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PROGRAMME DIRECTOR'S ANNUAL REPORT FORM

PROGRAMME DIRECTOR'S ANNUAL REPORT 2008

Programme name: **RURAL ECONOMY AND LAND USE PROGRAMME**

Programme Director: **Philip Lowe, Newcastle University**
Assistant Director: **Jeremy Phillipson, Newcastle University**
Communications Manager: **Anne Liddon, Newcastle University**

Reporting period: **from 1 January 2008 to 31 December 2008**

Number of Projects funded under the Programme:	**63 projects**
Total ESRC budget for Programme:	**£24,754,000**
Co-funding amount:	**£1,750,000**
Total amount of Director's Award including any supplements:	**£1,548,000**
Additional co-funding secured in 2008:	**£701,000**

Contents

Executive Summary **3**

1. Introduction **4**

2. Overview of Year **5**

3. Capacity Building and the Research Environment **10**
3.1 Scientific output 10
3.2 Interdisciplinary reach 11
3.3 Programme-wide events and networking 13
3.4 Research capacity and training 13
3.5 Data collection and management 14
3.6 Programme management 15
3.7 Added-value 16
3.8 Key items of expenditure 19

4. External Communication **20**
4.1 Programme level publications 20
4.2 Significant engagement events 21
4.3 Programme-level meetings with potential research users 23
4.4 Work shadowing and visiting fellowship schemes 28
4.5 Project-level meetings with potential research users 30
4.6 Relevance of research and potential impact 32
4.7 Press and publicity 39
4.8 Key items of expenditure 39

5. Progress of Projects **40**
5.1 First Call Projects on Sustainable Food Chains 40
5.2 Second Call Projects on People and the Rural Environment 49
5.3 Third Call Projects on the Management of Animal and Plant Diseases and on Sustainable Rural Planning 59
5.4 Interdisciplinary Fellows 66

6. Key Performance Indicators **69**
7. Forward Look **73**
8. Budget Matters and Co-funding **74**

Annex A: Programme Chronology 2008 **77**
Annex B: Publications During the Year **79**
Annex C: Conferences/Workshops Attended by Director's Office **98**
Annex D: External Engagement and Exploitation **99**
Annex E: Matters for Attention (*Confidential*) **100**
Annex F: Director's Self Assessment (*Confidential*) **101**
Annex G: Director's Office Budget (*Confidential*) **102**

Executive Summary

2008 was a peak year for scientific activity under Relu. The swelling volume of research results led to a broadening of the Programme's strategic influencing on sustainable food chains, land use policy and the management of animal and plant diseases. The Programme is gathering a reputation for the rounded expertise it brings to complex problems, leading to a bigger public profile, including over a hundred news items. The results of the research are increasingly appearing in high status science journals. The close and strategic involvement of stakeholders is ensuring that the work is having extensive influence on policy and practice. There has been intense interest in learning lessons from the Programme and applying them to new research initiatives. We have begun to develop a method to assess the realisation of Relu's innovative approach to knowledge exchange.

1. Introduction

Aims and objectives of the Programme: The Rural Economy and Land Use Programme (Relu) aims to advance a holistic understanding of the major social, economic, environmental and technological challenges facing rural areas. Its specific objectives are:

- to deliver integrative, interdisciplinary research of high quality that will advance understanding of the social, economic, environmental and technological challenges faced by rural areas and the relationship between them;
- to enhance capabilities for interdisciplinary research on rural issues, between social, environmental and biological sciences;
- to enhance the impact of research on rural policy and practice by involving stakeholders in all stages, including programme development, research and communication of outcomes.

Summary of Key Performance Indicators: A set of KPIs has been agreed for the Director's Office. The broad categories are: scientific quality; interdisciplinarity; user engagement, knowledge transfer and impact; research capacity and training; data collection and management; programme management; and added value (see Section 6).

Start and end dates of phases within the Programme: The reporting period covers projects funded under all three of its main waves of funding.

Number of researcher and related posts: There have been 450 researcher and related posts in the programme to date in 63 projects (Table 1). The Programme Director's Office comprises: *Director*: Professor Philip Lowe (80% FTE); *Assistant Director*: Jeremy Phillipson (70% FTE); and *Communications Manager*: Anne Liddon (100% FTE). The Office employed additional research assistance during 2008 to provide support on knowledge transfer (20% FTE).

Table 1: Number of projects started before, during and after the reporting period

Type of project	Total awarded	Started Prior to Reporting Period	Started During Reporting Period	Completed Prior to Reporting Period
First Call Seedcorn projects	34	34	0	34
First Call Research Projects	8	8	0	2
Second Call Research Projects	11	11	0	0
Third Call Research Projects	10	9	1	0
Interdisciplinary Fellowships	5	3	2	0
Interdisciplinary PhDs	16	10	6	0

Year of the Programme: Year 5 (2008)

Co-funding and collaboration during the year: The programme is a collaboration between the ESRC, BBSRC and the NERC. It has a budget of £24m, including co-funding of £750k from the Scottish Government and £1m from the Department for Environment, Food and Rural Affairs. A further £701k has been brought in during the year from a number of organisations (see Section 8).

PLEASE NOTE THAT THE REPORT IS STRUCTURED ACCORDING TO GUIDANCE AND EVALUATION CRITERIA SPECIFIC TO RELU

2. Overview of Year

Most of the Relu projects funded under the first wave of funding on sustainable food chains concluded their work in 2008. The second wave projects on land use started to produce results and the third wave projects, mainly on animal and plant diseases, were well into their investigations. The swelling volume of research results led to a broadening of our strategic influencing, creating a bigger public and scientific profile. We continue to break new ground with scientific publishing, editing special Relu issues of high status science journals. Interest in learning lessons from the programme has been intense, and we have specifically channelled effort into informing the setting up and design of the LWEC Programme. We have begun to develop a method and metrics to document and assess the realisation of Relu's innovative approach to knowledge exchange, with potential wider lessons for the way the Research Councils think about knowledge management and impact.

Strategic Influencing

Relu pursued a sustained approach to strategic influencing around respective project waves.

Following showcasing activities in the last reporting period around Relu's concluding first wave of Food Chain projects, we have prepared and widely disseminated a cross-cutting briefing paper covering 7 Relu projects, identifying key findings and implications regarding sustainable food chains. The programme continues to produce and disseminate project based policy and practice notes and in 2008 also brokered a bespoke briefing seminar series between the food projects and the Food Standards Agency. Key strategic findings from this series of projects include: comparisons of total life cycle analysis of vegetables grown in the UK and imports from Spain, Uganda and Kenya; the development of innovative interactive tools for involving stakeholders in examining risk in the food chain; modelling of the potential implications of land use in the UK of a switch to healthy eating; and evidence that biodiverse pasture can enhance the nutritional qualities of meat, a finding that could enable farmers to translate environmental protection into increased market value for their produce. The projects attracted considerable interest from policymaking and commercial organisations, including the major supermarkets. For example, one project was funded by two levy boards: the Horticultural Development Council and Hybu Cig Cymru (Meat Promotion Wales) to investigate the carbon footprints of their products.

Relu's Land Use Policy Initiative was a key focus of the year, embracing mainly the second wave of projects (see Section 4.3). The Initiative - supported by additional funding from Defra, Scottish Government and Commission for Rural Communities - has involved the appointment of two consultants as knowledge brokers to work between the research teams and policy makers to extract strategic lessons from the programme for policy. The activity, which was intended to configure and sensitise policy customers for emerging Relu findings, has helped mobilise Relu researchers around land use policy agendas and raised the profile of Relu research and its potential contribution within the land use policy and practice arena. Ongoing Relu projects are investigating many of the key policy issues currently on the land use agenda, including biofuels, flood risk, the balance between biodiversity and food production and the links between land use and

water quality. An ambitious programme of consultation around the Initiative stimulated involvement from a number of significant players, including RSPB, Marks and Spencer, Scottish Environment Protection Agency and the Woodland Trust. The Relu Programme hosted 'The Great Land Use' Debate, involving thousands of people across the UK, and stimulating and informing public interest (Section 4.2). During the year the Programme was also very active in shaping the terms of reference and activities of a national Foresight exercise on land use and feeding into the Scottish Government's inquiry into future land use. The findings of the Initiative have been widely disseminated to policy makers and agencies and will form a platform for further knowledge exchange activities in 2009. In addition individual projects have fed their findings into a range of policy developments. For example, a project looking at the implications of the European Water Framework Directive has been given additional funding by Defra to advise on changes needed to agricultural land use to implement the Directive.

Finally, in 2008 we extended our influencing role to the realm of the Management of Animal and Plant Diseases, tying this into the relevant projects within the third wave of funding at a very early stage in their development. In this area Relu is already raising a number of overarching questions, and feeding into emerging scientific and policy challenges. The programme is building links between researchers, stakeholders from the public and commercial sectors and senior policy makers, and making novel connections. This is enabling an exchange of varied expertise and experience and setting a new agenda for debate. For the first time, researchers are bringing social sciences as well as natural sciences into the investigation of animal and plant disease. During the year wide stakeholder involvement was enabled by a ground-breaking Relu-stakeholder workshop (see Section 4.2) and the inauguration of a new national stakeholder forum to advise the projects and programme (see Section 4.3). Individual projects have also engaged closely with policymakers. One project formulated a detailed response to the government's consultation on Responsibility and Cost Sharing in animal health and disease prevention, which involved developing an unusually multidisciplinary view of the regulation and they have continued this interaction with the Department. Members of another team, investigating Lyme Disease, have been invited to advise both the UK and Scottish Parliaments.

Raising the Public Profile

Relu stepped up its wider public engagement activities during the year. Most notably Relu opened up a national debate on land use in a successful on-line event during the Festival of Social Science/National Science and Engineering Week, which attracted over 4,500 visits (see dissemination highlight below). This was identified as a high impact event in the formal evaluation of Science Week; Relu organised the most events (a total of 10) involving a wide variety of audiences than any other Research Council investment. Major addresses during the year by the Director included a speech on *"Why social scientists should engage with natural scientists"* at the ESRC Research Methods Conference, Oxford and the Birkbeck/Ecology and Conservation Studies Society (ECSS) Inaugural Lecture on *"Whose Land is it Anyway?"*, London. The Programme achieved significant media profile during the year, including over a hundred news items and appeared frequently in national newspapers and radio (see Annex B).

Learning from Relu's experience – informing LWEC (Living with Environmental Change) and other successor programmes

Interest in the Programme continues to be high, both nationally and internationally, and there have been numerous invitations to speak at events and reflect on the programme interdisciplinary and knowledge exchange agendas (see Annex C). Relu has opened a dialogue between the social, environmental and biological research communities, and new initiatives need to consider how to absorb the lessons and maintain the dialogue. Some of the lessons are process/procedural ones (e.g. cross-council programme management; interdisciplinary research capacity building; interdisciplinary project assessment; cross-council programme data management; and knowledge exchange, communications and stakeholder engagement). Other lessons are substantive ones, such as understanding the centrality of socio-technical change to processes of social innovation, technological development or environmental adaptation. During the year for example the Director's Office attended various LWEC meetings, gave a number of presentations on the implications of Relu, and briefed the LWEC Director and secretariat. Additionally we scoped a joint Relu-LWEC capacity building call for proposals. Researchers and co-investigators are emerging from projects with novel experience with interdisciplinary research methods and interdisciplinary project management. The aim of the call would be to smooth the transition to, and develop and retain this human capacity for new initiatives.

Innovation in Knowledge Exchange

Relu's mandate to engage stakeholders at all stages and levels of the research programme has led it to adopt an innovative philosophy of knowledge exchange. This gives us a new perspective on a set of issues that have beset the Research Councils – how to document and assess the societal impact of the research they fund. As part of our monitoring of Relu's stakeholder engagement we routinely collect information on the involvement of stakeholders in the work and activities of the programme and its individual projects. During 2008 Relu scoped ideas for an ambitious plan of impact assessment of its knowledge exchange mechanisms and activities through development of a new analytical and evaluatory tool, the 'Stakeholder Interaction Assessment Matrix' (SIAM). The intention of SIAM is to map and assess how RELU research is influencing policy makers and other practitioners. It unpacks how they are involved in the programme and its projects, and to what effect. SIAM aims to get at the nature and impact of knowledge exchange – an approach which rejects the view that knowledge production and transfer are logically distinct and sequential stages. Potentially, knowledge exchange with stakeholders can occur throughout the knowledge production process – through the reshaping of connections, perspectives and understandings. In 2008 we undertook some pilot analysis to scope and develop the matrix. It holds data on all the stakeholder contacts of the complete portfolio of Relu projects. For 2007 alone over 1400 stakeholder contacts are contained in the matrix from the public, private and third sectors.

Science highlight 1: Relu Research Leads Innovation in Life Cycle Analysis

In the project *Comparative Merits of Consuming Vegetables Produced Locally and Overseas* researchers have carried out innovative science, applying life-cycle analysis to food. The methodology was originally developed to assess the full environmental impact – through production, use and disposal – of manufactured goods. To extend it to food, which is produced and consumed under such varying conditions, represents a

considerable challenge. The team has developed an approach which looks at the entire food production chain including growing, processing, retail and consumption. In applying and testing the methodology with a number of vegetable crops the Relu team has pioneered a number of technical breakthroughs in putting the methodology into effect. For example, they have developed a model for analysing carbon emissions of food at the consumption stage – a major source of impact. They have also developed frameworks and indicators to bring into the equation the impacts of growing food on soil organic carbon and the demands made on water, using the concept of "virtual water" which is the total amount necessary to grow and distribute a crop. These are factors that have so far been poorly addressed in life cycle assessments. The project has also involved much original empirical work, including measurement of the greenhouse gases (GHGs) emitted from fields in the UK, Spain, Kenya and Uganda where British suppliers source vegetable crops. They then used data on GHG emissions and other environmental information in a Life Cycle Assessment (LCA) of the different vegetables. The results showed that for some crops like beans, more GHGs are emitted from the production and consumption of African crops than UK grown crops, mainly because of the large amount of GHGs released in air freighting the crops. The same is not true for lettuce from Spain. During our winter Spanish lettuce are grown outside in the field. In the UK, lettuces are grown in the field in summer and in greenhouses in winter. Greenhouses use a lot of energy for heating and lighting and emissions from UK greenhouses during the winter were greater than those released from driving lettuce by truck from Spain to the UK. The situation for broccoli is different again, as it is grown outside in both Spain and the UK. Here UK broccoli released fewer GHGs than Spanish broccoli. The LCA also showed that a large proportion of the GHGs emitted during the life cycle of a vegetable were from its storage, use and disposal in the home. Overall, the project demonstrates that partial measures – such as food miles – are an inadequate representation of the environmental impact of agricultural products.

Science highlight 2: Relu research identified health benefits from food production

The project *Implications of a Nutrition Driven Food Policy for the Countryside* has been investigating the potential for enhancing the nutritional content of foods. Polytunnels are widely used to protect crops because of the many advantages to the grower and consumer, including enhanced product quality and consistency, extended seasons, and decreased pesticide use. For these reasons they are being used increasingly in the UK for an ever wider variety of salad and soft fruit crops. But the film traditionally used in polytunnels generally excludes UV light and there is some concern that this may affect the nutritional and eating qualities of some plants. It is thought that plants respond to UV light by accumulating flavonoids, because they help to protect plant cells from UV damage. Flavonoids not only contribute to the taste of food but have been found to have beneficial effects for human health. In recent years growers and scientists have developed and experimented with novel films that selectively block or transmit light from across the spectrum to enhance not only the productivity but also the quality of production. One potentially important development has been novel film that is UV transparent, and the Reading-based researchers have worked closely with both the chemists who develop these novel films and the commercial growers who are interested in experimenting with their application. In the current project the researchers discovered that a red variety of lettuce, grown under commercial conditions, responded dramatically to cultivation under the UV transparent film. The enhanced levels of UV the plants

experienced during growth caused the leaves to redden, and increased concentrations of the main flavonoids, quercetin and cyanidin, as well as luteolin and phenolic acids. The total phenol content and antioxidant activity doubled for lettuce grown under UV transparent film, compared with that grown under UV block film. These phytochemicals have proven health benefits, reducing the risk of chronic diseases such as heart disease, stroke, atherosclerosis and cancer. The present finding adds another application to those already established for specialised spectral filters in polytunnel films. These other applications of spectral filters include reducing pest infestation and controlling plant growth and development.

Dissemination highlight: The Great Land Use Debate

What is our rural land for and what do we expect from it? Should farmers be diversifying into energy crops or concentrating on feeding the nation? And is it reasonable to expect them to be competitive food businesses as well as managers and guardians of wildlife and landscapes? When floods overwhelm urban areas should that just be a problem for the individuals and businesses affected? Or should country dwellers be prepared to sacrifice rural land for flood storage? Everyone seems to want something different, but can rural land fulfil all of these expectations? What is our long term vision for land use in the UK and do we need an extension of the planning system from town into countryside in order to realise it? These questions were featured in a unque on-line debate during National Science and Engineering Week/Festival of Social Science 2008 (Section 4.2). Headline pieces were provided by leading thinkers in land management and the debate was kicked off by Secretary of State Hilary Benn. Around 100 comments were posted, reflecting a range of opinion on the three topics and there were over 4,500 hits on the site from readers. The debate received a large amount of media coverage being featured in the Guardian, The Times, Guardian on-line, Farmers' Weekly Interactive, RICS Land Journal, RASE Rural Matters, NFU News on-line and BBC Radio 4 Farming Today, as well as numerous website and electronic newsletters.

3. Capacity Building and the Research Environment

3.1 Scientific Output

95 presentations and papers were given by Relu researchers at conferences and workshops and 40 journal articles were published in 2008 (Annex B). Most of this work is appearing in high status disciplinary journals. At the programme level we have continued to concentrate on drawing together interdisciplinary special issues of high impact disciplinary journals devoted to synthesised findings from Relu research. These take the interdisciplinary message to, and validate it with, the disciplinary heartlands.

- **A Relu Special Issue of *Trends in Food Science and Technology* on Towards Sustainable Food Chains: Harnessing the Social and Natural Sciences. Volume 19, Issue 5, 2008**. The special issue was finalised in 2008. This is an international peer-reviewed journal providing those concerned with the science and technology of food production concise and critical synopses of important advances from across the full spectrum of food research. 7 synthesis papers were included arising from Relu's first wave of research on sustainable food chains. The articles explore the case for a strategic approach to research on sustainable food chains, combining social and technical perspectives.

  - Editorial: Towards sustainable food chains: harnessing the social and natural sciences Pages 224-225 Phillipson, Lowe
  - Socio-technical innovation for sustainable food chains: roles for social science Pages 226-233 Lowe, Phillipson, Lee
  - Involving the public and stakeholders in the evaluation of food risks Pages 234-239 Shepherd
  - Management of livestock and their manure to reduce the risk of microbial transfers to water – the case for an interdisciplinary approach Pages 240-247 Chadwick, Fish, Oliver, Heathwaite, Hodgson, Winter
  - The potential for competitive and healthy food chains of benefit to the countryside Pages 248-254 Traill, Arnoult, Chambers, Deaville, Gordon, John, Jones, Kliem, Mortimer, Tiffin
  - Options for producing a warm-water fish in the UK: limits to "Green Growth"? Pages 255-264 Little, Murray, Azim, Leschen, Boyd, Watterson, Young
  - Testing the assertion that 'local food is best': the challenges of an evidence-based approach Pages 265-274 Edwards-Jones, Milà i Canals, Hounsome, Truninger, Koerber, Hounsome, Cross, York, Hospido, Plassmann, Harris, Edwards, Day, Deri Tomos, Cowell, Jones
  - Microbial biopesticides for integrated crop management: an assessment of environmental and regulatory sustainability Pages 275-283 Chandler, Davidson, Grant, Greaves, Tatchell

- A Relu Special Profile of *Journal of Applied Ecology* was developed during the year. Following peer review of 22 submitted abstracts a selection of papers were written and submitted in 2008 for peer review. The special profile is due to be

completed in 2009 and will include papers based on data that have used an interdisciplinary approach to address an applied ecological problem, or are giving an overview of the approaches projects are taking in dealing with the socio-ecological system under study.

- Relu also supported preparation of a **Special issue of Mammal Review**: **on Wild Mammals and the Human Food Chain. Volume 38, Issue 2-3, April/July edited by Relu PI Piran White.** Five Relu papers are included:
  - Wild mammals and the human food chain, White and Lowe
  - Terrestrial carnivores and human food production: impact and management Baker, Boitani, Harris, Saunders and White
  - Consumptive and non-consumptive values of wild mammals in Britain, Macmillan and Phillip
  - Ecological and social challenges to biodiversity conservation on farmland: reconnecting habitats on a landscape scale Dutton, Edwards-Jones, Strachan and Macdonald
  - The functional role of wild mammals in agricultural ecosystems Gorman and Raffaelli

- Finally, Relu supported production of a landmark book on the future of land use, to be published in 2009 by Earthscan. The initiative is led by Relu PI Mike Winter and will include chapters from several Relu projects.

3.2 Interdisciplinary Reach

40 disciplines are represented in the Relu Programme. Every project includes natural and social scientists. The most prominent disciplines are economics, ecology, human geography, physical geography, hydrology, sociology, environmental modelling, environmental chemistry, microbiology, human psychology, crop science and management and business studies. During the year Relu's experience of interdisciplinary working and cross-council collaboration has been drawn upon by various research funders and Research Council programmes (see 3.7)

In 2008, as part of preparations for a special profile of Journal of Applied Ecology on 'Integrating Ecology and the Social Sciences', we also conducted a survey of 95 Relu ecologists (the largest discipline represented in Relu). The survey reveals a picture of the character and outcomes of interdisciplinary research within Relu. Thus collaboration with social scientists was considered to be taking place across a breadth of research activities spanning decision making on research design (88% were collaborating with social scientists here), methodology (76%) and publishing / dissemination (92%) (Figure 1). Three quarters (72%) of respondents were collaborating with social scientists in all three areas, indicating sustained involvement throughout the research. Individual activities reveal high levels of collaboration. As many as 82% were involved in joint preparation of reports and scientific publications. 78% were engaged in collective framing of research problems. Some 43% of Relu ecologists were involved in joint-modelling work with social scientists. Although some projects were at an early stage at the time of the survey

beneficial outcomes were emerging from collaborations (Figure 2). For example 55% thought there had already been cross-fertilisation of models and agendas, 51% thought new framings of research problems had been introduced and 49% considered holistic solutions to be emerging. Two thirds (66%) of survey respondents felt their ecological science had been enhanced.

Relu is also setting a conceptual and analytical agenda around interdisciplinarity. During the year we introduced new pages on the Relu website through which Relu researchers have posed new questions and debates on interdisciplinary working. Relu also published its conception of coupled socio-technical innovation, as part of a major special issue of *Trends in Food Science and Technology* (see Section 3.1).

Figure 1: Relu ecologists collaborating with social scientists by activity (%)

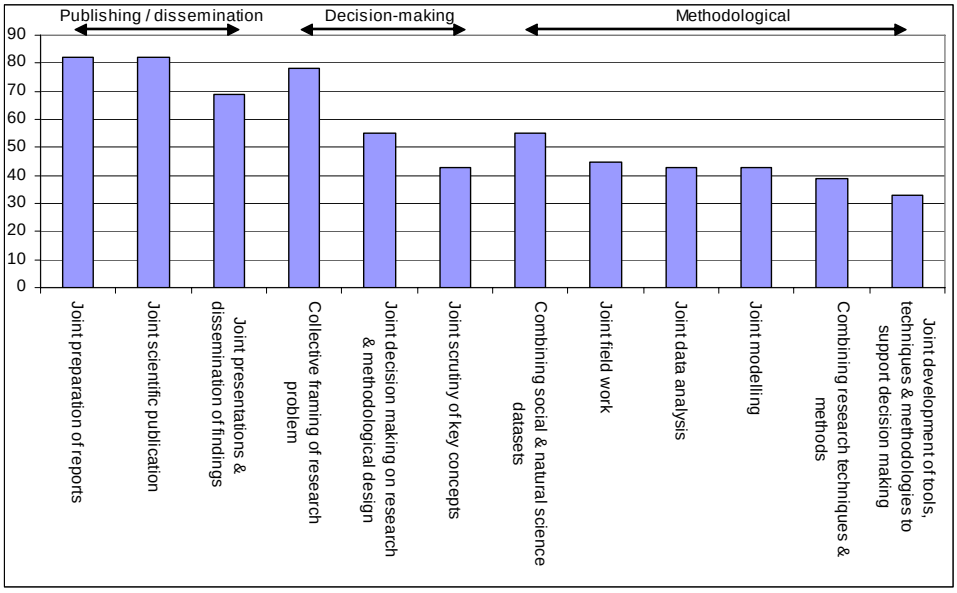
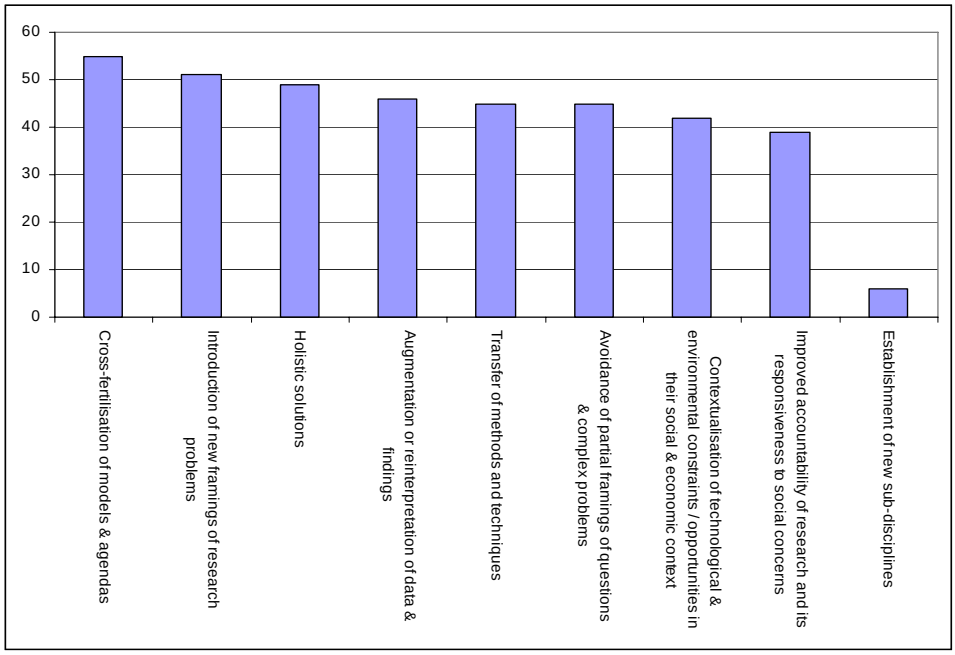


Figure 2: Outcomes so far of Relu ecologists' collaboration with social scientists (%)



Programme-wide events organised by the Director's Office included the "*Great Land Use Debate"* (March), a major workshop on *"The Management of Animal and Plant Diseases"* (May) (see Section 4.2) and three meetings of stakeholder forums (see Section 4.3). We also organised a media training session for research staff (4.3).

