Overview of lecture

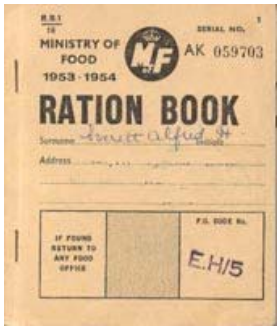
- Outline the changing policy context for rural land over the past half century (slides 2-7)
- Identify some of the challenges that climate change poses for land use (slides 8-10)
- Look at examples of agriculture, biodiversity and renewable energy (slides 11-15)
- Consider the implications for taking a strategic approach to land use (slides 16-25)

Where appropriate, I will draw on the analysis of research projects within the Rural Economy and Land Use (Relu) that I direct on behalf of the Research Councils.[1]

[1]I would like to thank the following for supplying me with material and ideas for this lecture: Jeremy Franks, Mark Kibblewhite, Anne Liddon, Andrew Lovett, Joe Morris, Jeremy Phillipson, Chris Rodgers, Peter Sutton. The opinions and judgements I express are personal ones.

The policy background

After WW2 food production was a priority



- During and after WW2 the overriding imperative was expansion of food production. Whatever land that could be brought into production was (roadside verges, home gardens, ploughing up of downland). There was little concern for the costs or efficiency of production – the limiting factor was seen to be the supply of human labour.
- Subsequently, in the post-war period, there was increasing, stress on productivism – the economically efficient expansion of food production.
- The focus was on boosting the productivity of the land and labour (and crops and animals). The emphasis on the spatial expansion of production diminished (although continued pressures to reclaim moorland and wetlands), but little concern for natural resource efficiency (e.g. use of water, fragile soils).
- Indeed, agricultural productivity became highly dependent on fossil fuel, turning farming from a net generator to a net consumer of energy.

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1970s/1980s

an era of over-production with butter and grain mountains and wine lakes

- Global food output expanded through a period of sustained economic growth. The commodity shortages and oil shocks of the early 1970's which framed the first concerns over Limits to Growth unleashed a renewed emphasis on productivism.

- Surplus food stocks built up. Disposal of surpluses and dumping on world markets caused growing disquiet and scandal.

- Introduction in the mid-1980s of supply controls – milk quotas; set-aside – in an effort to control overproduction.

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1990s onwards: consumer-oriented multifunctional agriculture

- We may come to see this as a sort of golden age for conservation
- Environmentalists' critique of over-intensive agriculture - for squeezing out wildlife and contaminating natural resources – was translated into schemes to deintensify agriculture, to encourage management for conservation.
- A complex system of regulations and rewards was established to safeguard and promote a multi-functional agriculture. Farmers were incentivised to maintain biodiversity, landscapes, and countryside access and to protect water resources. What many farmers saw as an untidy landscape left room for other functions than food production.
- Farmers encouraged to seek their rewards less from expanding low-cost commodity production and more from consumer demands for high quality, speciality and value-added products. Farmers' care for the environment seen as a potential source of green marketing. Green consumers were encouraged to 'Eat the View'.

- That particular slogan – Eat the View – now seems like a particularly sick joke, set against a crop of recent headlines.
- Are we entering a new era? It certainly feels like it, with soaring food prices; and talk of food shortages and a global food crisis.
- Market prices for wheat doubled in the year to February 2008. The price of milk went up by more than a quarter.
- Some of the concerns and issues are redolent of the Limits to Growth period of the early 1970s (with their combination of hikes in commodity prices at the end of a long period of global economic growth and the onset of economic stagflation)
- But other concerns take us back to the wartime Dig for Victory period. The Prime Minister even held a Food Summit at 10 Downing Street 22 April 2008. The World Bank estimates that global food supplies will have to increase by 50% by 2030 to keep up with population growth.

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Production at any cost?

Intensive farming damaging bird numbers

By Paul Eccleston, Daily Telegraph 06/06/2007

"*New green checks on subsidy payments to farmers are too weak to help declining farmland birds.*

"The European Commission today laid out its plans for reform of the Common Agricultural Policy but the limited measures to replicate the benefits of set-aside – which is being abolished – will do little to help skylarks, yellowhammers, linnets and other birds whose numbers have plunged."

- Does this mean a return to production at any cost? Many farmers and some scientists think that the balance has been tipped too recklessly towards environmental sustainability and away from food production objectives. They urge a renewed focus on productivism.
- But are we set to see more headlines such as this one?
- This is the fear of conservation organisations. The decline in farmland bird numbers has been halved in recent years, thanks mainly to the policy of set-aside. With such production controls now being abandoned, conservation organisations fear the worst.
- But we mustn't return to the old philosophy of expansion at any cost – it was too fossil-fuel dependent; too wasteful of natural resources.
- Moreover, the countryside contributes to many aspects of quality of life, and we should not carelessly sacrifice it.

