be highly influential and led to the government's Strategy for Sustainable Farming and Food (SSFF) and a raft of new initiatives, not least of which is a new Entry Level Environmental Stewardship (ELS) scheme which will be introduced in England in 2005. The significance of the new ELS is not just the environmental benefits it will generate across the whole countryside: it also demonstrates that all farmers and all farm businesses can benefit financially from their positive management of the rural environment. This new scheme will be very important in making tangible for the majority of ordinary farmers the concept of a second rural development pillar of the CAP.

Food security remains a critical policy objective, especially in light of the global objectives for poverty reduction. Food security now comes from wider trading networks that both enhance consumer choice and source products based on comparative advantage, thus allowing more of our land to be managed for environmental purposes. This also allows poorer countries to reduce poverty and secure economic growth through agricultural exports to richer countries including the EU. For the EU, maintaining land so that it remains possible to increase agricultural production either in response to "emergency conditions" or to changing price signals is relatively simple. Producing expensive food which could be obtained more cheaply elsewhere as the food security insurance is no longer necessary. We acknowledge the importance of internalising the full costs of producing and supplying the food products to consumers and the potential for local and geographical niche markets that allows domestic sources to displace imports by exploiting the competitive advantage of 'localness' that imported produce can never capture. In developing a trade orientated food security policy it is not acceptable, however, to export the environmental damage from food production and permit imports to undermine legitimate EU environmental protection and we believe the WTO round must address this issue.

The breadth of this debate reflects a significant repositioning of the place of agriculture in European society. This has been paralleled with the emergence of the concept of 'multifunctional' agriculture, providing a range of environmental and socio-economic services as well as products and commodities, and the idea of a 'European Model' of agriculture making a distinction from production focused 'New World' models.

The reforms of the CAP that were concluded in Luxembourg in June 2003 are a further landmark in the fundamental repositioning of farming at the start of the 21st century. At the heart of the reforms is the decoupling of farm subsidies from the production of agricultural commodities. This has major and only partially understood implications for farm businesses, which will rapidly shift their focus from arcane agricultural policies and towards markets and consumers as the primary driver of their business strategies and land management decisions. This will provide a very important driver for the reconnection of farmers with their markets: the major reason for the chronic failure of the sector that was identified by Curry. It will also have significant implications for the environment and the landscape of the countryside, both positive and negative. The Luxembourg reforms usher in a new set of challenges for the management of the countryside for environmental objectives and for English Nature, its partner agencies, Defra, environmental NGOs and farmers and their representative organisations.

The first "new-era challenge" we face is to understand better the implications of the reforms, and in particular the response of farmers to the decoupling of support: will they adapt quickly to new economic situations or will they maintain existing patterns of production and use decoupled payments to subsidise marginal or unprofitable enterprises? To do this we need to have excellent monitoring and evaluation systems that can be used to inform policy on both maximising the benefits and minimising the risks. We are working closely with Defra on developing an "Environmental Observatory" that will help identify trends and provide early warnings of problems.

We also need to continue to evaluate and refine the range of policy instruments we have at our disposal to encourage environmentally beneficial management. A new Environmental Stewardship scheme will be introduced in 2005, the product of a long, detailed and inclusive Defra led review process with new money to fund the Entry Level component. Effective targeting of agri-environment schemes is now possible with a range of data management and GIS based tools that we have been developing with the RDS, Countryside Agency and others. This can help improve the effectiveness of schemes in meeting objectives and also makes them more efficient and provides better value for taxpayers' money. An important objective for agri-environment scheme targeting in the future will be securing multiple benefits, for example landscape, biodiversity and water protection from the same management agreements. This will be particularly important as we move towards the Integrated Agency.

Current agri-environment schemes, however, were designed primarily to counteract the negative effects of subsidies linked to the production of commodities; it is not clear at this stage how effective these schemes will be in a world of decoupled support. In some cases their effectiveness may increase, and payment rates could be reduced, but in other cases schemes may prove to be inadequate in keeping unprofitable, but environmentally valuable, systems of farming going. Alternatively in some locations the optimum land management will not be about food production but about providing water management or flood defence functions or providing a range of other public goods that can no longer be supplied as a by-product of agriculture. As climate change and water management climb up the political agenda "catchment management farming" could become as accepted as arable or livestock systems. In these scenarios some entirely new schemes or approaches to paying for positive land management may be needed to ensure important areas are managed for their conservation and wider environmental benefits. In other areas we may have to learn to live with and adapt to the landscapes of the new economics of farming, and support the

development of new institutional arrangements if management needs for priority objectives cannot be integrated at farm level.

Despite the progress made in Luxembourg, and the new opportunities and challenges, the 2003 CAP reforms must not be seen as the end of the process. While decoupling removed the incentive to over-produce and the environmentally damaging consequences and allows farmers to re-connect with markets, the reform failed to make sufficient progress in redirecting resources into positive agri-environment and rural development schemes. Europe's farmers are still in receipt of about 40 billion euros of decoupled payments, of which ninety per cent has no defined environmental or rural development purpose and its value to the European public and taxpayer is highly questionable. Further reform is still needed to speed up the process of shifting decoupled payments into agri-environment and rural development programmes to pay for the wide range of land management objectives outlined above. In July 2004 the European Commission published its proposals for the reform of the Rural Development Regulation and the creation of a new European Agricultural Fund for Rural Development (EAFRD) funded by the CAP. English Nature sees the negotiations on the EAFRD as an extension or second phase of the 2003 CAP reform. When the EAFRD negotiations are concluded in the summer of 2005 it will be essential further progress has been made in reforming the CAP and releasing more resources to deliver the governments ambitious targets for the positive management of the rural environment.

The repositioning of agriculture from crisis and damaging subsidy regimes and into a new market orientated economic environment is a dynamic process, is still underway and generates major opportunities to influence new policy, engage with the emergence of new and development of existing markets and contribute to the way new technologies are used. English Nature needs to seize the opportunities to influence policy while working constructively with farmers and a range of other partners and rural stakeholders to help agriculture and land management adapt to its new roles in ways that are both profitable and sustainable.

Priority Actions

Six Priority Actions (PA) have been developed from our analysis of the sector and the identification of the opportunities arising from market, socio-economic and policy change and which aim to help secure English Nature's corporate targets and our Sectoral Objectives. The six Priority Actions are:

Priority Action 1

Secure more effectively targeted and better resourced schemes that encourage land managers to help deliver our priorities for wildlife gain, as well as other environmental and supporting socio-economic objectives on designated sites and in the wider countryside.

Expected nature conservation benefits: Will help deliver positive management and restoration on a wide range of designated and wider farmed habitats and contribute to meeting the PSA targets for SSSIs, including freshwater, and farmland birds.

Priority Action 2

Work with Defra and a range of other partners and stakeholders to develop more integrated livestock policies and strategies that are capable of securing environmentally sustainable grazing in both upland and lowland England through support for both site-based initiatives and by ensuring that the regulation and support for livestock, processing and marketing infrastructure is complementary to English Nature's objectives.

Expected nature conservation benefits: In a more market orientated livestock sector will make a major contribution to addressing the condition of overgrazed upland SSSI and help maintain, restore and prevent degradation of lowland grazed habitats vulnerable to declining economic viability of lowland livestock farming. More sustainable grazing, particularly in the uplands, will also have knock-on benefits for reduction of flood risk in downstream catchments and improvements in water quality.

Priority Action 3

Define and advocate English Nature's policies for the use of regulatory, advisory and farm audit strategies that substantially improve the environmental performance of individual farms, help ensure a farm's individual performance is appropriate to its landscape context and improve the baseline environmental standards for the agricultural industry as a whole.

Expected nature conservation benefits: Will underpin the effective delivery of a range of environmental schemes and services to farmers and land managers, improve the overall environmental performance of agriculture in the use of natural resources, reduce diffuse pollution and help farmers integrate an assessment of environmental risks and opportunities into farm business decision making.

Priority Action 4

Monitor, evaluate, influence and develop the innovative use of a range of technologies to both facilitate more environmentally sustainable farm systems and better conservation site management while ensuring statutory approval and assessment procedures minimise environmental risks. Develop understanding of the relationships between agriculture and climate change and further integrate work on climate change, biodiversity and agricultural policy.

Expected nature conservation benefits: Will help ensure that the negative impacts of new agricultural technologies on the environment are minimised, research and development is focused on sustainable solutions, appropriate technology is used to deliver specific habitat management objectives and adaptive land management strategies reduce the adverse impacts of climate change on biodiversity.

Priority Action 5

Working with other GB Environmental Agencies, NGOs and other stakeholders, undertake further policy research to test, develop and refine English Nature's understanding of and position on further reform of agricultural and rural development policy and policy processes at the EU level, and in particular a greater and faster shift in resources from Pillar I to Pillar II of the CAP. Further integrate work on water and agricultural policy and develop policy on

catchment sensitive farming. Champion, promote and advocate English Nature's policies for reform to domestic and EU audiences.

Expected nature conservation benefits: More sustainable agricultural and rural development policy, the integration of nature conservation objectives into domestic agricultural and rural development policy and adequate funding of agri-environment programmes.

Priority Action 6

Maintain and further develop English Nature's communications that explain and promote key agricultural and agri-environment policy messages to a range of audiences. Ensure the agricultural policy messages are integrated into English Nature's wider external communication plans and further develop internal communication to ensure the various parts of the organisation understand and can contribute to the work of the Unit.

Expected nature conservation benefits: For a range of external audiences improves understanding of English Nature's aims and objectives for farming and rural policy and improves the effectiveness of the way English Nature delivers its agricultural policy objectives on the ground.

To deliver these actions we identify the key organisations and the actions needed to achieve effective influence over policy and delivery. For agriculture, these are DEFRA, Treasury, the European Commission and farming and environmental organisations. Influencing public policy, however, is no longer sufficient. As recent reforms to the CAP break the link between policy and production we need to increasingly look to the role that markets and consumers play in influencing land management decisions and how we can engage with and help shape this process.

1. Characteristics and scope of the sector

1.1 The productive agricultural sector in the England is largely modern and commercially productive. It is also diverse. The total area of agricultural land is 9.1 million hectares, 72% of the land area. In 2002, crops account for 43%, grassland 38.5%, rough grazing 8%, set-aside 6% and other land 2%.