3.4 Research Capacity and Training

One of Relu's primary objectives is to enhance and expand capabilities for integrative, interdisciplinary research on rural issues between the social, biological and environmental science communities. On an ongoing basis Relu projects offer fertile ground for on-the-job training and work experience for research staff and students. The following programme level activities took place in 2008:

Interdisciplinary studentships
Relu operates a PhD studentship scheme that is open to applications competitively from the major research projects. The rationale is that research students will benefit from the diversity of scientific expertise and research experience that these major interdisciplinary endeavours have to offer. 16 studentships have been awarded in all and 1 was completed during 2008.

Interdisciplinary fellowships
In 2006 the Research Councils launched an Interdisciplinary Early Career Fellowship competition. The objective was to support outstanding early career researchers interested in pursuing interdisciplinary research and careers, and at the same time to foster the development of interdisciplinary research capacity in selected priority areas, including Relu. Following the competition two fellowships were awarded in 2008 to researchers linked to the Relu Programme. Dr Katheryn Appleton at the University of East Anglia will examine the sustainability of different patterns of future recreational use of the Ant catchment of the Norfolk Broads. Dr Angela Cassidy at the Institute of Food Research will investigate the way that science communication has structured and been structured by the controversy surrounding badgers and TB. Both Katheryn and Angela were previously employed as research officers on Relu projects. They join three other Relu fellows funded in a previous round.

Training activity
A targeted media training workshop for Relu projects took place on 27 February, held at the Centre for Economic Policy Research in London. Organised by the ESRC communications department in collaboration with Relu, it was facilitated by a freelance writer and media consultant and course tutors included journalists from national print and broadcast media. Six delegates from five Relu projects took part and the Relu Science Communications Manager also attended to observe and provide additional support. Comments fed back after the day were generally very positive and included: "The whole thing felt thoroughly well planned and managed to cover an extraordinary amount in the time……You've all left me with lots of ideas and food for thought."

Four hands-on data managing and sharing training workshops were held in 2008 organised by the Relu Data Support Service. They focussed on enabling the sharing of confidential

research data, including legal and ethical aspects of data confidentiality, informed consent for data sharing and documenting data in preparation for sharing. The workshops took place in Leeds, Colchester, Edinburgh and London and were attended by researchers from 11 Relu projects.

3.5 Data Collection and Management

The Relu Data Support Service (Relu-DSS) has continued to provide proactive support for data management and sharing to Relu. Guidance and materials developed for training workshops (see Section 3.4) were subsequently used to develop a new suite of web pages providing guidance on managing and sharing data, for the UK Data Archive (UKDA) website [http://www.data-archive.ac.uk/sharing/]. Before posting, the guidance was reviewed by data management experts from various UK Research Councils and data centres.

The Relu-DSS officer also visited Call 2 project teams to discuss and review datasets created and their project data management and sharing needs. Specific attention was given to possible confidentiality of data obtained from people as participants, copyright of datasets within and beyond project teams and proving good quality data documentation. All Data Management Plans for Call 3 projects were reviewed and advice and feedback given. Overall the plans were found to be well documented, suggesting that the advice provided to the researchers at application and induction stages had been beneficial.

So far datasets resulting from 6 Call 1 Relu projects have been accepted for archiving by UKDA. During the year the Relu-DSS upgraded its online data portal into a broader Relu Knowledge Portal [http://www.data-archive.ac.uk/relu/datasets.asp]. The portal now brings together datasets – archived at UKDA and the CEH Environmental Information Data Centre (EIDC) - and research outputs and publications – deposited in the ESRC Society Today digital repository - of all Relu projects. Thanks to the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH), Relu-DSS can harvest metadata of research outputs from ESRC Society Today and combine them with metadata of Relu datasets archived at UKDA and EIDC. The Relu-DSS website [http://www.data-archive.ac.uk/relu] was also revised and updated during 2008.

On a wider scale, Relu is influencing data management processes and protocols across the UK Research Councils. Linking Relu datasets archived at the social science data archive UKDA and those archived at the natural science data centre EIDC has required UKDA and EIDC to agree how their metadata standards relate to ensure interoperability. Relu-DSS is developing transfer procedures between UKDA and EIDC for datasets, accompanying metadata records and documentation and a procedure to streamline data licensing agreements across data centres. The Relu-DSS officer is also representing UKDA at ESRC meetings to consider compliance of social science data services with the European INSPIRE directive (Infrastructure for Spatial Information in Europe).

A *Best Practice Guide on Managing and Sharing Research Data* is being prepared for researchers and data managers across all research disciplines, with case studies and examples taken from a variety of research disciplines. The discussions of the DSS with

Relu researchers has highlighted the tensions that may arise between ethical review and the focus of Research Ethics Committees on data protection with the requirement for researchers to share and archive research data. This has resulted in dialogue with University Research Ethics Committees on how social science research data can be shared in ethical ways, including a publication in the journal Research Ethics Review, a data sharing presentation at the UK Universities Research Ethics Forum and the drawing up of guidance on data sharing.

Relu has impacted on data managing and sharing at an international level. The Relu data sharing policy, its proactive approach to data management and its data management planning across disciplines has been used as an exemplar by the Australian National Data Service for developing their approach to and guidance on data management and sharing. MIT Libraries point to the Relu Data Management Plan as an example for data management planning in their online data management and publishing guidance for researchers. And the UKDA, in its role as Co-ordinator of the Council of European Social Science Data Archives Preparatory Phase Project is working with the European Commission to promote the sharing and dissemination of European-funded social science data products. The Relu-Data Support Service is being considered as a possible model for future work in this area.

3.6 Programme Management

Programme management and project oversight
Project Communication and Data Management Plans (PCDMPs) provide a basis for quality assurance within the Programme. The plans are updated annually and form a basis for monitoring progress as well as discussion at project visits. 9 of 10 Third Call plans have been prepared by the projects and signed off by the Director's Office and Relu Data Support Service. A group planning meeting was held with Principal Investigators spanning all three funding calls, representing 13 Relu projects dealing with land use issues. In addition, individual site visits were conducted to 1 First Call, 4 Second Call and 9 Third Call projects, at which inter-project links and synergies were discussed. Seven cross-project events were also supported by the programme (Section 3.7).

Advisory committee meetings
The Strategic Advisory Committee met once and its Data Management sub-group twice during 2008. The Director's Office provided briefing, advice and background analysis for each. Papers were prepared by the Director's Office on the following themes: Review of Relu Food Forum; Management of Animal and Plant Diseases Workshop Report and Plans; Strategic Land Use: Research and Analysis for National and Regional Policy; and Linking Relu into LWEC. Two meetings of the Relu Land Use Policy Initiative Advisory Group took place in London.

Assessment activity
During the year the Director's Office contributed assessments to, and served on the assessment panel for, the ESRC/RCUK Interdisciplinary Early-Career Fellowships The Office also undertook assessments of knowledge transfer proposals for the research councils.

3.7 Added Value

Promoting synergy between research projects
As well as programme-wide events (see Sections 3.3 and 4.2), publications (see Section 3.1) and group planning meetings (Section 5.0), there was active encouragement of inter-project synergies. Seven such cross-project activities were supported by the Programme during the year:

- Relu sponsored session at the Institution of British Geographers Annual Conference on "*Rural Geography and Public Policy Engagement*". The session involved several Relu speakers and was organised by Relu PI Clive Potter and Carol Morris.
- Building on a cross-project *Stakeholder Analysis and Engagement* workshop in 2007 led by Relu researchers Anil Graves and Mark Reed the Director's Office sponsored a follow-up workshop involving five Relu projects in 2008 to enable drafting of a cross-project journal article which is to be published in *Journal of Environmental Management*.
- Relu sponsored Cambridge Conservation Forum Summer Symposium: *"Future farming in the UK: global implications for society and biodiversity"* organised by Relu PI William Sutherland. The conference included 7 Relu speakers.
- Relu sponsored a workshop in May on *Land Use Management: the New Debate*, involving several Relu projects aimed at developing a major book on the subject led by Relu PI Mike Winter and Matt Lobley.
- Relu sponsored a *Farm Production Modelling* workshop in July led by Relu PI Paul Armsworth and Co-I Nick Hanley. At the workshop 3 Relu projects shared modelling approaches and drew on the US experience of Relu ESRC-SSRC Visiting Fellow Professor Jim Shortle of Pennsylvania State University.
- Abigail Woods, Relu Interdisciplinary Research Fellow, held joint meetings with several Relu animal disease management projects during the year to help cement links.
- A Relu-sponsored session on *Healthy Diet, Healthy Countryside?* at the Sustainable Development Research Network conference in September involved two Relu projects.

Countless other informal and bilateral project synergies took place between the projects in 2008. Examples include:

- Joint-method development on modelling expertise (Res 227-25-0025 and Res 227-25-0024);
- Knowledge exchange and joint publications on biopesticides (Res 227-25-0048 and Res227-25-0093);
- Cross-membership of project advisory group (Res 227-25-0018 and Res 229-25-0007);
- Joint meetings on land use and water resources management (Res 227-25-0024 and Res229-25-0009);
- Joint meetings and informal exchanges on water catchment modelling and participation (Res 229-25-0008 and 229-25-0009);
- Joint-planning and coordination of data collection on disease research (Res 229-25-0013 and Res 229-25-0016);

- Sharing of experience of interdisciplinary project management (Res 229-25-0007 and Res 224-25-0041);
- Exchange of research protocols and questionnaires (Res 229-25-0007 and Res 227-25-0014);
- Joint analysis on waste disposal/management measures in relation to mitigation strategies for *E.coli* O157 (Res 229-25-0012 and Res 224-25-0086).
- A number of investigators are involved in more than one Relu project which is also encouraging synergies and learning across the programme.

Making international connections

The Relu Programme funds basic and strategic research of relevance to UK rural economy and land use. It is crucial though that the research done is of international standard, addresses global challenges and learns from experience from outside the UK. The Director's Office has therefore sought to help Relu projects make appropriate international connections.

- The Director's Office held discussions with Research Council international staff to consider ways in which Relu might contribute to a trans-Atlantic collaboration between the Research Councils and National Science Foundation, and in particular in relation to the parallel US research programme 'Dynamics of Coupled Natural and Human Systems'. Advice was given on the rewording of a joint call on 'The Ecology of Infectious Diseases'.
- Relu made another successful application to the competitive ESRC-SSRC Visiting Fellowship Scheme. Mark Reed, Project Manager on the Relu project *Sustainable Uplands: Learning to Manage Future Change* was awarded a fellowship to spend four weeks in the United States exchanging ideas with National Science Foundation researchers (funded by the Coupled Human Natural Systems programme) about how people interact with landscapes. The aim was to develop joint research initiatives modelling the interactions of climate change and human behaviour and using both local and scientific knowledge to explore potential options for adaptation.
- A previous Relu SSRC-ESRC fellow, Professor Jim Shortle from Pennsylvania State University, was invited back in 2008 to hold further discussions with a number of Relu projects around farm level modelling approaches.
- The Relu Director was invited onto the membership of Defra's China-UK Sustainable Agriculture Innovation Network, which is being established to provide a platform for the development and implementation of China-UK collaboration on sustainable agriculture.

Influencing Research Council policy and practice

The Programme is an active conduit for learning between the Research Councils and other research funders and a testing ground for inter-Council collaboration and new methods of working. Highlights from the year include:

- The interdisciplinary expertise of Relu researchers is being drawing into other research council programmes. For example, during the year, Relu investigators were successful in applying to the NERC led Environmental and Human Health (E&HH) Programme. The funding, which is being provided by ESRC, will strengthen social

science expertise within the E&HH Programme and incorporate new innovative modelling techniques. The Director's Office continued to advise the Relu Strategic Advisory Committee on ways in which lessons from Relu may be passed on to new initiatives and programmes. During the year the Director's Office was active in feeding lessons from Relu into the development of LWEC. The Director met with John Denham, Secretary of State for Innovation, Universities and Skills in May as part of a delegation led by NERC Chief Executive Alan Thorpe to brief the minister on LWEC. The Secretary of State's briefing described Relu as the "minimum standard" for LWEC. The Office attended several LWEC programme meetings, giving presentations on the Relu programme, and also held bilateral discussions with the LWEC Director (see Annex A).

- Presentations and briefings on the interdisciplinary lessons from Relu were given to European Research Funders' Forum (ERFF), UK Collaborative on Development Sciences (UKCDS) and ESRC Communications Conference. A major address was given to the ESRC Research Methods Conference, London on *"Why social scientists should engage with natural scientists"*. Relu researchers are frequently asked to pass on the learning they have experienced within Relu. For example, Wyn Grant and Justin Greaves from the *Role of Regulation in Developing Biological Alternatives to Pesticides* and the *Governance of Livestock Disease* projects presented a paper on their experience of the Relu programme entitled 'Interdisciplinary Research: Some Practical, Methodological and Philosophical Reflections' at a workshop on Transdisciplinarity: Working Across Boundaries organised under the auspices of the ESRC Stem Cell Initiative.
- Presentations on Relu's approach to knowledge exchange were given to the Technology Transfer Board and Scottish Government, and the Director's Office is represented on NERC's Knowledge Exchange Network. During the year Relu's Assistant Director of Relu was invited to be on the assessment panel of Scottish Funding Council Knowledge Transfer scheme. Relu's approach to knowledge exchange was highlighted as a Case Study in NERC's *Guidance Science into Policy: Taking Part in the Process*. NERC also introduced a work shadowing knowledge exchange fund following the experience of Relu's own scheme.
- Research Councils are increasingly looking to build on Relu's experience. During the year, for example, BBSRC's published review of biological research relevant to climate change, which aims to prepare the bioscience community for the Living With Environmental Change programme, recommended that "research should build on experience from the Rural Economy and Land Use cross-research council programme to study the interactions of social and economic factors with management for biodiversity in agricultural systems" and commented that Relu "broke new ground in forging collaborations of biological and environmental science with social and economic research".
- Relu's experience in cross-council data management and support, through its Data Support Service, is increasingly breaking new ground. Already it has led to the reform of wider guidance and materials for data management, including that of the UK Data Archive (see 3.5). During 2008 the programme developed the first integrated web based search engine to link together data and scientific publications produced by research projects. Traditionally these are handled separately by the Research Councils.

3.8 Key Items of Expenditure

Key items of expenditure include: £7k on the *Management of Animal and Plant Disease* Workshop; £4.1k on sponsoring synergies between research projects; £5.8k on attending Research Council meetings; £5.3k on project visits and planning meetings; and £6.9k on the Trends in Food Science and Technology Special Issue.

4. External Communication

4.1 Programme Level Publications

In 2008 Relu published a Programme-level briefing document and three Policy and Practice Notes. Briefing Paper No 8 *Land to Mouth*, provides a cross-cutting overview of the findings and implications of Relu's first wave of Food Chain research projects. Food is fundamental to our existence and plays many important roles in our lives, both physically and culturally. We take it as a given that there is such a thing as a healthy diet. The Briefing Paper explores such questions as: Can the way we use land to produce food promote such a diet and make us healthier? And what about the rural land on which food is produced, and which we generally value as a national asset? Can we as consumers, alongside food producers, promote the health of the rural environment? The Briefing Paper was widely circulated and submitted to the Cabinet Office Strategy Unit's Project on Food Policy.

During the year we also took forward Relu's new *Policy and Practice Note* publication series. Three Policy and Practice Notes were published, each to a consistent and accessible four-page A4 format, drawing out the main highlights of project's findings and their policy and practice implications:

- Policy and Practice Note no 2 "Warm Water Fish Production as a Diversification Strategy for Arable Farmers"

- Policy and Practice Note no 3 "Eating Biodiversity: an Investigation of the Links between Quality Food Production and Biodiversity Protection"

- Policy and Practice Note no 4 "Safe Recycling of Livestock Manures"

The briefing papers and Policy and Practice Notes were distributed to approximately 1900 stakeholders on the Relu mailing list including Civil Servants, think tanks, academics, NGOs, politicians and Relu researchers, as well as being available electronically. Four newsletters were also prepared and distributed to the Relu mailbase, which comprises over 2000 researchers and stakeholders.

The briefing papers have been well received by the Research Councils, stakeholders and academic community, with various letters of support received by the Director's Office. One stakeholder explained "Thanks you very much for this Newsletter and the accompanying tour of what Relu has achieved so far. It seems to me a remarkable and excellent outcome and very good value for money". Another said "The depth of information you have sent through is amazing…. really relevant stuff". Feedback received will help us refine the design and focus of the series as it develops in 2009.

In 2008 we also actively targeted the publishing outlets read by important knowledge brokers. For example, successive issues of the Royal Institution of Chartered Surveyors bimonthly Land Journal which reaches more than 27,000 land managers, advisers and agents, carried articles about Relu projects.

The Relu website was further developed during 2008 (www.relu.ac.uk), with the primary innovation being its development to host a high profile on line Great Land Use Debate (see Section 4.2). As well as 4500 visitors to the blog, the debate attracted more than 660 new users to the Relu website.

A Relu journal special issue was also completed and published in 2008, and another special issue progressed (see Section 3.1).

4.2 Significant Engagement Events

The Great Land Use Debate, Science Week, 7-17 March 2008
In 2008 Relu took the Land Use Initiative into the public arena with an on-line Great Land Use debate, opened by Secretary of State Hilary Benn who stated that "We all have a stake in the countryside and it's important that we all have a say in its future. I am therefore delighted that Relu is launching this debate on rural land use as part of its contribution to National Science Week. … 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. … We therefore need a properly informed debate about how to get the best from our land, based on the most up-to-date evidence. I believe that Relu has a key role to play in this". For this event we planned to achieve: Questions that would capture key themes on land use; Snappy and provocative headline opinions from key thinkers; and Well-targeted publicity that would draw contributors into the debate. The topics posted were: Have we got the balance right between protecting the environment and food production? Is rural land management the problem or the solution to flooding in our towns and cities? and What is rural land for? The Debate drew on expertise and opinion from key stakeholders in the Relu People and the Rural Environment Forum and Relu's land use policy analysts to arrive at the three key questions. Members of the PRE forum provided headline opinions as influential thinkers and practitioners in land management. Our publicity strategy for the Debate targeted three main groups: (i) Land management professionals and other special interest groups; (ii) Relu stakeholders and (iii) the wider public. For (i) we built links with the Royal Institution of Chartered Surveyors, Town and Country Planning Association, Farming and Wildlife Advisory Group, Royal Agricultural Society of England, Campaign to Protect Rural England and Defra, which included promotion of the Debate on their organisational websites and articles in their electronic/hard copy newsletters. We also managed to get prominent

articles and links onto NFU on line news, Farmers' Weekly Interactive and an interview on BBC Radio 4 Farming Today with link on the BBC website. For ii) we circulated email "newsflashes" as each new topic came on line to encourage people to contribute their views For iii) we achieved two articles with links on the Guardian interactive website with links to the debate, a letter flagging up the debate in the Guardian newspaper and an article on food prices that advertised the debate in The Times and on The Times website, as well as a double page spread about Relu that advertised the debate in the Newcastle Journal. There were around 100 contributions and the ideas and discussion were wide-ranging on all the topics. Following the debate, the comments were posted on the Relu website as a source of public information. They informed the work of Relu's land use policy analysts (see Section 4.3) and were submitted to the Government's Land Use Foresight project.

Activity at project level was also sponsored and supported by the programme and took place during the week across the UK, involving scientists, policymakers, schoolchildren, artists and the public in considering different aspects of rural economy and land use

- The South West: a grassland region Relu researchers from the *Realising the Links between Quality Food Production and Biodiversity Protection* project and colleagues from Exeter University organised a workshop with guest speakers from the RSPB and Devon and Dorset Wildlife Trusts. The workshop attracted scientists, policy makers, farmers and land managers who discussed the grassland economy in the South West.
- Food for the future – is it organic enough? Researchers from the Relu *Effects of Scale in Organic Agriculture* project and the Science Policy Research Unit at the University of Sussex organised events for researchers and secondary schools in Sussex, Cambridge and Leeds where they examined the environmental and health benefits of organic food and the difficult choices that consumers often have to make when trying to support sustainable development.
- How do you like your woods? Public perceptions of landscape and biodiversity: The Macaulay Institute and Relu team from the *Collaborative Deer Management* project held events in Edinburgh and Aberdeen where members of the public electronically recorded their preferences for woodland landscapes, as projected in a Virtual Reality Theatre, and considered whether attractive landscape views are compatible with other management aims.
- Mapping the perceptions of green space in York: The Department of Social Policy and Social Work, York University and Relu project team from *Social and Environmental Inequalities in Rural Areas* presented the results of a participatory mapping exercise about the perceptions of green space in York.
- Science meets the eye! Moors for the Future Partnership and the Relu *Sustainable Uplands* project mounted an exhibition of stunning images from research undertaken in the uplands of the Peak District and other parts of northern England, accompanied by a series of audio and video podcasts.
- Fishing Communities and Territorial Development: Relu's Assistant Director Jeremy Phillipson gave an address in Aberdeen to the Scottish Government and over 50 fishermen's organisations.

Management of Animal and Plant Disease, 22 May 2008, Regent's College, London
The purpose of this workshop was to bring together Relu researchers and stakeholders from government and industry to share expertise on animal and plant diseases, in line with Relu's aim to bring natural and social sciences to bear on problems and set new agendas. It isn't always clear who the real experts are in animal and plant disease management. There is a lot of uncertified expertise and experience that may be left out. The event was about bringing these different types of expertise together and rethinking strategy from first principles: what have animal and plant disease management got to learn from each other, what can we learn from past experience and how can we facilitate knowledge exchange between Relu researchers and key policy makers? The event involved a highly varied and unusual group of stakeholders in an unusual workshop model. The format was experimental and designed to free up individuals to contribute experience and expertise and make innovative connections. Policymakers from a very senior level attended and networked with academics engaged in cutting-edge research (including Policy-Research Speed Dating Sessions). Funding was provided by Defra as part of the Department's commitment to this wave of research. Six Relu projects were represented at the meeting. Formal feedback received from delegates who attended from all sectors was very positive. Of the 50 delegates, 52% were stakeholders. 97% of respondents rated the workshop overall as either "good" or "excellent". The organised networking opportunities were received with particular enthusiasm and 66% said they were actively following up contacts made during the day. 66% also mentioned either networking or discussion sessions as the most valuable part of the event and there were requests for future events and further opportunities of this kind from Relu. Examples of comments on the aspects that participants found particularly useful: (i) The far-flung, imaginative and interdisciplinary nature of the discussion; (ii) Speed dating: opportunity to discuss issues and approaches in informal atmosphere in small groups; (iii) Multidisciplinary aspects e.g. researcher/delivery bodies/policy advisors and link between natural and social sciences.

4.3 Programme-Level Meetings with Potential Research Users

Relu is committed to engaging stakeholders throughout the research process. This requires a new philosophy of *knowledge exchange*, not just knowledge transfer, and the sharing of knowledge between researchers and a wide range of policy makers, practitioners, businesses and other publics. Stakeholder engagement at all stages from identification of research questions, the conduct of the research to dissemination of the results, are central to meeting this objective. The programme's up-front stakeholder engagement has helped it build extensive soft networks for knowledge exchange, facilitated in particular by the programme's consultative forums and other novel mechanisms for building links between research and research users. Relu is advised by a Strategic Advisory Committee (SAC), chaired by Sir Howard Newby, which includes representatives from Defra, Countryside Council for Wales, Commission for Rural Communities, Scottish Government and the Joint Nature Conservation Committee. The Director of the programme is also a member of Defra's Science Advisory Council, has chaired the Vets and Veterinary Services Working Group, and is a members of Natural England's Science Advisory Committee.

Figure 3 records the formal involvement of 48 different stakeholder organisations at the programme level during 2008. Bilateral discussions were also held with several national stakeholders including Royal Agricultural Society of England, UK Collaborative on Development Sciences (UKCDS), Environment Agency Wales, Natural England, Food Standards Agency, Parliamentary Office of Science and Technology, Farming and Wildlife Advisory Group, Technology Transfer Board and Commission for Rural Communities (see Annex A).

At programme level, Relu has engaged with stakeholders via two main forums, one concerned specifically with issues regarding the food chain, and the other on the theme of people and the rural environment. A third forum was inaugurated late in 2008 to deal with Relu's research in the area of the Management of Animal and Plant Diseases. The forums are used as sounding boards on research programme and project development. They include key stakeholders from the public, private and voluntary sectors who can represent their organisations and also act as conduits for knowledge transfer. They attend regular, informal meetings, where researchers explain their work and the forum members debate the issues and provide feedback. Members are also kept informed about progress and research via the Relu newsletter and other communications.

