



Workshop

Forging interdisciplinary links to inform public policy

A case study in sustainable agriculture

*A one day interdisciplinary workshop
for economists and ecologists*

SUMMARY REPORT

Workshop held on Tuesday 8th May 2012
at Charles Darwin House, London

This workshop was convened by:



The Natural Capital Initiative supports the development of UK science, policy and practice aligned with the ecosystem approach; a way of looking at whole ecosystems in decision making and for valuing the goods and services they provide. NCI is:

- Providing an independent and inclusive forum for debate;
- Identifying gaps in science, policy and its implementation and facilitating the debate about how to address these gaps;
- Liaising with, and informing, key Government, Research Council and other initiatives, and
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8th May Workshop supporting partners



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Summary

This report summarises the views and ideas expressed during a workshop to forge interdisciplinary links between economists and ecologists on 8th May 2012. The event involved over 60 participants representing 43 organisations across a spectrum of stakeholder groups; from academia, NGOs, central and local Government, agencies and business. It was organised by the Natural Capital Initiative, GardnerLoboAssociates, York Environmental Sustainability Institute and the UK Network of Environmental Economists.

The event commenced with a welcome note from the workshop Chairperson Dr Peter Costigan (Department for Environment, Food and Rural Affairs), and remarks from Professor Duncan Wingham (Natural Environment Research Council). Two keynote presentations then outlined how farmers could be incentivised to protect environmental goods and services. Professor William Sutherland, Professor of Conservation Biology at the University of Cambridge, offered an ecologist's viewpoint of ways to address this issue and ensure sustainable agriculture policy is effective. Professor Ian Bateman, Director of the Centre for Social and Economic Research on the Global Environment at the University of East Anglia, then presented how an economist approaches this topic. Both argued that land management decisions must be based on natural science evidence and reflect the complexity of the natural environment.

A panel discussion then followed. Professor Tim Benton (University of Leeds), Dr Salvatore Di Falco (London School of Economics), Professor Charles Godfray (University of Oxford), Paul Morling (RSPB) and both keynote speakers outlined their thoughts on the key issues surrounding sustainable agriculture before the discussion was opened to the other workshop participants. It was clear from the discussion that UK agriculture must be considered within the global context of food security, climate change, commodity prices and ecological and social impacts of land use change. Participants agreed that there is an urgent need to integrate environmental goods and services into agricultural economic thinking and decision-making, and that no single solution for delivering sustainable agriculture is likely to be found.

The heterogeneous distribution of natural resources suggests that deliberation on a process of strategic spatial planning will be necessary to ensure agricultural and environmental goods and services are produced efficiently and in areas where they are most suitable. Both researchers and policymakers need to develop a better understanding of the factors influencing farmers' choices and of how these vary between different farming systems and businesses. Participants recognized that there is a continuing need for extension work and knowledge exchange between researchers, policymakers and practitioners.

In six groups, participants discussed what they saw as the key issues surrounding the integration of environmental protection into agriculture and how collaboration between ecologists and economists can help to address these. These issues included: better use of CAP Pillar 2 funds, how to incentivise farmers to deliver environmental goods and services, understanding farmers' choices, exploring strategies to enhance the resilience of agricultural production and agro-ecosystems, developing environmentally and economically effective agri-environment interventions, ecosystem services certification, and spatial targeting of agriculture. Each group developed ideas for suggested activities to begin to address a chosen issue and outlined a possible delivery plan.

The following key messages were concluded from the workshop:

1. Evaluations of future agricultural policy should include all drivers of agricultural change (economic, social, technological, environmental) and their consequences for both national and international agricultural production and environmental goals.

2. The heterogeneity of natural systems needs to be reflected in the design of agricultural policy and integrated into agricultural practice, to enhance the resilience of agriculture to both economic shocks (e.g. commodity price volatility) and environmental shocks (e.g. climatic variability).
3. Ecological and economic knowledge should be included explicitly in decision tools used to anticipate the impacts of changing technology and consumer demand on future farming practice, production and the wider environment.
4. Researchers and those involved in forming public policy need to develop a better understanding of the factors that influence farmers' decisions.
5. Ecologists and economists need to work together to create win-win policy scenarios for agriculture and the environment, for example on spatial planning for agri-environment interventions, or on management options that best utilise local skills, knowledge and resources.
6. There is a continuing need for extension work to disseminate research results and knowledge on sustainable agriculture practices, and on the contribution of ecosystem services to agriculture and human well-being, to policy-makers and practitioners.
7. Where knowledge gaps exist, for example in the valuation of biodiversity, appropriate measures to acknowledge and account for this constraint should be included in the evaluation and implementation of policy, to ensure that resources are used sustainably and effectively.
8. A strategic approach for establishing research priorities is needed.