1.2 Food and fibre are the main commodity products from agriculture, consumed either as a primary product or processed product although there is a growing interest in non-food crops. Principal products are:

a. *Cereals and oilseeds* for animal feed, flour, starch and gluten, malt, vegetable oils and oilseed residues;

b. *Sugar and Sweeteners* from sugar beet used in producing biscuits, chocolate, confectionary, breakfast cereals and soft drinks;

c. *Potatoes, Potato Products* as "raw loose", frozen or chilled chips, ready made meals, crisps and canned foods;

d. *Protein crops* in the form of peas, beans and other pulses for animal and human consumption;

e. *Milk and Dairy Products* as liquid milk, cream, butter, cheese, yoghurt, ice cream, desserts;

f. *Meat and Livestock Products* as beef, lamb, bacon, poultry, pork, processed meat, eggs and wool;

g. *Fruit and vegetables* largely sold through cooperatives and /or grown under contract to processors and retailers; and

h. *Biofuels, energy and non-food crops* a small diverse sector attracting growing interest of both farmers and policy makers.

1.3 Agriculture now makes a relatively small direct contribution to rural employment. In 1970, 787,000 people were employed in agriculture. By 1997 this figure had fallen to 531,000 and in 2003 the total agricultural labour force was 358,000, a 45% reduction in 33 years. Agricultural employees account for only 6.3% of total employees in remote rural areas, compared with 4.1% in accessible areas and 1.9% for England as a whole. A further 15% reduction in the total agricultural labour force is forecast by the year 2010.

1.4 Since the Second World War the number of farms has fallen and the average size of holdings has increased as farmers have attempted to reduce fixed costs in order to improve efficiency and maintain or increase farm income in the face of a cost-price squeeze. Between 1945 and 1992 the number of farms in England and Wales fell from 363,000 to 224,000.

Agricultural and other land use in England (Defra. June Census 2002)

Category	Hectares	Percentage of total land
Crops and fallow	3,922,229	43.1
Temporary grass	643,673	7.1
Permanent grass	2,859,583	31.4
Rough grazing	699,917	7.7
Woodland	263,095	2.9
Setaside	518,259	5.7
All other land	192,357	2.1
Total	9,099,113	100

Number of agricultural holdings in England by size

	2003	1995	1990	1990 – 2003 change
5 to <20 ha	36,470	38,362	37,034	-564 (-1.5%)
20 to<50 ha	25,686	33,756	35,321	-14033(-22.9%)
50 to <100 ha	21,432	24,847	25,830	
100 ha or greater	26,589	21,012	22,740	+3849(+16.9%)
Total	110,177	117,977	120,925	-10748(-8.9%)

Source Defra June Census

1.5 Farming no longer provides the economic foundation of rural areas, nor, in most cases, the basis of rural society. **It is, however, still very important politically and occupies a dominant and central place in land use and management of the countryside and hence in the debate on wildlife conservation and the sustainable use of natural resources.**

1.6 While the productivity of UK agriculture has increased annually since the Second World War, agriculture's contribution to GDP continues to fall steadily, now standing at 1.1% compared to just over 2% in 1984. This is not to underestimate agriculture's wider economic importance - the number of people currently employed in agriculture-related industries is approximately 14% of the population, but these jobs are not always located in rural areas. **The economic well-being of farm businesses and farming families now depends increasingly on the vibrancy of other parts of the economy of rural areas rather than *vice versa*.**

1.7 The nature of farm business and farm business decision-making is also changing. The decline in the number of medium sized 'family farms' is contrasted with the growth in the number of large farms and agricultural contracting and the increasing use of one-

year farm business tenancies. In many cases this puts greater distance between business decision-making and practical land management. At the same time there has been a growth in the number of part time farm businesses. These structural changes have important consequences for communicating with the farming community and influencing land management decision making.

1.8 The way agriculture markets its products is also undergoing significant change. Recent years have seen a growth of, and considerable interest in, on-farm processing and increasing the value added through regionally distinctive, organic or other premium products. Consumers are increasingly purchasing food products with value added attributes, including a significant service element, such as ready prepared foods or through a higher proportion of food eaten outside of the home. This requires more processing between the farm gate and the consumer and the raw agricultural product is increasingly distanced from the form in which it is consumed and the proportion of the final price the farmer gets has fallen as a result. Some farmers are exploiting this development in the market by providing some value-added aspect to their products. Whilst relatively small in comparison with the whole of the food sector, this area is growing fast and has a disproportionate significance for small and medium sized farm businesses and the economy of rural areas. This specialist and high value added food sector is also of considerable political interest and the focus of new policy thinking both in the UK and the EU. In some respects this is counter to trends in farming for bulk commodities (grains, meat and dairy products) towards increasing scale, efficiencies in production and greater use of new technology. However, even the large commodity markets are becoming increasingly segmented, creating a range of opportunities for producers to add-value or establish more profitable links to the rest of the food chain. Recent reforms to the CAP and the decoupling of support from production will also be of major significance for farm businesses and the way they engage with markets.

1.9 Inefficiencies in the food chain, which add costs and distance the producer from the final consumer are increasingly being identified as a significant structural problem for the industry and are being placed under critical scrutiny. There are strong regional differences both in the nature of farming and the extent to which farming is responding to these market pressures. **Farm enterprises are faced with a diversity of ways of developing existing or new farm business strategies. While it is accurate to say that farming is becomingly increasingly market aware, it is dangerous to over-generalise about the direction of individual farm business development.**

1.10 Financial pressures on farm businesses have increased as agriculture has moved from labour to capital intensive forms of production. Farm incomes in the UK halved in real terms between the late 1970s and early 1980s and then almost halved again by the early 1990s. In 2002/03, incomes are expected to increase as several sectors are predicted to see an increase in profitability.

1.11 Many farm families have been forced to look for additional income sources and this has led to the development of off-farm employment and diversification (e.g. tourism and recreation) which is now seen as an important means of maintaining the farming population. These factors coupled with wider social change in rural Britain, have weakened the links between farmers and rural communities. They have also been

potent forces for change which have affected the nature of farming practices and hence its relationship with the environment and ability to steward biodiversity and landscapes**. The primary aim of many of these diversified farm businesses is not, in general food production. Over 80% of food is now produced from just 25% of all farms and only 10% of farms produce over half of total food output. Around 50% of farms are considered part-time and the output from these is less than 3% of the total.**

1.12 Agriculture has a significant impact on the environmental, both positive and negative, and is of great importance and interest to nature conservation. This stems from the sheer scale of farming across the countryside as well as the way in which it is practised. It occupies a far greater proportion of the land surface than any other economic activity and it is both a creator and destroyer of environmental assets and resources. The position of agriculture is also an exceptional one because of the nature of its dependence on natural resources (land, soil, clean water and air etc.) and natural processes (propagation, growth, recycling etc.). **This complex relationship with the environment distinguishes farming from most other economic activities and makes it of crucial importance to the interests and objectives of English Nature.**

1.13 Five broad types of inter-related factors have led to, and continue to stimulate change in agriculture:

a. governance;

b. business and markets;

c. farm-scale decisions;

d. technology; and

e. major crisis in public and consumer confidence.

1.14 The future configuration of farming in response to these five drivers is difficult to predict. However, **significant structural adjustment is expected to continue as different categories of land owners/occupiers adopt different income generation and business strategies in response to policy reforms, market signals, changing international trading rules and the response of the public and consumers to issues such as foot and mouth disease and BSE.** While farmers can be offered incentives, persuaded or regulated to use environmentally sensitive practices the responsibility for progressing towards more sustainable agriculture is shared with the rest of society, including consumers, the food chain, agri-industry and government.

2. Key players

2.1 Agriculture is internationally practised, regulated and managed. Interest in the sector covers the full spectrum, from global trading markets (overseen by the *World Trade Organisation*) to specific in-field actions of farmers. It has been included in the Doha agreement on trade (2002) and this is leading to further progress on the liberalisation of agricultural trade and markets. The 2003 reforms of the Common Agricultural Policy which included the decoupling of support from production for a range of key

commodity sectors was largely driven by EU objectives for international trade and unreformed regimes, such as sugar, are coming under considerable pressure from sugar producing countries, global trading blocs and international development organisations. By paying over £3 billion per annum into UK farms through the CAP and the exercising of border controls, the administrative arm of the European Union (EU), the *European Commission* (EC), has the strongest bearing on the sector. All *Member States* have strong sector representation via their Agriculture Departments on the Agriculture Council. Whilst the *European Parliament* has a growing role in European policy generally, its role in agriculture is still limited.

2.2 The major lobby interests on the formal agriculture policy agenda have been the *farmers (especially NFU and its European network COPA), landowners (CLA and the European Landowners Association*) and the food industry and processing lobby. This balance of stakeholder power and influence, however, is changing. **The significance of EU agricultural policy in shaping or constraining wider EU political and socio-economic objectives, such as expansion of the EU, international relations, the EU approach to international development and the liberalisation of trade, means that current and future farm policy will be shaped by a much wider range of interests and objectives.**

2.3 The importance of agriculture and the CAP to the environment attracts the pressure group attention of a number of European statutory and voluntary *environmental networks (e.g. European Environmental Advisory Councils, BirdLife International, World Wide Fund for Nature and European Environmental Bureau). Greenpeace and Friends of the Earth* have taken aggressive stands against GM crops and the use and impact of pesticides but play less direct role in other aspects of agriculture policy.

2.4 The *Department for Environment, Food and Rural Affairs* (Defra) is one of the critical domestic players for English Nature. Defra, with the help of their associated agencies, negotiates, researches, advises on, and administers all Government and European agricultural and agri-environment policy and practice operating in the sector. The delivery of rural policy in England by Defra and its agencies is undergoing major change. The *Rural Strategy 2004* sets out the government's intentions to merge a number of the functions and responsibilities of English Nature, the Countryside Agency and the Rural Development Service into a single delivery agency with NDPB status and responsibility for statutory advice on biodiversity, landscape and public access.

2.5 The *Treasury* has an important and changing role in farming and agricultural policy. Traditionally seen as having largely fiscal and budget functions, the Treasury is playing a much more active role in policy innovation and development. The Treasury has an important role in setting *Public Service Agreement* (PSA) targets which are the responsibility of government departments to deliver. **PSA targets are important policy drivers and a number are of direct significance to agriculture and the environment.**

2.6 The *Cabinet Office*, with a function to tackle cross departmental issues, also has a particular interest in farming and the food chain and has been responsible for stimulating some innovative policy thinking.