As Relu food chain projects were drawing to a close, the seventh and final meeting of the Food Forum was held in May 2008. The Food Forum's 20 members represented an impressive grouping of leading experts and figures in food chain research and development. The group was chaired by John Lloyd Jones OBE**,** Chairman, Countryside Council for Wales. Terry Marsden of University of Wales, Cardiff was vice-chair. In addition members included: Ian Baker, Advantage West Midlands; Helen Browning, Eastbrook Farm Organic Meat; Judy Buttriss, British Nutrition Foundation; Lord Ewen Cameron, Dillington Farms; Helen Ferrier, National Farmers' Union; Bill Goldsworthy OBE, Agri-food Partnership; David Gregory, Marks and Spencer; Michelle Harrison, Henley Centre; Brian Harris, BBSRC; Mark Kibblewhite, Cranfield University; Charlotte Lawson, Food from Britain; Chris Lewis, Fields Farm, Crewe; Tom MacMillan, Food Ethics Council; Sarah Mukherjee, BBC; Steve Parry, Unilever; Howard Petch, Commission for Rural Communities; Sue Popple, Defra; Dr Bill Vorley, International Institute for Environment & Development; Peter Russell, Head of Rural Group, SEERAD.

A review of the forum by members signalled that they felt it has been a useful instrument of knowledge exchange and stakeholder engagement. Meeting on 7 occasions it had heard presentations from 14 research projects. Meetings were held in London and included short, tabled presentations from the researchers and extended discussions, prior to an evening meal, with further discussion between courses. Discussions had focused on research project themes and plans for dissemination. The group had also been active in advising the overall programme on its knowledge transfer strategy with specific views sought on the programme's approach and package of measures. The group was instrumental in shaping the 'communication package' for Relu's food chain projects. They had a particular influence on three core dimensions:

- The major 2007 conference *Unlocking Change in the Food Chain* which showcased project results and provided an opportunity to debate the wider implications. Forum

Figure 3: Formal Stakeholder Engagement in Relu at the Programme Level (2008)

Stakeholder	Representation on Programme Management Group or Strategic Advisory Committee	Representation on national stakeholder forum	Attendee at Programme Workshop
Advantage West Midlands RDA		√	
Association of Rivers Trusts		√	
BBC		√	
Biotechnology and Biological Sciences Research Council	√	√	√
British Poultry Council		√	√
British Veterinary Association			√
Cabinet Office			√
Clinton Devon Estates		√	
Commission for Rural Communities		√	
Countryside Council for Wales	√	√	√
DairyCo			√
Dept for Environment Food and Rural Affairs	√	√	√
Dillington Farms		√	
Eastbrook Farm Organic Meat (organic farmer)		√	√
Economic and Social Research Council	√		
Environment Agency		√	
Farm Animal Welfare Council		√	√
Fields Farm		√	
Food Ethics Council		√	√
Forest Research			√
Horticultural Trades Association		√	√
Ian Brown (diversified tenant farmer)		√	
Institute for European Environmental Policy		√	
International Inst' for Environment & Dev't		√	
Joint Nature Conservation Committee	√	√	
Land Use Foresight			√
London International Development Centre	√	√	√
Marks and Spencer		√	
National Farmer's Union		√	
National Office of Animal Health		√	

National Trust		√	
Natural England		√	
Natural Environment Research Council	√		
Nickerson-Advanta			√
One North East Regional Development Agency		√	
P.C. Tinsley Ltd (cereal/vegetable farmer)		√	
Royal Institution of Chartered Surveyors		√	
Royal Society for the Protection of Birds		√	
Royal Veterinary College		√	√
Scottish Government	√	√	√
Stockbridge Technology Centre		√	√
UK Water Industry Research		√	
Unilever		√	
Veterinary Laboratories Agency			√
Wales Agri-food Partnership		√	
Welsh Assembly Government		√	
Wessex Water Company		√	
Woodland Trust		√	

- members advised on the format of the conference and were the main contributors to its panel discussion session.
- Publication of a Relu briefing paper 'Land to Mouth' cutting across the project cluster (see Section 4.1). Forum members had called for the extraction of cross-cutting lessons from the projects. A forum member was contracted to prepare a pathfinder report on cross-cutting policy implications arising from projects. This was discussed at the conference and contributed to the briefing paper.
- A set of targeted policy and practice notes presenting key findings of individual projects – one for each project (see Section 4.1). Forum members expressed a demand for this series and shaped the format and design of these publications.

Members of the Food Forum have played an active role throughout many Relu programme activities, helping to organise conferences and workshops (for example a major workshop held at Advantage West Midlands RDA on *Sustainable Food Chains and Rural Development*), and in chairing and speaking at events. They also contributed to the online Great Land Use Debate.

Feedback from forum members on the value, outcomes and format of the forum has been very positive. Several members, particularly those from business backgrounds, comment how they appreciate the early evening timing. The Food Ethics Council has even copied the format in setting up its own seminars for food businesses. Members from both public and business sectors, noted very concrete ways in which information presented at the forum has fed back into their own organisations' policy and practice. For example, David Gregory, Technical Director at Marks and Spender said he "….routinely delegated to my team follow up activities with researchers, particularly in waste, water and agrochemicals" and that the forum has "influenced procurement strategies. Other contact between my team and researchers has helped inform decisions."

Two meetings of the Relu People and the Rural Environment Forum were held in 2008. They played an active role in advising Relu's Land Use Policy Initiative (see below). The forum includes the following members: Mark Avery, RSPB; Helen Barker, Joint Nature Conservation Committee; Ian Brown, tenant farmer and One North East Board Member; Tony Burton, National Trust; Lord Cameron of Dillington, rural businessman and cross-bench peer; Roger Clarke, Woodland Trust; Tamsin Cooper, Institute for European Environmental Policy; Julian Dennis, Wessex Water; Mike Farrimond, UK Water Industry Research; Tony Hams, Natural England; Chris Lea, Welsh Assembly Government; David Macdonald, University of Oxford / Natural England Board; Archie Ruggles-Brise, Association of River Trusts; Susan Steer, Organic farmer and RICS Countryside Panel; Mark Tinsley, horticulturalist; John Varley, Clinton Devon Estates; Frances Rowe, ONE North East Regional Development Agency; Paul Woodcock, Environment Agency.

Relu's Land Use Policy Initiative formed a core activity during 2008 and will form the basis of further knowledge exchange activities in 2009. The Initiative was initiated and managed by the Director's Office in response to heightened political interest in land use issues across the UK. Two land use policy analysts were appointed to draw out relevant findings from across the range of Relu research projects, backed by an expert advisory

group, involving Defra, the Scottish Government, Land Use Foresight, Commission for Rural Communities and Relu researchers. Alan Woods has been working across the UK, Vicki Swales has concentrated on the Scottish dimension and both have liaised closely with Relu research projects to identify cross cutting and strategic ideas to be fed back into the policy making process via Defra and Scottish Government. The project has been an experiment in knowledge brokerage. The analysts visited 20 Relu projects to understand their potential policy contributions. A 'Discussion paper', setting out four broad 'land use challenges' and seven 'cross-cutting issues' was circulated to the projects beforehand to stimulate discussion. Following the round of visits to the projects, and after consulting the researchers on a draft, a further Land Use 'Challenge paper' was prepared. This identified three 'strategic' policy questions for further discussion: How do we achieve multiple objectives from land and water? How do we achieve more democratic and accountable decisions? How can our use of land and water help tackle climate change? The 'Challenge paper' provided a focus for discussions with policy-makers in a range of Departments, Agencies and Voluntary bodies across the UK. Links were also made with the Government Foresight Project on 'Land Use Futures', which is exploring how land use in the UK could change over the next 50 years. The Challenge paper was subject to a Relu web-based consultation and attracted over 30 valuable responses from such organisations as the RSPB, Marks and Spencer, Scottish Environment Protection Agency and the Woodland Trust. Further inputs came from the Relu online 'Land Use Debate' (see Section 4.2). The final reports from the analysts set individual Relu research projects within a wider policy context, showing how the projects can contribute to policy, and equally how policy can contribute to the projects. The framework provided by the report is also intended to stimulate further thinking and debate among all those concerned with UK land use, including:

- Policy-makers (including policy-influencers): the reports illuminate policy challenges from Relu research and provide a route-map to facilitate connections and dialogue.
- Researchers: the reports indicate how research, effectively communicated, can assist policymakers, and flag up questions for consideration in continuing research.
- Rural communities (including rural businesses): the reports review areas of research relevant to the future and identify how communities can get involved and benefit.
- Research funders: the reports identify issues for consideration in future programmes and underline the benefits of interdisciplinary research.

4.4 Work Shadowing and Visiting Fellowship Schemes

We ran another round of the Relu Work Shadowing and Visiting Fellowship Schemes during 2008. 7 Relu researchers took part in work shadowing. Work Shadowing aims to introduce RELU research staff to the action-contexts in which their research may be used. These contexts may be commercial organisations, voluntary bodies or public agencies. There were 3 visiting fellows to the programme. Visiting Fellowships complement the work shadowing scheme. They aim to allow policy makers and practitioners from the commercial, voluntary or public sector to visit a Relu research team or cluster of teams with a view to exploring the implications of the research for their work.

Upon completion of placements, participants complete one page questionnaires evaluating the experience and providing feedback. The schemes appear to be bringing many benefits, for example: "crucially, links with IGD have helped us to appreciate the diverse nature of supply chain management and the need to be sensitive to the differences in the four sectors examined in our RELU project …. It has also helped us to appreciate the more applied/practical relevance of our own research …. [I]t is anticipated that the benefits of collaboration with IGD will outlive this particular RELU project and lead to both future joint research projects on food supply chains and different knowledge transfer activities" (Relu researchers work shadowing at the Institute of Grocery Distribution). Work shadowing has been "hugely beneficial to the … project both as a means to enable access to resources and information that would otherwise be difficult to come by and, critically, to inform the content and direction of the project" (Relu researchers work shadowing at the NFU).

Visting Fellow Kathyrn Monk, from Environment Agency Wales, is engaged in a very productive fellowship with the Relu project *Understanding Environmental Knowledge Controversies.* She has been able to raise "the project team's awareness of the constraints and views existing in the Environment Agency Wales towards both the specific use of evidence in policy and operational decision making and possible translation of project results into guidelines and in more general issues of KT within the EAW. All the discussions have increased my awareness and understanding of these areas of current science developments, providing a stronger basis for me to draw on when advising EAW colleagues. My role means it is essential that I have a high level of appreciation and understanding of a wide range of scientific research, and the Fellowship is an excellent way to help this".

Table 2: Working Shadowing and Visiting Fellowships 2008

Host	**Work shadower**	**Project**
RSPB	Dr Stefano Fiorini, Dr Justin Irvine, Rene van der Wal and Amy Turner	Collaboration in Land Management of Deer
Defra Plant Health Division	Peter Mills	Assessing the Potential Rural Impact of Plant Diseases
Institute of Grocery Distribution	Brian Ilbery and Damian Maye	Assessing the Potential Rural Impact of Plant Diseases
National Farmers Union	Brian Ilbery and Damian Maye	Assessing the Potential Rural Impact of Plant Diseases
Host Research Project	**Fellow**	**Fellow organisation**
Understanding Environmental Knowledge Controversies	Kathryn Monk	Environment Agency Wales
Sustainable Uplands: Learning to Manage Future Change	Denise Walton	Borders Foundation for Rural Sustainability
Angling and the Rural Environment	David Stewart	North East Rural Affairs Forum

4.5 Project-Level Meetings with Potential Research Users

During the year the projects engaged in several thousand stakeholder contacts in the public, private and voluntary sectors, including large numbers of individual businesses and the wider public. During the year the Director's Office has been developing its 'Stakeholder Interaction Assessment Matrix' to evaluate Relu's stakeholder links (see Section 2), which we aim to develop further in 2009/10.

Relu researchers are playing central roles in advising key policy makers. For example, project leader Wyn Grant is a member of the Availability Action Plan implementation group for the National Pesticides Strategy. Henry Buller, who has been leading on the Relu project *Realising the Links between Quality Food Production and Biodiversity Protection*, has been appointed to the Council of the Farm Animal Welfare Council as their expert for social science and education. Richard Shepherd, who leads the Relu project *Managing Food Chain Risks* has been appointed to the new Social Science Committee of the Food Standards Agency.

Over 75 presentations were given specifically by projects to stakeholders in 2008 (Annex B). Individual research projects ran over 27 stakeholder workshops which engaged a wide range of organisations (see Table 3).

Table 3: Project-Level Stakeholder Workshops in 2008

Project	***Workshop***
RES-224-25-0041 Buller	"The South West: a grassland region". In March Relu researchers from the Realising the Links between Quality Food Production and Biodiversity Protection project organised a workshop with guest speakers from the RSPB and Devon and Dorset Wildlife Trusts. The workshop attracted scientists, policy makers, farmers and land managers.
RES-224-25-0086 Chadwick	End of project workshop in July at North Wyke, Devon, on "Livestock farming and microbial watercourse pollution"
RES-227-25-0028 Hubacek	CREDIT workshop, "Carbon in Yorkshire & the Humber: workshop to explore synergies between ongoing work" January: To share experience and expertise in developing domestic land-based carbon storage, sequestration and offsetting projects, and identify potential synergies and future collaborations. CREDIT workshop, "Developing a regional land-based carbon offset scheme" June: The aims were to: present progress on the scheme; and provide interested parties with an opportunity to shape it and get more actively involved. Futures workshop: identifying future change in uplands, February: local and regional stakeholders from Nidderdale AONB and beyond "Science meets the eye!" Moors for the Future Partnership and the Relu Sustainable Uplands project mounted an exhibition as part of Science Week in March of visually stimulating images derived from a diverse range of research undertaken in the uplands of the Peak District and other parts of northern England, accompanied by a series of audio and video podcasts. "Futures workshop: identifying future change in uplands", August: local and regional stakeholders from Galloway uplands

RES-227-25-0014 Irvine	"How do you like your woods?" The Macaulay Institute and the Relu Collaborative Deer Management project held events as part of Science Week in Edinburgh and Aberdeen where members of the public electronically recorded their preferences for woodland landscapes, as projected in a Virtual Reality Theatre. Participatory GIS workshop. Can Managers inform models? Presentation of practitioner interview analysis, data analysis and knowledge integration
RES-227-25-0018 Whatmore	Public exhibition held in Pickering in September. This open exhibition of the Ryedale Flood Research Group's work, displayed posters, video clips of the group's working, and gave visitors an opportunity to try their hand at the custom built model produced by the project. The group collectively produced a report Making Space for People, which was presented at the exhibition, and a CD of resources generated by all team members, to be held in Pickering Library. Some 200 people attended the exhibition, and it received considerable attention in the local press (print and broadcast). Attendees included local and regional politicians and policy-makers and representatives of a wide variety of stakeholder bodies as well as local people.
RES-227-25-0006 Stagl	"Food for the future – is it organic enough?" The Relu project held events for Science Week for researchers and secondary schools in Sussex, Cambridge and Leeds where they examined the environmental and health benefits of organic food and the difficult choices that consumers often have to make when trying to support sustainable development.
RES-227-25-0025 Sutherland	In July William Sutherland organised a joint Cambridge Conservation Forum / Relu summer symposium in Cambridge entitled "Future farming in the UK: global implications for society and biodiversity". A large and diverse audience attended, including farmers, academics, and representatives of many NGO's and government agencies.
RES-229-25-0004 Huby	The project held a successful seminar series on "The use of Participatory Geographical Information Systems (PGIS) for rural research". Two seminars were given, one in York (May) and one in Bristol (July), to provide a wide range of academics and policy makers with the opportunity to exchange experiences and knowledge of research and work in rural communities of England. "Mapping the perceptions of green space in York". In March the Relu project team presented the results of a participatory mapping exercise about the perceptions of green space in York. This was part of Science Week.
RES-229-25-0005 Potter	Workshop on "Rhododendron control and Sudden Oak Death in Scotland" in December at Centre for Ecology and Hydrology in Edinburgh. Academic and policy attendees.
RES-229-25-0007 Quine	Meeting of project advisory board, June, London. Overview of project and specific exercise to obtain views of Board around the driving forces that govern the interaction between visitors and ticks (and tick-bearing habitat). Meeting of project practitioner panel, November, Birmingham. Overview of project and specific exercises to obtain information from Panel members of the measures already taken to reduce the risk of Lyme disease; and to obtain views of the likely development of the habitats/countryside use for four scenarios.
RES-229-25-0008 Waterton	Various meetings of Loweswater Care Project
RES-229-25-0009 Smith	Upper Thurne Catchment Stakeholder Workshop, Martham, Norfolk, May, discussion of project plans, characterisation of catchment, water quality issues, and relevant international experience; audience of local stakeholders.

	River Tamar Catchment Stakeholder Workshop, Roadford Reservoir, Devon, June, discussion of project plans, characterisation of catchment, water quality issues, and relevant international experience; audience of local stakeholders. First Project Communications Workshop (for national and international level stakeholders), SOAS, London, June, discussion of project plans and methodology, UK water quality issues and WFD implementation, the Catchment Sensitive Farming Programme and relevant international experience; audience of national and international stakeholders and researchers. Upper Thurne Catchment Stakeholder Workshop, How Hill, Ludham, Norfolk, November, discussion of water quality standards, prototype Report Card, and catchment modelling; audience of local stakeholders. River Tamar Catchment Stakeholder Workshop, Roadford Reservoir, November, discussion of water quality standards, EA WFD classification for the Tamar, prototype Report Card, and catchment modelling; audience of local stakeholders.
RES-229-25-0012 Strachan	A seminar was held in October to discuss "Perceptions of *E. coli* O157" with researchers and members of the public.

4.6 Relevance of Research and Potential Impact

Relu is pursuing a sustained strategy of influencing, outlined in Section 2. Analysis of the projects shows that the Programme is providing insights of relevance to key policy and practice domains. Over 500 new stakeholder links were established in 2008. There were 17 written policy submissions, 41 events focused on public participation, 346 businesses trained/advised and 5 new material or technological advances (see Table 4).

Table 4: Contributions to Policy and Practice

IMPACTS	
Establishment of new stakeholder-research links	506
Written submissions to policy makers	17
Meetings to advise/brief policy makers	38
Meetings to advise/brief businesses	38
Businesses trained or advised	346
Memberships of stakeholder boards or advisory groups	18
New material or technological advances (efficiency improvements, new technologies or materials, new processes)	5
Commercialisation: Spin-outs, licences, patents etc.	0
Number of stakeholders visiting/placed with project	14
Number of researchers work shadowing/placed with stakeholders	12
Number of interactions/events focused on public participation and engagement	41

Source: Relu project annual reporting for SIAM (see Section 2)

Examples of research impact include (see also Section 2):

Report on "Social Research in Defra" builds on the example of Relu projects
Defra's Science Advisory Council has issued a major report on "Social Research in Defra" which recognises the Relu programme as a model for integrating social and natural science research. It refers specifically to two Relu projects: *Modelling the Impacts of the Water Framework Directive* and *The Role of Regulation in Developing Biological Alternatives to Pesticides*.

Climate change scheme takes a step forward
The Relu *Sustainable Uplands* project has hosted a workshop of partner organisations to take forward their scheme to use carbon offsetting to fund restoration of upland areas. Britain's uplands represent our largest store of carbon; more than is stored in the forests of France and Great Britain combined. However, many large tracts of moorland have been damaged by drainage, causing them to lose carbon and biodiversity. The team has evidence that blocking drainage ditches and restoring peat bogs can lock up the greenhouse gas, carbon dioxide from the atmosphere, in the peat and businesses seeking ways to reduce or offset their carbon emissions, are increasingly looking towards land-based schemes that can help tackle or cope with climate change. Partners who attended the workshop included Defra, Environment Agency, Government Office, Yorkshire and Humber Assembly, Forestry Commission, Moors for the Future, National Parks, National Trust, Natural England, RSPB, Universities of Durham and Leeds, and Yorkshire Forward. The workshop focussed on ways to put interested businesses in touch with organisations restoring peat bogs and planting trees. The next step is to draft a carbon-offsetting scheme, to be led by Carbon Action Yorkshire, as part of Yorkshire Forward!s Sustainable Futures Company. Going under the name CREDIT "Carbon Reduction and Investment Techniques", the group has now drafted a scheme and is setting up a series of projects to support its launch. David Maclean, MP for Penrith and the Borders, cited the work being done by the Relu project on carbon storage in the uplands and the need to restore the peat in order to maximise this effect. The research on carbon sinks has also been fed into a Value for Money report by the National Audit Office. The work has now fully matched the project's own Relu funding with additional knowledge transfer funds from various public and private sector sources.

Residents experiment with hydrological modelling
Over 200 people attended the Relu *Knowledge Controversies* event in Ryedale, North Yorkshire, in October, to celebrate the conclusion of the project's first case study, looking at the area's flooding problems, and publication of their report "Making space for people". They had an opportunity to find out about this way of "doing science differently", watch video clips and try their hands at hydrological modelling.

Time is of the essence in choice experiments
Researchers on the *Sustainability of Hill Farming* project are carrying out choice experiments to identify public preferences for different kinds of landscapes. A unique element of this research is the analysis of the relationship between how people anticipate and experience the utility of environmental goods. Participants completed a valuation exercise on three occasions: prior to a visit to the Peak District National Park, during the

visit and upon return from the National Park. A further set of workshops will be run in early 2008, in which the team will investigate the influence of time on utility, in addition to investigating the impact of additional information about both the existing and historical landscape in the National Park.

Foresight on land use

The Department for Innovation, Universities and Skills (DIUS) began a major Foresight exercise on strategic land use, looking at the long term challenges facing the use of our land over the next 50 years. Relu researchers were drawn into the early scoping of this initiative. Given that Relu is covering many of the critical issues concerning the future use of rural land and encompasses the widest spectrum of relevant expertise, it is not surprising that DIUS's Foresight team expressed considerable interest in learning from the programme. The team has sought guidance and advice from the programme; three Relu researchers are on its main lead expert group; and various inputs have been sought from Relu research projects.

Effects on farmers' incomes of pollution prevention

The Relu *Modelling the Impacts of the Water Framework Directive* project has completed a first case-study analysis of the impact of the WFD on both river water quality and the incomes of farmers if they were required to reduce diffuse pollution from fertilisers. The researchers examined the Derwent catchment in Yorkshire and showed that alternative policy instruments could yield very different changes in water quality - at very different costs. Selection of appropriate measures is vital if decision makers want to ensure that implementing the WFD is a smooth and efficient process. This work is now being extended to cover the rest of the country, and is proving highly influential with officials in Defra and the Environment Agency responsible for implementing the WFD.

How to maximise agri environmental outcomes

The Relu project *Improving the Success of Agri Environment Schemes* has been cited by Natural England as an example of good practice to help Entry Level Scheme agreement holders improve their understanding of the management options and maximise the delivery of outcomes.

How to grow tropical fish for food

The Relu research project on *Warm Water Fish Production as a Diversification Strategy for Farmers* investigated the whole process, from what kind of technical set-up is going to suit UK farmers, to establishing a market for the fresh tropical fish tilapia and identifying the “green” and “local” credentials that will most appeal to potential consumers. After the project they were awarded £5,000 from the University of the Highlands and Islands HI Links project to support knowledge transfer activities. The grant paid for a feasibility study with a farmer on the west coast of Scotland. The project was also approached by Scottish Enterprise to advise on the development of regional aquaculture in the borders/ South Scotland area. This initiative includes identifying small to medium sized enterprises interested in producing tilapia, then providing support and mentoring for them to implement the necessary technology and identify markets.

Relu Director advises on future of rural vet profession
Philip Lowe, Director of the Relu Programme, has chaired a Working Group for Defra, the devolved governments, the veterinary profession and the farming industry on the future of veterinarians in the farming and food sectors. The report he is preparing will be an independent one, but it does relate to the work of the Relu Programme on the management of animal diseases, and the means of knowledge exchange between research and practice. The report will be published by Defra in May 2009.

Researcher pursues life cycle analysis into Unilever
Llorenc Mila I Canals worked for three years as a research officer on the Relu project *Comparative Merits of Consuming Vegetables Produced Locally and Overseas* doing environmental life cycle analyses of vegetable supply chains. Although he had an academic career in mind, when an opportunity to join Unilever came up in March 2008 he decided to give the commercial sector a try. He said: "The level of the research debate in this industry is extraordinarily high, and given the current strong interest in sustainability issues along the food supply chain my experience in the Relu project has been very well received. In particular, the work with social scientists has helped me to better understand consumers' expectations in relation to food, and working with soil scientists has proven key to grasping the uncertainties underlying the carbon footprints of food produce."

Researchers contribute to Pitt review on flooding
Researchers from two Relu projects: *Integrated Floodplain Management and Understanding Environmental Knowledge Controversies* contributed to the Pitt Review – Learning Lessons from the 2007 Floods - in a number of ways. The *Integrated Floodplain Management* team informed the Review of the impacts of the 2007 floods in rural areas and participated in an update of the scientific evidence base used in 2004 Flood Foresight Project. They reviewed the implications of recent research on how rural land management can affect the generation of floods during extreme weather events. The project collected data on the impacts of the 2007 flooding in rural communities in Worcestershire, Oxfordshire, Yorkshire and Humberside. Members of the project team, Tim Hess and Joe Morris, also joined the Environment Agency's Quality Review Panel to review the draft Catchment Flood Management Plans produced by the EA regions before it goes out for public consultation.

Researchers contribute to England's soil strategy
Relu researchers working on the project *Sustainable Uplands: Learning to Manage Future Change* contributed to Defra's consultation on a soil strategy for England.