Introduction

Sustainable agriculture

Amid concerns over food security, volatility in food commodity prices and global climate change, how should the UK be developing and positioning its agricultural sector? As demand for production rises, advice urging the sustainable management of natural resources and of the environmental goods and services that flow from them, can be easily overlooked. Environmental goods and services, whilst recognised as essential for food production, carry little market value and at a time of 'food crisis', their sustainable management may be seen as a long-term goal to be dealt with at a later date by a wealthier generation.

The need to balance food production and the sustainable management of natural resources was one of the challenges explored by the Foresight Report on the Future of Food and Farming (2011). Among its twelve recommended priority areas, the following are of particular relevance to UK agriculture: (i) a lack of new land for agricultural production, (ii) a need to promote sustainable intensification in agriculture to increase food production, (iii) the promotion of, and provision of incentives for, best agricultural practice by producers and, (iv) the inclusion of environmental protection within the economics of food production.

This workshop focused on the area of integrating environmental protection into the economics of food production and on actions and evidence needed to incentivise the uptake of sustainable agriculture by producers.

UK agriculture operates within a global market and must comply with European Parliament and Council regulations for the Common Agriculture Policy (CAP). Recent proposals for the future CAP (2013-2020) have set out a number of measures to improve the sustainability of agriculture across the EU (European Commission, 2011a). The issue for policy-makers and all those engaged with agriculture is whether these are sufficient to ensure the sustainable management of biodiversity and other natural resources within agriculture.

Workshop outline

The workshop provided an opportunity for ecologists and economists to discuss some of the issues they considered critical to the development of a sustainable agricultural and food industry in the UK. Its aim was to specify and agree the fundamental issues that need to be addressed in order to help policymakers implement policies, tools, training and knowledge transfer activities which deliver sustainable agriculture throughout the UK.

To initiate the discussion, Professor William Sutherland (University of Cambridge) and Professor Ian Bateman (Centre for Social and Economic Research on the Global Environment, University of East Anglia) both addressed the following questions from the perspective of their different disciplines, ecology and economics respectively.

- What actions should ecologists and economists be jointly urging Government to undertake to incentivise farmers to maintain the potentially competing aims of environmental protection and increased production?
- What evidence should we be providing to demonstrate that such actions will work in practice?

A mixed panel of economists and ecologists then outlined their views on the issues they considered critical to the implementation of sustainable agriculture within the UK. The discussion

was then opened up to all participants to comment on or add to the points already raised. A summary of the discussion is given below. For the afternoon session, participants working in six interdisciplinary groups, selected a single issue and outlined activities that could be developed to address it. These are listed in Annex B.

Keynote presentations

Professor Bill Sutherland

Professor Sutherland set out an ecological perspective on the question of how to incentivise farmers to protect environmental goods and services. He reminded participants that farmland occupies 38% of the total land area within the EU and that many species depend on the semi-natural habitats associated with farmed land. Conversely, farming itself depends on the ecosystem services (*e.g.* pollinators, soil fertility, water regulation) that these species and habitats provide. Over the last 50 years, changes in farming practices have led to a significant decline in biodiversity (*e.g.* weed management reducing weed seed density with a consequent decline in seed-feeding birds), a trend that UK agri-environment schemes (currently supported under Pillar 2 of the Common Agricultural Policy) are aimed at reversing. These schemes represent the largest source of conservation spending in the UK.

Professor Sutherland suggested that a significant gap remains between ecologists and policy-makers with respect to the uptake of ecological science knowledge into policymaking. He set out 14 principles that he considered should be followed to address this issue and to enhance the sustainability of UK agricultural policy.