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Or smart production?

- Production is one of a number of ecosystem services
- Increasing production involves trade-off combining economic/ecological efficiency
- Climate change is thrown into the mix

- The move away from a carbon-based economy demands that food and other vital resources must increasingly be derived from the sustainable exploitation of agricultural, forestry and marine ecosystems.
- Boosting food production involves careful trade-offs with other ecosystem services, if system functionality is to be maintained.
- As the Millennium Ecoystems Assessment sets out, there are a range of natural processes that regulate the climate, protect us from floods, purify water, and provide aesthetic and recreational value.
- Multi-functional agriculture which in the past has relied upon inefficient farming (with farmers tolerating, or being paid to maintain, sub-optimal production) must now become increasingly efficient, with the emphasis as much on ecological efficiency as economic efficiency.
- The experience with agri-environment policy of the last twenty years also should not be wasted. It points to the ways in which we might balance the public and commercial interest in the management of land.
- An additional public objective to be met is responding to climate change – a factor that exacerbates other pressures.

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How will the UK climate change by 2080?

- UK CIP project a rise of 2-3.5C
- Spring 1-3 weeks earlier; winter 1-3 weeks later
- Wetter winters; drier summers. Greater frequency of extreme weather events
- Sea level rise in South East England 26-86 cm

Source: UK Climate Impacts Programme 2002

- Already earth surface temperature up by about 0.6°. Most of this increase since 1970. UK warming has been higher than average with the 1990s the warmest decade on record. The central projection for 2080 is a 2–3.5° increase.
- The number of frost free days, hot summer days and the growing season have all increased, meaning a significantly earlier spring and later winter.
- There is a greater frequency of extreme weather events.
- Global mean sea level is rising by about 1.8mm p.a (more for SE England; less for Scotland).

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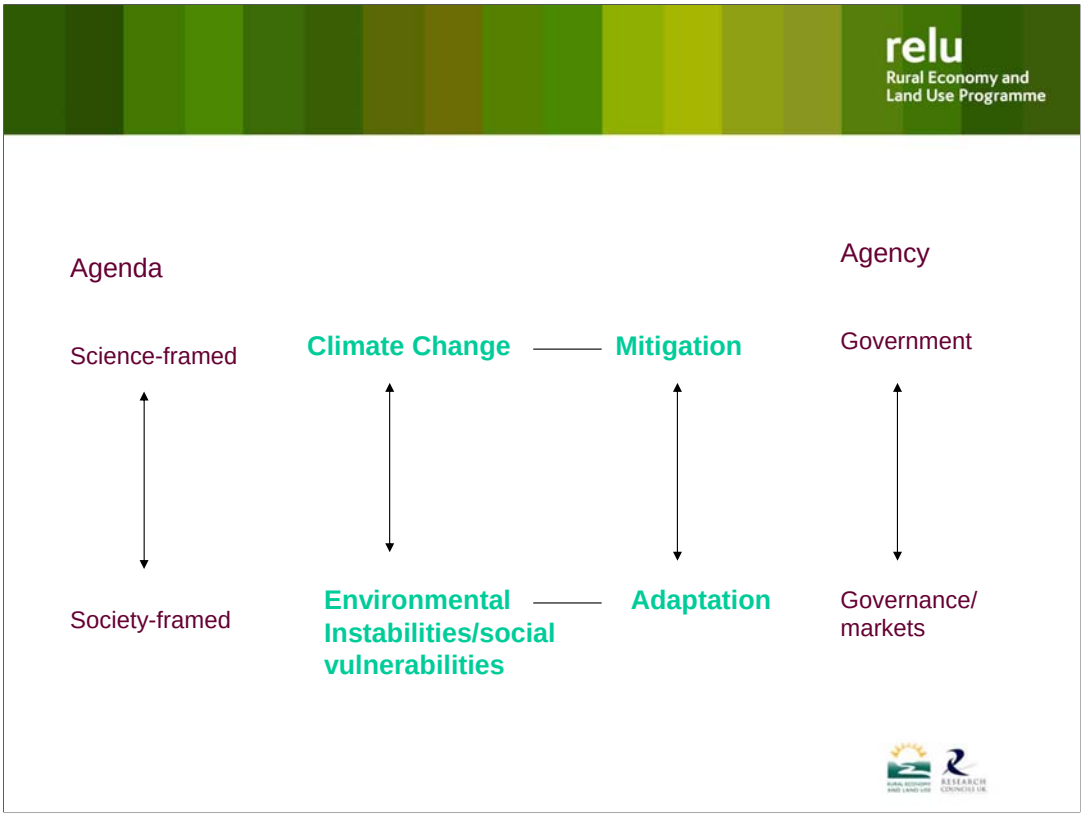
Mitigation versus adaptation?