Modelling where faecal indicator organisms will hit the fan
Researchers at the Centre for Research into Environment and Health (CREH) at Aberystwyth working on the Relu project *Modelling the Impact of the Water Framework* Directive have been leading on the modelling of faecal indicator organism concentrations in watercourses. These represent the first generic faecal indicator organism models to be developed for the UK that incorporate human and livestock population data as predictor variables. Further research will predict variations in concentrations of these organisms

across the initial project case study area of the Humber catchment, and investigate the impacts of different scenarios for agriculture, such as changes in stocking densities.

Taking the long view on landscape change
Human timescales often aren't appropriate for understanding and managing habitat change. Relu interdisciplinary fellow Althea Davies has carried out a review, bringing together palaeoenvironmental and historical information relevant to current UK upland management and conservation, which shows how a longer timescale often lends a different perspective and emphasises the benefits of an interdisciplinary approach to understanding processes of change. For example, putting current debates on moorburn into a longer context shows that increased use of fire during the 20th century is often just the most recent phase of intensification which has been happening since the 19th or even late 18th century, and must raise questions over what levels are ecologically sustainable for the future.

Telegraph readers wax lyrical on Dutch elm disease
More than 100 Daily Telegraph readers emailed and wrote to the Relu project *Lessons from Dutch Elm Disease in Assessing the Threat from Sudden Oak Death*. They were prompted by an article asking for memories and photographs of the 1970s Dutch elm epidemic and its effects on the landscape. Responses flooded in, with some even in verse. These will all provide an invaluable archive for the researchers. Clive Potter who is heading the project was delighted with the contributions. He said: "This is exactly what we needed and all of the letters and emails will be a great resource for our research. We certainly never expected to get so much useful material from a single article."

Using Participatory Geographical Information Systems for rural research
Relu researchers from the *Social and Environmental Inequalities in Rural Areas* project have hosted seminars in York and Bristol on using Participatory Geographical Information Systems (PGIS) for rural research. The seminars, open to academics, policy makers and practitioners, provided an overview of the different PGIS techniques available, background case studies from the project team's previous research, the ethical dimensions of PGIS, and the participatory assessment and identification of inequalities using multicriteria mapping. They were attended by staff from the Environment Agency, Commission for Rural Communities, Natural England and the Health Protection Agency.

Evidence to Parliament on Strong Rural Communities
Neil Ward, from the Relu *Knowledge Controversies* project, appeared before the House of Commons Environment, Food and Rural Affairs Committee to give oral evidence to its inquiry into the potential of England's rural economy. He emphasised the diversity of economic activity in rural areas and the difficulties in separating these from the urban, regional and international picture. The Committee explored the rationale for Defra's new Departmental Strategic Objective (DSO), established under the recent Comprehensive Spending Review, for 'strong rural communities'.

Researchers influence policy on Lyme disease
Researchers on the project *Assessing and Communicating Animal Disease Risks for Countryside Users* have been in demand from policymakers and organisations in the UK.

Sarah Randolph (University of Oxford) was invited by Hugo Swire, MP for East Devon, to sit on the expert panel at a Parliamentary seminar on Lyme disease, that was organised by MPs in response to pressure from members of the patients' support group Lyme Disease Action. Chris Quine (Forest Research) attended a meeting on Ticks and Lyme Disease at the Scottish Parliament, called by Minister for Environment Michael Russell to update a range of bodies on the Relu project's progress on looking at current communication on risk of Lyme disease to professionals and the public.

Relu researcher speaks at United Nations

David Uzzell (University of Surrey) from the *Assessing and Communicating Animal Disease Risks for Countryside Users* project was invited to speak at the United Nations to an audience of Member States, United Nations officials as well as psychologists on 'Human Behaviour and Climate Change: A Social Justice Issue'. This was part of a half-day briefing on 'Psychology and Social Justice Related to the UN Global Agenda' to inform the UN about current applied psychological and social research on the mitigation of climate change, adaptation to changing environments and the reduction of suffering especially in respect of physical and mental health.

Pesticides go green at European Parliament

In December David Chandler and Wyn Grant from the *The Role of Regulation in Developing Biological Alternatives to Pesticides* project gave evidence to the European Parliament Committee on Agriculture and Rural Development on the consequences of the "cut off" criteria for pesticides - hazardous properties that can result in a substance being banned - and the biological alternatives. The presentation stimulated considerable interest amongst MPs.

Parliamentary Office notes lessons on river basin management

The Parliamentary Office of Science and Technology (POST) which produces authoritative briefing notes for MPs on contemporary science and technology issues has drawn on Relu research in its latest POSTnote on River Basin Management Plans. The programme is specifically cited regarding stakeholder engagement, lessons from other European countries, engaging planning authorities and costs arising from land use changes.

Parliamentary Office notes lessons from history

A Parliamentary Office of Science and Technology (POST) briefing note for MPs on The Lessons from History, has drawn on the research of Relu interdisciplinary fellow Abigail Woods, and her work on Foot and Mouth Disease.

The consequences of a healthy diet for the UK countryside

Relu research at Reading University has found that if everyone adopted healthier eating habits this would have important implications for the UK countryside. With loss of demand for red meat, remote regions more dependent on beef and sheep production and unsuited to arable production would see numbers of farms decline. Loss of employment would have significant detrimental effects on the rural economy and migration to more prosperous regions would increase. The effects of these changes would also be felt in upstream industries, particularly feed suppliers. In the east and south-east of England,

intensive horticulture would expand, together with the use of poly-tunnels and irrigation. In those areas able to take advantage of the new arable and horticultural opportunities, farming income would increase, but significant increases in farm employment are unlikely as farmers would probably turn to casual labour and mechanise more tasks.

Relu research demonstrates production methods for health benefits

People find making major changes to a "healthier" diet problematic. Hence, there has been a search for so-called 'super-foods' that may give equivalent health outcomes by delivering higher concentrations of beneficial components. But Relu research on *Implications of a Nutrition Driven Food Policy* suggests most consumers do not like taking these in the form of food supplements and are wary of 'technological manipulation' of food. They are more welcoming of benefits attributable to simple changes in husbandry or choice of plant variety and livestock breed. Yet the commercialisation of agriculture in recent decades has seen production methods and varieties/breeds selected for reasons of productivity, uniformity of appearance, shelf-life etc, rather than health benefits. But the researchers found that the beneficial flavonoid content and anti oxidant capacity of lettuce grown in polytunnels could be improved by cropping it under novel UV transparent plastic films and that grazing sheep on biodiverse pastures that include broad-leafed plants as well as rye-grass reduces saturated fatty acid in lamb-meat and increases levels of 'good' fatty acids. Furthermore, they found that consumers would be willing to pay the extra costs involved in producing these healthier foods.

New farm waste risk management tool

Relu researchers at North Wyke, Lancaster and Exeter Universities, investigating how livestock manures can be recycled safely, have devised a "Kite" tool for farm advisers to use, that shows graphically how the four components of risk – accumulating microbial burden to land, landscape transfer potential, farm infrastructure and social and economic problems on the farm - interact, and where intervention is going to be most effective.

New methods for involving consumers in food risk management

Relu research led from the University of Surrey has been investigating how stakeholders and consumers can be most effectively involved in managing and communicating food chain risks. They have used a computer-based "fuzzy felt" system to help groups of "expert" and "non expert" stakeholders map their understanding of the food chain and where the major risks lie.

Relu research identifies spatial incidence of social and environment inequalities

Relu researchers at York University have devised four indicators that measure how desirable different rural local authority areas are to live in, and also how equally desirable facilities may be accessed by different groups. Their four indicators are: *'Disadvantage'* which incorporates income deprivation together with disadvantage in education and employment, poor mental well-being, fuel poverty and factors that make it difficult for people to find accommodation, such as house prices; *'Inaccessibility'* which is an indicator of areas further away from schools and leisure activities, but where the up-take of countryside stewardship schemes means that farming may be more sensitive to the environment, and rivers cleaner; *'Eco-desirability'* which indicates areas that have a high diversity in vegetation and wildlife, and where house prices and business activity tend to be

high; and *'Pollution'* which indicates problems such as concentrations of particulates and nitrogen dioxide, but also some social issues, for example crime rates. Rural parts of Redcar and Cleveland could be the worst place to live in environmental terms. But it depends on exactly where you are, because Redcar and Cleveland also comes out as the most environmentally unequal, with some groups enjoying much more desirable surroundings than others. Lincolnshire is ranked top on inaccessibility and also comes second on inequality within that measure. This suggests that although there are people who are isolated and unable to access basic amenities, there is a sharp social division, with other groups comparatively unaffected by such difficulties.

4.7 Press and publicity

Coverage of Relu's research continued to grow in 2008 (see Annex B). The projects were well represented in the research councils' publications, including several articles in the ESRC's Britain in 2009, a podcast and news items on NERC's new on-line Planet Earth and magazine articles and web coverage from BBSRC and RCUK.

There were several features in specialist news media, with the Royal Institution of Chartered Surveyors' Land Journal taking a further four articles, and the Royal Agricultural Society of England featuring three projects in their magazine, Rural Matters. The Relu Science Communications Manager also wrote articles for Farmers' Weekly and the Food Ethics Council's magazine and appeared on BBC TV's Countryfile.

Relu's Great Land Use Debate achieved a large amount of media coverage in March, being featured in the Guardian, the Times, Guardian on-line, Farmers' Weekly Interactive, RICS Land Journal, RASE Rural Matters, NFU News on-line and BBC Radio 4 Farming Today, as well as numerous websites and electronic newsletters.

Other highlights included two one-page features about Relu projects in the Daily Telegraph, as well as numerous references to projects and quotes from researchers in print and broadcast media.

4.8 Key items of expenditure

Key items of expenditure include: £7k on the *Management of Animal and Plant Disease* Workshop; £8.4k on Briefing Papers/Policy and Practice Notes; £7.9k on national stakeholder forums; and £4.2k on UK networking/liaison meetings.

5. Progress of Projects

62 projects (including 34 small seed corn projects and 28 large research projects), 10 PhD studentships and 3 interdisciplinary research fellows started prior to the reporting period. Of these all seed corn projects were completed in 2005, and 2 large research projects were completed in 2007. In 2008 1 large research project, 5 PhD studentships and 2 interdisciplinary research fellows commissioned under the Third Call commenced their work, as well as 1 studentship funded under the Second Call. 5 research projects funded under the first call completed their work in 2008.

A group planning meeting was held with Principal Investigators representing 13 Relu projects dealing with land use issues. Individual site visits were conducted to 1 First Call, 4 Second Call and 9 Third Call projects. Expenditure on individual project visits amounted to £4.5k (budget £16.8k).

5.1 First Call Projects on Sustainable Food Chains

RES-224-25-0041, Prof H Buller, University of Exeter
01 Jan 05 - 30 Dec 07[1]
Eating Biodiversity: An Investigation of the Links between Quality Food Production and Biodiversity Protection

This project investigated the links between quality food production and biodiversity protection by looking at the benefits of grazing farm animals on natural grasslands to farm businesses, product quality, ecological management and human health.

Researchers undertook detailed fieldwork on over 40 beef, lamb and cheese producing farms where farmers have specifically sought to graze their animals on natural grasslands and where this is or might be considered as an actual or potential source of added value. The results might be divided into three sets: the contribution of on-farm grassland management to environmental value; the effects of natural grassland pasture feeding on the quality of the final animal products; and the impact of such production on farm businesses and rural development.

In terms of environmental impacts, the results show that, on certain farms, conversion from formerly improved pastures to natural grassland is leading to a net increase in the area under permanent grass, with an associated growth in grassland diversity. Furthermore, the extensive grazing practices on the farms are having an identifiable and beneficial impact upon the floristic composition. As many of the farms concerned are located within what are recognised as priority habitats (notably heath and moorland and calcareous grassland), these high value, extensive systems are helping to reverse biodiversity loss.

Detailed laboratory analysis indicates that differences in pasture biodiversity can positively affect meat quality, chiefly as a result of the impact of plant species upon the rumen process. These findings confirm research that has been undertaken elsewhere. There are a

[1] All project start and end dates are taken from 2007 Project Annual Reports

number of elements to this. First, the research reveals that, when controlling for breed, lamb meat produced on biodiverse rich grassland (particularly heather pasture systems) displays higher levels of Vitamin E (a natural anti-oxidant affecting shelf life) than control meat. Second, lamb meat from biodiverse rich grasslands recorded generally lower skatole levels (a product of rumen fermentation which adversely affects meat taste, particularly when grilled) than control meat. Third, lamb meat from biodiverse rich grassland recorded higher levels of a number of nutritionally healthy fatty acids (notably n-3 polyunsaturated fatty acids and conjugated linoleic acid) than control meat. Fourth, beef breeds (such as Longhorn) were shown to be more suited to biodiverse pastures and generally yield higher meat quality.

For producers, this has potentially significant implications for farm businesses and, ultimately for rural development. By integrating natural value into production chains, producers are able to increase the value of their products and, through marketing and sales strategies, retain a greater proportion of that value within the farm business. The analysis of returns shows that, despite possible lower production volumes (in body weight per animal and in the number of animals produced), the higher prices obtained, in some cases combined with payments under agri-environmental schemes for natural grassland management along with other 'Pillar 2' measures, make this form of farm enterprise profitable in what are often otherwise considered as marginally productive regions.

RES-224-25-0044, Prof G Edwards-Jones, University of Wales, Bangor
01 Dec 04 – Feb 08
Comparative Merits of Consuming Vegetables Produced Locally and Overseas

The project poses the question 'Which is best; to produce fruit and vegetables in the UK, or to import produce from overseas?' Researchers investigated different aspects of growing local food, including the environmental impact, the emission of greenhouse gases (GHGs) and compared these with importing produce from Spain, Kenya and Uganda. They also tried to understand how important the localness of vegetables was to consumers, and to see if eating local food had any impact on their health.

In order to explore these issues researchers undertook field work on farms and questioned farmers about their businesses. They held focus groups and one to one interviews with local people in rural areas and carried out a large scale survey of urban consumers. They then used a series of models and analytical techniques to help understand these data.

The research focused on the cabbage family (cabbage and broccoli), peas and beans, and lettuce and leafy salad in three study regions in the UK (Lincolnshire, Hereford & Worcester and Anglesey) and three overseas countries, Spain, Kenya and Uganda.

They measured the GHGs emitted from fields in each study region, and showed that vegetables such as lettuce emitted more greenhouse gases than did other types of crops such as wheat. They used data on GHG emissions and other environmental information in a Life Cycle Assessment (LCA) of the different vegetables. The LCA looked at the

environmental impacts of the entire production chain, including growing, processing, retail and consumption.

The results showed that for some crops like beans, more GHGs are emitted from the production and consumption of African crops than UK grown crops. This is because the aircraft used to transport the crops to the UK release a large amount of GHGs. The same is not true for lettuce from Spain. During our winter Spanish lettuces are grown outside in the field. In the UK, lettuces are grown in the field in summer and in greenhouses in winter. Greenhouses use a lot of energy for heating and lighting. They found that the GHGs from UK greenhouses during the winter were greater than were the emissions from transporting the lettuces by truck from Spain to the UK. The situation for broccoli is different again, as it is grown outside in both Spain and the UK. Here UK broccoli released fewer GHGs than Spanish broccoli. The LCA also showed that a large proportion of the GHGs emitted during the life cycle of a vegetable were from its storage, use and disposal in the home.

RES-224-25-0048, Prof WP Grant, University of Warwick
01 Nov 04 – 31 Oct 07
The Role of Regulation in Developing Biological Alternatives to Pesticides

Insect pathogenic fungi are naturally widespread in the environment and can be used to control insect pests of crop plants. Fungal bio-pesticides have been produced in the past, but little work has been done on their environmental sustainability. The project is looking at the potential for these and examining the rules governing the introduction of bio-pesticides in the UK, Europe and the USA to assess whether changes in regulations might encourage a move towards bio-pesticide use.

There has been a poor uptake of microbial pesticides in the UK. The regulatory system in the UK was developed in accordance with a chemical pesticides model which did not facilitate the registration of biopesticides.

The regulatory agency, the Pesticides Safety Directorate (PSD), introduced a Pilot Project to facilitate the registration of biopesticides in 2003 and converted this into a Biopesticides Scheme in 2006 offering features such as pre-submission meetings, reduced registration fees and a Biopesticides Champion within PSD. The project was able to study this process of regulatory innovation and work with PSD to provide training to facilitate the achievement of their objectives. It also enabled the development of a model specifying the conditions under which regulatory innovation was likely to occur.

Outputs from the project will explore the wider implications of the system of private retail governance which some supermarkets are operating. Some retailers cultivate a greener image than competitors as part of a marketing strategy. This leads them to prohibit or control the use of pesticides that have been approved by the regulatory system. A cross-national comparative element was introduced into the analysis by comparison with regulatory arrangements in Denmark, the Netherlands and the United States.

Relatively little is still understood about the underlying ecology of bio-insecticides. Research results indicate that habitat type is likely to influence the environmental fate and behaviour of entomopathogenic fungal strains released as biocontrol agents. It would make sense to develop control agents for a particular habitat type using fungal strains from a genetic group adapted to the same habitat. Ecological niche theory suggests that such strains are likely to persist for longer (thereby giving more effective pest control) and there should be less of risk of the strain establishing in a heterologous habitat and causing unintended effects on nontarget organisms.

The project team submitted a response to the draft National Pesticides Strategy and also took part in the informal and formal consultations run by Defra on the future of PSD. At a European level, the project was represented on the steering group of the European Commission policy action, REBECA (Regulation of Environmental Biological Control Agents). Project members took an active role in various workshops and played a key role in shaping the final report with Professor Grant serving as a member of the round table at the plenary session of the final conference in Brussels. The work undertaken in the project is consistent with Defra's Science and Innovation Strategy objective to develop alternative plant protection technologies to reduce reliance on conventional pesticides.

RES-224-25-0066, Dr DC Little, Stirling University
03 Jan 05 – 31 Dec 07
Warmwater Fish Production as a Diversification Strategy for Arable Farmers

This project aimed to develop technical guidelines for a sustainable system for tilapia culture as a potential diversification strategy for farmers in the UK. It has involved a comprehensive analysis of the practicality, sustainability and viability of the system through laboratory and on-site investigations, as well as trials with commercial partners.

Many farmers have underutilised farm buildings that if insulated would be suitable for farming these fish, as well as relevant husbandry skills, and some have access to on-farm energy sources that have little alternative use. Moreover many farmers were attracted to the project concept through an appreciation of how fish might be a valuable and novel product, complementary to their current activities and allowing them to diversify through food production. Initially it was perceived that a culture system that has been promoted elsewhere but was unproven under commercial UK conditions (Activated Suspension Technology, AST) might be appropriate rather than more conventional Recirculated Aquaculture Systems (RAS). A series of technical trials established that AST was highly uncompetitive with RAS and the researchers concluded that fish welfare and resource use efficiencies were particularly high for a simple, modular design of RAS.

This comparison of technical systems has provided conclusive information for stakeholders within an emerging and important area of aquaculture. It has provided an evidence base for future investors and promoters and contributed to the knowledge base on sustainable aquaculture strategies.

A simplified RAS approach was further developed with inputs of UK-based commercial collaborators with a view to identifying interested adopters in the UK farming industry. An integrated approach to identifying market opportunities for various scales of production was pursued throughout the project. Focus group-based research confirmed several potential niche markets for such 'ethical' fish produced locally, the results of which were fed back into the cost models for potential adopters.

An important component of the project was assessing the interest and capacity among both farmers and other stakeholders in using tilapia as a diversification strategy. The risks associated with such a novel production and marketing system have emerged as the major impediment to farmers seeking to develop a pilot system. The reluctance of Government agencies to support both production and marketing start-ups of small-scale aquaculture have also proved a problem since such scheme attributes often disallowed support for the type of pilot required to establish the approach in a commercial environment.

The integration of technical and marketing research has been critical in the project and led to new insights to developing novel diversification strategies and in generating data for use in assessing public health/environmental health impact.

RES-224-25-0073, Prof B Traill, University of Reading
01 Apr 05 - 30 Apr 08
Implications of a Nutrition Driven Food Policy for the Countryside

This project draws on economics, psychology, ecology, crop science, animal science and human nutrition to assess the potential for improvements in the nutritional quality of soft fruit, lettuce, and meat and milk, and the possible implications for both human health and the countryside.

Policy makers have become increasingly concerned about the obesity 'epidemic' and other aspects of an unbalanced diet, such as consumption of too little fruit and vegetables and too much saturated fat. The project aimed: to determine the potential for agricultural production systems to produce crops and livestock with enhanced nutritional profiles; to examine the determinants of overall diets, attitudes and constraints to healthy eating sensitivity of diets to prices, attitudes and demographics and hence policy options to promote healthier eating; and to model the impact of three scenarios on changes in diet on land use and production, wider rural employment implications of land use change, and impacts on landscape and biodiversity and public preferences for different types of land use change resulting from a nutrition-driven food policy

The researchers experimented with using plastic filters in polytunnels to study the effects on levels of beneficial compounds (phytochemicals). For soft fruit, the results were found to be limited in comparison with the effect of variety, but for lettuce results were more positive. In lamb, enhancing biodiversity had a positive impact on meat fatty acid profile as reflected in increased levels of n-3 and total polyunsaturated fatty acid profiles. In consumer studies, choice experiments show consumers willing to pay a premium for enhanced health attributes in both strawberries and lamb in excess of production cost

increases. The researchers conclude there is potential for choosing varieties, breeds plant and animal and husbandry methods to select for healthy nutrient profiles and consumers would be willing to pay for significant improvements provided the products could meet health claim and labelling regulations.

In the investigation of policy options to encourage healthy eating, selected fiscal measure (1% tax per percent saturated fat used to subsidise fruit and vegetables) led to intake of saturated fatty acids and cholesterol falling by 4.5% and 5.4% respectively. Other nutrients such as sodium and all categories of fats, as well as total energy intake would decrease, while protein, fibre and fruit and vegetables intakes would increase (by 4.5% for the latter). Attitudes and constraints to healthy eating were modelled effectively and linked to demographics. This enables the targeting of specific healthy eating messages to specific population segments through leaflets and marketing campaigns; for example, young females care more about healthy food for reasons of appearance than health. The disappointing finding is that the low SES groups, who are known to eat least healthily, prove to be the most difficult group to target.

Healthy eating scenarios imply loss of demand for red meat. Regions dependent on beef and sheep production are hard hit. These more remote regions are not well suited to production of arable crops, so will not benefit from growth in demand for cereals and fruit and vegetables. Structural change in these areas would be extreme, with declines in the number of farms and average farm sizes increasing. The overall net margin of agriculture would rise due to increased production of higher market value crops. In the East and South East, intensive horticulture will expand, together with the use of poly-tunnels and irrigation. In those areas able to take advantage of the new arable and horticultural opportunities, farming income will increase, but significant increases in farm employment would not occur, due to dependency on casual labour and the scope for the use of machinery for these operations.

The predicted spatial distributions of farmland birds resulting from land-use projections of policy scenarios differs among species. Species associated primarily with arable land were affected negatively, whilst those associated with grassland landscapes expanded their range. In contrast, the predicted responses of birds typical of mixed farming varied considerably and were predominately determined by spatially explicit changes in the balance of different agricultural land uses. The impacts of the scenarios on the landscape character vary spatially across England according to differences in the extent of permanent pastures, stocking rates and crop diversity.

RES-224-25-0086, Dr D Chadwick, IGER, North Wyke
01 Feb 05 - 30 Jun 08
Sustainable and Safe Recycling of Livestock Waste

This project is evaluating the changes needed in management practices to limit the risk of pathogen transfers from grazing livestock, manures and other farm wastes to water courses. The effect of these changes on the economics and practicalities of farming are

being investigated as well as the 'knock-on' effects for local communities and industries reliant on clean water supplies.

The project has developed a farm scale risk tool to indicate the likelihood of faecal indicator organism (FIO) loss from farm enterprises and to highlight key attributes of the farm system contributing to FIO loss. The 4 key risk components are; accumulating microbial burden to land, landscape transfer potential, infrastructural characteristics of the enterprise, and social and economic obstacles to taking action. It enables the farmer or other land manager to analyse where the most serious and difficult risks lie, and to mitigate these more effectively and efficiently.

The farm-scale toolkit highlighted that changing farmer attitudes to manure and land management is part of the process by which we can make our food and water safer, but that this not always enough. Appreciation of the interplay of social and natural processes and understanding this interaction will allow the policy community not only to target high risk areas, but also develop mitigation strategies that are sensitive to the different ways in which risk is produced. The review of management practices which could reduce FIO transfers to water was accompanied by the development of an FIO cost assessment tool to allow farmers and advisers to explore the financial burden of employing mitigation measures.

Results from replicated plot-scale experiments on FIO survival and dispersion from a range of faecal matrices were used to inform the risk assessment tools. This research also demonstrated the need to assess environmental trade-offs from different land management practices. For instance, slurry injection, as is required in several European countries to reduce ammonia emissions, rather than surface spreading, favoured survival of FIOs in the injection slots.

A citizens' jury heard evidence from 18 expert witnesses with different responsibilities and expertise in the area of microbial watercourse pollution and were asked to judge the nature and acceptability of these risks as this relates to the role of livestock farming, and what might constitute socially acceptable and sustainable pathways to their management. The process highlighted emerging public priorities for action and provided an opportunity for stakeholders to discuss policy approaches.

RES-224-25-0090, Prof R Shepherd, University of Surrey
01 Feb 05 – 31 Jul 08
Managing Food Chain Risks

Too often in recent crises in food and agriculture (e.g. BSE, E. coli, Foot and Mouth Disease) a narrowly technical perspective has been taken: the social, political and economic issues have been addressed too late in the process with the result that many people lose confidence in the authorities' management of the situation. The project is therefore incorporating the thinking and values of stakeholders into the scientific modelling of risks.