1. UK agriculture must be viewed as part of the global system and global trends and influences driving markets, production, population growth, demand *etc.* should inform the development of agricultural policy. UK policy cannot be developed in isolation from the rest of the world.
2. Policy-makers and scientists need to anticipate all potential environmental, economic and social issues associated with emerging technologies, farming practices, crops and consumption patterns. Professor Sutherland cited the example of biofuels, where policy drivers ran ahead of the scientific evidence, leading to significant issues for farmland ecology, food security and the greenhouse gas balance of biofuel production. He pointed out that a number of proposed practices (*e.g.* sterile farming, biochar, perennial cereals) need to be evaluated fully from an ecological standpoint before their widespread adoption is advocated.
3. Policymakers and scientists should consider all the drivers and consequences surrounding the introduction of a new farming practice and review all possible options, taking account of existing evidence, before proceeding to a policy decision.
4. The effectiveness of agri-environment interventions should be thoroughly reviewed. He stated that there were relatively few studies on the effectiveness of agri-environment schemes, and fewer than 50% of these were scientifically rigorous. The CAP absorbs a very large budget, but there is comparatively little research that justifies the 'environmental' measures advocated by it.
5. Agri-environment interventions should be carefully targeted. In some cases the location for the intervention is obvious, *e.g.* a Cirl Bunting measure should only be used near areas with Cirl Bunting populations. In other cases, the location is less obvious *e.g.* coastal

managed retreat measures, such as restoration of wetlands, can increase flooding if placed too low down in a river catchment.

6. Providing information and evidence can change practitioners' behaviour - an unpublished study by Jessica Walsh et al (<http://www.zoo.cam.ac.uk/zoostaff/csg/walsh.html>) shows that providing practitioners with evidence of the effectiveness of conservation interventions can increase the likelihood that they will adopt the measure (in answer to a query from the floor, Professor Sutherland clarified that in cases where behaviour didn't change, it was often because the practitioner's actions fitted with the evidence).
7. Practitioners' preferences are a significant factor in determining whether an intervention is implemented. The practices applied are not necessarily the most ecologically valuable or the most financially rewarding for the land owner. For example, many farmers do not like the measures designed for skylarks as they consider them to be untidy. It is important to try and link practitioners' preferences and skills to interventions that fit the land management priorities of an area. In this way, policies incentivising sustainable agricultural practices can make the greatest impact, capturing the skill and enthusiasm of the practitioner and linking it to local / regional priorities.
8. Consideration should be given as to who will take up new technology. For example, if GM measures to combat weeds are taken up on a very weedy farm, the measure will be very effective; however, if taken up on relatively weed free land, it will not be effective. But the weedy field may be an organic farm which will not adopt a GM measure.
9. Agri-environment interventions should be targeted and supported by reliable post-establishment management. For many agri-environment measures, there is little evidence that they produce significant benefits. Targeted interventions make a greater difference and their effectiveness can be increased substantially by well-planned post-establishment management.
10. There is a need to identify those interventions with overlapping ecosystem service benefits; for example expanding forests has benefits for biodiversity as well as for recreation. Similarly soil retention through reduced tilling has benefits for biodiversity and carbon sequestration.
11. Economic incentives for undertaking agri-environment interventions should reflect the management priorities of an area, whether these be for biodiversity, tourism, flood prevention, water management, crop production for example.
12. Policy and science questions should be identified in collaboration with practitioners.
13. The process of evaluating evidence for decisions should be transparent. For example, in a study of bumblebee conservation, practitioners were asked to rate interventions in terms of importance for biodiversity benefits, and bee experts were asked to rank them in terms of the certainty of the scientific evidence for these perceived benefits. The interventions for which importance was rated high and certainty low were identified as priorities for research. This is a transparent way to decide the focus of research and policy, and is critical for designing effective agri-environment measures. Currently robust evidence for the effectiveness of measures such as Ecological Focus Areas and crop diversification proposed under current CAP reform is lacking.
14. Decisions regarding the implementation of agri-environment measures on particular holdings should be delegated to stakeholders, but the process should not be overly complex. Product certification initiatives such as those of Linking Environment And Farming (LEAF) and the Marine Stewardship Council are useful tools for encouraging this.

In conclusion, Professor Sutherland acknowledged that addressing these issues would require adoption of a different way of working, focusing on the integration of scientists, policy makers and stakeholders. In responding to questions from participants, Professor Sutherland emphasised that the food security issue is not solely about increasing productivity, but is about restructuring the whole of the food and farming system to reduce waste, protect the environment and improve the distribution of goods *etc.*

Professor Ian Bateman

Ian gave a presentation on how to provide incentives for farmers to protect environmental goods and services. In presenting an interdisciplinary environmental-economic approach in which he outlined seven principles for what he referred to as sustainable economic decision making.