Where should the balance lie?

- The science and politics of climate change have so far focused on mitigation. Increasingly, though, the focus is expanding to include the steps needed to adjust our economy and society to unavoidable changes in climate.
- We will have to adapt to rising sea levels, increased risk of inland flooding from extreme weather events, and changing conditions – both threats and opportunities – for agriculture.
- Adaptation means more spending, for example, on flood defence. According to the Environment Agency, 1.9 million properties and 1.4 million hectares of agricultural land could be at risk of flooding over the next fifty years; with the current annual bill of £1.4 billion worth of property damage possibly increasing 20-fold. How do we avoid such costly bills, but also not divert a huge proportion of our national income to flood defences?
- But adaptation must be combined with mitigation. We will have to use land to produce low-carbon energy - from wind-farms and solar power to biofuels - but also to absorb carbon emissions
- Moreover, forests and peat bogs have value not just for the diversity they support but also for their capacity to lock up huge amounts of carbon. How do we use and value them appropriately?



- These two agendas - mitigation and adaptation - interact, with potential synergies and frictions. In simple terms, the scale of the adaptation challenge will be set by the effectiveness of efforts to meet the mitigation challenge.

- However the two involve different time scales /different levels of decision-making/different actors. Efforts to mitigate climate change are science framed and focussed on governmental and intergovernmental action and regulation. Adaptation efforts are society framed, as people, organisations and markets respond to their perceptions of resultant risks and vulnerabilities. Both demand learning to manage under conditions of uncertainty.

- The way we use land is central to both the mitigation and adaptation agendas. On the one hand, land is both a major source of emissions and a major means for decreasing them. On the other hand, land especially as space is central to our capacity to adapt and adjust to the effects of climate change – for example, flood sacrifice areas or changing cropping zones or shifts in the geographical ranges of species.

- Much of the medium-term growth in greenhouse gas emissions is already in the 'pipeline'. So adaptation is a necessity. It is important to ensure short-term adaptations don't add to the long-term problem. The deployment of land must reconcile the short and long- term perspectives. What does this mean for land uses such as agriculture, biodiversity and renewable energy?

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What does climate change mean for agricultural land use?

- Agriculture produces 7% of UK ghg (among the main contributors to CO_2, methane, and N_xO)
- Mitigation measures: reduction in energy use; substitution of fossil energy; increased carbon storage; reduced emissions from livestock; and from manures and fertilisers
- Agriculture must also adapt to climate change (changing growing season, extreme events, pests and diseases, drier summers)

- Turning first to agriculture. It is responsible for 7% of UK ghg and should adapt various mitigation measures, such as:
  - Reduction in direct energy use (fuel, electricity, heating) and indirect energy (e.g. fertilisers)
  - Substitution of fossil energy through biofuel production and anaerobic digestion of manure etc.
  - Increased carbon storage in soils through higher inputs (straw incorporation, manure, cover crops, grass in rotation) and reduced soil organic matter turnover (no-till)
  - Reduced methane and nitrogen emissions through changes to the diets for ruminant animals, improved handling and storage of manures (including anaerobic digestion), and technical measures to reduce emissions from manures and fertilisers applied to soil.
- But agriculture will also have to adapt:
  - Growing seasons will change (already it has increased by about a month since 1990, and this trend is expected to continue)
  - Agriculture will have to cope with different pests and diseases
  - A shift in the geography of crops – with new opportunities as well as losses
  - Possible water shortages

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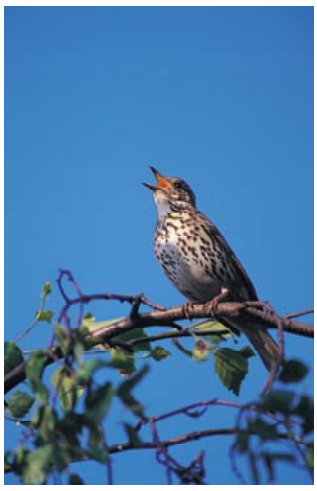
Plants and animals: go north or go south?

Direct key impacts of climate change upon biodiversity:

- Changes in the timings of seasonal events, leading to loss of synchrony between species and food availability
- Shifts in suitable climate conditions for individual species leading to change in abundance and range
- Changes in the habitats which species occupy
- Changes to the composition of plant and animal communities
- Changes to habitats and ecosystems, such as altered water regimes, increased rates of decomposition in bogs and higher growth rates in forests.



Source: MONARCH project, 2007

- Of course, wildlife has no option – it must adapt or perish. And adapt not only to the direct effects of climate change, but also to the human reactions to climate change, for example geographical shifts in arable and livestock production or growing new crops.

