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PROGRAMME DIRECTOR'S ANNUAL REPORT FORM

(Edition 7: October 2004)

PROGRAMME DIRECTOR'S ANNUAL REPORT 2005

(This page must be completed by the Case Officer before forwarding to the Director)

Programme:	**RURAL ECONOMY AND LAND USE PROGRAME**
Director:	**Professor Philip Lowe, University of Newcastle**
Assistant Director:	**Jeremy Phillipson, University of Newcastle**
Reporting period:	**From 1 January 2005 to 31 December 2005**
Number of Projects funded under the Programme:	**53 projects**
Total Research Council budget for Programme:	**£22,000,000**
Co-funding amount:	**£1,754,154**
Total amount of Director's Award including any supplements:	**£913,764**

Contents

Executive Summary

During 2005 a raft of small 'seed-corn' studies funded under the First Call were completed, and 8 large projects, funded under the same call, started their research on the *Sustainability of Food Chains*. Under the Second Call and its broad theme of *People and the Rural Environment*, 11 projects were chosen for conditional awards (with a total value of circa £7 million) from 89 applications. In all 33 disciplines are represented in First and Second Call projects. A Third (and final) Call – on animal and plant disease management and sustainable rural development - was also planned and announced.

A range of programme activities, most notably a successful and high profile first annual conference, gave identity to the RELU research community and instilled in it the Programme's ambition and goals. Lord Whitty, Defra's Minister for Farming, Food and Sustainable Energy opened the conference. A panel discussion, chaired by Sir Howard Newby, Chair of RELU's Strategic Advisory Committee and Chief Executive of HEFCE, involving the Chief Executives of ESRC, BBSRC and NERC on the theme: 'Why Interdisciplinary Research: The Challenges and the Obstacles' concluded the conference.

As the reputation of the programme has spread there were a growing number of invitations to address conferences on the lessons from RELU, especially for the design of interdisciplinary and European research programmes.

Important steps were taken to formalise RELU's stakeholder constituency. The first of RELU's stakeholder forums – on the food chain – was launched. The forums comprise senior figures from commerce, government and the voluntary sector and act as sounding boards on programme and project development. The suite of Stakeholder Engagement Plans, already covering Defra, UK Water Industry Research and the Scottish Executive Rural Affairs Department, was extended to include the Environment Agency and Welsh Assembly Government. A workshop reporting the outcome of the First Call scoping studies, capacity building awards and development activities was jointly organised with the Land Use Policy Group of the UK conservation agencies – a key grouping of potential professional customers for RELU research.

A paper was prepared on the appropriate approach to knowledge exchange for the Programme's distinctive mission. It was circulated widely throughout the RELU research community and across the Research Councils for consultation. The programme also pioneered its own knowledge transfer mechanism with an innovative stakeholder work shadowing scheme for researchers. Several RELU projects are demonstrating tangible impacts on policy and practice even at a relatively early stage in their research. For example, in 2005 Wyn Grant (University of Warwick) and his RELU project team provided an influential submission to the national consultation 'Pesticides Safety Directorate: a Draft National Strategy for the Sustainable Use of Plant Protection Products'.

A quarterly electronic newsletter was launched, with an initial subscription list of 1600 researchers and stakeholders. The first programme-level briefing papers were published: *Setting the Research Agenda* and *Rural Economy and Land Use Futures*. Over 125 presentations and papers were given by RELU researchers at conferences and workshops. Preparations were begun for a Special Issue of the *Journal of Agricultural Economics* reviewing the substantive scope and interdisciplinary foundations of the programme.

RELU made a successful application to the ESRC-SSRC Visiting Fellowship Scheme. Professor Clare Hinrichs from Pennsylvania State University was awarded a fellowship to study the "Relocalization of agri-food systems in USA and UK" through extended visits with four RELU food chain project teams to take place in 2006.

(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. The specific objectives of the Programme 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 5).

Start and end dates of phases within the Programme: The reporting period covers the completion of the smaller projects funded under the first of three waves of research, the commissioning of the Second Call for proposals, and the design of the Third Call (see Fig 1).

Number of researcher and related posts:
The 35 First Call projects which were undertaking research in 2005 involved 175 principal and co-investigators, over 40 researchers and 5 research students. The Programme Director's Office is an interdisciplinary team comprising: *Director*: Professor Philip Lowe (80% FTE); *Assistant Director:* Jeremy Phillipson (60% FTE); and *Communications Manager:* Dr Jo Daymond (100% FTE).