1. In assessing the problem, all drivers of change, not just the main focus of the policy should be considered. Therefore, in encouraging agricultural management for biodiversity, it is necessary to consider the influence of markets, technology, environmental change and public policy drivers, *etc.* on agricultural production.
2. Decisions must be based on natural science evidence and reflect the complexity of the natural environment over time and space. At present most economic studies do not reflect this. For example, the pattern of most agricultural land use is best predicted by profit, but this is heavily influenced by environmental factors (climate data, soil data, policy determinants, crop prices *etc.*) which require a large amount of data in order to be fully accounted for. Data must be cross-sectional (to capture spatial variation) and include time-series (to capture trends). Models need to be flexible to assess the relative importance of the different drivers (*e.g.* economic signals may result in a faster uptake of management practices than a policy trigger) and accurately predict changes (*e.g.* rainfall with climate change) and the impact of those changes.
3. We must consider all major impacts of a decision. For example, farm land-use change will alter farm output and earnings but also water quality, biodiversity, greenhouse gas emissions and recreational opportunities.
4. Assessment of impacts must be undertaken even-handedly and where possible expressed using the same units i.e. putting an economic value on environmental variables. Professor Bateman showed a graphic from the UK National Ecosystem Assessment indicating that when decisions are based purely upon market priced outputs then intensification of farming makes economic sense, but when the effect of agricultural land use change on ecosystem services was taken into account, then intensification led to net economic losses.
5. Where robust valuations are not available, sustainability constraints should be applied *e.g.* some aspects of biodiversity are very difficult to value in monetary terms (especially 'non-use' or 'existence' values). In such cases policy can be used to define rules for ensuring that resources are managed sustainably and effectively.
6. In the evaluation of policy proposals, we must consider alternative uses of resources and recognise that one strategy will not be suitable everywhere. Thus, the impact of land use change on ecosystem service flows from farmland will vary significantly between regions (*e.g.* tree planting in peatland areas may actually result in increases of greenhouse gas emissions; agricultural intensification near urban areas may lead to major loss of recreation opportunities); we therefore need to use the right policy in the right area.

7. The natural capital from which ecosystem services are derived must be managed sustainably. In other words, it is important to avoid an exclusive focus on the flow of ecosystem services and thereby ignore the underlying natural capital stock.

In response to questions from the floor, Professor Bateman said that new technologies are a significant source of uncertainty in predicting changes to levels of food production.

Panel discussion

Dr Peter Costigan (Defra) chaired the discussion panel which included Professor Bill Sutherland (University of Cambridge), Professor Ian Bateman (University of East Anglia), Professor Tim Benton (University of Leeds), Dr Salvatore Di Falco (London School of Economics), Professor Charles Godfray (University of Oxford) and Paul Morling (RSPB). Each panelist outlined the issues they considered to be important in developing sustainable agriculture policy for the UK, before the discussion was opened to the other workshop participants.

The following section sets out the key messages and presents a brief summary of the discussions surrounding each topic.

Key messages

1. Evaluations of future agricultural policy should include all drivers of agricultural change (economic, social, technological, environmental) and their consequences for both national and international agricultural production and environmental goals.
2. The heterogeneity of natural systems needs to be reflected in the design of agricultural policy and integrated into agricultural practice, to enhance the resilience of agriculture to both economic (*e.g.* commodity price volatility) and environmental (*e.g.* climatic variability) shocks.
3. Ecological and economic knowledge should be included explicitly in decision tools used to anticipate the impacts of changing technology and consumer demand on future farming practice, production and the wider environment.
4. Researchers and policy-makers need to develop a better understanding of the factors that influence farmers' decisions
5. Ecologists and economists need to work together to create win-win policy scenarios for agriculture and the environment, for example, spatial planning for agri-environmental interventions, or management options that best utilise local skills, knowledge and resources.
6. There is a continuing need for extension work to disseminate research results and knowledge on sustainable agriculture practices, and on the contribution of ecosystem services to agriculture and human well-being, to policy-makers and practitioners.
7. Where knowledge gaps exist, for example in the valuation of biodiversity, appropriate measures acknowledging and accounting for this constraint should be included in the evaluation and implementation of policy, to ensure that resources are used sustainably.
8. A strategic approach for establishing research priorities is needed.