2.7 As a primary land user, the sector is subject to the attentions of other land uses represented variously by Defra, their *Statutory Agencies*, the voluntary conservation and recreational organisations, such as *RSPB* and the *Wildlife Trusts*. Farming and rural business organisations, such as *NFU and CLA* represent farmer and landowner interests.

2.8 Despite representing a relatively small direct part of the economy of rural areas the evolution of agricultural policy into a broader based rural development policy generates interest in the sector from rural development organisations such as *ACRE, CPRE* and the *European Rural Exchange*.

2.9 A large network of agricultural manufacturers, suppliers, distributors, consultants and contractors, services the whole sector. The powerful *processing and retailing* outlets of the food and drink industry provide the final link to the consumer and have a strong bearing on the behaviour and practice of the farmer. The whole sector has a high profile in the *media and press* and is serviced by a comprehensive range of professional and technical journals. Ultimately, the landowners and farmers deliver the agricultural and environmental product. There is a large range of landowners, from major institutional landowners such as The *National Trust*, the *Duchy of Cornwall*, *Defence Estates* and farming corporations and companies to a declining number of family farms and a growing number of part-time and 'lifestyle' farms.

2.10 Descriptions of the roles and responsibilities of the key players are listed in Annex I.

3. Socio-economic and political factors

3.1 The diversity of farming enterprises, the range of activities they are engaged in and the sorts of drivers they respond to means it is difficult, and often dangerous to generalise about farming and farmers. Farms and farm businesses are very diverse in their objectives, size, structure, management motivations and options for change. Farmers vary too in their understanding, sympathy and willingness to act for conservation. Economic and social circumstances have powerful influences over the morale of the farming industry. Fundamental economic difficulties exist in the farming sector, resulting from the long term chronic effects of over-protectionism, demands on farmers from markets and the powerful multiple retail sector to reduce the cost of farm-gate commodity prices and a structure ill-suited to meeting new market demands. **Farm structural change is inevitable and, in pure economic efficiency terms, desirable but the environmental consequences of structural change are mixed and as has been demonstrated above, farming is frequently not primarily about efficiency of production.**

3.2 These factors, currently exacerbated by a strong pound and the consequences of foot and mouth disease and the BSE crisis have combined to make some farmers defensive. Farms are isolated places to live and work in and the farming community often feels isolated from other sectors of society. Farm businesses have also become isolated from their markets and the demands of customers because of the highly interventionist nature of agricultural policy and the operation of state controlled marketing boards. **The need to overcome the agricultural industry's isolation and to re-connect farmers and farm businesses with society, consumers and the supply chain was a key finding of the recent Policy Commission on the Future of**

Farming and Food, Chaired by Sir Don Curry (Curry Commission) and subsequently developed into the government's Strategy for Sustainable Farming and Food (SSFF).

3.3 This sombre mood that has prevailed in the industry for a number of years, however, is in contrast to a more forward-looking and optimistic view being adopted by a growing number that see new opportunities. These stem from recent reforms of the CAP and a number of new policy initiatives, such as the introduction of an Entry Level Environmental Stewardship Scheme and a raft of other post-Curry initiatives implemented under the SSFF, such as the establishment of the English Farming and Food Partnerships (EFFP). The EFFP aims to strengthen the profitability and sustainability of England's farming, food and related farm-based industries through developing co-operation and partnership activities between farmers and between farmers and the food chain.

3.4 Farmers have traditionally been a powerful political force. For many years, government supported strong farming institutions (their own Ministry, research council, training board, colleges of further education) as a consequence of strong representation in Parliament and a powerful and effective lobby in the National Farmers' Union (NFU). This influence has changed, although in many ways it is no less powerful. Reforms to the House of Lords and a growing urbanisation of the countryside have much reduced formal representation of the farming industry in Parliament. Many agricultural institutions that were state funded are now either privately funded or have had to diversify across a range of land-based, amenity or environmental objectives. However, there has been a marked concentration of capital, land, expertise and technology and access to markets amongst the largest "industrial" sector of farmers.

3.5 To date, the emphasis of NFU representation, the thrust of government policy and the powerful influence of the farming media has concentrated on policies to support this productively efficient segment of the sector. Many 'smaller' farm businesses feel increasingly distinct from the industrialised sector and their interests are represented by a complex coalition of specialist interests allied to regional and local government, and environmental interests. There is, however, much competition for the mantle of farmer representation across-the board and broadly a party political consensus reflects the need to pursue a 'twin track' policy which on the one hand liberates large-scale farms to maximise opportunities driven by markets and on the other hand supports a diverse, extensive and socially acceptable agriculture.

3.6 The farming and food industry, markets and policy have been the attention of considerable public debate and policy thinking at both EU and domestic levels over recent years, and the sector remains in a period of intense policy review and change. The foot and mouth outbreak led to a number of specific studies and reports, some government sponsored others initiated by local and regional authorities. Other reviews, most notably the Policy Commission on the Future of Farming and Food have taken an overall perspective on the future of the sector.

3.7 At the European level the objectives for the CAP is undergoing major change. The Commission as a whole, rather than just Directorate General Agriculture, is taking a much greater interest in the reform of agricultural policy because of its impact on a

wide sweep of policy areas, including: budgets and finance, external and trade relations, health, EU expansion, environment and development of less developed nations. The breadth of this debate reflects a significant repositioning of the place of agriculture in European society. **This repositioning is a dynamic process, which is still underway and generates major opportunities to influence new policy, but also creates considerable uncertainty for the industry over future farm business strategies. English Nature needs to seize the opportunities to influence both policy and markets while working constructively with the industry to help it adapt to its new roles in ways that are profitable and sustainable.**

Reform of the CAP

3.8 The CAP has been criticised from a number of perspectives:

a. cost to taxpayers and consumers;

b. protecting inefficient production and inhibiting innovation;

a. distorting international trade;

b. damaging the economies of developing countries; and

c. encouraging intensive and environmentally damaging production systems.

3.9 The 1998 *Agenda 2000* reforms of the CAP established the current model of reform that aims to address, to a greater or lesser degree, the criticisms identified above. This policy recognised the damage caused by subsidising agricultural production and aimed to phase in reductions in the supported prices coupled with producer compensation in the form of direct payments.

3.10 In addition the Agenda 2000 reforms introduced the concept of a CAP of two pillars: Pillar I being the traditional agricultural subsidies and support and Pillar II, which provided a package of rural development and agri-environment payments to either help farmers adapt to new economic circumstances or to pay farmers for the delivery of a range of environmental "public goods". The provision of public goods, such as providing wildlife habitats, managing and maintaining landscapes or other environmental resources on which society and other industries, such as rural tourism, depend, cannot be rewarded by normal market mechanisms. In considering the role of the CAP and its legitimacy it is necessary to make a clear distinction between Pillar I and Pillar II. The current budget split between the two pillars is about 90% for Pillar I and 10% for Pillar II.

3.11 In June 2003 the Council of European Agricultural Ministers meeting in Luxembourg agreed a radical package of measures as part of the mid-term review of Agenda 2000 reforms. The Luxembourg CAP reform negotiations were driven by a central argument about the need to reform the CAP to be consistent with the EU's aspirations for greater liberalisation of world trade and to secure progress in WTO negotiations. The negotiations were not primarily motivated by an environmental agenda, although removing the damaging effects of production subsidies on the environment is an

important consequence of the reforms which English Nature strongly supported and welcomes.

3.12 The decoupling of farm support from production is at the core of the 2003 reform agreement. The direct support received by EU farmers will be largely decoupled from what they produce and combined into a new Single Farm Payment (SFP).

3.13 The value of the 2003 reforms has also been recognised in the recent DTI White Paper on International Trade:

"The UK Government has always been a leading voice for agricultural reform in Europe, advocating a market-based system, where any public support farmers receive reflects delivery of benefits for the whole of society, such as environmental protection, provided in a way which does not distort world markets.

These reforms have been moving the CAP away from costly and damaging price support towards a model aimed at paying farmers directly for providing certain public benefits. The fact that most tax-financed subsidies will no longer be linked to what a farmer produces will reduce the incentive to overproduce and encourage farmers to focus on the demands of the market. The reforms represent a significant shift away from the most trade-distorting forms of subsidy and will reduce the damage caused by the CAP in terms of dumped products on the world market and reduce the negative impacts on the environment."

3.14 Although broadly supportive of this analysis English Nature has some concerns that it probably over-states the likely positive environmental outcomes and does not recognise that there will be environmental downsides to the reforms which may need to be addressed through other policy measures. English Nature has consistently argued, along with the other GB environmental and countryside agencies, that decoupling support from production would in itself not deliver an environmentally sustainable agricultural policy for Europe. Research which we commissioned in 1996 and 1997, and more recent Defra commissioned studies by GFA / RASE and IEEP[1], explored the environmental effects of the decoupling of agricultural support and concluded that if CAP reform is to lead to a more sustainable agriculture then it needs to be part of a wider package of measures.

3.15 Decoupling of support will not lead to land management for environmental objectives, unless there is a market reason for doing so, or if there are other policies to encourage this – such as, legislation, cross compliance and incentive schemes. The reformed CAP and the resources provided under Pillar II schemes have a very important role to play in addressing these market failures. A well managed and wildlife rich countryside will not be delivered by the current CAP but neither can it be delivered by markets alone.

3.16 Given the uncertainty of the outcomes from the 2003 reforms and the unpredictability for the response of individual farmers it will be important that the environmental impacts of reform, both positive and negative, are carefully monitored. English Nature is

[1] *GFA-RACE, IEEP: The Potential Environmental Impacts of the CAP Reform Agreement*. Report for Department for Environment, Food and Rural Affairs. (2003)

partnering Defra in the development of a CAP Observatory which aims to monitor and evaluate the impact of the reforms on the environment. The outputs of this work will be very important in designing effective policy responses.

The purpose of the Single Farm Payment

3.17 In arguing for a shift in direction of CAP support from subsidising production towards paying for the delivery of public benefits it is important to give careful consideration to the purpose of the new decoupled farm support. English Nature has been critical of the idea that the SFP is some form of basic land management payment rewarding farmers for the management of the countryside. The decoupled SFP is not linked to any requirements to actively farm or manage the land. If a farmer is eligible for SFP then he retains that support largely regardless of his land management decisions.