- Regarding the direct effects, the greater frequency of extreme weather events is likely to have as much impact on biodiversity as trends in temperature and rainfall.

- A majority of at-risk species – birds such as song thrush, plants such as twinflower - are likely to experience changes in the location and/or extent of areas where they can survive. Change is likely to be too rapid for evolutionary adaptation, though genetic variation in species may give added resilience.

- Current habitats are fragile and may be impossible to preserve as climate changes. It will be important to facilitate movement of species, largely northwards, to enable them to survive.

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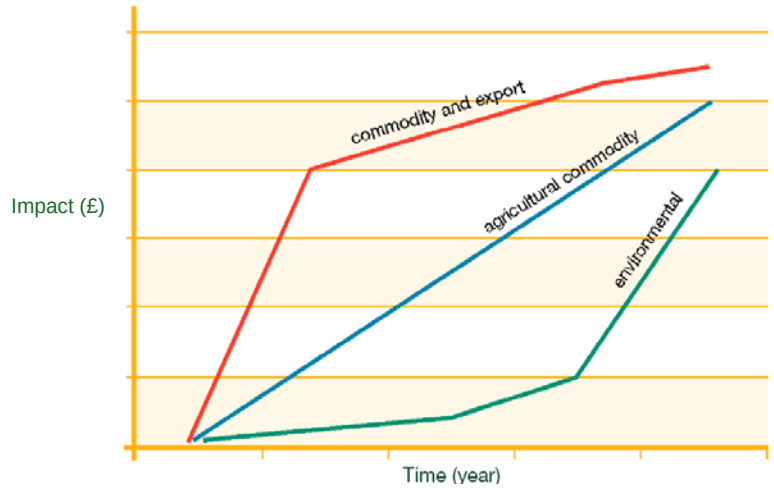
Impact profiles of different kinds of non native species



Source: Waage, 2005

- Of course, not all wildlife is welcome, and climate change raises the prospect of more invasive species.
- Different non-native species have differing impacts on the rural economy and the rural environment. The biggest problems will be caused by those species that have an impact on both.
- In the future, there may be a cross over between environmental and agricultural policies as a result of non-native species. Much depends upon changing societal attitudes (a key aspect of adaptation) towards a core dilemma for conservation: Will society perceive non native species as bad news, or will a new generation welcome their role in enhancing biodiversity?

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Biofuels - the “green” solution……..

……or the gas-guzzler’s friend?

- An instructive case of a damaging clash between short and long term objectives is provided by biofuels which are an important potential future use of land

- Climate change is largely to do with our excessive use and dependency on fossil fuels. Their replacement with renewable biofuels would seem to offer considerable potential to head off climate change.

- However the driving force so far has been short-term considerations of national energy security and farm income diversification. So-called first generation biofuels (grains, vegetable oils) have diverted resources from food production (forcing up food commodity prices – accounting for about a third of the increase in cereal prices) while consuming considerable amounts of fossil fuel in their production.

- Second generation biofuels from dedicated crop species could be more efficient and grow on marginal land. They include biomass from wood chippings, straw, miscanthus, willow; also from farm and food waste. Energy crops tend to use a lot of water and may struggle with drier summers. However, an extension of the growing season would allow the cultivation of species at more northerly latitudes, where, in particular, forestry may provide the greatest potential. Future development in biofuels might include novel sustainable sources, such as marine algae and water reed that divert neither commodities nor land from food production.

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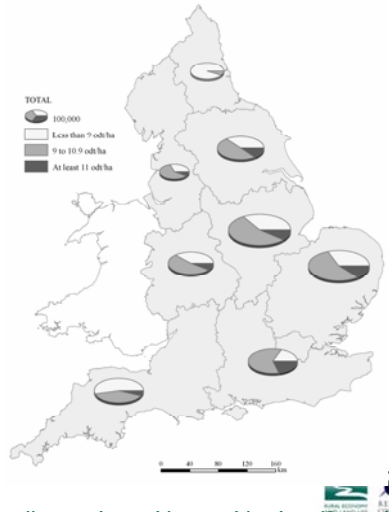
Sustainable Biofuels?

Miscanthus



http://www.relu.ac.uk/research/projects/SecondCall/Karp.htm

- Second generation energy crops have the potential to reduce $C0^2$ emissions and provide other environmental benefits but this will depend on: what they replace; the landscape character of the area; water availability; how they are managed; and the scale of the planting

- Work done by a Relu project led by Angela Karp at Rothamsted and colleagues, including Andrew Lovett at the University of East Anglia, has looked at possible planting strategies for miscanthus and short rotation coppice willow that would optimise yields, and avoid both high grade agricultural land and areas of environmental constraint.