Assessment of UK agricultural policy

UK agriculture must be considered within the global context of food security, commodity prices, and potential impacts of land-use changes. Future production policies will need to take account

of projected global food demand, uncertainties arising from climate change and market pressures such as energy prices. There is also a need to integrate ecosystem services into economic thinking and decision making; some progress has been made but it was considered that there is still a long way to go. The links between biodiversity protection, jobs and economic growth need to be demonstrated and explained.

Changes in global food demand have ramifications for the economy and for the environment. Modelling global food demand over the next 30 to 40 years was seen as critical, as changes in global dietary preferences could lead to an increase in food prices. UK households currently spend the smallest proportion of household income on food than at any point in history. It was recognised that the value of food should reflect the true cost of production and that farmers should receive a fair share of this value. A decline in domestic food production would lead to increased reliance on external production, and policy-makers must ensure that food imports do not lead to environmental, social or economic degradation outside of the UK.

Integrating the heterogeneity of natural systems into agricultural policy

A particular challenge for conservationists, land managers and policymakers alike is to determine the scale at which decisions about managing biodiversity and ecosystem services should be made. This is complicated by the fact that different services may need to be managed at different scales, for example insect pollinators at a farm scale, water resources at a catchment scale, Skylarks at a regional or national scale. Moreover, the heterogeneous distribution of species and services combined with multi-functional demands from different land-users reinforces the need for strategic spatial planning to ensure that services are delivered where they are most suitable.

There is also an important temporal dimension and a pressing need to create models to understand long term changes in the system, and to provide insights on the management of agriculture to increase resilience to both economic and ecological shocks.

These issues of spatial and temporal scale and heterogeneity mean that a blanket policy for delivering sustainable agriculture is not the solution.

The role of agro-ecology in enhancing agricultural productivity merits further investigation. Significant work on agro-ecology is ongoing in developing countries and insights from this work might usefully be explored and applied to UK agriculture.

Anticipating the impacts of technological change

As noted in the keynote lectures, policymakers, scientists and social scientists need to work together closely in the evaluation of new technologies. It is often assumed that technology will generate solutions for all food production issues. While it is important to pursue technological advances, the solutions they offer can often be constrained by cost, practicality and social acceptability. A comment was made that EU legislation can be a significant barrier to the introduction of new technologies to the market and it can take up to 7 years for them to become available. Delays are not just due to regulation, however; a significant proportion reflect poor data and scientific evidence. Companies vary in their attitudes towards Corporate Social Responsibility obligations, with some showing greater diligence and exceeding the required standards, whilst others lobby strongly against moves in favour of the environment. It is therefore critical to have close involvement and engagement of the private sector in developing solutions for sustainable agriculture.

Understanding the factors that influence farmers' decisions

It is important to remember that farmers are at the centre of agricultural systems and the debate surrounding them. Participants recognised that there is a real need to develop a better understanding of what influences farmers' choices (*e.g.* economics, ethics, farming tradition, family structure and values, local environment *etc.*). Studies profiling different farming communities were suggested as their responses to different drivers will vary significantly between farm types (*e.g.* hill farmers, large-scale arable, lowland dairy *etc.*). The social dimension of agricultural policy needs to be evaluated carefully as perceptions of unfairness and inequity in a system can lead to inaction. Within any economic framework, human capital must be valued alongside economic capital.

The concept of ecosystem services needs to be explained and made relevant to farmers. There is often an expectation that farmers should adopt environmentally friendly measures because it is their duty to protect the public good provided by their land. However, ways must be found of giving farmers some value from adopting these practices; currently not enough money is available from the public sector to enable this.

It was recognised that the benefits from ecosystem services are distributed unevenly across different areas of society. This will influence the choice of mechanisms used to incentivise farmers to increase ecosystem service provision. Thus pollinator services benefit some farmers, and providing information about this service might serve as a sufficient incentive. For other services (*e.g.* carbon sequestration), the benefits accrue to society in general, so farmers may require a payment in order to be persuaded to adopt the appropriate measures.

The discussion touched on the effectiveness of different types of intervention, whether these should be prescribed and linked to payment by management, or decided by the land manager and linked to some biodiversity or other environment-related target (payment by results). The consequences of different levels/degree of targeting interventions were discussed, together with the limits to using economic instruments to incentivise management for biodiversity. There are difficulties in valuing biodiversity and some ecosystem services (*e.g.* cultural services) and economic incentives can reduce land managers' willingness to participate in schemes to protect their farm environment or encourage them to focus on the options that are easiest to deliver.