The aim of the project was to design and evaluate decision support tools and processes for participatory risk management and communication across the food chain that fully integrate the views and values of all stakeholders, particularly those in the rural community. The work centred on three case studies: (CS1) pesticide residues on apples and pears; (CS2) campylobacter in chickens; (CS3) a crisis scenario related to contaminated chicken feed.

Participation was investigated in 11 workshops (including one web-based) bringing together different combinations of experts and stakeholders. The workshops were successful in highlighting new areas of concern (such as mixtures of pesticides) and this did not differ greatly between a group of experts on the one hand and experts and members of the public on the other.

In a second stream of research, statistical risk modelling both fed into each of the case study workshops and also made significant progress on specific technical aspects of modelling. A probabilistic model was developed and applied to exposure of children to the pesticide carbendazim in apples, apple juice and processed apple foods. A key feature was the development of new approaches, using Bayesian techniques, to model various sources of uncertainty and variability, including measurement uncertainty and calibration errors affecting chemical concentrations, and variability of pesticide residues between and within batches of produce. It was shown that measurement uncertainty can have a significant impact on results, with unquantified uncertainties making the quantitative estimates conservative. Further developments have modelled between and within individual variability in consumption and extended the approach to model consumption of more than a single food type. A simplified model was implemented as a web-based calculation tool for the public to compute their probability of exceeding recommended limits according to their age and diet.

The project found that risk information had a greater impact on perceived risk if attributed to the Food Standards Agency (FSA) rather than to the food industry, showing the FSA to be a more trusted source. Attributing information to a group comprising FSA experts plus stakeholders, rather than an FSA group alone, led to information being rated as more factual but the FSA were seen as less expert and to have less responsibility.

The project also investigated how stakeholders thought about the food chains for chicken and apples and the implications this has for communicating the risks involved. Innovatory methodology was developed("fuzzy felt") that involved constructing a picture of the chain, indicating where the risks were and how they should be mitigated. There is also a web-based version.

RES-224-25-0093, Dr AS Bailey, Imperial College London
01 Feb 05 – 31 Jan 09
Overcoming Market and Technical Obstacles to Alternative Pest Management in Arable Systems

This project is investigating both the efficacy of alternatives to chemical pesticides and issues for producers in switching to them. Two alternatives are being explored: habitat

manipulations to encourage predators and parasites and semiochemical odours (natural smells) to manipulate predator distribution.

This project is conducting innovative natural science research to evaluate an existing (i.e. habitat manipulation) and novel (i.e. semiochemical 'push-pull') biocontrol technology considering ecological mechanisms and impacts from lab to farm scales. They combine this technical knowledge with outputs from novel social and economic analyses of path dependency, considering factors such as private costs of adoption, consumer preference and retailer led supply chain governance. By choosing an 'established' and a new technology, they aim to use this programme of technical and economic research to look backward and forward in developing effective tools to evaluate and promote the adoption of alternative control technology into the UK agricultural systems.

A field study was conducted to determine the proportion of the predatory insect population using floral resources and the extent of their subsequent movement. A trace element was applied to a flower-rich grass margin and the usage by predatory insects of the resources was evaluated by collecting insects across the adjacent fields using a grid of sticky traps and determining the proportion contained the trace element. Value of grass margins for overwintering insects and of these and flower-rich margins for pollinators in summer was evaluated.

Field scale spatial experiments of aphid populations in winter bean crops were conducted at Rothamsted farm. Analysis of treatments with and without semio-chemical treatments suggest that both the level of pest population and their distribution across field is significantly affected by the deployment of signalling chemicals. While background effects of natural predators and parasitoids appear to control pest populations effectively at the margin of field, pest populations were greater at greater distance from the margin in the absence of semio-chemical signals. Pest populations were lower and more uniform in the treated crop.

The nature of the problem facing practitioners and researchers alike has become clear from the work focussed on commercial adoption of integrated pest management (IPM). The research integrates scientific and economic research on two potentially complementary PM technologies in a way not possible before. However, the systems in which these technologies fit are highly complex. While we have long recognised that IPM approaches involve many more than just 2 technologies, crops require a degree of protection from attack by an array of biological organisms which directly effect plant growth or compete for resources with the crop itself. Since these problems differ by crop, and their impact is heterogeneous across farms, the types of IPM portfolio approaches that farmers adopt will not be uniform. Analysis of a farmer survey conducted by the project team has uncovered that commercial cereal farmers use one of 4 identifiably distinct IPM portfolios. While a farmers choice of portfolio might be based on the farms specific agro-ecological conditions and the crop protection problems it faces, it can also be seen that Agri-Environmental Policy (AEP) in the UK has influenced up-take. In particular, the Environmental Stewardship Scheme, with its emphasis on ecological land-use change and on Crop Protection Plans does appear to have promoted the uptake of measures which can enhance

Conservation Biological Control. To a greater degree, these effects highlight the importance of Government Policy incentives in promoting a change in technology that might not occur if purely market mechanism were relied upon. Future work needs to recognise the complexity of the system under study and to be directed toward the optimal design of AEP incentive schemes.

5.2 Second Call Projects on People and the Rural Environment

RES-227-25-0001 Dr K Hubacek, University of Leeds
01 Mar 06 – 31 Oct 09
Sustainable Uplands: Learning to Manage Future Change

The uplands in Britain are facing a time of considerable change, and it is important that these biodiverse areas, which provide much of Britain's drinking water, as well as being a valuable resource for tourism, sheep farming, game, fishing and other recreation, are managed in a sustainable and acceptable manner. Focusing on three upland areas, the Peak District, Nidderdale in the Yorkshire Dales and Galloway in Scotland, this project aims to help people identify the most appropriate ways to adapt to changes in a socially and environmentally sustainable way, and to monitor progress.

The project has published a series of scenarios depicting some potentially dramatic changes for upland landscapes, based on the views of stakeholders in three upland sites combined with published evidence. For example, if global food shortages continue, we could see the expansion of arable crops into upland valleys and many more livestock grazing the hills. Alternatively, if the demand for bioenergy takes precedence, more acres could be given over to forestry, and there might be many more windfarms. But if conservation was the priority, we could actually see less farming and forestry in future, and more of the uplands left to wildlife. All of these potential futures are possible and may happen in combination with each other. They are all also likely to be affected by climate change, which has major implications for farming, wildlife and tourism. Local people taking part in the research identified the futures they think are most likely to happen, and that would have greatest impact on landscapes, wildlife and livelihoods.

The team has coupled an ecological model with an agent-based model of human behaviour, based on interviews with Peak District land managers. The models suggest that as temperature increases heather becomes more vulnerable to over-grazing and so managers respond by removing sheep from the moor. This shows how such coupled socio-ecological systems are likely to be self-regulating to an extent, but the models also suggest that efforts to restore historically degraded moorland may be significantly hampered by climate change.

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The team has shown how blocking upland drainage ditches and re-vegetating bare peat can lock up carbon from the atmosphere and potentially cut down the amount of carbon lost in brown stream water). They have also shown that revegetation, especially with Sphagnum bog mosses, can slow water flow across peat by at least 10 times, hence potentially reducing flood risk. With appropriate management, the majority of moorland could save

enough carbon to pay back its restoration costs within 30 years through carbon offsetting schemes. This compares well with forestry-based alternatives. Data is being collected to get the first such scheme accredited under the Voluntary Carbon Standard. In the meantime, the project plans to launch a Corporate Social Responsibility scheme to fund climate and biodiversity benefits in uplands, to be trialed early 2009 in Yorkshire and Galloway.

RES-227-25-0002 Dr E Oughton, University of Newcastle
01 Mar 06 – 31 May 09
Angling in the Rural Environment

Angling is increasingly important as the rural economy moves from being dominated by production (agriculture, forestry), to being dominated by consumption (leisure, tourism). But rivers are under further pressure from other human activities, so their ability to sustain flora and fauna may be at risk. This project looks at the case studies of the Rivers Esk, Ure and Swale and analyses the complex relationships between river, fishing, biodiversity and institutions of governance and practice. Results will be used to inform policy on integrated development of the rural river environment.

This project has found that there is heterogeneity in anglers and angling community and specialisation of angling interests which makes it impossible to identify a single angling interest. Anglers are not, however, excluded or powerless and demonstrate a stocking/engineering tradition of management of the river rather than a holistic or habitat management approach. But although a lot of effort has been put into organisation and reorganisation of bodies concerned with angling this has made them inward rather than outward looking. Angling management through governing bodies continues to be highly dispersed. There also seems to be a major disjuncture between consultation and decision making processes.

Ecological findings include large variations in delivery and transport of sediment in the River Esk although spatial patterns of transfer do not appear to have changed over the last few years. Variations in sediment transfer can be qualitatively linked to patterns in fish spawning in the Esk

RES-227-25-0006 Dr S Stagl, University of Sussex
01 Jan 06 - 31 Dec 09
The Effects of Scale in Organic Agriculture

This project investigates what causes organic farms to be arranged in clusters at local, regional and national scales and assesses how the ecological, hydrological, socio-economic and cultural impacts of organic farming may vary due to neighbourhood effects at a variety of scales. It will map out some alternative scenarios for future growth of the organic sector in the UK, and evaluate the potential positive and negative effects that different patterns of organic cultivation might have, at a variety of scales, in the future.

Analysis of the concentration of organic farms by the researchers showed that about a third of the variance in their occurrence across the country can be predicted by a statistical model. A combination of environmental variables associated with a lower agricultural potential predisposes farmers to convert to organic farming, which further promotes conversion of farmers in the neighbourhood. Organic farming as a "wildlife friendly" method is more likely to occur in agriculturally less favoured areas, where economic incentives for conversion to organic farming do not need to be high and the loss of production due to conversion will be comparatively small. This suggests that an efficient conservation strategy, which takes the global demand for food into account, would be to promote organic farming as an agri-environment scheme in landscapes that are already rich in organic farms at the expense of those existing high-production landscapes that are not.

Organic farming mainly enhanced plant species richness in crop fields and this best at a regional scale pointing to a considerable heterogeneity among organic farms. Overall the benefits of organic farming to species seem moderate. The grain yield of winter wheat fields on organic farms is less than half of that of non organic farms. This difference in yield numbers gives rise to concern that the moderate biodiversity benefits of organic farming may not be justified given the current debate on food supply shortage.

RES-227-25-0010 Dr J Bullock, CEH Dorset
01 Oct 06 - 31 Sep 11
Improving the Success of Agri-Environment Schemes

The study is considering how well wildlife habitats are created under agri-environment schemes. So far these schemes have had limited effects, possibly because of a combination of less than optimal management by landowners and the inability of plants and animals to colonise new habitats, either because they are already so rare, or because of obstacles in the landscape. Researchers will examine the effects of training on farmers as well as the availability of different species and habitat types in the wider landscape, to enhance the biodiversity benefits of agri-environment schemes.

The project aims to develop a holistic understanding of the factors determining success of agri-environment schemes (AES) through the combination of ecological and socio-economic research methodologies and interaction of researchers. Researchers are doing this by exploring farmer attitudes and approaches to agricultural management under AES and determining whether their personal attitudes affect biodiversity outcomes. They are carrying out training and measuring the differences beween outcomes for trained and untrained farmers and also quantifying the extent to which landscape factors (poor species pools or barriers to dispersal) constrain development of biodiversity under AES.

During 2008 ecological surveys were carried out for the second year: two surveys for butterflies, bees and habitat status; one visit to estimate seed availability; and three visits to survey winter birds. Each trained farmer had a follow-up ½ day visit from the trainer and there was more tailored training which involved visiting the farmer's ELS strips and discussing issues arising. The trainer was interviewed to elicit information on his training method and his perception of the training process and the farmer's responses. This information is important to achieve more general recommendations about training methods.

The team has liaised closely with Defra and Natural England, to discuss the research and the initial results of the training, and the progress of Entry Level Stewardship (ELS). Both organisations are very positive about the project and have agreed that training is a vital next step in ELS. Data from the initial stages are being processed.

RES-227-25-0014 Dr J Irvine, Macaulay Institute
01 Feb 06 - 31 Dec 09
Collaborative Deer Management

The management of deer provides a useful case study for the use of ecological resources in the countryside, because there are so many associated costs and benefits. However, in some areas, high deer numbers are causing overgrazing and damage to sensitive natural habitats, to agricultural and forestry crops and even to suburban gardens, and are often involved in road traffic accidents. This project is investigating how well people involved in deer management work together and how this can be improved so that the costs of managing deer are minimised and the benefits maximised.

Wild game management has become increasingly complex as stakeholders have multiplied and as 'sustainability' influences the contemporary debate. The researchers have looked at whether the current legal framework for game management is relevant to regulate the contemporary environmental, social and economic dimensions of this natural resource. Their analysis suggests that current legislation is increasingly divergent from contemporary trends and has created inertia with respect to sustainable deer management. A radical shift in UK legislation toward legal responsibility to manage wild deer sustainably, as exists in other European countries, could provide the necessary catalyst for change.

Participatory GIS techniques have been used in West Sutherland and Balquhidder to capture stakeholder knowledge about deer management and deer movement and habitat use. PGIS became an effective platform for the integration of different forms of knowledge and data relevant to a mobile resource such as deer. This process was fundamental for identifying the gaps in both stakeholder and scientific knowledge and to develop new models describing deer behaviour. This has provided a new evidence base for managers to address management conflicts that can exist (for example, between sporting and conservation interests) and to discuss deer management in a more objective manner and from a position of common, agreed, knowledge.

Using discrete choice experiments researchers are testing the role that collaboration and additional incentivisation may play in affecting the trade-offs practitioners are prepared to make among the various objectives they may have. They found that collaboration can affect the choices people make but interestingly, incentives to compensate people for the costs of collaboration are unpopular among the private sector practitioners. This seems to be because incentives are perceived to be linked to relinquishing management control to the funding body.

The team has looked at the preferences of different societal groups for a range of woodland landscapes. They found that differences in preference are primarily due to age, not due to livelihood. In addition, people without a strong connection to woodland are more likely to shift their preferences when presented with new information.

RES-227-25-0017 Professor J Morris, Cranfield University
01 May 06 – 31 Mar 09
Integrated Management of Floodplains

This project is exploring changes that have occurred over the past 40 years, in areas which were 'defended' under flood defence schemes. Case studies of selected schemes, first studied by the research team in the early 1980s, will show how land use has changed in the meantime and the consequences for livelihoods and the management of flooding problems. The project will help inform decisions about the future management of floodplains.

The study seeks to explain changes in land and water management over the last 40 years in eight selected floodplain areas that were previously served by agricultural flood defence schemes. This involves stakeholder and institutional analysis, farmer interviews, field observations, modelling of hydrological and related ecological processes, and analysis of farm incomes. The influence of agricultural policy, interacting with farmer circumstances and motivation, is also explored.

Using a mixture of scientific perspectives, options for future land and water management are identified for the study sites. Opportunities for achieving a wide range of benefits through the management of water regimes on floodplains are assessed for each site. Such benefits relate, for example, to farming, biodiversity, amenity, flood management, water quality and the wider rural economy. The study informs strategies for floodplain management, helping to develop approaches that are appealing to major stakeholders.

Two parallel studies were carried out and completed in 2008 on the impacts of the summer 2007 floods on rural areas. One focussed on the impacts of flooding on farming. An interview based survey of 80 farmers in Yorkshire, West Midlands and Oxfordshire was used to derive estimates of flood damage to agriculture. Cost per ha flooded ranged between about £500 and £6,000 per ha, highest for horticultural producers, and lowest on extensive grassland. Most damage costs were uninsured. Another study examined the impact of the summer floods on rural households (40 surveyed), non farm businesses (15) and communities (6). This suggested that there was a 'rural dimension' to flooding due to relative remoteness, especially regarding access to support services. Rural businesses, many associated with leisure trades, were particularly affected by loss of trade in the normally busy summer period. These studies are to be published in January 2009 by the Environment Agency. They will be used to inform flood management project appraisal.

A methodological framework to assess the relationship between flood and water level management has been produced. This supports the design and appraisal of land drainage management for agriculture in floodplains.

Scenarios of alternative land and water management options in floodplains have been developed for 8 case study sites. These include scenarios that maximise agricultural production, maximise ecological value, or maximise flood storage capacity, with outcomes measured using a range of economic, social and environmental indicators. Indicators are also grouped by major ecosystem services. The scenarios confirm the critical role of water regime management in floodplains. The degree to which these scenarios enable river and floodplain 'restoration' has also been reviewed.

RES-227-25-0018 Professor S Whatmore, Oxford University
01 Mar 07 – 30 Jun 10
Understanding Environmental Knowledge Controversies

This project studies flooding and water pollution as pressing rural land management problems that are controversial among scientists and the public, especially those directly affected. To explore these environmental 'knowledge controversies', the project develops cutting edge tools and approaches that pinpoint which practices result in which impacts, and account for how environmental science is produced, used and disputed. The project sets out to develop a different way of "doing science" that involves social and natural scientists working closely together, and with local people, in 'Competency Groups'. The team will evaluate this approach and identify lessons for other kinds of controversial areas of science (e.g. nanotechnology and climate science).

To examine processes of scientific knowledge production associated with diffuse environmental problems like flooding and pollution, the team has been carrying out interviews with modellers and documentary analysis to map the political economy of flood risk modelling in the UK and in-depth ethnographic case studies of models; modellers; modelling in situ.

To develop an integrative methodology for forecasting the in-river and floodplain effects of rural land management, they are using a standard quasi-distributed hydrological representation modified to include hydrological connectivity.

Competency Groups have been developed as a new approach to interdisciplinary public science and a collaborative approach to public engagement, such that non-scientists inform the research and knowledge production process from the outset.

The team has completed Phase 2 (12 months) of the project, working with eight residents of Ryedale in North Yorkshire over a 14-month period. Much of our research effort has focused on the Ryedale Flood Research Group, including meetings an interactive website and exchange forum and a selection of activities in situ (such as project team members working with local residents to collect data to aid the model-building and to gather feedback on the experience of working in the group).

This phase concluded with an open exhibition of the Ryedale Flood Research Group's work, which displayed posters detailing the group's work, video clips of the group's working, and gave visitors an opportunity to try their hand at the custom built model

produced by WP2. The group collectively produced a report Making Space for People, which was presented at the exhibition, and a CD of resources generated by all team members, held in Pickering Library. They are now three months into Phase 3 of the project and have recruited a similar group in Uckfield in Sussex.

The project work has already made a tangible impact on the local plans for flood risk management in Ryedale. The bunds proposal (the potential solution resulting from other group activities and modelling) became an expression of interest shortlisted by Defra.

RES-227-25-0020 Dr Angela Karp, BBSRC
01 Jan 06 - 31 Mar 09
Impacts of increasing land use under energy crops

Although some potential impacts of converting land to energy crops have been researched it is not yet clear how to balance decisions based on climate, soil and water availability, against possible impacts on the environment, social acceptance and rural economy. Using the East Midlands and South-West regions as study areas, this project has reviewed current knowledge and conducted new state-of-the-art social, economic, hydrological and biodiversity research to develop an integrated scientific framework for Sustainability Appraisal (SA) of the medium and long term conversion of land to energy crops.

Climate change, rising fuel bills and future fuel supplies have resulted in an urgent need to develop renewable energies as a substitute for fossil fuels. Short Rotation Coppice (SRC) willow and Miscanthus are biomass crops with potential for renewable energy production in the UK and policies are encouraging farmers to grow more to help reduce CO_2 emissions. However, converting large areas to these crops constitutes a significant land-use change; they are perennial and taller (3-5m height), may be deeper rooting and may attract different wildlife than current crops.

In comparison with arable field margins, SRC willow and Miscanthus have been found to have higher abundance of butterflies of conservation interest whilst pest species were less abundant compared with arable crops. SRC willow plantations also showed more farmland and woodland birds but results in Miscanthus were less clear. Measurements of water use at commercial field sites has shown that SRC willow water use is similar to that of a cereal crop, higher than permanent grass and lower than that of mature woodlands whilst Miscanthus water-use approaches that of woodlands.

Street-based questionnaire surveys, public meetings, and stakeholder and focus groups using computer-generated landscape visualisations have revealed that there is no particular concern over the appearance of the crops. People are more concerned with lorry movements and where the processing units and power stations would be built. Wider margins and smaller, scattered fields are slightly more favoured than large planting blocks.

A wide variety of factors has been found to affect farmers' decisions on whether to grow energy crops. Additional significant factors to relative profitability include the impacts of the crops on farmers' existing systems and their attitudes to risk management, market

volatility and environmental issues. There is real interest in growing biomass crops but the relative level of profitability and clear policy support are essential elements in their large-scale adoption in the UK.

Geographic-Information Systems (GIS) were used to identify areas where energy crops could be grown in the UK without significantly impacting on food production or on using designated land for e.g. nature reserves and cultural heritage. Less that 20,000 ha of these crops are grown today and the results indicate that there is sufficient land available within these constraints to meet production up to the UK government Biomass Strategy objective of 350,000 ha. The results of the research have been integrated in a scientific framework developed with key stakeholders for a 'Sustainability Appraisal' which can be used to identify key environmental, economic and social impacts that might occur should these crops become more widely grown.

RES-227-25-0024 Professor I Bateman, UEA
01 Jan 06 - 30 Apr 10
Modelling the Impacts of the Water Framework Directive

The project is developing a hydrological-economic model to assess the costs and benefits of changing farming practices in the Humber catchment area in order to produce a healthy river environment with good amenity value in line with the European Water Framework Directive.

The project seeks to develop and implement a methodology for integrated modelling of the relationship between rural land use (and consequent farm incomes) and water quality (including diffuse and point sources of nutrients, pesticides and faecal matter and consequent ecological status). This methodology combines econometric statistical and linear programming analysis of a large cross-section and time series panel database of farm activity with hydrological models linking land use with consequent water quality.

The resulting model is being used to provide policy guidance on strategies for implementing the Water Framework Directive (WFD) within the context of ongoing Common Agricultural Policy (CAP) reforms. Particular attention is given to the impact on land use, farm incomes and the rural economy of alternate policy options.

Data collected include over 50,000 farm years of records from individual farms and a 35 year time span of the pattern of land use across the country. These were complemented by detailed data on environmental and agro-climatic factors such as soil characteristics, temperature, rainfall, and a full time series of how prices and subsidies have changed over that period. Bringing this all together has enabled researchers to build up a detailed model of land use changes that enables decision makers to see the impacts of policy change and vulnerabilities to changes in market conditions.

Over 2,000 households have been interviewed about their use of environmental recreation areas with a particular emphasis upon rivers. The data were collected in a manner that allowed the real-world to be brought into the analyses by looking at the spatial

relationships between land uses, rivers, etc. This gives the decision maker the unique ability to see where they would get the most social benefits from spending public money. Defra, Environmental Agency, the Parliamentary Office of Science and Technology, Natural England etc have already held meetings with the team to look at the implications of the research and Defra invited researchers to stage a two day workshop for senior personnel and team which has identified two key areas in which they want to collaborate.

RES-227-25-0025 Professor W Sutherland, University of Cambridge
1 Feb 06 - 21 Dec 09
Management Options for Biodiverse Farming

The variation in management of farms is a key determinant of differences in biodiversity. This study is linking together models of the dynamics of weed and bird populations and farm management decision-making. These will then be applied to help us to understand how the variability in arable farming practices, and intensity affect biodiversity and farm livelihoods. The work will be used to determine the most effective ways of targeting agri-environment schemes.

The research will determine the social and economic drivers of variation in farmer behaviour, produce weed population models to predict the impact of this variation in management, and create behaviour-based game theory models and habitat-occupancy models to relate birds (and four mammal species) to farming practice. These will be brought together in a single model that predicts the responses of farmers and the resulting consequences for farm livelihoods, employment and biodiversity. The single model will then be used to demonstrate how changes in market forces, incentives (e.g. agri-environment schemes) or legislation will affect profitability, employment and biodiversity. The issues that the model will be designed to examine include the most cost effective means of delivering biodiversity targets, such as the Government's Wild Bird Indicator, the optimal design of agri-environment schemes, and examination of the expected ecological consequences of subsidy and price changes.

During 2008 the project has progressed rapidly with the finalization of the integrated modelling framework, as well as the acquisition, consolidation and early analysis of social, economic, weed and bird datasets. Modelling of bird populations has followed two directions, each based on analysing the variation in counts from the national, annual Breeding Bird Survey (BBS). First, a combination of data on cropping and field boundary habitats from the BBS with CEH Land Cover summaries has been used to model the dependence of bird abundance in 2007 on land-use (habitat) within arable farmland. These models, constructed for all species found commonly on farmland, allow both general patterns of positive and negative influences of habitat features to be determined and cropping predictions from the integrated model to be translated into effects on numbers of birds. The second suite of analyses uses field-level land-use data from the CEH Land Cover map from 2000 to investigate the dependence of bird abundance in 2000 and trends in abundance from 1995 to 2008 on landscape heterogeneity at the $1km^2$, $9km^2$ and $25km^2$ scales. The weed modeling team successfully collected their second year of field data and has continued to develop the theoretical aspects of their new weed modelling approach. In

addition a set of habitat feature maps was collected for each of the study farms which will provide valuable parameter data for bird modeling.

During 2008, the development of the integrated model has progressed from an early prototype to a fully fledged model that is detailed, well validated and tightly integrated with the social and bird data.

RES-227-25-0028 Professor P Armsworth, University of Sheffield
01 Jan 06 - 31 May 09
The Sustainability of Hill Farming
Taking the Peak District as a case study, the project is examining how hill farmers are likely to respond to major changes in the Common Agricultural Policy and the consequences for upland landscapes and bird biodiversity.

The project is aiming to develop coupled ecological-economic models that predict how representative hill farms will respond to changing framework conditions over the next 20 years and what impacts this will have for moorland birds and landscape features. The team is designing modelling techniques that account for economic and ecological interactions among farms to predict regional-scale agricultural production patterns and their impact on biodiversity and landscapes, looking at public preferences for contrasting moorland futures and assessing whether alternative policy interventions can deliver a sustainable hill farming economy compatible with moorland conservation.