- The map presents a policy-related scenario for planting on 310,000 hectares (which could provide for the target of about 2% of electricity demand). It shows the varying regional potential (2-20%) for using environmentally-unconstrained, lower grade land (note – below 9 oven-dried tons/ha, which is the white pie sections on the right-hand map, production becomes less economically viable).

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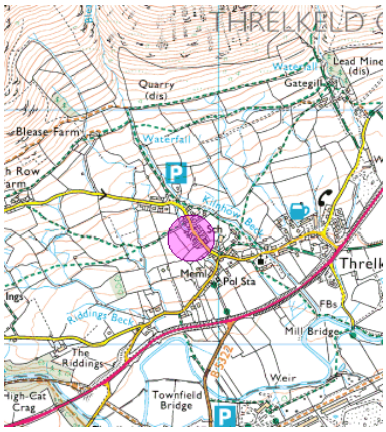
Strategic Land Use – meeting the challenges

- Tackling such competing priorities requires a flexible and strategic land use policy
- There are significant opportunities (the new environmental consciousness, CAP reform, a plethora of policy instruments)
- Critical need for:
  - Recognition of ecological capacities
  - Promotion of precision farming
  - Reorientation of production incentives
  - Mechanisms for locally coordinating and adapting management of land
  - Long term vision for land use integrating production and environmental objectives



There are thus multiple demands on land from different sources. How to effectively guide these demands in ways that are both:

- Flexible, to allow people and businesses to adjust to environmental change; and
- Strategic, to ensure that long-term public good is pursued.

Significant opportunities present themselves:

- A change in the zeitgeist relating to global environmental change, including a widespread willingness to change personal behaviour, and support for strategic action
- Reform of the Common Agricultural Policy which is unlocking considerable scope for the reassignment of resources (human, financial and land) for the sustainable management of agricultural land
- The availability of diverse instruments and means (designated areas, agri-environmental payments, catchment management, national park plans, biodiversity action plans, regional rural delivery framework, the Scottish Rural Development Plan, Natural England, Environment Agency) for what one might call strategic environmental planning

Land use policy seems to suffer from the inverse problem of other fields where strategies are drawn up but too often resources fail to flow. Here there are many resources but an absence of a coherent strategy. Critical need for:

- Recognition of ecological capacities
- Promotion of precision farming, to support economic and ecological efficiency
- Reorientation of production incentives, to support sustainable land management
- Mechanisms for locally coordinating and adapting management of land, to facilitate flexible responses by people, business and communities
- Long term strategic vision for land use integrating production and environmental objectives

Let's examine each of these elements; first – ecological capacities

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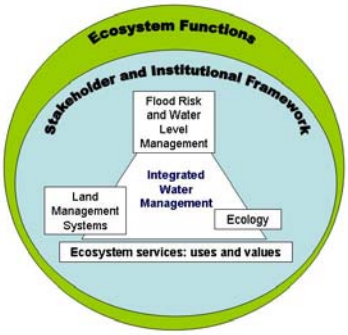
Strategic Land Use – Ecological Capacities

- Recognition of ecological capacities
- Principles and procedures for trading off ecosystem services



- Boosting production in a sustainable fashion involves careful trade-offs with other ecosystem services if ecological capacity is to be maintained.
- To operationalise this approach we need studies of the functionality of agro-ecosystems – not a fashionable topic amongst academic ecologists who in recent years have been too preoccupied with population and behavioural ecology.

- There is a clear need, for example, for experimentation and demonstration in how to integrate a number of positive agri-environment approaches in a whole farm approach. To date studies have concentrated on just one or two dimensions: whether water quality, water supply, soil erosion, run-off and drainage, aquatic biodiversity and terrestrial biodiversity; and techniques such as buffer zones or minimal tillage or rotational fallow; but there has been little effort to integrate these approaches. Such understanding is needed to inform future policies for the best management of agricultural land for both high output food production and important environmental objectives.

- But applied ecology here must meet up with economic and institutional analysis if we are to establish clear principles and procedures for making sustainable trade-offs between desired ecosystem services.

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Example of Flood Plains

Modelling land and water scenarios: synergy and trade offs

Function	Use	Scenarios: Arable farming (Rapid drainage, low flood frequency)	Flood storage (Rapid drainage, high flood frequency)	Wetlands (Slow drainage, high flood frequency)
Production	Agricultural production	High	Medium	Low
	Bio-fuel crops	H	L	M
Regulation	Flood water storage	M	H	L
Habitat	Biodiversity targets	L	M	H
Carrier	Road networks/industry	H	M	L
Information	Recreation	L	L	H
	Education	L	L	H

http://www.relu.ac.uk/research/projects/SecondCall/Morris.htm

- Work being done by Joe Morris and his Relu team at Cranfield is looking at how to achieve multiple objectives in floodplains, including food production; nature conservation; flood regulation; maintenance of rural livelihoods; and enjoyment of the countryside.