3.18 Our critique of the SFP leads to the obvious question: so what is the SFP for? Since this is difficult to answer, we can first define what it is not for:

a. the payment does not appear to be a compensation for policy change, which could be justified if the payment was intended to be a short term adjustment measure, however, the payment is open ended and is not reduced progressively over time to encourage transition to a new policy position;

b. nor is it an efficient means to support income as it is not linked to any definition of income "need": since it is either linked to historic levels of support or is paid according to how many hectares of eligible land you control, so the greater the assets you have the higher the level of payment; and

c. it cannot be claimed to be an environmental payment since regardless how it is paid, it is not linked to the delivery of any land management or environmental objectives, other than basic requirements not to damage the environment demanded by cross compliance.

3.19 English Nature believes the SFP was a necessary compromise to securing the primary objective of the Luxembourg negotiations: decoupling of CAP support to put the EU in a strong negotiating position to secure further progress on the liberalisation of international trade through the WTO. More recently the Commission has attempted to justify the purpose of the SFP as income support and to clarify its relationship with the Pillar II of the CAP:

"The 1st pillar [the SFP] concentrates on providing a basic income support to farmers, who are further free to produce in function of market demand, while the 2nd pillar supports agriculture as a provider of public goods in its environmental and rural functions and rural areas in their development."[i]

3.20 However, for the reasons we set out above we would argue that the SFP is a very inefficient, expensive and inequitable means of supporting the incomes of its recipients. We conclude from this that it is not possible to identify any robust justification for the SFP and that further reform before 2013 is highly desirable.

The direction of further reform

3.21 On 22 July Mrs Beckett, the Secretary of State for the Environment, made an announcement on the implementation of the 2003 Common Agricultural Policy reforms England including decisions on cross compliance, the operation of the National Reserve and the use of modulation[2] to help fund the new Environmental Stewardship scheme[3].

3.22 Overall the announcement:

a. confirmed decisions on modulation, assuring resources for the roll out of the Entry Level agri-environment scheme, which we strongly support;

b. signalled a strong commitment to a further shift in farm support in England towards paying for positive environmental management rather than subsidising farmers and agriculture, which has been the policy of English Nature for some time;

c. introduced a number of welcome measures under cross compliance which we had advocated; and

d. drew a clear line between the baseline standards required through cross compliance and incentive led management of the countryside through agri-environment schemes, something we had urged Defra to do.

3.23 English Nature warmly welcomed the announcement, particularly since it clarified and confirmed the future direction of farm support in England and the government's commitment to a further shift in resources from the Single Farm Payment (Pillar I) and into agri-environment and rural development funding (Pillar II). We believe these decisions provide a model for further CAP reform and wish to see progress accelerated to enable the delivery a range of the government's food, farming and rural land management targets and objectives through revised EU funded rural development programmes in England, which will run from 2007 to 2013. But at the current time the resources available under Pillar II are inadequate to meet these demands.

Reform of the Rural Development Regulation

3.24 A major opportunity to secure further environmental benefits from CAP reform is through the reform of the Rural Development Regulation (RDR), the legal basis for Pillar II of the CAP. This is necessary in order to provide a new legal and financial basis for EU funded rural development programmes across the Union, such as the various agri-environment and development schemes under the England Rural Development Programme (ERDP). ERDP schemes are of critical importance to the delivery of a number of government targets and objectives for nature conservation, landscape

[2] Modulation is a piece of jargon used to describe the transfer of money between the CAP budget used to provide farm subsidies, also known as Pillar I support, and into Pillar II used to fund agri-environment and rural development schemes.

[3] *New Environmental Standard for Agriculture with CAP Reform.* Statement by Margaret Beckett, Secretary of State for Environment, Food and Rural Affairs, 22 July 2004.

management, resource protection and the management of the historic and cultural features.

3.25 In July 2004 the European Commission published its proposals for major changes to the delivery and funding of the RDR for the 2007 to 2013 programming period, to be recast as the European Agricultural Fund for Rural Development (EAFRD[4]). The Commission envisages three "axes" for rural development support:

a. increasing competitiveness of agriculture through restructuring
b. enhancing the environment and countryside through land management; and
c. enhancing rural quality of life and diversification of economic activities

3.26 There is some debate about how radical the underlying change is: many measures, for example, would remain much the same as under the current RDR, but there is a shift in philosophy towards the second pillar accompanying CAP reform whilst contributing to other EU policy priorities.

3.27 Discussion of the draft Regulation will be chaired under the Dutch and subsequent Luxembourg Presidency. Agreement in principle may even be delayed until the UK Presidency in the second half of 2005 whilst resolution of overall funding for the EAFRD (and possibly final approval of the Regulation) will have to await resolution of the wider debate on EU funding. However, there are some indications about how EAFRD resources will be distributed between axes and Member States.

3.28 English Nature is a strong supporter of the UK in negotiating successful conclusion to the negotiations in 2005. Our objectives for the negotiations are:

a. a clear statement from the Commission regarding the purpose and strategy for EU funded rural development programme that emphasises the importance of the environment and sustainable rural development;

b. a greater share of the total EU Rural Development budget, the UK, currently receives a disproportionately small allocation of the available budget;

c. a more rapid shift of resources between the two Pillars of the CAP, in order to increase funding under the new EAFRD; and

d. the flexibility for Member States to voluntarily increase transfers from national SFP allocations and into Rural Development Programmes.

3.29 **Over the next 12 months it is absolutely critical that the UK government is as successful in these negotiations as it was with the CAP Mid Term Review if we are to see a more rational EU agricultural and rural policy, adequate funding and more effective delivery of agri-environment and rural development schemes in England and across the EU.**

[4] *Proposal for a Council Regulation on support for rural development by the European Agricultural Fund for Rural Development (EAFRD).* European Commission. 14 July 2004.

4. Technology

4.1 Technology plays a fundamental role in enabling farming to respond to social, economic and political drivers, although it is not normally in itself seen as a driver of change. **Technologies make policies possible.**

4.2 Discussions of the factors influencing agriculture and its impact on the environment often focus on the impact of policy and economics and the role of technology is often overlooked. **The way technology is used by agriculture, however, has always been an important shaper of the landscape and the rural environment and adaptations of many traditional technologies provide important tools for the management of land for conservation objectives.** Initiatives such as the Grazing Animals Project (GAP) and the Forum for the Application of Conservation Techniques (FACT), both sponsored by English Nature, provide networks to share new ideas, techniques and practical solutions for the conservation management of land.

4.3 **The capacity and power of new technology to change the way we exploit agricultural land is continuously expanding**. The change from hay-based grass conservation to silaging and from spring to autumn sowing of arable crops are powerful examples of technological changes that have both increased productivity and had adverse impacts on the terrestrial, freshwater and marine environment. For the past forty years there has been debate on the safety and environmental impacts of agrochemicals. In recent years however, intense public debate about the use of genetically modified organisms (GMOs), or more generally, biotechnology, in agriculture has highlighted the fact that technological innovations can have significant impacts on markets, farming and the countryside, and can pose risks to biodiversity and other components of our environment.

4.4 We can view biotechnology as the latest in a long series of technologies that have enabled farmers to adapt their practices to produce food, fuel and fibre more efficiently, in greater quantities and at lower cost. The advent of genetic modification heralds a new era in which crop, tree and animal varieties can be adapted in ever more radical ways, although opinions are mixed as to the desirability of the technique and the use of its products in agricultural systems. But GM is just one tool in a whole "toolbox" of genetic techniques that will soon have the ability to transform the face of agriculture, forestry and fisheries in the UK and Europe.

4.5 Because agricultural technologies will enable crop varieties to be more closely tailored to policy and market needs than has previously been possible, there is potential for them to be used either in more environmentally harmful or in more beneficial ways, depending on the nature of the drivers affecting their development and use. This includes the use and management of crops for traditional purposes but increasingly the potential environmental costs and benefits of biofuels and non-food crops need to be carefully assessed.

4.6 For example, if policy and/or market forces encourage increased production of wheat to supply global markets at competitive prices, technology will respond by developing varieties with higher yields and cheaper weed management options, perhaps herbicide tolerant winter wheat with enhanced disease resistance and high nutrient conversion

capability. These are the kinds of developments that we are currently seeing in advanced plant breeding.

4.7 Conversely, if policy and markets provide farmers with incentives to grow quality, pesticide-free products for local markets, while enhancing in-field biodiversity, technology could respond by breeding desired quality and/or resistance traits into locally-adapted varieties, which could be grown using specially designed management practices with proven biodiversity benefits, perhaps as part of a whole rotation.

4.8 Improved use of science in agriculture is not restricted to laboratory-based technologies. Organic farming takes ecological science as one of its inspirations and has developed over recent decades into a modern and highly effective system of agriculture. **Evidence from a range of comparative studies, most carried out in the last decade, now allow us to say with a high degree of certainty that, when compared with equivalent non-organic farms, organic agriculture makes a substantial positive contribution to the conservation of biodiversity and often to wider indices of sustainability as well.** Maintaining this positive relationship between organic farming and nature conservation is an important objective for English Nature. The organic movement has traditionally worked with all parts of the food chain, especially consumers, in a way that provides an effective demonstration for more conventional food and farming sectors and the future development of the Government's Sustainable Food and Farming Strategy. We will continue to work with the sector to help maintain the high organic standards that prevail in the UK and to extend these at international levels with the aim of increasing the amount of land farmed organically and enhancing the competitiveness of domestically produced products.

4.9 Given the extent to which recent past efforts at crop breeding have concentrated on traits which are of less value in organic systems there is little doubt that if new crop breeding programmes focused, for example, on pest resistance and the development of more competitive root architecture we could see further improvements in agronomic efficiency within a system that would still retain its ecological functionality.

4.10 Given the current situation in Europe, it is likely that technologies will develop in both these directions, although if we want farming to follow the organic / 'local production' path, significant policy shifts will be needed to encourage industry to dedicate sufficient resources to development of suitable varieties and management practices. Private sector companies, with major research and development resources, can see that sustainable agriculture is an important avenue for technological development, but they can also see that the commercial viability of sustainable systems will rely largely on government intervention and the use of a range of policy instruments, including the provision of public sector incentives to farmers. However, given the uncertain future of the CAP, reluctance by industry and public institutions to embark whole-heartedly into such initiatives is understandable.

4.11 One initiative that could help tip the balance towards more environmentally sustainable crop varieties is a DEFRA-sponsored review of the National Listing process – specifically the criteria used to determine Value for Cultivation and Use ('VCU') of varieties on the list. At the moment, the primary characteristics used to grade new

varieties are those relating to yield. A new variety that had excellent pest and/or disease resistance, but lower yield, would achieve a low score under the present system, so there is little incentive for breeders to develop such varieties. This likewise applies to the Recommended List (RL) of cereal and oilseed varieties published by HGCA. The varieties on the RL account for the vast majority of crops sown in the UK each year. It is hoped that the review, contracted out to NIAB, will lead to the development of new grading systems for these lists, with higher weighting towards crop characteristics that enable more sustainable cultivation.