A linear programming model has been constructed for each farm type, based on the economic survey data. The models incorporate agrienvironment and Hill Farm Allowance payments. The researchers used the models to examine at the effect of the Single Farm Payment vs. historical headage payments and to compare these to a scenario with no subsidy payments. Key results are that: i) the main effects of decoupling are to reduce stocking rates, and to change the mix of livestock activities; ii) agri-environmental schemes mediate the income losses from decoupling, and farmers are predicted to maximise take up of new Environmental Stewardship programmes, which have both positive and negative feedback effects on livestock numbers; and iii) removal of the Single Farm Payment would lead to negative net farm incomes, and some land abandonment.

Additional model development is being undertaken to examine different strategies for integrating biodiversity into the farm production models including moving to a non-linear programme formulation.

Throughout the 2008 field season, survey efforts focused on collecting more detailed data on bird behaviour and movement patterns. Taking curlew as a focal species, vantage-point watches of focal individuals were carried out, noting details regarding movements and behaviour. Analyses of the broad-scale bird survey data and habitat survey data collected in 2007 continued throughout 2008, including for example, estimating and controlling for differing detectabilities of species to provide estimates of the densities of the species observed. Key findings included: i) Within-property habitat quality did explain 42% of the variation in richness of upland specialist species, but had no influence on overall species

richness or the richness of species of conservation concern ii) But socio-economic circumstances of farms alone accounted for 24% of the variation in overall species richness; and iii) no farm management variable, including many prescriptions included in agrienvironment schemes, was shown to offer better predictive power of avian species richness than random.

5.3 Third Call Projects on the Management of Animal and Plant Diseases and on Sustainable Rural Planning

RES-229-25-0004 Dr M Huby, University of York
01 Aug 07 – 31 Jul 09
Social and environmental inequalities in rural areas
This project is examining patterns of social and environmental inequalities in the distribution of social, economic and environmental goods and services. Having identified inequalities in socio-economic or environmental goods and services, consideration will be given to whether they can be regarded as unfair or unjust and the project will explore local residents' perceptions of local inequality and injustice.

A refined and extended dataset on Social and Environmental Rural Conditions (SECRA) developed in an earlier Relu Scoping Study is being used in this project to examine patterns of social and environmental inequalities in the distribution of social, economic and environmental goods and services. Methods for measuring inequality differ in the natural and social sciences and the project explores ways to resolve differences in finding a common approach.

Researchers have selected variables reliable and robust enough to indicate prevailing environmental and socio-economic conditions and used factor analysis to combine these to reflect four different dimensions of the English countryside. These relate to social and economic conditions, accessibility and remoteness, ecology and environment.

Preliminary findings of the quantitative work show that inequalities do indeed exist in rural counties of England. Current work is examining the quantitative relationships between ecological and environmental inequality and social or economic disadvantage. These are expected to vary between counties. The qualitative fieldwork is now well underway and there are early indications that local residents do perceive some aspects of inequality to be unfair and deserving of policy attention.

RES-229-25-0005 Dr C Potter, Imperial College London
03 Sep 07 – 30 Aug 09
Lessons from Dutch Elm Disease in Assessing the Threat from Sudden Oak Death
The aim of this research is to examine the threat to trees and woodlands in the rural landscape from Sudden Oak Death (SOD) in the light of experience of the Dutch Elm Disease (DED) outbreak of the 1970s. The work brings together historical research methods to investigate memories of DED amongst experts and members of the public, with modelling tools to map the likely spread and impact of SOD.

Researchers have uncovered a rich archive of material relating to Dutch elm disease and networked with many more stakeholders than expected, as well as carrying out a study tour to California and Oregon in autumn 2008 and establishing links with colleagues at the University of California.

A reconstruction of the DED outbreak using modelling, archival research and interviews has now been completed. SOD interview programme has been achieved and the model development and data sourcing is nearly complete. Valuation work is now in hand and the main survey work is due to commence in May 2009. A stakeholder jury will be convened to draw together memory and prediction in order to reach a series of verdicts on the impact of DED and the prospects and manageability of SOD in the UK. Recruitment is underway for this.

RES-229-25-0007 Dr C Quine, Forest Research
01 Sep 07 – 30 Nov 10
Assessing and Communicating Animal Disease Risks for Countryside Users

Many people take pleasure from outdoor leisure activities but surprisingly little is known about how best to warn countryside users about the potential for problems such as Lyme Disease without scaring them away or spoiling their enjoyment. This research will help those involved in the countryside to better understand how to deal with diseases such as Lyme Disease, how to effectively communicate the degree of risk, and how to encourage preventative action such that the countryside continues to be a source of pleasure and well-being for its users.

Scenarios have been developed, identifying factors influencing the interactions of humans and ticks. Four scenarios were outlined along a land use intensity axis (from a production focus to ecosystem services) and a leisure pattern axis (from planned and facility based leisure to informal and dispersed leisure). These scenarios were then debated with the Practitioner Panel to sensitise the project team to the practical implications of the scenarios, and to identify the practical and policy issues around people, vegetation, vertebrate management.

Fine-scale measurements of tick abundance have been conducted at three-weekly intervals since March 2008 in plots at three study sites: the New Forest, Exmoor and Richmond Park, London. Such detailed sampling is unprecedented, and the innovative collecting method will yield new insights into patterns of tick abundance through the year, and with changes in vegetation and environmental conditions such as soil moisture. Early results confirm the strong effects of vegetation type, causing large differences in tick abundance in plots separated by as little as 50 metres. Such differences are likely to be caused by the dual effects of variable microclimate (which affects off-host tick survival) and the varying abundance and species composition of the vertebrate host assemblage (which affects tick feeding success).

Patient questionnaire packs have been developed and provided to the Lyme Research Unit at the HPA in Southampton. The patient questionnaire packs will be distributed with the

results of every Lyme borreliosis-positive blood test that the lab returns to hospitals; and will be provided to 'sentinel' GP practices and individual GPs who work in Lyme hot-spots.

RES-229-25-0008, Dr C Waterton, Lancaster University
01 Jun 07 – 31 Dec 10
Testing a Community Approach to Catchment Management

The aim of this research is to carry out an interdisciplinary study aimed at sustainable catchment management in Loweswater, Cumbria and to assess the transferability of the approach to other places and problems. . The research is shaped by a new institutional mechanism or 'new collective' (Latour 2004) set up by the local community, stakeholders, and Lancaster and Loweswater researchers as part of the research project

The institutional mechanism described in the last report and at that time referred to as the Loweswater Knowledge Collective (set up by Lancaster and Loweswater researchers, local residents, institutional stakeholders and other interested parties) is now meeting regularly. At the first meeting, the collective renamed itself as the "Loweswater Care Project" (LCP); this can be seen as a significant step in which the participants appropriated the group for themselves. The group is now well established and has agreed priorities and purpose.

A large proportion of the fieldwork concentrating on the ecological and agricultural value of the catchment is now complete. This work has involved long periods of time spent in the catchment using new technology (a combination of software and hardware) to map the landscape of the catchment, field by field including assessments of habitats and landscape features. The work has been combined, where possible, with meetings with the farmers alongside the agricultural consultant who has carried out soil nutrient analyses for the farms.

Reports on the whole catchment and on each farm have been useful in determining what margins are available for change in the land-use in the catchment, what fertilising strategies may be used in future. What scenario of land use and farm change might be financially viable, and which are ecologically desirable. Work to connect farm analyses with modelling expertise (to ascertain the impact of farm practices on lake water quality) is continuing.

There has been a routine monthly assessment of the physical, chemical and biological properties of the lake. A monitoring buoy has also been established on the lake, following a detailed discussion with the local community and the National Trust. A hydroacoustic and net survey of fish populations was carried out and in June 2007 and a further hydroacoustic survey in June 2008. The surveys have revealed that the fish community is dominated by inshore perch in good condition, but there are few fish in the open water. There are also smaller numbers of brown trout, pike and minnows. Researchers plan to use the data from the monitoring buoy, plus data from the farm survey and the previous studies on nutrient sources to the lake to produce a detailed model of how Loweswater might respond if different management procedures were implemented. These might include improving all

septic tanks in the catchment, reducing fertilizer applications, reducing losses from slurry tanks or changing household detergents to phosphorus free forms.

RES-229-25-0009 Mr L Smith, Imperial College London
01 Jun 07 – 31 Oct 10
Catchment Management for Protection of Water

This project is investigating how to extend the scientific and social accomplishments of innovative catchment management programmes in the USA, and other European countries to the UK. A catchment management 'template' will be derived which compiles and assimilates scientific understanding and governance procedures as tested in actual decision making and management practice in case study catchments. This will provide a framework to integrate interdisciplinary assessment of methods to protect water resources.

Two UK catchments are being investigated as case studies: the River Tamar and the River Thurne, against which the lessons from international experience will be tested: The project will research the current issues, drivers of change, water quality targets, pollution mitigation potential and governance systems in these two catchments. Results will be integrated with the findings of the wider comparative study of governance arrangements, leading to the "template". At this stage in the project the findings are still preliminary.

Diffuse water pollution originating from agriculture and other rural activities pose challenges for public policy and require innovative management approaches. Implementation of the best 'mix' of measures for a given location requires the right combination of regulation, advice, incentives and voluntary action, and can best be designed and delivered by a collaborative approach to catchment management. Such an approach will be characterised by the integrated and holistic assessment of both bio-physical conditions and the economic and socio-cultural goals of those affected by change. Initial engagement with stakeholders in the Tamar and Thurne catchments revealed that communication of water quality monitoring data in a way that informs land users and other interest groups is essential and that there is a strong local demand for this. To provide an accessible synthesis of existing water quality data an Ecosystem Health Report Card has been developed using the example of the Thurne catchment. Environment Agency staff have expressed a strong interest in this approach.

RES-229-25-0012 Dr Norval Strachan, University of Aberdeen
01 Oct 07 – 30 Sep 10
Reducing Escherichia coli O157 risk in rural communities

E.coli is a very serious threat to human health. It can be devastating and sometimes fatal, and children and elderly people are at particular risk. But we still know little about how it is spread in rural environments. This project is investigating how stakeholders perceive the risks of E.coli and how we can reduce the risks of people becoming infected.

Microbial analysis has identified an 8-hour reactivation time when *E. coli* O157 is transferred from the environment into a more hospitable environment. The 6 month

persistence study has also been completed and initial mathematical models have been developed to estimate the relative importance of human infection from food borne, waterborne and environmental pathways. Lists of interventions to reduce *E. coli* O157 risk in the food chain have been compiled ahead of research into their acceptability.

Researchers have collected opinions from over 2,000 rural residents, workers and visitors in the two study areas (North Wales and Grampian) and interviewed 50 stakeholders to reveal a wide diversity of concern, knowledge and needs regarding *E. coli* O157 risk in rural areas. There was a good (32%) response to the survey of livestock farmers in Grampian through NFU Scotland and 1,058 visitors at rural attractions in North Wales and Grampian in Easter and early summer spent time describing their attitudes to *E. coli* O157 risk.

RES-229-25-0013 Professor P Mills, University of Warwick
01 Sep 07 – 31 Aug 10
Assessing the Potential Rural Impact of Plant Disease

UK crop production is vulnerable to a plethora of pathogens some of which directly affect crop yields, disrupt the food chain and impact on land use and social infrastructure. The aim of this project is to develop a critical, inter-disciplinary appraisal of the potential impacts of plant diseases (food and non-food) on land use and the UK rural economy.

2008 was an active year for engagement bringing the project in direct contact with well over 100 stakeholders representing academics, the food chain, industry, producers, growers, the agrochemical industry, Government, public agencies, and advisors. Working papers have been produced jointly by natural and social science team members on topics including;

- risk, farmer knowledge, disease and biosecurity
- structural change in the UK mushroom industry
- *Phytophthora ramorum* and the horticulture sector
- potato diseases in Britain; a historical review
- mushroom diseases and their impacts
- Development of the international governance of plane pests with particular reference to UK Plant Health

RES-229-25-0015 Professor B Wynne and Professor L Heathwaite, Lancaster University
01 Jul 08 – 01 Jul 11
Assessment of Knowledge Resources in Animal Disease Control
Containment is a controversial issue in animal disease outbreaks. Strategies often come under the spotlight, particularly when human health may be at risk or when animal and farm welfare issues are promoted in the media. This project is building more integrated strategies of containment by bringing together expertise in public health, sociology, microbiology, epidemiology and veterinary science, environmental science, human geography and medical statistics.

The output of this project will be a cross-disciplinary approach to strategies of containment that will address two main issues: (1) why particular technical advances have been adopted

and not others in the deployment of strategies of containment and (2) how complexity and uncertainty in models of animal disease outbreaks and their containment can be improved so that the social, technological and natural dynamics of animal disease problems are better understood. These two project objectives will be delivered using a comparative approach across three disease areas: foot and mouth disease, cryptosporidium, and avian influenza, which differ in their biological characteristics, scale of threat, degrees of urgency, and the challenges they pose for strategies of containment.

The research team has designed a prototypical conceptual framework for analysing risks and uncertainties in strategies of containment across different disease areas. In essence, the framework is designed to identify the generic stages employed by policy makers and industry to contain diseases and how these can be evaluated at strategic, tactical and operational levels. The framework is designed to be interdisciplinary in scope and allow for comparative cross-disease approaches to analysis. This prototypical work will be subject to refinement over the lifetime of the project but we judge this development to be potentially of interest to policy/industry stakeholders.

RES-229-25-0016 Professor G Medley, University of Warwick
01 Nov 07 – 31 Oct 10
The Governance of Livestock Disease

As well as concerns about their welfare, we know that sick animals produce less meat and milk, and provide less profit. Animal disease can also seriously affect consumer demand at home and abroad. This project is considering a range of issues around several different cattle diseases, how policy on one disease affects others and how different organisational levels interact in tackling disease outbreaks.

The research team aims to develop an interdisciplinary framework to elucidate the governance of livestock diseases (i.e. the reciprocal impacts of dynamic changes to epidemiology, policy, law and economy) in order better to inform stakeholders of the potential impact of different policy and regulatory changes.

The project is using data on five endemic infections of cattle across 114 farms to address infectious disease dynamics and control within and between farms. Together with Professor Gerard Marcou (University of Paris 1 Sorbonne), they are conducting a comparative legal study of the manner in which French and UK systems of regulation tackle animal diseases in the context of the EU. This includes institutional and cultural aspects of regulation and law.

Through archival work they seek to understand how policies on cattle disease have developed and been framed, and through network analytic, game-theoretic and econometric tools to understand the determinants and impacts of farmers' responses to diseases in a spatio-temporal context and the role of economic and behavioural incentives in disease control.

Research to date affirms the conjecture in the original proposal. Endemic and/or exotic livestock disease unfolds in a complex adaptive system in which the different spheres interact reciprocally. For example, disease epidemiology on a farm will affect farmers' disease management and biosecurity practices, which in turn affect the epidemiology of disease on many farms and resulting market impacts and which ultimately influence political response to disease via public sector and non-governmental organisations (such as NFU and RCVS). Government responses to disease include the development of legal frameworks that eventually affect disease patterns and their market, welfare and epidemiological consequences. Consequently, the observed state of the system (epidemiology, politics, law and economics) is a consequence of multi-level complex, interactions.

RES-229-25-0022, Professor C Banks, Southampton University
01 Oct 07 – 30 Sep 10
Energy Production on Farms through Anaerobic Digestion
The project examines the potential for development of anaerobic digestion on farms, and the contribution this could make to rural development and agricultural diversification. Policy issues are addressed through analysis of regulatory measures within the EU and those specific to the UK, identifying drivers and obstacles that could stimulate or inhibit the development of on-farm digestion as part of a wider strategy for rural development, while meeting the cross compliance criteria included in the reformed Common Agricultural Policy.

The research will develop models to analyse the economics, energetics and land use implications of diversification into on-farm energy production; assess the benefits and potential drawbacks regarding environmental protection and sustainable agricultural practice, through environmental risk-based analysis methodologies; seek farmers' opinions on diversification and renewable energy production; and explore the potential benefits to the rural community from uptake of anaerobic digestion in integrated farming systems. It will draw together information to produce reliable datasets for modelling different land usage scenarios, which can then be used to make economic evaluations and environmental risk assessments. Both approaches will be developed within a framework model allowing application to a wide variety of situations.

The research on the policy side of the project has shown that, while progress is slow, the regulatory mechanisms and drivers likely to help promote anaerobic digestion on farms are beginning to be put in place. It is too early for changes to have produced an increase in the number of on-farm digesters, but an indication of the increased interest these measures are likely to bring may be seen in responses to the farm survey questionnaire which was sent out at the end of the year.

The project continues to make progress towards the development of modelling systems that integrate land use scenarios, energy production, economics and environmental risks and benefits associated with the introduction of AD onto farms and the diversification into on-farm energy production. Researchers have reviewed the benefits and risks associated with the introduction of AD with respect to nutrient management, gaseous emissions (including

greenhouse gases) and disease control. This has resulted in a comprehensive report on these aspects of the research, with quantitative data that is now being used as the basis for considering the costs and savings associated with these elements which could contribute to future fiscal drivers. Overall, the report shows positive benefits from the use of AD, particularly in the case of livestock farming units. It also highlights the difficulties of moving towards self reliance in nutrient provision in arable farming, even when crops are grown for on-farm processing into biogas. An initial model for environmental assessment has been developed, based on listing influencing factors and then weighting their significance in differing scenarios. This model needs refining as well as exploration of alternative modelling approaches.

The work on energy balances within an integrated farming systems has moved on. A model now exists to determine energy balances for the use of AD in an integrated farming system allowing a determination of sustainability from an energy perspective.

5.4 Interdisciplinary Fellows

RES-229-27-0003 Althea Davies, University of Stirling
01 Mar 07 - 29 Feb 10
Foundations for the Future: Learning from the Past (Lessons from the past for the future of the uplands)
In this interdisciplinary fellowship, Dr Davies is exploring how knowledge about the way landscapes have been formed historically might influence how those who inhabit or visit those areas today appreciate them. She is using a range of different kinds of evidence, including historical records, archaeology and environmental data, such as pollen preserved in bogs, to trace changes in the upland landscapes of the Peak District and Sutherland over the past 500 years. Dr Davies is also using techniques developed by economists to help assess people's values regarding landscape change or conservation. These methods will be used to assess how information from the past affects their preferences for the future.

The main output from Project 1 – a review of existing environmental history relevant to current upland management and conservation – was put online in April 2007 and disseminated via RELU (newsletter and project contacts), agency staff and others who had expressed an interest. I regard this as a working document, which I am continuing to update and amend in response to comments and relevant new publications. I am working with a wider network of palaeoecologists keen to engage with conservation and management issues to develop a communication framework.

Year two has focussed on developing and implementing research plans for projects 2 and 3 (case studies) in consultation with local stakeholders to provide historical depth to current issues of management concern. Project 2 is nearing completion, in terms of data generation, and stakeholder meetings will be held in spring to assess their response, particularly to long-term climatic and management legacies. Finally, a novel choice experiment examining how different sources of evidence relating to the uplands are viewed by policy-makers, agency staff, researchers and practitioners is under construction (Project 4); long-term

sources are a key aspect and this will form the basis for workshops in Scotland and England.

RES-229-27-0002 Evan Fraser, University of Leeds
01 Sept 07 – 31 Aug 10
Integrating economic and land use models to anticipate rural vulnerability to climate change
In this interdisciplinary fellowship, Dr Fraser is using tools from a range of disciplines to consider how climate change may affect food production and distribution, and the rural economy. His research involves a historical assessment of cases where relatively small environmental problems have had major effects on food production and distribution systems, with a view to identifying key factors that make systems vulnerable. Dr Fraser will assess the importance of these factors in a range of different circumstances and apply this knowledge to predicted changes in our climate, to see what the effects might be.

Dr Fraser is using tools from range of disciplines to consider how climate change may affect food production and distribution, and the rural economy

He started his research with a historical assessment of cases where relatively small environmental problems have had major effects on food production and distribution systems and has been exploring how food system vulnerability to climate change emerges in volatile political and economic contexts, using these to identify key factors that make systems vulnerable. He then aims to assess the importance of these factors in a range of different circumstances and apply this knowledge to predicted changes in our climate, to see what the effects might be.

RES-229-27-0001 Abigail Woods, Imperial College London
1 Sept 07 - 31 Aug 10
Reinventing the wheel? Farm health planning 1942-2006
As part of this interdisciplinary fellowship, Dr Woods is exploring the history of animal disease prevention from 1942 onwards, in its economic, social, political and policy contexts, and relating her research to current policy discussions and the present-day science and practice of farm health planning. She is looking at the circumstances that gave rise to past initiatives, considering not just the science, but the social and political factors that have influenced the way we react to outbreaks of animal disease. An understanding of these past initiatives should help us to avoid "reinventing the wheel" and the work will aim to produce some definite recommendations regarding future framing, implementation and evaluation of farm health planning.

During 2008 her key findings relate to the veterinary preventive medicine initiatives pursued by the Ministry of Agriculture, the veterinary profession and selected farmers over the period 1960-75, and the lessons for farm health planning today. She has shown that veterinary preventive medicine rose to political prominence during 1960-75 as a result of: the changing disease demographics of intensive farming and the lack of simple drug solutions; the cost-price squeeze which made increasing productivity essential to farmers'

survival; the internal agendas of Ministry of Agriculture officials and veterinary concerns about the profession's future

Dr Woods' research suggests that the government's refusal to fund large-scale co-ordinated preventive medicine services resulted in a host of piecemeal initiatives involving a mixture of state, industry and veterinary inputs that had a limited impact on animal health. The reasons included: their questionable cost-effectiveness; the difficulty in applying preventive measures; lack of interest and expertise amongst grass roots vets and their failure to build good working relations with other experts; the existence of alternative, less arduous methods of disease prevention; diminishing farming interest as profits improved; and changing government priorities.

RES-229-27-0006 Dr Katy Appleton, University of East Anglia
The Development of Sustainable, Multi-Functional Landscapes in Rural Areas: A Case Study of a Norfolk Broads River Valley
In this interdisciplinary fellowship, Dr Appleton will examine the sustainability of different patterns of future recreational use of the Ant catchment of the Norfolk Broads. This research programme aims to develop and assess ways to deliver sustainable, multifunctional landscapes in rural areas, particularly those with significant pressures from tourism and recreation.

RES-229-27-0007 Dr Angela Cassidy, University of Manchester
01 Oct 08 – 30 Sep 11
The Badger-TB Controversy: Expertise and Experience in Animal Disease Research
Dr Cassidy will investigate the way that science communication has structured and been structured by the controversy surrounding badgers and TB.

6. Key Performance Indicators

The Tables present the Key Performance Indicators for Year 5 of the Programme. All indicators and measures were satisfactorily achieved or exceeded.

Table 5: Performance Against KPIs, 2008

KPI	Programme Target/Measure	Director's Office Target/Measure	Statement of Achievement
1. Scientific Quality			
1.1 Intellectual leadership		To play a leading role in the development of the research field	The focus of intellectual leadership in 2008 was on: (a) preparation of a scientific publication covering the First Call projects and a progress was made in preparing another special issue of *Journal of Applied Ecology* (Section 3.1); (b) leading a major workshop on the *Management of Animal and Plant Diseases* (Section 4.2); (c) delivery of keynote speeches, including a speech on *"Why social scientists should engage with natural scientists"* at the ESRC Research Methods Conference, London and the Birkbeck/Ecology and Conservation Studies Society (ECSS) Inaugural Lecture on "*Whose Land is it Anyway?"*, London.
1.2 Relu applications and awards	Over 17% EOA reports rated outstanding and less than 10% rated problematic[2]		PMG to report
1.3 Refereed journal articles	Number in 2008		40 articles were published (Annex B).
1.4 Books/book chapters authored	Number in 2008		8 books / book chapters were published (Annex B).
1.5 Conference papers	Number in 2008		98 conference papers/presentations were given by Relu researchers, including 13 by the Director and Assistant Director (Annex B).
2. Interdisciplinarity			
2.1 To ensure that the Programme engages the wide range of disciplines	To engage under-represented disciplines.	Progress interdisciplinary journal special issues	An interdisciplinary special issue of Trends in Food Science and Technology was published during the year and progress made in preparing a special profile of *Journal of Applied Ecology*.