- They are pursuing an integrated analysis of ecosystems and stakeholders which explicitly recognises that the different streams of environmental and productive services serve different stakeholder interests.

- This example of modelling land and water scenarios for Beckingham marsh on the river Trent in Nottinghamshire reveals the possible synergy and trade-offs between ecosystem functions and services.

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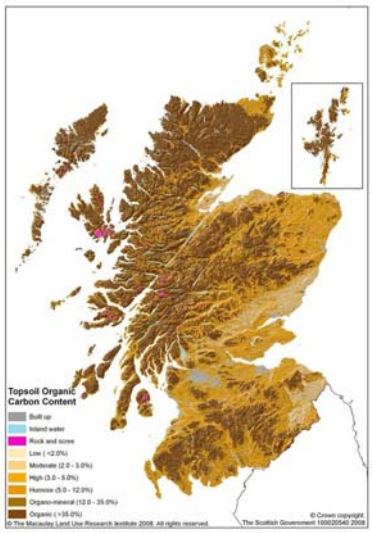
Example of peat lands



Scottish soils are estimated to hold around 3,000 million tonnes of carbon

http://www.relu.ac.uk/research/projects/SecondCall/Hubacek.htm

- Another example of important ecological capacity is peat. More carbon is stored in Britain's soils – most in blanket peat - than in the forests of France and Germany combined, and it is vital to safeguard their storage potential.
- Disturbances such as over grazing, drainage or ploughing greatly increase carbon dioxide emissions. Much of the damage and erosion is due to extensive drainage ditches dug in the post-war period, in an unsuccessful attempt to increase the productivity of peat lands.
- Dr Fred Worrall, on another Relu project with colleagues from Durham and Leeds, has proposed working with a carbon offsetting company to allow consumers to offset their carbon footprint by paying for upland regeneration. They estimate that the cost of blocking one hectare of peat drains is at least £188 but would help peat to reform. And there could be other benefits, to downstream flood control and water quality, as well as biodiversity gains.
- How do we properly value these benefits and ensure that upland regeneration is appropriately resourced?

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Strategic Land Use – Precision Farming

- Reintensification of production in a way that sustains ecological capacities calls for developments in agricultural engineering and farm management
- The arable land of England is an important resource whose productive capacity could be greatly expanded through micro-precision farming
- Better management of water is a key target

- The second element in strategic land use is precision farming. Developments in agricultural engineering and farm management are called for, to enable the re-intensification of production using reduced inputs, while supporting a range of ecosystem services including carbon storage.
- The capacity of land to deliver goods and services can be increased many fold by the application of engineering. Drainage, terrace construction and irrigation have been used for millennia to increase capacity for agricultural production, and the technical potential exists to further enhance or adjust the capacity of most agricultural land. The current crop of RSPB projects demonstrates what can be done to enhance both production and biodiversity together.
- The arable land of England is both highly productive and resilient. It represents a relatively important area for global food production, especially because climate scenarios suggest that it will not be lost to increased aridity and may even become more productive in the medium term as the growing season lengthens (some of it though may be vulnerable to sea-level rise).
- In enhancing its productive capacity, better management of water could be a key target. There has been little strategic investment in field drainage for three decades and this is now in need of renewal. And there is an opportunity for widespread deployment of innovative systems that combine sensors and informatics to control soil water much more precisely. Then still largely at a "proof of concept" stage, there are promising developments in the use of micro-robots within field crops for seed placement, weed control and pest management - illustrating that engineering the landscape may take novel forms.