4.12 **Markets also have an important part to play in stimulating technological development**: for example European consumers are increasingly demanding food free of pesticides. Organic farming has an important role to play in responding to this demand using appropriate technology to increase the production of organically grown crops and livestock. However non-organic producers will also be looking to respond to this demand, especially in regions where arable 'commodity' crops are produced by intensive systems not involving livestock. However, the best ways of delivering the range of environmental functions that are increasingly being demanded of agriculture are not necessarily obvious. Those involved in R & D, whether in publicly- or privately-funded institutions, need to enter into dialogues with all organisations that have expertise in the various elements of agricultural sustainability.

4.13 It is thus important for English Nature to be aware of and influence developments in agricultural technologies, foresee their potential impacts on biodiversity, and to understand what is driving these developments. Policy and strategic decisions will increasingly need to take into account the likely effects that new technologies, especially plant breeding, will have on what is currently seen as "normal" farming practice. **Influencing the direction of research and development in agricultural technologies is a key strategic target for English Nature. We also have a central, statutory role working with government and industry on the development and application of regulatory systems governing the use of the products of agricultural technologies, principally novel crops and agrochemicals.**

5. Pollution and eutrophication

5.1 Excess levels of nutrients in water can give rise to a condition known as "eutrophication", which can affect a wide variety of aquatic systems, including rivers, lakes, ditch systems, fens, bogs, wet grasslands and estuarine/coastal habitats. An excessive supply of nutrients interferes with the delicate balance between aquatic plant species, favouring a smaller number of vigorous species and creating reductions in species diversity. In freshwaters, submerged flowering plants are lost and systems become dominated by algae – this has knock-on consequences for a range of animal species, dependent on submerged plants for shelter, food and reproduction. Excessive growths of algae in and on bed sediments (in both freshwaters and marine systems) can also radically alter sediment conditions, affecting a range of species dependent on the sediment for all or part of their life cycle.

5.2 In addition to the loss of submerged flowering plants and the habitat they provide, the resultant algal blooms associated with eutrophication can give rise to additional water quality problems. Large depletions in oxygen levels can occur - many cases of large-scale fish kills have been reported associated with algal blooms. Certain species of algae

also release toxins that may seriously affect the health of mammals (including humans) fish and shellfish. These blooms can prevent the use of water for drinking water supply and for recreation so reducing its amenity value.

5.3 Atmospheric sources of nitrogen can also cause enrichment of terrestrial semi-natural ecosystems which are often naturally nutrient poor. This increase in nitrogen alters the plant community composition in favour of more aggressive species better able to utilise the additional nitrogen. It can also lead to direct losses of very sensitive species. Atmospheric deposition of nitrogen in sensitive catchments also leads to acidification and enrichment of some freshwaters. Agriculture is a major contributor to atmospheric nitrogen, largely as a result of ammonia emissions from intensive livestock systems.

5.4 **Agriculture is an important source of environmental pollution and the eutrophication of fresh and coastal waters. Considerable improvements have been made with regard to point source pollution incidents, which for many water bodies, are now less important than diffuse pollution for which agriculture is often the main source.**

5.5 **Phosphates:** In freshwaters, phosphorus is the nutrient of greatest concern, since it is naturally in short supply relative to the other major plant nutrient, nitrogen. In coastal systems, nitrogen is more of a concern since it is frequently in shortest supply. However, these are over-simplifications. There are situations in freshwater where nitrogen is a particular concern, for instance, on fens and wet grasslands, and there are coastal systems where phosphorus is likely to be the key management target, for example, in instances where blue-green algae need to be controlled.

5.6 **The pollution loads of both phosphorus and nitrogen from agriculture have greatly increased over the past 50 years as a result of intensification of production systems**. Whereas nitrogen is a highly water soluble mobile element and rapidly moves through soils, phosphate is often tightly bound to clay particles and high freshwater loads are more closely associated with soil erosion and the loss of soil to water bodies. The increasing incidence of soil erosion in England from more frequent cultivation, reductions in soil organic matter, changes in the timing of cropping patterns (such as the shift from spring to winter sown cereals), higher livestock densities and greater soil compaction and poaching and the heavy and / or inappropriate use of fertilisers are estimated to have doubled phosphorus loads by from agricultural land between 1931 and 1991. **Unless the problem is addressed the situation will become much worse. It is estimated that an annual surplus of 16kg P/ha has been building up in agricultural soils – if this continues, many more soils will become saturated with phosphorus and leaching will greatly increase.**

5.7 **Today, around half of all phosphorus loads and 70% of all nitrogen loads to UK waters originate from agriculture.** As point source discharges of nutrients are progressively addressed, though the Urban Waste Water Treatment Directive and other initiatives (particularly on designated sites), the relative contribution from agriculture will grow even if agricultural loads do not increase, which they are likely to in the absence of effective countermeasures.

5.8 **Turbidity and siltation**: Artificially elevated loads of fine particulates (silt) have a major physical effect on aquatic systems, increasing turbidity and smothering river

and lake sediments. Increased turbidity levels reduce light levels in lakes and lead to the loss of rooted submerged plants, as well as impairing the vision of many animals relying on sight for catching prey or avoiding predators. The small size of particles blocks the interstices of coarse sediments in rivers and lakes and prevents proper aeration, which has major consequences for certain rooted plant species and a range of animals with life stages that are dependent on sediments with low levels of silt. In rivers, salmonid fish are the most prominent animals suffering from siltation problems (they bury their eggs in gravels), but a range of fish and invertebrates and also plants such as water-crowfoot species are affected. In lakes, heavy loads of silt have been implicated in declines of submerged plant communities, by creating an unstable and heavily anoxic rooting medium. **Agriculture is a heavy contributor to silt loads, arising from the inappropriate cultivation of erosion-sensitive soils and soil compaction from the use of heavy machinery.**

5.9 **Organic pollution**: This results from contamination of water with easily degradable organic material, such as silage and manure effluent and domestic sewage. As it decomposes in the water it uses up oxygen, thereby suffocating fish and other animals living in the water. Large amounts of ammonia are also produced, which is very toxic to wildlife. Colonies of bacteria feed on the carbon and nutrients, building up into unsightly masses known as 'sewage fungus'.

5.10 Organic wastes also contain solid material, which can increase turbidity and reduce light penetration. It can settle on streambeds, reduce bed stability and alter the substratum for bottom-living (benthic) communities of invertebrates. Organisms that require clean river water are gradually eliminated, resulting in a reduction in species diversity and a high abundance of fewer pollutant tolerant species that can survive under low oxygen condition, such as *Tubifex* worms, non-biting midges, and bloodworms.

5.11 Organic pollution affects migratory fish such as salmon and sea trout, which require well-oxygenated waters. In headwaters, the effect of deoxygenation is to make spawning and nursery areas unusable while in lowland areas it can effectively act as a barrier preventing migratory species from reaching the headwater breeding grounds.

5.12 **Ammonia**: The intensification of farming practices over the last 50 years, and in particular the increase in stock numbers, and of nitrogen in feeds and fertilisers, has led to considerable increases in the emissions of ammonia from agriculture. **Currently, over 80% of emissions of ammonia in the UK are from agriculture with the majority from intensive livestock production. Ammonia can damage sensitive habitats through nitrogen enrichment and acidification, and as other air pollutants such as sulphur dioxide and oxides of nitrogen have been greatly reduced, the relative importance of ammonia has increased.** Deposition of ammonia is very high in the locality of intensive livestock units but it is also transported long distances and there are high inputs of wet deposition onto sensitive upland sites.

5.13 Atmospheric deposition of nitrogen exceeds the critical loads set for the protection of sensitive ecosystems over a significant proportion of the UK and ammonia is the dominant component of total nitrogen deposition. The Countryside Survey 2000 and the New Plant Atlas of British and Irish Flora have provided evidence of a shift towards nitrogen-liking species in semi-natural habitats. This trend is most strongly correlated

with deposition of ammonia and its compounds. **Thus, in the long term, ammonia represents a significant threat to the attainment of favourable condition of SSSIs.**

5.14 Ammonia emissions from agriculture were highlighted as an issue in the government's Strategy for Sustainable Farming and Food (SFFS). Whilst the UK has signed international agreements to reduce emissions of ammonia, the reductions are small and there will remain large areas of sensitive ecosystems in exceedance of the critical load. A strategy is required to target ammonia mitigation, including on-farm measures and land use measures, to deliver a significant reduction in the deposition to protected sites.

5.15 **Pesticides:** Widespread pesticide use is one of the features of intensive agriculture. While initial concerns from the 1960s about direct toxicity to vertebrates are less prevalent now, present use continues to contribute directly to declines in arable flora and farmland invertebrates and indirectly to the declines of many species higher up the food chain. By affecting the availability of invertebrate and plant prey items within cultivated areas, pesticides are a likely contributory factor in the declines of a number of farmland bird species. In addition, there continue to be concerns about the occurrence of pesticides in water courses and in aquatic sediments, as well as pesticide drift into terrestrial non-crop habitats.

5.16 Key areas of for action in relation to the agricultural use of pesticides are:

a. the need for a coherent and comprehensive Government strategy and action plan for pesticides use;

b. successful and widespread uptake of the various actions identified for users, advisers and suppliers/manufacturers under the industries' Voluntary Initiative on pesticides. This must be linked to appropriate incentivisation and backed up by a pesticide tax if voluntary measures are not successful;

c. further refinement of areas of inadequate risk assessment in the current regulatory process, including monitoring programmes;

d. greater resources into surveillance and enforcement of compliance with pesticides legislation; and

e. strategically, a push for development of crop protection practices which reduce the damage of pesticides in the environment, including husbandry methods that do not rely on pesticide use and advisory/extension service roles.

6. Climate change and biofuels

6.1 Climate change is the most significant and far reaching environmental threat to face the Earth in its recent history. Greenhouse gas (GHG) emissions from human activities, including agricultural practices, are accelerating what was a wholly natural process and scientific evidence suggests that we are currently committed to at least 50 years of rapid climate change.