There was a perception amongst participants, that current agri-environment scheme funds (available under the CAP) delivered insufficient environmental benefits and value to farmers. Farmers need to feel that their actions have a purpose, and that they are working towards a common goal - the creation of a Farmers Trust may be a way to address this.

The importance of engaging the business community in valuing and protecting ecosystem services was also stressed. To do this, robust evidence is needed that demonstrates that protecting ecosystem services is truly profitable and therefore attractive for them to pursue. Such evidence may need to be linked to regulation to leverage uptake by business.

Creating win-win policies for agriculture and the environment

Within the UK, agriculture needs to be considered alongside other surrounding land uses. Agricultural biodiversity is a part of overall biodiversity and should not be dealt with in isolation. Farming plays an important role in biodiversity conservation because of the large proportion of land that it occupies (38% of the European Union). Thus assessments of the environmental impacts of farming should focus on whole farming systems rather than on specific features.

Discussants suggested that a programme focusing on the comparative advantage of different land regions for producing food, ecosystem services or supporting biodiversity might stimulate greater efficiency in land use and food production. Such a programme would need to be run in close

cooperation with land managers, encouraging them to target their management in the most effective places and focusing on stakeholders best equipped to implement them. It might also require ecologists, who tend to focus on minimising environmental impacts, to accept the need for trade-offs between production and biodiversity conservation. Thus, agricultural practices might need to be intensified in some areas, to increase production, whilst other areas might be managed more extensively to enhance biodiversity and ecosystem services. A 'business case approach' to determine the environmental benefits that can be delivered by different farm types might help land managers establish the potential competitive advantage they could gain from adopting particular management practices.

Agri-environment interventions need to be targeted at areas where they will be most effective and where possible, provide multiple ecosystem service benefits in order to create win-win scenarios between stakeholders. A focus on targeted interventions would require joined-up policy and deliberation with local and national stakeholders. Due consideration would need to be given to synergies and conflicts between the provision of agricultural and environmental goods and to the requirements of different end-users.

It was observed that policymakers often create policies which are the easiest to implement rather than the most effective. It was noted that the development of agri-environment measures may be constrained by CAP payments. Similarly, cross-compliance measures (established under Pillar 1 of the CAP) remain relatively simple, and of limited effectiveness, as they are designed to be implemented across the whole EU. Targeting measures can, however, be very challenging as they must involve monitoring and evaluation to achieve an appropriate fit between measure and location. Such an approach may increase the costs of implementation substantially and reduce the proportion of total spend available to farmers. Careful thought needs to be given to balance the costs of effective design and implementation against the value to biodiversity, ecosystem services and farmers (as service providers).

Disseminating knowledge and best practice

The provision of information on the nature and benefits of ecosystem services to agriculture and human well-being is vital for the uptake of sustainable farming practices worldwide.

Accordingly it is important that mechanisms such as extension and support services to be maintained. These have the benefit of enabling research and policymakers to engage with social networks and communities of farmers. Such mechanisms offer opportunities for policymakers to understand the challenges facing producers and enable demonstrations and discussion of best practice and new technologies. It was noted that the loss of the national network of Farming and Wildlife Advisory Group advisors significantly reduces the opportunities for exchanging new ideas, knowledge and practices on sustainable farming.

Prioritising research and handling knowledge gaps

Participants supported the call by Professor Sutherland, for a more transparent mechanism for establishing priorities for research and policy in sustainable agriculture (see report on the [Green Food Project](#), July 2012). It is critical to identify and address the knowledge gaps and uncertainties surrounding the role of biodiversity and ecosystem services in agriculture, for example establishing the links between ecosystem services and underlying natural capital. In the interim, where knowledge is lacking, constraining measures should be included in the evaluation and implementation of policy, to ensure that resources are used sustainably.

Group discussions

In six groups, attendees discussed the issues identified and chose one topic that they considered the most relevant to sustainable agriculture, to be considered in more depth in the afternoon session of the workshop.

Participants developed ideas for suggested activities to begin to address this chosen issue and outlining a delivery plan including who would take on these activities, on what time-scale, the current available resources, any additional resources required and possible funding sources.

Details on the six proposals developed during the workshop can be found in **Annex B**.