[2] These % figures reflect the current average evaluation grades under ESRC Programmes

within the natural and social sciences that can make important contributions to its research			
2.2 Facilitation of inter-disciplinary training and advice opportunities		1 interdisciplinary workshop on the management of animal and plant diseases	A successful workshop was held (Section 4.1) embracing contributions from across the social and natural sciences.
2.3 Number of disciplines engaged in Relu		Commentary on range and combination of disciplines involved under each call	A discipline analysis was prepared in an earlier reporting period.
3. User Engagement, Knowledge Transfer and Impact			
3.1 Meetings or events involving stakeholders		a) Workshop on the Management of Animal and Plant Diseases; Orchestrate Great Land Use Debate as part of Festival of Social Science/National Science and Engineering Week b) 1 meeting of Food Forum c) 2 meetings of People and the Rural Environment Forum d) Membership of forums and SAC e) Number of bilateral meetings with stakeholders f) Number conferences attended by Director or Assistant Director g) Number of	a) Major workshop held (May) and Great Land Use Debate (March) – see Section 4.1 b) 1 meeting held of the Food Chain Forum (Section 4.3) c) 2 meetings were held of the Relu People and the Rural Environment Forum (Section 4.3) d) Forum membership steady (Section 4.3). PMG to report on SAC e) 18 bilateral meetings were held between the Director's Office and stakeholders (Annex A). f) 22 conferences were attended by the Director or Assistant Director (Annex C). g) 13 presentations were given by the

		presentations to stakeholders by Director and Assistant Director	Director and Assistant Director (Annex B)
3.2 Links created between award holders and stakeholders		Commentary on actions taken to engage stakeholders with award holders.	Commentary provided in Section 4. See also Section 2.
3.3 Work shadowing and visiting fellowships		5 work shadows and 5 visiting fellowships set up and completed	7 work shadows and 3 visiting fellows set up and completed (Section 4.4).
3.4 Informing public policy	To make a substantive Programme input (eg written or oral responses) to major relevant policy reviews/ consultations during the life of the Programme	Number of responses to policy reviews/ consultations	The programme contributed actively to agriculture and policy debates during 2008 (Section 4). Highlights of its strategic influencing strategy included the Land Use Policy initiative and its contribution to the national Foresight programme and a major stakeholder workshop on the *Management of Animal and Plant Diseases* (Section 2). Individual projects made substantial inputs into several policy domains (Section 4.6).
3.5 Project Comms and Data Management Plans	To be completed 3 months after start of award	Oversee preparation of PCDMPs of 3rd Call projects	28 of 29 Relu projects have had their PCDMPs signed off. The final plan is under preparation.
3.6 Media coverage of research and outputs		Number press releases issued	The Director's Office issued 4 press releases in 2008. The Programme generated over hundred news items, including in national newspapers and on radio (see Annex B).
3.7 Reports or briefings produced for stakeholders		1 programme briefings and 3 policy and practice notes prepared and distributed	1 programme briefing paper was prepared and distributed, and 3 policy and practice notes (Section 4.1). 79 presentations were given specifically to stakeholders and 17 working papers and briefing papers published (Annex B).
3.8 Relu website		Director to maintain up to date website	The website was developed and updated regularly throughout 2008.
3.9 Relu Newsletter		4 newsletters prepared and distributed	4 newsletters were prepared and distributed to the Relu mailbase.
4. Research Capacity and Training			
4.1 Training workshop		Director to organise 1 media	1 media training workshop held (Section 3.4).

		training workshop for junior researchers.	
5. Data Collection and Management			
5.1 Data Support Service	Progress of Data Support Service		PMG to report
5.2 Deposition of Data	Project data deposited within 3 months of end of awards		PMG to report
6. Programme Management			
6.1 Commissioning	Complete commissioning of interdisciplinary fellowships	Review proposals and provide advice at interdisciplinary fellowship assessment panel	The Director's Office provided assessments of applications to interdisciplinary fellowship competition.
6.2 Applicants and Award holders		a) Provide telephone and email advice to applicants and award holders b) Meet with third call award holders to discuss progress c) Hold planning meeting with land use projects	a) Regular contact was maintained with all award holders through joint planning meetings, individual site visits and frequent e.mail correspondence advice b) Meetings with 9 Third Call projects took place in 2008. Individual site visits were also conducted to 1 First Call and 4 Second Call projects c) A group planning meeting was held with Principal Investigators representing 13 Relu projects dealing with land use issues.
6.3 Annual Report		Prepare annual report for 2007, to include report on progress of projects.	Submitted to ESRC by Director's Office. All active Relu projects submitted annual reports with guidance supplied from the Director's Office.
6.4 SAC Meetings	Number of meetings held		PMG to report
7. Added Value			
7.1 Support effective networking between project teams		Hold 1 major workshop for disease projects and enable other networking activities as appropriate	1 major workshop held in May; 1 training workshop (February). Additionally the Director's Office actively encouraged inter-project linkages (Section 3.7).

7. Forward Look

Our forward communication plans for 2009 are planned as follows:

Sustainable Food Chains

1 We will continue to prepare and distribute *Policy and Practice Notes* for food chain projects

People and the Rural Environment

1. We will finalise and distribute a Relu Special profile of *Journal of Applied Ecology*
2. As part of Science and Engineering Week/Festival of Social Science we will organise a series of *regional land use events.* We intend to focus the research programme's efforts on the regional context, a level of analysis largely missing from the ongoing national strategic land use review.
3. We will run a major *Conference on the Future of Rural Land Use*, drawing together the findings of the second major wave of Relu research projects and building on the programme's Great Land Use Debate. The conference will consider the implications of the Relu research for land use policy and practice. National as well as regional policy makers, planners and land managers will take part. The conference will present key future challenges for rural land use, explore cross-cutting concepts for identifying priorities, and give hands-on demonstrations of cutting-edge methodologies that help clarify critical choices.
4. A Policy and Practice Note will be written applying Relu research in the regional context as well as a Relu Briefing Paper on the Future of Rural Land Use.

Management of Animal and Plant Diseases

1. We will orchestrate a *Relu workshop on the Management of Animal and Plant Diseases* (to follow up an earlier workshop in May 2008).
2. We will hold the first meetings of the Relu Animal and Plant Disease Forum

Table 6: Planned and potential activities and outputs for 2009

January	Relu Newsletter
February	1st Meeting of Relu Animal and Plant Disease Forum
March	SW Regional Land Use Event
	North of England Land Use Event
	Annual Report 2008
April	Relu Newsletter
	Relu Special Journal Issue *Journal of Applied Ecology*
July	Relu Newsletter
	Conference on the Future of Rural Land Use
	Relu Policy and Practice Note on Relu research and the regional land use agenda
September	2nd meeting of Relu Animal and Plant Disease Forum
	Relu Briefing paper on the Future of Land Use
October	7th meeting of Relu People and the Rural Environment Forum
	Relu Newsletter

8. Budget Matters and Co-funding

There are no matters of concern to report. The programme was successful in negotiating additional co-funding during 2008, amounting to £701,365, to extend their research and strengthen knowledge transfer:

RES-227-25-0001 Managing Uncertainty in Dynamic Socio-Environmental Systems: an application to UK uplands	• £99,975: DEFRA, Ecosystem services of peat (Holden) • £14,900: UKPopNet, Uplands breathing in or breathing out? Linking land management, hydrology and carbon footprints (Holden) • £29,990: DEFRA, A compendium of UK peat restoration projects (Bonn) • £92,000: Yorkshire Water, Carbon mapping for YW landholdings (Worrall) • £202,500: Yorkshire Water, Ecosystem change for water quality benefits (Holden) • £175,000 White Rose PhD scholarships: "Impact of large scale management change on upland ecosystems." Three White Rose PhD studentships. (Holden, Hubacek, Termansen et al.).
RES-227-25-0024 Catchment Hydrology, Resources, Economics and Management (CHREAM): Integrated modelling of WFD Impacts upon Rural Land Use and Farm Incomes	Marie Curie Fellowship. Funder Ref: 221150 PIIF-GA-2008-221150 (call FP7-PEOPLE-2007-4-2-IIF). Grant amount: €85,921.57 (circa £79,000). Award flagged in last annual report but financial details now available.
RES-229-25-0007 Assessing and communicating animal disease risks for countryside users	Forestry Commission co-funding (20% of FR costs)
Director's Office	• ESRC Knowledge Transfer for private sector work shadowing / visiting fellowships £500 • SSRC-ESRC Visting Fellowship Scheme £4500 • ESRC for Science Week 2007 £2000

ANNEX A: PROGRAMME CHRONOLOGY 2008

Month	Programme Events	Project Start/End Dates and Visits
Jan 08	Meeting with Officials of the British Veterinary Association, London	End date project RES-224-25-0066 *Warmwater Fish Production as a Diversification Strategy for Arable Farmers* (Little), Stirling
	ESRC Research Director's Meeting, London	Land Use Policy Analysts meeting with Paul Armsworth and colleagues, Sheffield
	Meeting with John Moverley, Chief Executive, Royal Agricultural Society of England, London, to discuss links between RASE and Relu	Land Use Policy Analysts meeting with Klaus Hubacek and colleagues, Leeds
	Foresight Land Use Meeting, London. Advice on scoping of Foresight study.	
	Relu Newsletter January 2008	
Feb 08	NERC Knowledge Exchange network meeting, Cambridge	Land Use Policy Analysts meeting with Sarah Whatmore and colleagues, Oxford
	Tyndall Conference on Climate Change Adaptation, London "Living with climate change: Are there limits to adaptation"	Land Use Policy Analysts meeting with Bruce Traill and colleagues, Reading
	Relu media training day for researchers	
Mar 08	Presentation at seminar *on "Relu and the Great Land Use Debate"*, School of Agriculture, Food and Rural Development, Newcastle University	End date project RES-224-25-0044 *Comparative Merits of Consuming Vegetables produced Locally and Overseas* (Edward-Jones), *Wales*
	Relu Great Land Use on-line Debate (part of ESRC Festival of Social Science/National Science and Engineering Week)	
	ESRC Mapping the public policy landscape Seminar Series. Seminar on Change and Continuity in Scotland's fishing communities, Aberdeen. (Presentation on *"No 'one size fits all' solutions for fishing communities"*)	
	Foresight Workshop, London "*The Future Uses of Land*"	
	British Society of Animal Science reception, London	
	Relu Data Management Subgroup meeting, London	
Apr 08	Fifth meeting of Relu People and the Rural Environment Forum, London	
	Relu Land Use Analysts Advisory Group meeting, London	
	ESRC/RCUK Interdisciplinary Early-Career Fellowships interview panel	
	Scottish Funding Council Knowledge Transfer Assessment Panel, Edinburgh	
	Defra Evidence Strategy Workshop, Reading	
	Relu Newsletter April 2008	
May 08	Living with Environmental Change seminar with Secretary of State for Innovation, Universities and Skills, John Denham London	Director's Office visit to Project 227-25-0018 *"Knowledge Controversies in Rural Land Management"*, to discuss emerging findings and knowledge transfer.
	Relu sponsored Workshop led by Michael Winter "*Land Use Management: the new debate*", London	

	Relu Animal and Plant Disease Workshop, London involving researchers, stakeholders and policymakers.	
	Living with Environmental Change Programme Partners Meeting, London	
	Food Ethics Council Business Forum (*Presentation on "Land use and food security"*)	
	Seventh meeting of Relu Food Chain Forum, London. This was the final meeting of the Food Chain stakeholder forum.	
Jun 08	Launch of Living with Environmental Change Programme, London	End date project RES-224-25-0086 *Sustainable and Safe Recycling of Livestock Waste* (Chadwick), IGER
	Relu Seminar by Laurens Klerkx , Assistant Professor, Communication and Innovation Studies Group, Wageningen University *"Matching demand and supply in the agricultural knowledge infrastructure: experiences with innovation intermediaries"* Newcastle University	
	Director's office meeting with Relu Programme Management Group, Swindon	
	Director's office meeting with LWEC, Swindon	
	*"From a land of plenty to a land of uncertainty … finding the answer*s", Royal Overseas League, London, Conference organised by Sir Ben Gill and Chris Pollock. Relu Director acted as rapporteur.	
	SENS Seminar, Newcastle University (Presentation on *"The Relu programme and interdisciplinary research")*	
	Relu Farm Modelling Workshop, Stirling (organised by Paul Armsworth and colleagues)	
	ESRC Research Methods Conference, Oxford (Presentation on *"Why social scientists should engage with natural scientists"*)	
Jul 08	Relu sponsored Cambridge Conservation Forum Summer Symposium: *"Future farming in the UK: global implications for society and biodiversity"*	End date project RES-224-25-0090 *Managing Food Chain Risks* (Shepherd), Surrey
	VIP reception with Rt Hon Hilary Benn MP and RDAs at Royal Show	Start date project RES-229-25-0015 *Assessment of Knowledge Sources in Animal Disease Control* (Wynne/Heathwaite), Lancaster
	XII World Congress of Rural Sociology, Korea. (Presentations on *"The Localization of Farm Policy"* and *"New approaches to rural development"*) Also organised a workshop on agriculture and multi-level governance.	
	Relu end of project event at North Wyke, Devon, *Livestock farming and microbial watercourse pollution*	
	Meeting of Relu Strategic Advisory Committee, London	
	Meeting with Dr Andree Carter, UKCDS, London to discuss the lessons from Relu	
	Relu Newsletter July 2008	
Aug 08	Meeting with Kathryn Monk, Science Strategy Manager, Environment Agency Wales to discuss links to Relu, Newcastle	

	Relu sponsored RGS-IBG Annual Conference Session on Rural Geography and Public Policy Engagement, London. *(*Presentation on "*From Linear to Exchange Models of Knowledge Transfer")*	
Sept 08	Defra Research and Evidence Strategy Workshop, Reading	Director's Office visit to Project 229-25-0004 *"Social and Environmental Inequalities in Rural Areas"*, to discuss emerging findings and knowledge transfer.
	China-UK Sustainable Agriculture Innovation Network (SAIN) Round Table Meeting, Defra, London	Director's Office visit to Project 229-25-0008 *"Testing a Community Approach to Catchment Management"*, to discuss emerging findings and knowledge transfer.
		Director's Office visit to Project 229-25-0009 *"Catchment Management for Protection of Water Resources"*, to discuss emerging findings and knowledge transfer.
	NERC Knowledge Exchange Network (KEN) Meeting, Liverpool	
	Final stakeholder meeting Project 224-25-0073 *"Implications of f Nutrition Driven Food Policy for the Countryside"*, Reading	
	Scottish Government *Rural Land Use Study: Launching a Programme of Research into the Current and Potential Contributions of Scotland's Rural Land*, Macaulay Land Use Research Institute, Aberdeen	
Oct 08	Meeting with Paul Rouse and Owen Dowsett, ESRC, Swindon	Director's Office visit to Project 229-25-0013 *"Assessing the Potential Rural Impact of Plant Disease"*, to discuss emerging findings and knowledge transfer.
	Meeting with Judy Parker and Owen Gaffney, NERC, Swindon	Director's Office visit to Project 229-25-0012 *"Reducing E Coli 0157 Risk in Rural Communities"*, to discuss emerging findings and knowledge transfer.
	Meeting with Ruth Lee, ESRC, Swindon	Director's Office visit to Project 229-25-0022 *"Energy Production on Farms through Anaerobic Digestion"*, to discuss emerging findings and knowledge transfer.
	Environmental Research Funders' Forum (ERFF) and UK Collaborative on Development Sciences (UKCDS) joint Workshop, 21st Century Research Collaborations, Warwick University. (Presentation on "*Relu: Lessons Learnt")*	Director's Office visit to Project 229-25-0005 *"Lessons from Dutch Elm Disease in Assessing the Threat from Sudden Oak Death"*, to discuss emerging findings and knowledge transfer.
	Meeting with Sir Don Curry, Government adviser on the Food and Farming Strategy, to brief him about Relu Programme, Heddon-on-the-Wall	End date project RES-224-25-0073 *Implications of a Nutrition Driven Policy for the Countryside* (Traill), Reading
	Meeting with Ken Roy, Director of Evidence, Natural England, to discuss links to Relu, Newcastle	
	Meeting with Derrick Jones, Head of Analytical Services and PK. Khaira of the Chief Scientist Team, Food Standards Agency (FSA) to discuss knowledge exchange between the Relu Programme and FSA.	
	Meeting with Melissa Smith, Parliamentary Office of Science and Technology (POST), London	

	Birkbeck/Ecology and Conservation Studies Society (ECSS) Inaugural Lecture in series "What is land for? (Presentation on *"Whose Land is it Anyway?"*), Birkbeck College, London	
	Land Use Policy Analysts meeting, Newcastle	
	Meeting with Jim Egan and Chloe Palmer, Farming and Wildlife Advisory Group, Newcastle	
	Relu Newslestter October 2008	
Nov 08	ESRC Communications Conference, London (Presentation on *"Relu and the Great Land Use Debate")*	Director's Office visit to Project 229-25-0007 *"Assessing and Communicating Animal Disease Risks for Countryside Users"*, to discuss emerging findings and knowledge transfer.
	Sixth meeting of Relu People and the Rural Environment Forum.	Director's Office visit to Project 229-25-0016 *"The Governance of Livestock Disease"*, to discuss emerging findings and knowledge transfer.
	Technology Strategy Board (TSB) Lunch & Learn Session, Swindon (Presentation on *"The knowledge exchange strategy of the Relu Programme")*	
	Relu Land Use Analysts Advisory Group meeting, London	
	Relu PI planning meeting, London	
	Relu - LWEC Meeting with Dan Osborne, NERC and Andrew Watkinson, LWEC Director	
	Meeting with Nicola Lloyd, Head of Analysis, Commission for Rural Communities, Newcastle	
	Relu Data Management Sub-Group, London	
Dec 08	Briefing Scottish Government on Knowledge Exchange and Stakeholder Engagement, Lessons from Relu, Edinburgh	
	Living with Environmental Change (LWEC) Objective D meeting, Edinburgh (Presentation on *"Lessons from the Relu Programme")*	
	Relu Newsletter September-December 2008	

Annex B: PUBLICATIONS DURING THE YEAR

Type of Publication	Number of Outputs **Produced** in 2008	Number of Outputs **Submitted** to ESRC Society Today
Journal Articles	40	31
Books	1	1
Book chapters	9	5
Briefing papers, working papers	17	6
Conference papers	38	13
Conference presentations	60	6
Press releases	7	1

JOURNAL ARTICLES

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PRESS AND PUBLICITY

January 2008	RELU newsletter	
	Western Mail	*How big is your foodprint* article citing Edwards Jones project 3 January 2008 http://icwales.icnetwork.co.uk/search.cfm?what=gareth+edwards+jones+bangor
	Daily Telegraph	*A taste of the good old graze* feature about Henry Buller's Relu project and relu 19 January 2008
	Guardian	*Peat bogs pelted with heather to slow Co2 emissions* quoting Fred Worrall from Hubacek project on peat bogs as carbon sinks in story about NT/Moors for Future seeding Peak with heather 31 January 2008
	RCUK Newsletter	*Relu's Great Land Use Debate*
	International Pest Control	*Biopesticides: the regulatory challenge* article on Grant project Jan/Feb 2008 p41/42
February	RICS Land Journal	P 19 February/March issue *Plain Speaking* article by Anne Liddon on Morris Integrated Management of Floodplains project

		Have your say in the great land use debate article on science week debate. Also link on members section of their website.
March	RCUK newsletter	*Relu science week activities*
	Relu Policy and Practice Note no 2	Warm Water Fish Production as a Diversification Strategy for Arable Farmers
	Relu Briefing Paper no 8	*Land to mouth. Exploring the links between sustainable land use and the food we eat*
	Newcastle Journal	Two-page spread on Relu (p30/31*): Food for thought in rural land use, Have your say in the Great Land Debate* and *Fishing for the benefit of us all* (Oughton project)
	Farming and Wildlife Advisory Group	*Relu Great Land Use Debate* link on news section of website
	Town and Country Planning Association	*Relu Great Land Use Debate* featured in members' electronic bulletin and on website
	Rural Matters (RASE magazine)	*Relu Great Land Use Debate* featured in March issue of Rural Matters newsletter and on link on home page of RASE website
	NFU Newsonline	The Great Land Use Debate on front page 7 March 2008 http://www.nfuonline.com/x26253.xml
	Campaign to protect Rural England	*Relu Great Land Use Debate* link with CPRE debate web page
	BBC Radio 4	*Farming Today* Thursday 6 March featured interview with Philip Lowe on the Relu Great Land Use Debate with link to Relu website to join debate
	ESRC Social Sciences	*Extended flood research funding* article on Whatmore flooding project in Spring 2008 issue 68
	Rural Europe Agri-environment and Rural Development Policy	*On-line debate to establish rural land use* p10
		Can the upland landscape be managed without farmers p14 March issue no 60

Guardian website	Rachel Dixon rounds up this month's green-themed debates, campaigns and activities, including Relu Great Land Use Debate with link 6 March 2008 *http://www.guardian.co.uk/environment/2008/mar/06/greenagenda.march?gusrc=rss&feed=environment*
Guardian Comment is free website	*Fields of dreams* comment piece by Anne Perkins on rural land use citing Relu and Great Land Use Debate with links 6 March 2008 *http://commentisfree.guardian.co.uk/anne_perkins/2008/03/fields_of_dreams.html*
Farmers' Weekly interactive	*Farmers urged to enter land use debate* 7 March 2008 http://www.fwi.co.uk/Articles/2008/03/07/109735/farmers-urged-to-enter-land-use-debate.html
The Times	*Price rises feed through to your shopping basket* article by Valerie Elliott mentioning Great Land Use Debate 7 March 2008 *http://www.timesonline.co.uk/tol/news/environment/article3500963.ece*
Daily Telegraph	*Oaks: next for the axe?* Potter project on Dutch elm disease implications for Sudden oak death 8 March 2008 http://www.telegraph.co.uk/earth/main.jhtml?xml=/earth/2008/03/08/eaoak108.xml
SDRN news bulletin	*ESRC 'Festival of Social Science'* The Great Land Use Debate is being hosted by the UK Research Council's Rural Economy and Land Use Programme to explore our varied expectations of rural land and to consider the extent to which these may be fulfilled by the UK countryside. See www.relu.ac.uk
Guardian	*Too many people not enough food* – letters page responses to Prof John Beddington 11 March 2008 letter from Relu Director Philip Lowe calling for public debate on land use and flagging up Relu on-line debate http://www.guardian.co.uk/environment/2008/mar/11/food

	ESRC Today website	*Downside of country living* news article citing Huby project on Social and Environmental Inequalities in Rural Areas http://www.esrcsocietytoday.ac.uk/ESRCInfoCentre/about/CI/CP/Our_Society_Today/News_Articles_2008/DownsideCountryLiving.aspx?ComponentId=25990&SourcePageId=20654
	The Observer	*How the myth of food miles hurts the planet* 23 March 2008 citing Gareth Edwards-Jones on food miles http://www.guardian.co.uk/environment/2008/mar/23/food.ethicalliving
April	Relu Newsletter	
	Western Mail	*Prof questions carbon footprint of food miles* 1 April Gareth Edwards-Jones presenting at Oxford University conference http://icwales.icnetwork.co.uk/countryside-farming-news/farming-news/2008/04/01/prof-questions-carbon-footprint-of-food-miles-91466-20699307/
	BBSRC Business	*Livestock disease: a multifaceted approach to a multifaceted problem* April 2008 p 17 Graham Medley project
	Timesonline	*How much your groceries will cost in 10 years* 25 April 2008 quoting Relu interdisciplinary fellow Evan Fraser
	RCUK Newsletter	*Managing Food Chain Risks* and *Great Land Use Debate Draws in Wide Range of Opinion* April issue
	RICS Land Journal	*The battle for biodiversity* article by Anne Liddon on Bullock project April/May issue
May	Relu Policy and Practice Note no 3	*Eating Biodiversity: an Investigation of the Links Between Quality Food Production and Biodiversity Protection*
	Continuity Central news website	*UK entering a 'flood-rich' period* Stuart Lane from Whatmore project 7 May 2008 http://continuitycentral.com/news03902.htm
	BBC Radio 4 Today	*Flooding will get worse* Stuart Lane from Whatmore project interviewed on Today programme 6.55 am 7 May 2008

	Metro	*Flooding risk "far greater than was thought"* Stuart Lane 7 May 2008 from Whatmore project
	Daily Telegraph	*UK flood defences "inadequate" warn MPs* quoting Stuart Lane from Whatmore project http://www.telegraph.co.uk/earth/main.jhtml?xml=/earth/2008/05/07/eafloods107.xml
	BBC News website	*Flood risk fear over key sites* Stuart Lane from Whatmore project 7 May 2008 http://news.bbc.co.uk/1/hi/uk_politics/7386383.stm
	Guardian	*Sinking feeling* Fred Worrall quoted on Hubacek upland project research re peat being degraded and giving off carbon in Peak District, 21 May 2008 http://www.guardian.co.uk/environment/2008/may/21/carbonemissions
	Rural Matters (RASE magazine)	*Land use – the great debate* p 7 and *What will the Water Framework Directive mean for UK farmers?* p 19 Summer 2008
	The Ecologist	*The rainforests on our doorstep* referring to work done by Fred Worrall on Hubacek uplands project http://www.guardian.co.uk/environment/2008/may/21/carbonemissions
	The Guardian	*Sinking feeling* referring to work done by Fred Worrall on Hubacek uplands project 21 May 2008 http://www.guardian.co.uk/environment/2008/may/21/carbonemissions
	ESRC eNews	*Land to Mouth: exploring the links between sustainable land use and the food we eat* May issue
June		
	Science and Public Affairs	*Democratising Science* Sarah Whatmore, Catharina Landstrom and Sue Bradley on Knowledge Controversies project June 2008 http://www.britishscienceassociation.org/web/News/ReportsandPublications/Magazine/MagazineArchive/SPAArchive/SPAJune08/_WhatmoreBradleySPAJun08.htm

	BBC Radio 4	Joe Morris of the Integrated Management of Flood Plains project on *Farming Today* on the aftermath of the 2007 floods
	RCUK newsletter	*Relu crosses interdisciplinary boundaries with new publication* May/June article on Trends in Food Science special issue
	Bangor and Anglesey Mail	*Research at Bangor University to reduce risk of contracting harmful pathogen* Killham project
July	Relu newsletter	
	Uckfield FM	Neil Ward interview on *flood work in Uckfield needs help from residents* 10.30 am, Friday 4 July Whatmore Knowledge controversies project
	Kent and Sussex Courier	*Views wanted for university flood project* 4 July 2008 C:\Documents and Settings\nacl4\Local Settings\Temporary Internet Files\OLK25\The Views of Uckfield residents are wanted for a university project about flooding in the town (2).htm Whatmore Knowledge controversies project
	BES blog	Cambridge conservation forum conference http://ecologyandpolicy.blogspot.com/2008/07/future-farming-and-its-impact-on.html 4 July 2008
	Mark Holdstock blog on Food and Farming	*Is healthy eating good for the countryside?* 12 July 2008 http://markholdstock.blogspot.com/ citing Traill project
	ESRC annual report	*The land-use debate goes on-line* p 19 *Food facts* p 20
	RICS Land Journal	*Collective action* article on Medley project by Anne Liddon p26 July-August 2008
	ESRC Society Today electronic newsletter	*Relu sparks new thinking on animal and plant disease*
August	Farmers' Weekly	*Forging positive links with consumers* "Talking Point" article by Anne Liddon p 37 22 August 2008