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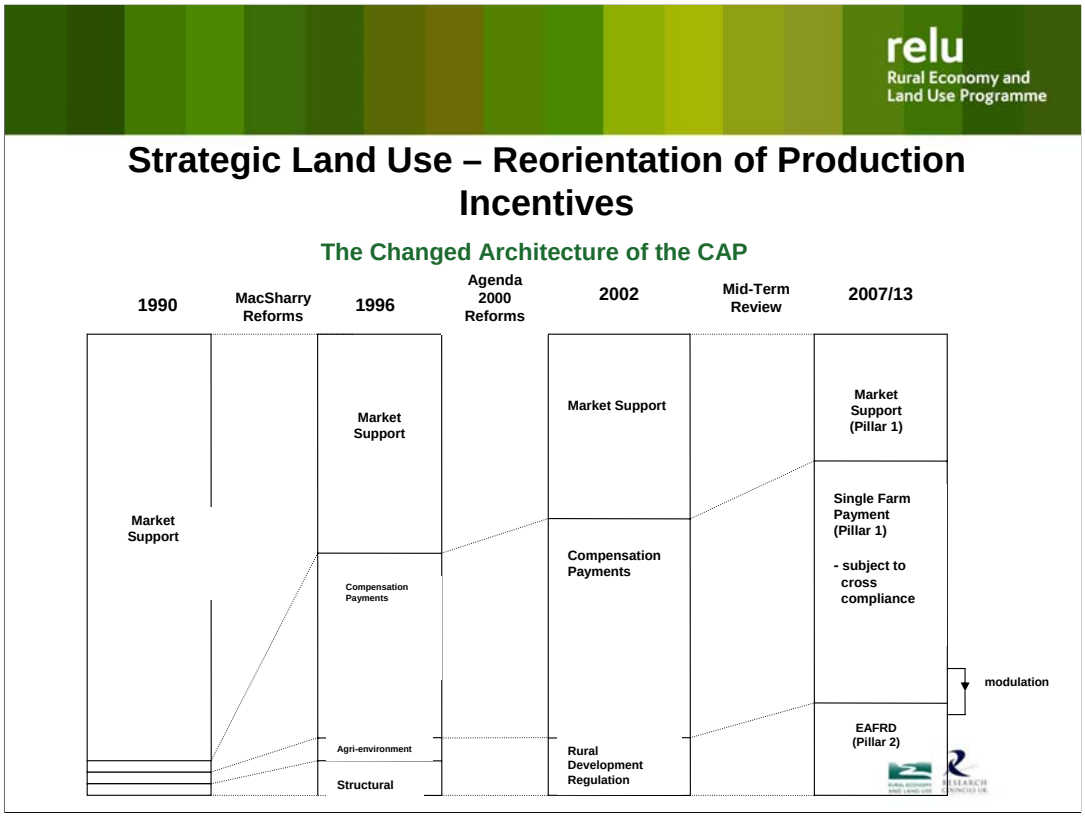
Example: Management Options for Biodiverse Arable Farming

http://www.relu.ac.uk/research/projects/SecondCall/Sutherland.htm

- A Relu research team led by Professor Bill Sutherland at Cambridge is investigating management options for biodiverse arable farming.
- They are using economic models to determine what actions by farmers are financially optimal. Then through farm interviews, the researchers are determining why real arable farmers deviate from these model predictions, and how they vary in the way they manage their farms.
- The variation in management between farms is an important determinant of biodiversity. The team will use ecological models to predict how weed and bird populations will respond to changes in management practices.
- The work will improve understanding of what farming methods and management approaches are best able to integrate production and environmental objectives.
- How are these approaches to be encouraged amongst the farming community?



- There are potentially large-scale public resources for sustainable land management available from the unfolding reform of the Common Agricultural Policy.

- Annual public expenditure under the CAP is over €70 billion (€6 billion within the UK), but the bulk of it (three-quarters) is skewed towards farm income support and its pattern and level of distribution simply reflect historical production levels and previous budget allocations, rather than future sustainability challenges.

- The current CAP Health Check and budget review should pave the way for a refocused CAP in the next EU budgetary period which starts in 2014.This is an opportunity to reorient the CAP towards developing the productive and ecological capacity of land and rural resources, rather than the protection of past farm incomes.

- That would suggest a major shift of resources to Pillar 2 – the European Agricultural Fund for Rural Development. This is what supports agri-environment, farm development and rural diversification schemes. If it is to be enlarged, it will need to be reworked as a sustainable land and resource management fund, with an emphasis on investment in productive and ecological capacity and adaptability. At the moment its scope is too restricted, it is too centralised and rigid, and it is not goal-oriented – it stifles the local initiative, problem-solving and innovative behaviour that need to be encouraged amongst land manager, if adaptability and resilience are to be fostered.

- That leaves the question of the future of Pillar 1 of the CAP. Of course, the architecture of the CAP would be significantly different if sustainable development was at its core. In the meantime there is cross-compliance – the requirement that farmers receiving CAP payments should respect certain environmental and agricultural production standards. This offers weak and limited safeguards. Few countries enforce these requirements and they are insufficient to address concerns over loss of farmland biodiversity, sustainable use of water and accelerating climate change.

- Currently the European Commission is proposing to include additional standards for cross-compliance including the retention of landscape features and the establishment of buffer strips along water courses. If European farmers are to justify receipt of payments on anything like this scale beyond the current budget period, it is vital that there be a thorough greening of Pillar 1, including a condition that recipients maintain the basic productive and ecological capacity of land.