Annexes

Annex A – Workshop programme

| Programme | Facilitation |
|---|---|
| 9:30 Registration and coffee | |
| 10:00 Introductions: Workshop rationale, objectives, timetable, expected engagement of participants, housekeeping expected outcomes and future direction for this event | Dr Sarah Gardner |
| 10:05 Introductory remarks – public policy needs | Dr Peter Costigan |
| 10:10 Welcome note | Professor Duncan Wingham |
| 10:15 Keynote Professor William Sutherland (Department of Zoology, University of Cambridge): <i>Incentivising farmers to protect environmental goods & services: an ecological approach</i> (20 min) | Professor William Sutherland |
| 10:45 Keynote Professor Ian Bateman (Centre for Social and Economic Research on the Global Environment (CSERGE), University of East Anglia): <i>Incentivising farmers to protect environmental goods & services: an economic approach</i> (20 min) | Professor Ian Bateman |
| 11:15 Coffee (15 minutes) | |
| 11:30 Panel Discussion and Questions Identifying key issues that ecologists and economists need to address together to facilitate the uptake of sustainable agriculture in the UK. | Chair: Dr Peter Costigan Panellists: Professor William Sutherland (University of Cambridge) and Professor Ian Bateman (University of East Anglia), Professor Tim Benton (University of Leeds), Dr Salvatore Di Falco (LSE), Professor Charles Godfray (University of Oxford) and Dr. Paul Morling (RSPB) |
| 12:15 Brainstorming session 4 to 6 groups To prioritise key issues from the Panel Discussion. | Facilitation: Professor William Sutherland, Professor Ian Bateman, Professor Tim Benton, Dr Salvatore Di Falco, Professor Charles Godfray and Dr Paul Morling |
| 12:30 Lunch (1 hour) | |
| 13:30 Voting; Final ranking of key issues and selection of issues for break-out groups | Dr Peter Costigan |
| 13:45 Introduction to group exercise | Dr Sarah Gardner |
| 13:50 Group work. Each group to: a. focus on one key issue from the final ranked list. b. propose activities that could be undertaken to explore / resolve this issue. c. prepare an outline proposal for 1 activity to move this issue forward, by whom and within what timescale. | Facilitators: 1. Professor William Sutherland 2. Professor Ian Bateman 3. Professor Tim Benton 4. Dr Salvatore Di Falco 5. Dr Paul Morling |
| 15:00 Tea and coffee (15 minutes) | |
| 15:15: Outcomes from the group work – 10 minutes for each group, 5 min for presentation, 5 min for discussion | Professor Rosie Hails |
| 16:00 Concluding remarks | Dr Peter Costigan |
| 16:15 Workshop close | |

Annex B – Proposals

| Group | Issue addressed | Proposal and delivery plan | By who? | Timescale? | Available resources? | Additional resources needed? | Funding sources? |
|--|--|--|---|-------------------|--|--|-------------------------|
| <p>1.</p> <p>Chair: Ian Bateman</p> <p>Rapporteur: Ian Bateman</p> | <p>What is the best way to spend CAP Pillar 2 funds?</p> <p>This is a policy relevant issue which addresses the reform of an existing framework using existing money, but raises fundamental questions over achieving better efficiency than currently</p> | <p>Define the objective (will be an amalgam of social, economic and environmental);</p> <p>Build on the NEA and previous AES work to set boundaries of the system;</p> <p>Determine the influence of scale (global, regional, local) to ensure farmers ‘do the right thing in the right place’</p> | | | NEA Framework | Must be interdisciplinary – needs facilitation of this | CAP funds |
| <p>2.</p> <p>Chair: Tim Benton</p> <p>Rapporteur: Laura Bellingan</p> | <p>How to incentivise farmers to ‘do the right thing in the right place’ using top-down funding and bottom-up knowledge</p> | <p>Using top-down funding from the CAP, managed through Defra/DESS etc according to national/international objectives and awarded by LNPs. Local landowners should bid for funding based on what environmental protection they will offer for a certain price.</p> <p>Action: Initial conversation with Defra, potentially under the Green Food Initiative and discussions concerning sustainable intensification; design a plan; undertake stakeholder consultation</p> | EC, Government departments, LNPs, land owners | Decade | Pilot studies would be feasible now by the transfer of funds between the CAP pillars | Will require a revolution towards the recognition and acceptance of the need for payments for service provision and monitoring | CAP, central government |