6.2 Climate mitigation is aimed at driving down greenhouse gas emissions and is essential in moderating climate change in the long term. Due to the lengthy activity times of

greenhouse gases once in the atmosphere, the effects of mitigation measures are unlikely to be realised until well into the second half of this century. From the perspective of the agricultural sector, such measures include reducing methane emissions from livestock production, implementing minimal cultivation regimes to reduce carbon emissions from soil disturbance, reducing inputs of artificial nitrogen fertiliser (which is very energy-intensive to manufacture and increases emissions of N_2O into the atmosphere) and investing in crops which maximise potential for carbon storage (sequestration).

6.3 The potential of biomass and biofuels to contribute to a reduction in greenhouse gas emissions is an area that has attracted considerable interest. Plants are a renewable source of energy, but since the discovery of fossil fuels their use in industrialised countries has been largely confined to domestic wood-burning fires and stoves. Modern agricultural technologies have enabled intensive production of crops that could be used for 'biomass energy' production on a larger scale.

6.4 The government's *Strategy for Sustainable Farming and Food*, published in December 2002, advocates on-farm diversification (including non-food uses of crops) to sustain jobs and provide new employment.

6.5 Prices for commodity crops, particularly wheat, are currently very low and the production of bioenergy crops has been suggested as a way for farmers to supplement their incomes. Producing energy from biomass and biofuel crops requires dedicated infrastructure systems, including guaranteed supplies of raw material, transport systems and processing plants. It has been claimed that the establishment of such production systems in rural areas would create new employment opportunities in rural areas. In recognition of the potential contribution that bioenergy crops could make towards emissions targets and rural development objectives, various initiatives have been set up in the UK and the EU to promote their use.

The principal crops that could be grown as bioenergy crops in the UK

Crop	Electricity	Heat	Biodiesel	Bioethanol
Willow (short rotation coppice)				
Miscanthus				
Oilseed rape	waste straw	waste straw		
Wheat	waste straw	waste straw		
Sugar beet				

6.6 A major investment in biomass or biofuel crops could have impacts on the English landscape, and therefore on biodiversity. The overall impact on biodiversity would depend on factors such as the kinds of crops that were grown, the areas under cultivation, how they were managed and what kinds of land use they were replacing. In comparison with other methods of renewable energy generation, biomass energy crops are a relatively inefficient use of land. This means that very large areas would be needed to make a significant contribution towards renewable electricity or fuel production and abatement of greenhouse gas emissions.

Approximate areas of selected bioenergy crops needed to abate greenhouse gas emissions (CO2 equivalent) by 1 million tonnes per year (EN calculations)

Crop	Usage	CO_2 abatement (t/ha/year)	Area needed to abate 1 m t CO_2 /year ('000 ha)	Area under cultivation in 2002 ('000 ha)
Oilseed rape	Biodiesel	2.0	513	430
SRC willow	Electricity (combustion)	2.9	345	< 10
SRC willow	Electricity (gasification)	3.7	270	< 10
Wheat	Bioethanol	4.3	233	2,000
Sugar beet	Bioethanol	5.5	182	170

6.7 To put this into perspective, the UK target for 2020 is to reduce greenhouse gas emissions by 125 million tonnes per year compared to the 1990 baseline but to abate emissions by just 1 million tonnes would require over half a million hectares of land to be used to grow oilseed rape for biodiesel production.

6.8 Because biomass energy crops will essentially be competing for space with a range of other land uses, the UK needs to think strategically about the role of bioenergy within the range of options for GHG abatement, conservation of farmland biodiversity and rural development. English Nature considers that Government decisions on levels of support for the industry should be based on sound scientific evidence within a strategic framework that includes both demand management and land use strategies.

6.9 It will increasingly become important to reconcile the goals of climate change abatement with those of biodiversity conservation. This will mean seeking win-win scenarios that can deliver both objectives. For example, reducing tillage and/or synthetic nitrogen inputs can both reduce GHG emissions and increase biodiversity within soils and above ground. In the long term this may mean a shift towards perennial crops such as miscanthus, which have very low nutrient requirements and can remain in the ground for 15-20 years. Current moves towards developing a carbon and environmental sustainability certification scheme for biofuels represent a potential driver for improvements in farming practice towards these goals.

6.10 In addition to exploring how agriculture can reduce its contribution to greenhouse gas emissions and help to find more sustainable energy sources climate adaptation is necessary to accommodate the inevitable impacts the environment, societies and economies over the next 50 years or more. Adaptation has not been adequately or explicitly addressed within the policy arena and has little resonance with decision makers. Effective adaptation measures will also need to be cross-sectoral (for example crossing urban and rural policy boundaries). They will also need to be recognised in spatial, land-use, and agri-environment policies and other environmental protection measures. From a biodiversity perspective, accommodating changing species' distributions across fragmented agriculture dominated landscapes in response to climate change will be a major challenge for nature conservation.

7. Agriculture and nature conservation

Overview and the wider countryside

7.1 Agriculture and farmers' business and land management decisions are one of the main determining influences on the quality and survival of wildlife in the countryside. **English Nature's primary interest in the sector is to influence agricultural land management decisions so that they sustain, enhance and restore the quality of the farmed environment for biodiversity.**

7.2 The interdependence of agriculture and nature conservation and the essential role that farmers have in caring for the farmed environment is well recognised. Until recently agriculture has moulded the English countryside to form landscapes enriched with a diversity of wildlife, natural features, historic places and distinctive local character. The management, enhancement and recovery of biodiversity on farmland is fundamental to achieving English Nature's goal of wildlife gain and to fulfilling commitments to the Government's PSA targets, UK Biodiversity Action Plan and other international obligations.

7.3 Encouraged by agricultural policies and with technological advances over the last 50 years, the intensification and specialisation of farming methods (key elements of which are greater mechanisation, labour shedding, greater use of agro-chemicals, increase in farm and field size and more specialised production on individual farms) have seriously reduced the range and abundance of wildlife habitat and natural features. The consequence has been a gradual erosion of the traditional relationship between agriculture and nature conservation. For instance:

a. lowland wildlife habitats survive often as neglected fragments;

b. upland habitats are damaged by heavy livestock grazing and related practices;

c. coastal habitats are squeezed between rising sea levels and land defences;

d. general farmland no longer supports the extent and number of dispersed species, such as farmland birds, mammals and currently rare arable plants; and

e. freshwaters are affected by excess nutrients and sediment, drainage and abstraction.

7.4 These effects can be listed as key environmental indicators or generic impacts (see Annex II). Specific impacts include, for example, in England and Wales since 1940, unimproved neutral grassland has decreased in area by an estimated 97% whilst lowland calcareous grassland has decreased in area by an estimated 80% (NCC 1984). In the last 25 years a whole suite of characteristic 'common' farmland species including arable wildflowers, mammals, invertebrates and farmland birds have suffered declines in population and range.

7.5 As a general rule biodiversity has been pushed to the margins of modern conventional agriculture (except where physical constraints prohibit this, as in the uplands) where it now subsists as a residual resource peripheral to most farming systems. The net effect

of the processes of agricultural intensification and specialisation has been to replace ecological and landscape diversity with uniformity.

7.6 The various pressures, policy, economic and markets on extensive and sustainable grazing and mixed farming systems in both the uplands and lowlands is a critical issue for securing English Natures' conservation objectives. Solving these complex problems and finding ways to make livestock grazing both economically viable and environmentally sustainable is a major challenge. Strong partnerships will need to be developed between a wide range of interests. New grazing systems, possibly using animals that are not intended for consumption, may be needed.

7.7 Key components of agricultural environments (agro-ecosystems) in England are:

semi-natural 'infield' habitats: These habitats are the product of grazing and cutting, and less commonly, burning of vegetation. They include chalk and limestone grassland, neutral grassland, fen meadows and grazing marsh, lowland heath and heather moorland. These habitats are often species-rich and this richness depends upon the maintenance of low soil nutrient status. The application even of very low levels of artificial fertiliser leads to loss of species diversity;

field-boundary habitats, including hedgerows, field margins and water bodies. The flora of hedgerows provide valuable 'woodland edge' habitats which, in conjunction with appropriate infield habitats, support a wide range of invertebrate, bird and mammal species. Such diversity depends upon appropriate hedgerow and hedge-bottom management (e.g. cyclical coppicing or layering) in combination with appropriate infield practices (e.g. retention of winter stubbles, prevention of nutrient and spray drift);

farm freshwater habitats, including ponds, ditches and streams support a wide variety of aquatic and emergent flora together with invertebrates, amphibians and mammals. Such diversity depends upon appropriate management, high water quality and appropriate water quantity;

in-field habitats, that is cropped habitats, including grass leys. Under traditional management these habitats are valuable for biodiversity in their own right. Traditional ley farming, whereby pasture is established by under sowing spring cereals with a grass/legume mix followed after one to three years by a return to cereals, represents the favoured habitat management for a suite of now declining farmland birds such as corn bunting, skylark and grey partridge;

species dependent upon mosaic of habitats including the above and small traditionally managed broad-leaved woodlands (e.g. greater horseshoe bat);

non-agricultural habitats such as larger open water bodies and systems whose biodiversity is dependent upon the sustainable use of land in the river catchment and of groundwater resources;

soils that retain structure, fertility, carbon storage capacity and unpolluted status as well as supporting their own specialist and little understood biodiversity; and

an **unpolluted atmosphere** that does not compromise biodiversity through, e.g. acidification or nitrogen enrichment.

7.8 Socio-economic communities are needed to retain the population, skills and knowledge and economic and political capacity to manage and sustain this diverse range of semi-natural and managed eco-systems. The role farmers and their families have provided in managing the countryside and its environment has, until recently, been taken largely for granted. Wildlife and landscape was a by-product or joint-product of economic farming given the markets and technology available. Competition and technological progress has led to changes in farming systems which have changed the link between wildlife, landscape and food production. Society now values wildlife and cultural landscapes explicitly for themselves, and policy has developed that reflects this, although it has lagged behind the impacts of the modernisation of agriculture. Many farmers share these wider values and retained valued environmental areas within their modernised farm businesses. However more recently, as the economic pressures on farming have increased, their ability and willingness to provide largely free environmental services for society has been eroded. **The continuation and renewal of farming's environmental land management function needs to be supported and adequately rewarded by society and become a more formal part of the farming economy, farm business choices and a natural enterprise choice for modern and efficient multifunctional farm businesses.**

Habitat and Biodiversity Action Plans

7.9 Agricultural management has a major role in the delivery of HAPs and SAPs. Agriculture is by far the major land use in England. As an industry, it has great potential for delivery of the biological enhancements we seek.