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Strategic Land Use – Responsive and Flexible Mechanisms

- The role of carbon accounting/trading in environmental planning and rural land use
- The future of protected sites and spatial designations
- The need for a generic stewardship obligation on rural landowners

- Turning to the fourth element in strategic land use, to facilitate flexible responses by people, businesses and communities, we need responsive mechanisms for adapting management of land. These must balance the public and commercial interest in land use and facilitate coordinated action. Landowners and managers need a clear framework of incentives and responsibilities.
- Our understanding of the rights and responsibilities of farmers and landowners is also changing. For example, carbon accounting is bound to come to the food and farming sector and may be key to stabilising, say, peatland as a carbon store. Walkers Crisps already carries a statement of carbon footprint on the packet. The New Zealand government has formally committed itself to introduce a system of carbon accounting for agricultural commodities for 2013.
- Climate change will require us to re-think which land should be designated for environmental protection. The current system of protected area designation is too static, for situations that will be dynamically uncertain. It was always a dubious proposition that drawing a line on a map round an area could effectively insulate it from surrounding environmental changes. The obsessive demarcation of a conserved from an un-conserved countryside has become unhelpful now that the animals and plants they are meant to put in aspic are on the move. Moreover, the blanket development restrictions that protected areas originally portended have long been recognised as too blunt.
- Gradually, over the past 25 years, English and European law has adopted a succession of more flexible legal measures, not necessarily confined to protected areas, to safeguard and maintain biodiversity and natural resources on farm land, including management agreements, cross-compliance and codes of practice. These measures are marked by their tendency to place positive obligations (and not just restrictions) on landowners to encourage the positive management of land. Desirable to rationalise this piecemeal framework into a generic stewardship obligation on rural landowners that would allow for property rights to be adapted progressively in step with ecological conditions.

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The example of environmental cooperatives

- Environmental cooperatives have proliferated in the Netherlands
- Local farmer and non-farmer members
- Collective environmental contracts help management at landscape scale
- Get the "*right people in the right places doing the right thing*"

http://www.relu.ac.uk/research/projects/Franks.htm

- To realise the public good functions of land management – diffuse pollution control, habitat management, pest control, recreational amenity, water quality maintenance, flood control – often requires concerted action at larger scales than the individual farm or landholding. A strongly coordinated response is needed, for example, in the creation of new habitats as part of a strategic, landscape scale approach to the development of functional connectivity in the context of climate change.
- One possible bottom-up way of achieving such coordinated responses is through environmental cooperatives.
- Environmental cooperatives in the Netherlands and their relevance to the UK have been investigated in a Relu project by Jeremy Franks at Newcastle.
- These examples of institutional innovation began to emerge in the 1990s in response to increasing pressure from government legislation. They were an initiative from within the farming community, responding to environmental concerns in their local areas, often involving non farmers as equal members
- The lesson from the Netherlands is that, although environmental cooperatives depend on the commitment of their members, the government can provide a supportive framework, for example, covering start-up and overhead costs, funding training and conservation schemes, and listening to cooperative representatives in the development of policy.

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Strategic Land Use – Long-Term Vision

http://www.foresight.gov.uk/OurWork/ActiveProjects/LandUse/LandUse.asp

"*As a society we need to take a fundamental look at how we use and value our rural land and what sort of countryside we want future generations to inherit. The rural environment provides us with a huge range of benefits: from food production to health and wellbeing; from wildlife conservation to water and flood management. It is also central to the challenge of climate change and has a really important role to play in both mitigation and adaptation. We therefore need a properly informed debate about how to get the best from our land, based on the most up-to-date evidence. … In particular, we need to work towards a consensus on how we can use land, not just for one purpose but to achieve multiple benefits - for communities, for the environment and to meet our economic needs.*"

Secretary of State Hilary Benn,
Relu Great Land Use Debate March 2008
http://www.relu.ac.uk/events/Majorprogrammeevents.htm

- The final element in strategic land use is the need for a long-term vision.
- Government's Foresight Project on Land Use Futures was set up in April 2008 and will explore how land use in the UK could change over the next 50 years. It aims to identify future challenges and potential responses that would encourage sustainable land use practices.
- Relu, the programme I direct, has contributed to this process via its on-line Great Land Use Debate during Science Week 2008 which attracted more than 4,500 participants. There were comments from the whole spectrum of opinion on issues such as the multiple functions of land and flood storage, including this comment from the Secretary of State.
- The strategic vision needs to reconcile the competing demands for food/water/energy security – the term security implies a national responsibility, but does not necessarily entail self-sufficiency (we have international obligations as well as legitimate national interests). It must facilitate land-based mitigation of climate change; and adaptation steps (e.g. flood control, shifts in wildlife ranges). It should also set a framework for multifunctional land use, embracing both rural and urban land.
- Land use is all about co-ordinating the long-term and the short-term, the public interest and private interests, the economy and the environment. Land use policy must be well informed, but ultimately it is a matter not of technocratic determination but of democratic choice. The future of land, at this crucial time, must engage a wide public debate.