Workshop for Economists and Ecologists, 8th May 2012

Forging interdisciplinary links to inform public policy. A case study in sustainable agriculture

| Group | Issue addressed | Proposal and delivery plan | By who? | Timescale? | Available resources? | Additional resources needed? | Funding sources? |
|--|---|---|---|---|--|---|--|
| <p>3.</p> <p>Chair: Salvatore Di Falco</p> <p>Rapporteur: Sarah Gardner</p> | <p>Behavioural change to enable resilience in agricultural production and ecosystems: Case study – optimising soil fertility for production and ecosystem services in a specified region <i>e.g</i> Yorkshire</p> | <p>5-part plan including: i) map famers’ approach /activities towards soil fertility in different agri-sectors, ii) define resilience in terms of soil fertility & compare with farmer practice, iii) survey to understand drivers of farmers’ behaviour / attitude to soil fertility, iv) identify set of incentives appropriate for changing behaviour, v) model implementation and funding of incentive mechanisms and establish appropriate timescale</p> | <p>Workshop group in consultation with farmers, rural business and urban consumers in the region. Involve policy-makers in latter steps</p> | <p>5-year with phased reporting</p> | <p>Parts i) and ii) could start immediately based on existing literature and databases</p> | <p>Financing needed for personnel and T & S for parts iii) – V)</p> | <p>NERC, BBSRC, food & agricultural bodies <i>e.g.</i> Ag & Hort Development Board, Food & Drinks Federation</p> |
| <p>4.</p> <p>Chair: Peter Costigan</p> <p>Rapporteur: Bruce Howard</p> | <p>Achieving a balance of spatial activity of farming without high bureaucratic costs or over-prescription</p> | <p>Experimentation with farms/clusters of farms across the UK offering each different management options (voluntary, mandatory, incentives). Underpinned by evaluation of existing experience and behaviour of land managers vs. the desired situation; simulations and scenarios; consultation with land managers using focus groups; in the ground pilot experiments</p> | <p>Must involve stakeholders to asses non-farm impacts; economists; ecologists</p> | <p>Start work now but introduce in next round of CAP reform</p> | <p>NEA scenarios, Natural England network, EU horizon 2020 FP7 project (due); Defra DTC/CSF scheme</p> | | |

Workshop for Economists and Ecologists, 8th May 2012

Forging interdisciplinary links to inform public policy. A case study in sustainable agriculture

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|---|--|--|--|---------------------|--|--|---|
| <p>5.</p> <p>Chair: Paul Morling</p> <p>Rapporteur: Daija Angeli</p> | <p>Better 'choice of choice': integrating ecosystem service protection into sustainability labels on food to encourage better consumer choices</p> | <p>Scoping out the feasibility of an Ecosystem Services Certification:</p> <p>Desk study to assess impact and success of existing certification schemes (MSC, FSC, organic <i>etc.</i>)</p> <p>1 workshop to develop a framework around ESS Certification</p> <p>1 workshop to populate this framework and how it can usefully be implemented in existing landscape of certifications</p> | <p>Workshops to involve Businesses around certification, ESS scientific community, government, farming community, consumer representatives</p> | <p>12-18 months</p> | <p>Knowledge base around existing schemes (FSC, Fairtrade, Organic, FTSE 4 Good)</p> | <p>Financial resources</p> | <p>Business, Which? Magazine</p> |
| <p>6.</p> <p>Chair: Bill Sutherland</p> <p>Rapporteur: Ece Ozdemiroglu</p> | <p>Where do we need bees? A case study of spatial targeting of agriculture</p> | <p>1. Expert-led literature review encompassing economics and ecology to identify factors defining the benefits of pollinator provision and knowledge/data gaps, 2. Gap filling with existing knowledge – by expert/stakeholder engagement and communication, 3.</p> <p>GIS/economic modeling to identify what incentives should be used where to match benefits and spatially variable factors. Information provided to farmers to allow them to choose which measures to adopt</p> | <p>Everyone – academic led but with involvement of all stakeholders</p> | <p>1 year</p> | <p>A lot of information available but not collated</p> | <p>1 ecologist, 1 economist and 1 social scientist/community engagement expert working over 1 year</p> | <p>NERC, LWEC, Defra, NFU, agricultural industries, fruit producers, honey packers, businesses with bees in their logos</p> |