7.10 Each HAP and SAP identifies the specific threats facing priority species and habitats. **Nearly half of all HAPs and SAPs identify agricultural practices as a threat to the priority species or habitats that they seek to protect and enhance.** Of the 391 published SAPs, 174 (44%) make reference to agricultural practices as a threat, and an additional 89 (23%) identify agricultural management as an area where action should be taken to address concerns. This percentage is greater than for any other sector. Of the 45 HAPs, 29 (64%) identify agricultural practices as a threat or an area of concern. However, only 7 HAPs and 62 SAPs are exclusively associated with agricultural land, indicating that the influence of agriculture goes far beyond farmed land itself. The most frequent agriculture-related problems mentioned in the Action Plans are associated with inputs of herbicides and pesticides, fertilisers or the resultant eutrophication (for 95 plans), and over-, under- or inappropriate grazing (for 36 plans). **Thus, improving the basic environmental performance of agriculture, in the way it uses, manages and affects natural resources, particularly soil and water, is as important as direct management of habitats in order to secure English Nature's biodiversity objectives.**

7.11 Within the agriculture sector the largest number of BAP actions relate to the design and implementation of agri-environment schemes. Whilst the increased funding for agri-environment schemes will mean that more can be done, the contribution they make to BAP targets needs to be more fully understood. One of the biggest problems in assessing the extent to which contributions to targets have been achieved lies in correlating the

area of BAP habitat with the areas covered by the schemes in England. On the other hand, agri-environment schemes have helped to deliver two of the main BAP success stories so far, on the stone curlew SAP and the cereals field margins HAP, where targets have been met ahead of schedule.

7.12 As well as impacts on individual species, agriculture has also had a dramatic effect on a wide range of wildlife habitats. This trend of loss has continued through the 1990s, for example between 1990 and 1998 the UK lost 18 per cent of its remaining chalk grasslands and 13 percent of its neutral grasslands (*Countryside Survey 200*0). Many of the habitats affected are important for achieving the BAP targets, through restoration or rehabilitation by improved management. Their loss means re-creation of new habitat, a more expensive and much less certain option than rehabilitating existing habitat areas, becomes more important. The new EIA Regulations should help reduce losses of many important habitats in future.

SSSI and the PSA target for favourable condition

7.13 There are 4102 Sites of Special Scientific Interest (SSSI) in England covering 1,050,159 ha, equivalent to approximately 7.5% of the total land are of England. The purpose of SSSI is to safeguard, for present and future generations, the diversity and geographic range of habitats, species, geological and physiographical features throughout England.

7.14 As part of Spending Review 2004 DEFRA has adopted the following Public Service Agreement target:

a. Care for our natural heritage, make the countryside attractive and enjoyable for all and preserve biological diversity by:

b. *reversing the long-term decline in the number of farmland birds by 2020, as measured annually against underlying trends; and*

c. *bringing into favourable condition, by 2010, 95% of all nationally important wildlife sites.*

7.15 By far the largest proportion of the area of SSSI currently in unfavourable condition is as a result of agricultural practices and agriculture is the sector with the most potential to make a positive contribution to the PSA target.

7.16 The condition of different habitat types varies significantly: the upland suite of habitats suffers badly from overgrazing and inappropriate burning, while undergrazing and scrub encroachment is a significant problem on lowland calcareous grassland.

7.17 Major changes to agricultural policy and developing markets to provide incentives and reward farmers who agree to manage SSSI for conservation objectives have the potential to make considerable contributions to the PSA target. Increasing available incentives can be achieved by increasing resources for agri-environment schemes by capping agricultural production subsidies (modulation). It is possible to use other

instruments to switch funds, such as National Envelopes for sheep and beef subsidies, but the Government has decided not to use these in England.

7.18 However, the new Environment Stewardship scheme does include many options that will contribute to the SSSI target. Making sure this potential is realised depends on effective targeting of the available funds to farms with SSSIs and helping them prepare sound applications that include the measures required to achieve favourable condition on the SSSI as part of their whole farm proposal. In the longer term more funds will be needed. Ideally these will come from additional modulation at EU level combined with an increased allocation to the UK. If this does not occur the UK will need to secure the power to transfer funds from the Single Payment to agri-environment schemes at national level on a voluntary basis. It could also explore the potential for using the national envelope option in future.

7.19 Just over 60,000 ha of SSSI (approximately 6% of the SSSI area) are covered by Countryside Stewardship or Environmentally Sensitive Area agri-environment agreements. A significant proportion, just over 40% of this area remains in unfavourable condition. Of particular note is where agri-environment schemes are topped up by English Nature administered Wildlife Enhancement Scheme (WES) agreements. Using this combination of schemes the more specific and complex management requirements of SSSIs can be met. The new Higher Level Scheme provides the capacity to refine management for many habitats and we have agreed a policy to transfer current WES agreements to the HLS where this is the case.

Table: Reasons for SSSIs being in unfavourable condition:

Cause of unfavourable condition	**NNR units (% number)**	**All SSSI units (% of area)**
Agricultural overgrazing	**8**	**31**
Agricultural undergrazing	**10**	**10**
Coastal erosion	**14**	**8**
Highway /coastal flood defences	**2**	**7**
Water levels	**19**	**4**
Scrub control	**11**	**4**
Over grazing – deer	**4**	**4**
Weed encroachment (thistles / ragwort)	**1**	**2**
Eutrophication / water quality	**7**	**1**
Conifer encroachment	**5**	**1**
Agricultural improvement	**4**	**1**

Farming and the wildlife character of local areas.

7.20 The UK Biodiversity Action Plan includes an over-arching objective to -:

"maintain and enhance biological diversity, paying particular regard to species, habitats and natural and managed ecosystems characteristic of local areas, and the biodiversity of natural and semi-natural habitats where they have been diminished over recent past decades."

7.21 DEFRA has adopted this through their PSA targets set out above. This concern for the general quality of wildlife is also reflected in the Quality of Life Headline indicators, which include reference to populations of wild birds.

7.22 Many of these species are widely distributed and their range has contracted alongside their total populations. This is also true of some of the key species covered by Species Action Plans including bat species and some of the flowering plants previously common in arable areas. This means the measures required to restore and maintain these species across their expected range need to be widespread and complement the more targeted measures focused on SSSIs. We believe new approaches to agri-environment schemes, particularly a new entry level agri-environment scheme with options tailored to different areas will make a significant contribution to the recovery of widespread species associated with farmland and to the locally characteristic farmland species in particular areas. Providing advice on the best options by Character Area is welcome as it ensures the diversity of landscapes and their management needs are embedded in the system.

7.23 Agriculture also has widespread impacts on adjacent habitats, in particular wetlands and freshwater habitats including rivers and lakes. These are largely through the transfer of chemicals and nutrients applied to agricultural land to these non-target areas. Good agricultural practice, encouraged through cross compliance measures, will limit these impacts, but in some cases positive action and management will be needed as well, including establishing and managing buffer areas or investing in facilities to handle chemicals, nutrients and wastes better.

8. Policy tools and their use

8.1 Although markets will be of growing significance in influencing farmers' land management decisions national and EU policy will remain a very important means of securing environmental objectives in the sector for the foreseeable future. There is a wide range of policy tools available to policy makers that are relevant to the sector and which can be used to achieve policy objectives including:

a. **legislation**, including national regulation such as Hedgerow Regulations or EU Directives and Regulations, such as the Water Framework Directive;

b. **environmental conditions** (cross compliance) placed on the receipt of EU farm support measures, such as Good Agricultural and Environmental Condition (GAEC) requirements on the Single Farm payment;

c. **advice,** such as the Farm Business Advisory Service (FBAS);

d. **voluntary measures and codes**, such as the pesticides Voluntary Initiative or the Defra Codes of Good Agricultural Practice (CoGAP);

e. **fiscal instruments**, including preferential fuel duty for agricultural use;

f. **financial incentive schemes**, such as the Environmental Stewardship agri-environment scheme which pays farmers for management of the countryside; and

g. the **land use planning** and **environmental impact assessment** (EIA) obligations for certain development operations.

8.2 Many environmental issues arise because their costs or benefits are incurred by society as a whole rather than by the person creating them. For example, when pollution costs are not taken into account by those causing the pollution, because the costs are borne by others, then the market does not function efficiently. And the same is true when private business activity creates public benefits (e.g. through stewardship of the countryside) which are not fully rewarded in the market place. There may then be a case for Government intervention to improve the working of the market, and raise the efficiency of the economy and to deliver better environmental outcomes. There may also be a need to intervene to improve environmental outcomes in order to meet international obligations, for example under EC Directives and international agreements.

8.3 The effects of agriculture on the environment are significant and complex, with both positive and negative impacts operating at local, regional, national and global levels. Positive environmental impacts include: providing a 'carbon sink'; supporting and maintaining diverse and attractive landscapes with historic features; and providing a complex range of habitats and food sources for farmland wildlife. Major negative impacts include: greenhouse gas emissions (carbon dioxide, methane and nitrous oxide); soil erosion; water pollution; and adverse impacts on biodiversity. Estimates of the economic value of those impacts are necessarily broad brush and imprecise but they suggest negative impacts in the range £1 billion to £1½ billion (for the UK) and positive impacts in the range £600m-£900m.

8.4 The best mechanism for informing a decision on whether or not to take action – and the type and extent of any action – should be cost-benefit analysis wherever it is practicable. The 'best' instrument or package of instruments will have the highest environmental benefits for the lowest cost of implementation and compliance, although it will also be necessary to take into account possible wider economic impacts (e.g. on competitiveness) and social impacts, including the distributional effects upon farm incomes and other stakeholders.

8.5 The forms of intervention available include: facilitating change by providing information (e.g. offering free advice, running awareness-raising campaigns); encouraging voluntary action (e.g. supporting industry-led environmental initiatives); incentivising change using economic instruments (e.g. taxes, subsidies, tradable permits, tendering systems); and requiring change using regulatory instruments (e.g. limits on emissions, technology standards).

8.6 The most appropriate form of intervention depends upon a number of factors, but will be determined in part by the type of market failure. Where an adverse environmental impact results from the effects of production subsidies, then policy reform which removes (or "de-couples") these subsidies represents the most obvious means of addressing the problem. Where there is an information failure, then providing advice, education or training services or running awareness-raising campaigns can help to reduce negative environmental impacts and increase provision of positive

environmental impacts. Where there are negative environmental impacts, voluntary instruments (such as farm assurance schemes), regulation, taxes, charges, tradable permit schemes, or some combination of these, might be appropriate, according to the particular situation.