	BBC TV 1	*Countryfile* Anne Liddon interviewed for item on food security in UK 31 August 2008
September	Food Ethics Magazine	*What does IAASTD mean for us?* article by Anne Liddon on implications of IAASTD report for UK research p29 vol 3 issue 3 Autumn 2008
	RICS Land Journal	*Taking the heat* article on Banks anaerobic digestion research by Anne Liddon p 25 Sept-Oct 2008
	Regeneration and Renewal magazine	*Farms urged to emulate the French* coverage of presentations by two Relu food projects at SDRN conference, 19 September 2008
	South West Sound Radio	*Sustainable uplands* story on Hubacek project work in Galloway on local radio 25 September news programmes throughout the day
	Planet Earth on-line	*Sustainable uplands* Hubacek project Podcast about Uplands project is first feature on new NERC Planet Earth on-line website 26 September 2008 http://planetearth.nerc.ac.uk/multimedia/story.aspx?id=5
	RCUK newsletter	*Rising to the Rural Land Use Challenge – consultation* and *Slurry solutions* Chadwick project
	Rural Matters RASE newsletter	*Are willow and miscanthus the biofuels of the future?* Article on Karp project autumn issue
	NERC Using Science newsletter	Relu consultation on land use autumn issue
	ESRC Society Now	*Supermarkets key for biopesticides?* Article on Grant project in Autumn issue
	Crawley News	*Researchers head to Uckfield* coverage of Whatmore Knowledge controversies project
October	International web news coverage	Friday, September 05, 2008 Coverage of Grant Biopesticides project in international web news feeds**:** *Biological alternatives to chemical pesticides*

	Smash Hits
	Biological alternatives to chemical pesticides Argentina Star
	Biological Alternatives To Chemical Pesticides Science Daily
	Biological alternatives to chemical pesticides Malaysia Sun
	Biological Alternatives to Chemical Pesticides innovations report
	Biological alternatives to chemical pesticides Newstrack India
	HID Global, EMEA region (Europe, SourceSecurity.com
	Biological alternatives to chemical pesticides SINDH TODAY
	Biological alternatives to chemical pesticides Fresh News
Radio Cymru	News item on food safety and malpractice in abattoirs – interview with Gareth Edwards-Jones from Killham project
Radio Minster	Interview with Stuart Lane about Whatmore Knowledge Controversies project on breakfast show 27 October 2008
BBC Radio York	Knowledge controversies project open day - Sarah Whatmore was interviewed at 7:05 (28th October 2008) on the Radio York Breakfast Show. Mike Potter (a local resident who is part of competency group) interviewed on the mid morning show, plus featured on evening news.
Malton & Pickering Mercury	*Dam plan to halt flooding* 29 October 2008 http://www.maltonmercury.co.uk/news/Dam-plan-to-halt-flooding.4637108.jp article on Whatmore Knowledge Controversies project

	Ryedale Gazette and Herald	*Together we'll make it work* 30 October 2008 article on Whatmore Knowledge Controversies project http://www.gazetteherald.co.uk/search/3802329.Together_we___ll_make_it_work/
	BBC Radio 4	*You and Yours* 9 October Sarah Randolph (Quine project) interviewed about Lyme Disease
November	Relu Policy and Practice Note no 4	*Safe recycling of livestock manures*
	RICS Land Journal	*Clear Course Now farmers can measure the risk of livestock waste contaminating watercourses p11 continued p17* article on Chadwick project by Anne Liddon
	ESRC Britain in 2009	*Meat production and the environment* p15 Buller project *Running buses on giant compost heaps* p16 Banks project *Promoting greener pest controls* p 20 Grant project *Social sciences helping to solve animal and plant disease* p88-89 article by Anne Liddon citing Relu animal and plant disease projects
	BBC Radio 4	*Living Memory* Clive Potter on Dutch elm disease
	Press and Journal	*Experts E coli findings* Killham project 1 November 2008 *http://www.pressandjournal.co.uk/Article.aspx/917148*
	Aberdeen Evening Express	*Highlighting E coli in north east study* Killham project 2 November 2008
	Northsound 2	News item Killham project 2 November 2008
	Original 106 FM	News item Killham project 2 November 2008
	STV North Tonight	News item Killham project 2 November 2008
	Radio Scotland	*Out of Doors* Killham project 2 November 2008
	BBSRC website	*Advice system for farmers improves water quality through better manure recycling* 28 November 2008 Chadwick project http://www.bbsrc.ac.uk/media/releases/2008/081128_water_quality_manure_recycling.html

	Science Daily website	*Recycling manure safely to avoid polling rivers and streams* 28 November 2008 Chadwick project http://www.sciencedaily.com/releases/2008/11/081128082941.htm
	Space and earth science news website	*Researchers fly a kite for manure recycling* 28 November 2008 Chadwick project http://www.news-about-space.org/story/147094914.html
	AECC news website (Asociacion Espanola de Comunica cion Cientifica)	*Researchers fly a kite for manure recycling* 28 November 2008 http://www.aecomunicacioncientifica.org/portal/index.php?option=com_content&view=article&id=26883&catid=39:alphagalileo&Itemid=75 Chadwick project
	Physorg website	*Researchers fly a kite for manure recycling* 28 November 2008 http://www.physorg.com/news147094914.html Chadwick project
	BBC Radio Cymru	*On the Farm* Risks of Ecoli Prysor Williams from Killham project 18 November 2008
December		
	IPMNet News electronic newsletter	*Use of Biopesticides Lagging in the UK* article about Wyn Grant project December 2008 issue
	Planet Earth on-line	*E Coli kite mark shows manure pollution risk* 2 December 2008 http://planetearth.nerc.ac.uk/news/story.aspx?id=255 Chadwick project
	Innovations report website	*Researchers fly a kite for manure recycling* 1 December 2008 **http://www.innovations-report.com/specials/printa.php?id=123435** Chadwick project
	Generef website	*Researchers fly a kite for manure recycling* 2 December 2008 **http://www.generef.com/newsstory.rss.html?pid=57767** Chadwick project

The poultry site news website	*E coli kite mark to show pollution risk* 3 December 2008 **http://www.thepoultrysite.com/poultrynews/16611/eme-coli-em-kite-mark-to-show-manure-pollution-risk** Chadwick project
Yorkshire Post	*Human waste a significant factor in rural areas* 6 December 2008 **http://www.yorkshirepost.co.uk/farming-news/Human-waste-39a-significant-pollution.4766918.jp** Chadwick project
Rural Matters RASE Magazine	*Sustainable and safe recycling of livestock waste* p19 winter issue 2008 Chadwick project

PRESENTATIONS TO STAKEHOLDERS AND SUBMISSIONS TO STAKEHOLDER CONSULTATIONS

Acs, S. et al *'Effects of subsidy changes on hill farm production decisions, income and biodiversity'* Moors for the Future's 5th Research Day, 20 June 2008, Bakewell. (Moors for the Future, PDNPA, NT, NE, gamekeepers, researchers, etc.)

Armsworth, P. et al *'Hill Farm Economics and Biodiversity in the Peak District'* Moors for the Future, Upland Research Forum, 25/11/08, Castleton. (Farmers, game keepers, NE, PDNPA, NT, RSPB, Scottish FWAG, DEFRA, etc.)

Armsworth, P. et al *'Ecosystem Services'* NE Board Workshop on Ecosystem Services, 24/06/08, Sheffield.

Armwsorth, P. et al. *'The Future of the Uplands'* RELU / CCF The Future of Farming, 03/07/08, Cambridge. Title: The Future of the Uplands. Authors: (National stakeholder community (JNCC, NE, RSPB, farmers, etc.)

Banks, C.J. *'Renewable energy from crops and agrowastes'*. EU Energy and Biorefineries Contractors meeting, Brussels, 15-16th Oct, 2008 (EU Policy makers, EU project officers, and lead researchers from the EU)

Bateman, I.J. (2008) *'Valuing the non-market benefits of water quality improvements in rivers and wetlands: Incorporating spatial and visual complexit'y*. Presented at *Wetlands and Aquatic Ecosystems: Their Functions and Values*, a knowledge exchange workshop for research scientists and practitioners from Europe and Southern Africa, Worcester College, Oxford, 24th - 25th November 2008 (Policy makers and academics from various countries)

Bateman, I.J. (2008) *'Valuing X (when X is unknown): Can experimental economics improve the valuation of environmental preferences?'*, Keynote Plenary address to the *BIOECON* conference, 29th-30th September 2008, University of Cambridge. (Academics and UK policy makers)

Bateman, I.J., (2008) *'Valuation and optimal targeting of land use change policies'*, Keynote Plenary address to the *Conference on Ecosystem Services in China and the U.S.*, Institute of Geographic Sciences and Natural Resources Research (IGSNRR),

Chinese Academy of Sciences, Beijing, China, 13th – 14th October 2008. (Chinese and US policy makers)

Bateman, I.J., et al '*Catchment Hydrology, Resources, Economics And Management (ChREAM)'* to Axis 2/ Ecosystems Group, Welsh Assembly Government, Technium Aberystwyth, 8th February 2008.(Policy makers)

Buller, H. (2007) '*Can we change the way producers add value to their product's*. Paper to the RELU Food Chain conference, London, 9th November, 2007.

Chandler, D. '*Development in Insect Biological Control: Field crops IPM – challenges and expectations'* Sainsbury's Supermarkets Ltd. in conjunction with Greenery UK, Biopesticide/IPM conference, 18 March 2008, Sainsbury's HQ, High Holborn, London

Chandler, D., Grant, W., Greaves, J., Davidson, G. et al, *'The Consequences of the 'Cut-Off' Crietria for Pesticides: Alternative Methods of Cultivation*', Agriculture and Rural Development Committee of European Parliament, Brussels, 8 December 2008

Eden, S. '*How people use and enjoy rivers'*. Workshop presentation, North Yorkshire County Council's 'Natural Environment Day' open public event, October 2008, Northallerton.

Fezzi C., Bateman I., Day B., Posen P. and Rigby D. (2008) *'Analyzing Water Framework Directive impacts using a multinomial logit land use model'*, presented at the 107th European Association of Agricultural Economists (EAAE) Seminar, January 29th February 1st 2008, Seville. Academics and researchers, mainly agricultural and environmental economists, and policy makers (European Union, Defra, etc.). (EU policy makers and academics)

Fezzi C., Bateman I., Day B., Posen P. and Rigby D. (2008) *'Developing and Testing an Agricultural Land Use Model for Predicting the Impact of Policy Change: A Case Study Examining the Water Framework Directive Implementation*', presented at the 6th UK Network of Environmental Economists (UKNEE) conference (Envecon), 14th of March 2008, London. Academics and researchers, mainly environmental and natural resource economists, and policy makers (Defra, Environmental Agency, etc.). (UK policy makers and academics)

Fiorini, S., Turner, A., Irvine, R.J., Armstrong, H. and Yearley, S. July 2008. '*Can Managers inform models?'* Presentation of practitioner interview analysis, data analysis and knowledge integration (Participatory GIS workshop). (12 Balquhidder DMG deer managers and local government agency staff)

Finch, J. Invited talk on "Soil water deficits and evaporation rates associated with Miscanthus in England". AAB Biomass and Bioenergy II conference. York. Dec 10-12, 2008 (Biomass and Energy crop scientists, growers and stakeholders)

Givens, D.I. and Traill, W.B. (2008). Presentations to stakeholders at the Plants and Health Showcase, University of Reading (September 2008).

Gowing, D. Presentation to Cambridge Conservation Forum. Girton College, Cambridge University. 11th January 2008. (Conservation researchers)

Gowing, D. Attendance at national stakeholder meeting to discuss management of floodplain grassland. Centre for Ecology and Hydrology, Wallingford, 8th May 2008. (Ecologists and hydrologists)

Gowing, D. '*Biodiversity considerations with respect to Urban development in the floodplain of Shenley Brook, Milton Keynes'*. Presentation to Pell Frischmann

consulting engineers on Pell Frischman Offices, Milton Keynes, 8th October 2008. (Civil Engineers)

Gowing, D. '*Floodplain management'* Presentation to Flitwick Moor SSSI Stakeholders At Bedford Group of internal Drainage Boards, 6th November 2008 (Internal Drainage Board, Wildlife Trust, Environment Agency, Natural England, Beds County Council)

Gowing, D. '*Floodplain grassland management for conservation'*.Presentation to the Institute of Professional Soil Scientists on floodplain grassland management for conservation. ICS, London, 21st October 2008. Ben Moore in attendance. (Soil Scientists)

Greaves, J. Presentation on interdisciplinarity at the '*Transdisciplinary Workshop: Working Accross Boundaries'*,16th December in Manchester. (Social science researcher)

Holden J. (2008) *'Hydrology and carbon cycling in upland organic soils'*. Natural England Heathland conference, York, September 2008 (60 upland stakeholders (only three academics present)

Holden, J (2008) '*Opportunities for collaborative growth in the water sector: examples from the University of Leeds. Business opportunities for the water sector in the north of England'*, Harrogate, Jan 2008. – the presentation highlighted the Sustainable Uplands RELU project as an opportunity for industry in terms of approach and methods. (Industry – around 100 UK water professionals from companies in the north of England)

Holden, J. (2008) *'Hydrological damage to peatlands caused by windfarm development'*. Presentation to the European Parliament, April 2008. (European Parliament, Press.)

Holden, J.**,** Reed, M., Hubacek, K. et al (2008) *'Sustainable uplands for sustainable lowlands. Connecting urban and rural greenspace'*, Joint RGS-PLACE conference, Leeds, April 2008. (Public and planning professionals)

Hubacek, K. Invited presentation to RICS Rural Conference, Harrogate and Kendal, 23rd October 2008 (Chartered Surveyors and Land Agents and other rural property-related professionals)

Hubacek, K. Response to DEFRA's consultation on a Soil Strategy for England (DEFRA)

Hubacek, K. Response to the Scottish Government's Consultation on a Rural Land Use Study (Scottish Government)

Ilbery, B. *'Risk framing and scenario development'* Presentation to stakeholder group, Imperial College, July 24th 2008.

Jones, C. '*Muck, money and mortality: views of E. coli O157 risk in rural area's* (Academic colleagues, St Marys University of Aberdeen)

Jones, C. '*Views of E. coli O157 risk in rural areas'* (Arnage Primary School)

Jones, C. '*Views of E. coli O157 risk in rural areas'* (Kininmonth Primary School)

Jones, C. '*Views of E. coli O157 risk in rural areas'* (Port Elphinstone Primary School)

Jones, C. '*Views of E. coli O157 risk in rural areas'* (Udny Green Primary School)

Jones, C., Cross, P., Williams, P., Hunter, C. and Edwards-Jones, G. '*Construction of risk in an multi-disciplinary study of Escherichia coli O157 in rural areas'* (Food Micro 2008 Aberdeen Exhibition Centre)

Karp, A. Cambridge, 3 July, Invited talk on "*Technological Drivers of Agricultural Change*" to a conference on "Future farming in the UK global implications for society and biodiversity" (Cambridge Conservation Forum)

Little, D. (Joint team authorship) *'Do farmers need to change their ideas about diversification?'* 7th November 2007, RELU Conference, London. Presented by Dave Little.

Little, D. (Joint team authorship) *'Tilapia Project Presentation'*, July - December 2007, University of Stirling. Presented by Francis Murray, Dave Little and William Leschen (Presentation given to various farmers and rural entrepreneurs who visited the university throughout 2007 as they were interested in adopting tilapia as a diversification strategy.)

Little, D. (Joint team authorship) Farmer's workshop presentation, *'Tilapia Project Presentation'*, 26th March 2007, Auchterarder. Presented by Francis Murray

Lobley, M. et al., 4th June 2008, *'The role of training in ELS'*, CEH Monks Wood (Defra Land use policy & NE land use teams)

Lowe, P. *'Land use and food security'* Food Ethics Council Business Forum, London.

Lowe, P. *'Relu: Lessons Learnt'* European Research Funders' Forum (ERFF) and UK Collaborative on Development Sciences (UKCDS) joint Workshop, 21st Century Research Collaborations, Warwick University.

Lowe. P. *'Whose Land is it Anyway?'*, Birkbeck/Ecology and Conservation Studies Society (ECSS) Inaugural Lecture in series "What is land for? (Presentation in Birkbeck College, London)

Lowe, P. *'The knowledge exchange strategy of the Relu Programme'*. Technology Strategy Board (TSB) Lunch & Learn Session, Swindon.

Maye, D. *'Risk perception and management'* Presentation to Bayer CropScience, Cambridge, July 30, 2008 (Agrochemical industry personnel)

Medd, W. Participation at *Food Chain Forum 7th Meeting*, 13th May 2008 (RELU stakeholders)

Medley, G. Presentation of GoLD objectives at Society of Veterinary Epidemiology and Preventive Medicine, Liverpool, March 2008 (SVEPM conference delegates (principally researchers and policy makers for veterinary epidemiology and preventive medicine.)

Medley, G. Presentation of GoLD research programme to Scottish Government Centre of Excellence (EPIC) conference, keynote address, Aberdeen, September 2008 (Members of EPIC – veterinary epidemiology centre of excellence – including representatives from Scottish Government and Quality Meat Scotland.)

Mills, P. *'Growing risk'* Presentation to Bayer CropScience, Cambridge, July 30, 2008 (Agrochemical industry personnel)

Mills, P. *'Growing risk'* Presentation to stakeholder group, Imperial College, July 24th 2008.

Mills, P. Presentation made to Workshop for UK Living With Environmental Change programme (December 2008, Edinburgh) (Academics, research funders, Govt Departments)

Oughton, E.A., Wheelock, J., Bolland, J. and Whitman, G. Institute of Fisheries Management, Identifies those factors that may discourage/encourage anglers in relation to EA research on barriers to participation. Audience: public and private fisheries managers, academics. Leeds October 2008

Phillipson, J. *'Fishing Communities and territorial development'* Conference organised by the Scottish Government. Presentation to over 50 fishermen's organisations,

Aberdeen. ESRC Mapping the public policy landscape Seminar Series. Seminar on Change and Continuity in Scotland's fishing communities, Aberdeen.

Quine, C.P. Introduction to the project, *'Assessing and communicating animal disease risks to countryside users'*, 5th Feb 2008, Roslin (Prof Maggie Gill and Dr Caspian Richards, RERAD Scottish Govt)

Quine, C.P. Introduction to the project, *'Assessing and communicating animal disease risks to countryside users'*, 19th March 2008, Roslin (Dr Vicky Swales, RELU Policy Analyst)

Quine, C.P. Introduction to the project, *'Assessing and communicating animal disease risks to countryside users'*, 25th April 2008, Scottish Parliament, Edinburgh (Ticks & Lyme Disease meeting organised by the Scottish Government)

Quine, C.P. Introduction to the project, *'Assessing and communicating animal disease risks to countryside users'*, in Perth on 20 August (A tick borne disease workshop organised by EPIC - Epidemiology, Population Health and Infectious Disease Control - Centre of Excellence)

Randolph, S. Lecture on tick ecology, Annual Meeting of Lyme Disease Action, Leicester, 18July08 (Lyme Disease Action members and other interested people.)

Randolph, S. *'Review of tick ecology and role in disease'*, Parliamentary seminar, 10.Nov.08 (MPs, Physicians, Public Health practitioners, Lyme Disease Action members)

Rigby, D. *'Researching the Risk and Management of Escherichia coli O157 in rural areas'* (North West Zoonoses Group)

Rouquette, J.R., Gowing, D.J., Posthumus, H., Dawson, Q.L., Hess, T.M. and Morris, J. (2008) *'Integrated Floodplain Management: An Ecosystem Services Approach'*. Invited seminar presented to the Catchment Science Centre and Department of Animal and Plant Sciences, University of Sheffield, 12 November 2008. (The Catchment Science Centre and Department of Animal and Plant Sciences, University of Sheffield (academics, researchers and students).

Salter, A, 26th Nov, Presentation to Permastore Ltd, Permastore ltd, Eye, Sufolk (Directors and senior managers of Permastore ltd, suppliers of AD equipment)

Smith, L. *'Wily Solutions for Wicked Problems: Investigating Sustainable Protection of Water Resources'* London Water Research Group Seminar Series, Kings College, London, 17 November 2008.

Smith, L. Multiple presentations made by team members at 4 catchment workshops and 1 national workshop (local and national level stakeholders)

Strachan, N. *'Reducing the risk of E. coli O157 in rural communities'* (RELU Food Forum meeting)

Tiffin, J.R. (2008). Presentation on WTP for enhanced foods to Chartered Institute of Marketing Food and Drink group, London (Summer 2008).

Tiffin, J.R. (2008). Presentation to Sustainable Development Research Network Conference, London (Autumn, 2008)

Tinch, D. et al *'Valuation of upland landscapes and biodiversity'*. Moors for the Future's 5th Research Day, 20 June 2008, Bakewell. (Moors for the Future, PDNPA, NT, NE, gamekeepers, researchers, etc.)

Ward, N. Oral evidence to EFRA Rural Affairs select Committee on rural economy issues, May 2008

Whatmore, S. and Landstrom, C. and Lane, S. 2 seminar presentations (Environment Agency Wales (Policy makers)

Whatmore, S. Contribution to Natural England – Scientific Advisory Panel consultation on social science (Policy makers)

Williams, P. *'Reducing the risk of E. coli O157 in rural environments'* (FUW Anglesey regional meeting)

Williams, P. *'Reducing the risk of E. coli O157 in rural environments'* (NFU Llansannan regional meeting, Denbighshire)

Williams, P. '*E. coli O157 in the context of Welsh soils'* (Welsh Soils Discussion Group (British Society of Soil Science meeting), Bangor)

Williams, P. '*Reducing the risk of E. coli O157 in rural environments'* (NFU Caernarfon regional meeting)

Williams, P. '*Reducing the risk of E. coli O157 in rural environments'* (NFU Anglesey regional meeting)

Annex C: CONFERENCES/WORKSHOPS ATTENDED BY DIRECTOR'S OFFICE

February 08	Tyndall Conference on Climate Change Adaptation, London *"Living with climate change: Are there limits to adaptation"*
	Relu media training day for researchers
March 08	ESRC Mapping the public policy landscape Seminar Series. Seminar on Change and Continuity in Scotland's fishing communities, Aberdeen. (Presentation on *"No 'one size fits all' solutions for fishing communities"*) Conference organised by the Scottish Government. Presentation on *"Fishing Communities and territorial development"* to over 50 fishermen's organisations, Aberdeen
	Foresight Workshop, London "*The future uses of land*"
April 08	Defra Evidence Strategy Workshop, Reading
May 08	Food Ethics Council Business Forum (Presentation on *"Land use and food security"*)
	Workshop led by Michael Winter "*Land Use Management: the new debate*", London
	Animal and Plant Disease Workshop, London involving researchers, stakeholders and policymakers.
June 08	Launch of Living with Environmental Change Programme, London
	*"From a land of plenty to a land of uncertainty … finding the answer*s", Royal Overseas League, London. (Conference organised by Sir Ben Gill and Chris Pollock)
	SENS Seminar, Newcastle University (Presentation on *"The Relu programme and interdisciplinary research")*
	ESRC Research Methods Conference, Oxford (Presentation on *"Why social scientists should engage with natural scientists"*)
July 08	Cambridge Conservation Forum/Relu 2008 Summer Symposium: *"Future farming in the UK: global implications for society and biodiversity"*
	Relu end of project event at North Wyke, Devon, *Livestock farming and microbial watercourse pollution*
	XII World Congress of Rural Sociology, Korea. (Presentations on "*The localization of farm policy"* and *"New approaches to rural development"*)
August 08	RGS-IBG Annual Conference, London. Relu Special Session on Rural Geography and Public Policy Engagement *(*Presentation on '*From Linear to Exchange Models of Knowledge Transfer')*
September 08	Defra Research and Evidence Strategy Workshop, Reading
	China-UK Sustainable Agriculture Innovation Network (SAIN) Round Table Meeting, Defra, London
	Scottish Government *Rural Land Use Study: Launching a Programme of Research into the Current and Potential Contributions of Scotland's Rural Land*, Macaulay Land Use Research Institute, Aberdeen
October 08	European Research Funders' Forum (ERFF) and UK Collaborative on Development Sciences (UKCDS) joint Workshop, 21st Century Research Collaborations, Warwick University. (Presentation on "*Relu: Lessons Learnt")*
November 08	ESRC Communications Conference, London (Presentation on *"Relu and the Great Land Use Debate")*
December 08	Living with Environmental Change (LWEC) Objective D meeting, Edinburgh (Presentation on *"Lessons from the Relu Programme")*

Annex D: EXTERNAL ENGAGEMENT AND EXPLOITATION

Level of usage of any research resources generated	High. See section 2 and 4
Level of co-funding by business and government agencies of any research resources generated	£701k of co-funding during 2008
Number of interactions/events focused on public participation and engagement	Several thousand interactions with various non-academic publics/audiences
Number of researchers trained in media and public engagement skills (not funded centrally by ESRC)	Unknown
Number of collaborative ESRC research projects	All 29 of Relu research projects involve collaboration with other Research councils and have active stakeholder engagement (see section 4)
Amount of external funding for joint research (excluding joint Research Council projects)	£701k of co-funding during 2008
Number of users placed with research programme	3 visiting fellows
Number of researchers placed in user organisations	7 work shadowers

Annex E: MATTERS FOR ATTENTION
(*Confidential*)

Annex F: DIRECTOR'S ACTIVITIES SELF ASSESSMENT
(*Confidential*)

Annex G: DIRECTOR'S OFFICE BUDGET
(*Confidential*)