8.7 Subsidies (including agri-environment payments, grants for capital investment, tax breaks) can be used to address negative environmental impacts. The Polluter Pays Principle creates a presumption against using subsidies in this way, but there may be cases in which they offer the best solution to a problem particularly when the distributional effects upon farm incomes and other stakeholders are taken into consideration. Subsidy is more appropriate where positive environmental impacts are being provided (the "Provider Gets" principle). However, there are limits to what is affordable; and on what is permissible under EC State Aid rules. There may be other ways in which the market could be encouraged to deliver, such as through labelling, farm assurance or other voluntary schemes.

8.8 Economic instruments, including agri-environment schemes, will generally be more advantageous for farmers than regulations. Regulations generally impose the same standards on all producers, regardless of how expensive it is for individual producers to change their environmental performance. Economic instruments allow those with high clean up costs to make smaller changes in their behaviour and incentivise those with low clean up costs to make relatively major changes. This means that economic instruments can sometimes achieve the same environmental benefits as regulation but at a lower cost to the economy and to the industry concerned.

8.9 No instrument is likely to perform better than alternative options in all respects and there will be trade-offs between the use of different instruments, reflecting their relative strengths and weaknesses. Frequently a single instrument does not operate in isolation. Combinations of different types of instrument work alongside each other to achieve a desired environmental outcome. This may be because, for example, there is more than one type of market failure; there is a need to take distributional consequences into account; or because it is necessary to encourage a transition from the current position to the optimum outcome, recognising that this will involve transition costs for those involved. A combination of regulatory and economic incentives, comprising both payments and taxes, may therefore provide an effective means of addressing the mix of positive and negative environmental impacts which arise from agriculture.

8.10 A review of policies undertaken in other OECD countries shows that only environmental subsidies or payments have been widely adopted. While all OECD countries have introduced some form of environmental payments, only a handful have introduced charges and none has chosen to apply tradable permits on any significant scale.

8.11 There is a need to look across a broader range of policy instruments – information, voluntary, economic and regulatory – and seek cost-effective options or packages of measures. In particular, it would be useful to assess the scope for using economic instruments to address the environmental impacts of agriculture, as these can allow more flexibility for farmers, resulting in lower compliance costs.

9. English Nature's sectoral targets and objectives

9.1 The priority actions, which English Nature will engage in for the period of this Sector Analysis, are drawn from: our *Corporate High Level Targets*; our *Sectoral Targets for Agriculture* and from the forgoing analysis of policy, market, technical and land management factors which we believe will drive the sector over the next few years.

Corporate High Level Targets

9.2 English Nature's activity in the agricultural sector has a major contribution to make towards securing our high level objectives for 2001 – 2005 as set out in our Corporate Plan. The top-level performance targets with particular relevance for agriculture, and on which our agricultural work needs to deliver are:

Designated sites:

- To safeguard the finest examples of England's wildlife and geology in a favourable or recovering condition for the benefit of present and future generations.

- Through influence and action, support DEFRA in achieving its target of bringing 95% of the area of SSSI into favourable or recovering condition by 2010.

Wider environment:

- To improve, enhance and monitor the levels of biodiversity in the wider environment.

- Through action and influence, support DEFRA in achieving its target to reverse the long-term decline in the populations of farmland birds by 2020.

People and policies:

- Increase the total resources available to support activities required to achieve national nature conservation targets through policy changes, greater public support and access to external funds.

Science:

- To have sufficient scientific information and understanding to make sound judgements which benefit nature conservation.

- To have a sufficiently sound reputation, in terms of scientific understanding and judgement, so that the scientific information we present is able to withstand robust challenge, and our advice is accepted.

Sectoral Objectives

9.3 To help achieve these corporate objectives English Nature has established a set of Sectoral Objectives for agriculture, these are:

a. to work with DEFRA, the Rural Development Service and others **to optimise spending of agri-environment and rural development funds** under the England Rural Development Programme to help achieve the Public Service Agreement Targets for SSSIs and farmland birds and to deliver Biodiversity Action Plan Targets;

b. as part of our input to the mid-term evaluation of the England Rural Development Programme in 2002/2003, we will continue **to advocate improvements to existing schemes** and measures in light of experience and monitoring results, and to extend these schemes in ways that consolidate wildlife gains already achieved **through appropriate targeting**;

c. Through our work contributing to the mid-term review of the CAP and through our inputs to the development of a new Government Strategy for Sustainable Food and Farming we will **advocate a further switch of funds from production subsidies towards payments for environmental goods**, press for **the implementation of environmental conditions on subsidy payments** and the use of various opportunities under livestock support regimes **to reduce stocking on overgrazed upland** habitats and **increased support for extensive beef and organic farming**;

d. promote the environment as an integral part of all other rural development programmes, particularly in the Less favoured Areas;

e. through the inter-agency Land Use Policy Group we will lead a policy research and advocacy programme to influence opinion in the World Trade Organisation and EU Agriculture Council in favour of fundamental Common Agricultural Policy reform;

f. promote the need for joined up delivery services, developing links between, whole farm planning, food production and the environment, and for higher environmental performance in the agriculture sector both within the UK and across Europe; and

g. take an active and respected role in providing well grounded advice on **the use of agricultural technology and the development of R&D programmes** to promote sustainable agricultural systems.

Annex I - Summary of key shaper, key players and English Nature lead teams/individuals for each Priority Action

Priority action	Key shaper	Key player	EN lead teams/individuals
1. Secure more effectively targeted and better resourced schemes that encourage land managers to help deliver our priorities for wildlife gain, as well as other environmental and supporting socio-economic objectives on designated sites and in the wider countryside.	Treasury, DEFRA (particularly CMD and RDS), European Commission (particularly DG Agriculture and DG Environment)	NGOs (RSPB, NT, Wildlife Trusts, CPRE, WWF, WCL), Statutory Agencies (LUPG), NFU, CLA, HFI, FWAG, National Parks, Soil Association	Agriculture Unit (Chris Reid), Environmental Impacts Team (Chris Mainstone, Jonathan Burney), Chief Surveyor, (Sites and Surveillance Team), all Local Teams
2. Work with Defra and a range of other partners and stakeholders to develop more integrated livestock policies and strategies that are capable of securing environmentally sustainable grazing in both upland and lowland England through support for both site-based initiatives and by ensuring that the regulation and support for livestock, processing and marketing infrastructure is complementary to English Nature's objectives.	DEFRA (particularly CMD, BASD, RDD, HFPU and RDS), Treasury.	NGOs (RSPB, NT, Wildlife Trusts, WWF, WCL), NFU, CLA, HFI, National Parks.	Agriculture Unit (Livestock and Hill farming Policy Officer), Operations (Bruce Keith), Local Teams
3. Define and advocate English Nature's policies for the use of regulatory, advisory and farm audit strategies that substantially improve the environmental performance of individual farms, help ensure a farm's individual performance is appropriate to its landscape context and improve the baseline environmental standards for the agricultural industry as a whole.	DEFRA, Environment Agency	NGOs (RSPB, NT, CPRE, WWF, WCL), Environment Agency, RDS, LEAF, FWAG, NFU, CLA, HFI, Assured Food Standards, Retailers, BRC, consumer groups	Agriculture Unit (James Trueman), Freshwater Unit, Pesticides (Alastair Burn)

Priority action	Key shaper	Key player	EN lead teams/individuals
4. Monitor, evaluate, influence and develop the innovative use of a range of technologies to both facilitate more environmentally sustainable farm systems and better conservation site management while ensuring statutory approval and assessment procedures minimise environmental risks. Develop understanding of the relationships between agriculture and climate change and further integrate work on climate change, biodiversity and agricultural policy.	DEFRA, Research Councils, ACRE, DTI, Cabinet Office, No. 10 Policy Unit, EC, World Bank.	NGOs (RSPB, FoE, Greenpeace, Genewatch, Green Alliance, Five Year Freeze). NFU, CLA, Biotec. Industry FWAG, Soil Association, NT, Wildlife Trusts, RBA	Agriculture Unit (Brian Johnson, John Bacon, Ian Alexander), Environmental Impacts Team (Alastair Burn)
5. Working with other GB Environmental Agencies, NGOs and other stakeholders, undertake further policy research to test, develop and refine English Nature's understanding of and position on further reform of agricultural and rural development policy and policy processes at the EU level, and in particular a greater and faster shift in resources from Pillar I to Pillar II of the CAP. Further integrate work on water and agricultural policy and develop policy on catchment sensitive farming. Champion, promote and advocate English Nature's policies for reform to domestic and EU audiences.	DEFRA, Treasury, Cabinet Office, No. 10 Policy Unit, European Commission	NGOs (RSPB, NT, CPRE, WWF, WCL), LUPG, NFU, CLA, LUPG	Agriculture Unit (Gareth Morgan), Environmental Impacts (Jonathan Burney), Team, European Unit, Government Unit (Alex Machin)
6. Maintain and further develop the Unit's high standard of communications and explain and promote key policy messages to a range of audiences. Ensure the agricultural policy messages are	Internal EN audiences: Senior management, Council, Local Teams and RGMs and RPOs, national teams and units. External audiences:		Agriculture Unit (Rebecca Isted), Press Office, various internal publications and communication strategies.

Priority action	Key shaper	Key player	EN lead teams/individuals
integrated into English Nature's wider external communication plans and further develop the Unit's internal communication to ensure the various parts of the organisation understand and can contribute to the work of the Unit.	government, other agencies, NGOs, farming organisations, land managers and farmers, and general media.		

Annex II - Generic impacts on biodiversity of agricultural intensification and specialisation

1. Loss and fragmentation of semi-natural ‘infield’ habitats through improvement or conversion to arable cropping.

2. Abandonment or under-management of extant semi-natural ‘infield’ habitats (mainly in the lowlands).

3. Loss or mismanagement of ‘interstitial’ habitats.

4. Drying out of wetland habitats due to water over-abstraction.

5. Pollution, siltation and eutrophication of surface and groundwaters leading to severe reduction in characteristic farmland species.

6. Shift from spring-sown to autumn sown cereals leading to loss of winter stubbles and loss of suitable nesting sites for characteristic bird species.

7. Universal application of artificial fertiliser leading to the loss or degradation of characteristic hedgerow or field margin vegetation.