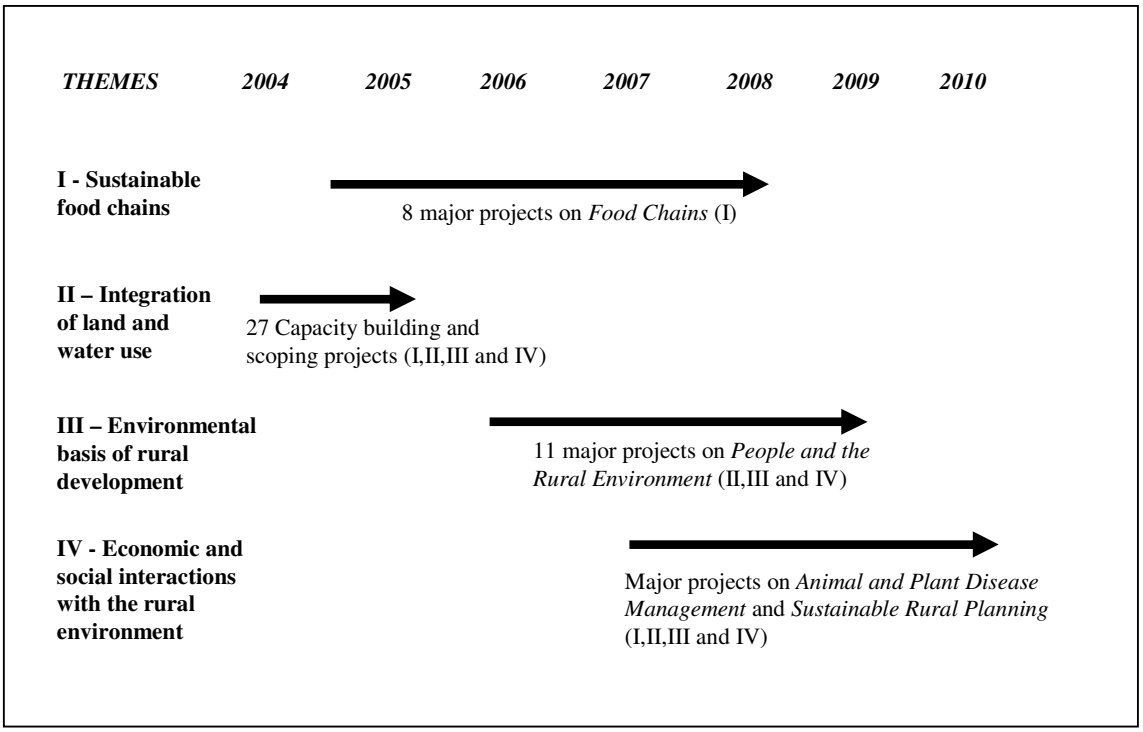
Number of projects started before, during and after the reporting period: 29 projects (including 2 large research projects) started in 2004 prior to the reporting period. 6 large research projects and 5 PhD studentships started in 2005. 11 large research projects commissioned under the Second Call will commence in 2006.

Year of the Programme: Year 2 (2005)

Co-funding and collaboration during the year: The programme is a collaboration between the ESRC, BBSRC and the NERC. It has a budget of £24 million, including co-funding of £750,000 from the Scottish Executive Environment and Rural Affairs Department (SEERAD) and £1 million from the Department for Environment, Food and Rural Affairs (Defra). During the reporting year £4,154 additional funding was obtained through a successful application to the ESRC/SSRC Visiting Fellow Scheme.

Highlights: Highlights for the year are presented in Section 2 and Annexe A.

Figure 1: The Shape of RELU



(2) Overview of year

During 2005 the large projects funded under the First Call for proposals started their research and a raft of small scoping studies, capacity building awards and development activities completed their work. The assessment process was completed for RELU's Second Call for proposals and a Third (and final) Call was planned and opened for expressions of interest (concept notes). One of the benefits of funding a range of initial, exploratory and preparatory studies under the First Call was to establish a sizeable academic constituency for the Programme. Otherwise – as an interdisciplinary programme – RELU would have lacked its own grouping of people with an interest and a stake in the Programme and its future development. During 2005 a range of programme activities, notably a successful first annual programme conference, gave identity to that constituency but also instilled in it a sense of the Programme's ambition and goals. During the year the programme continued to roll out a raft of concrete actions in an effort to meet RELU's aspirations regarding stakeholder engagement. As the reputation of the programme has spread there were a growing number of invitations to address conferences on the lessons from RELU, especially for the design of interdisciplinary and European programmes and for the pursuit of accountability and stakeholder engagement in scientific research. RELU also produced its first programme level publications.

2.1 RELU Events

The events organised by the Director's Office included a major research launch conference; the first meetings of RELU's Food Chain Forum; and a workshop reporting the outcomes of the First Call scoping studies, capacity building awards and development activities.

The research launch conference was a lively 3-day event held in January attended by over 125 researchers and research users. It was opened by Defra's Science Minister and concluded with a debate on interdisciplinarity between the Chair of RELU's Strategic Advisory Committee and the Chief Executives of BBSRC, ESRC and NERC. In between there were presentations on the projects' research plans as well as workshops on data management and interdisciplinary methods and stakeholder-led workshops on the research issues arising from current policy challenges. The conference served to initiate RELU's research community and to give a common sense of the scientific challenge of the programme (see 3.6.3).

The first of RELU's stakeholder forums – on the food chain forum – was launched and met on two occasions. Towards the end of the year, a second forum – on people and rural environment – was also launched. The forums comprise senior figures from commerce, government and the voluntary sector. They act as sounding boards on research programme and project development (3.3.4).

In May a workshop was held reporting the outcome of the First Call scoping studies, capacity building awards and development activities. These novel funding mechanisms had been pioneered by RELU to assist research groups to scope topics and to establish interdisciplinary capacity in pursuit of the Programme. The workshop was jointly organised with the Land Use Policy Group of the UK conservation agencies – a key grouping of potential professional customers for RELU research (see 3.6.3).

2.2 RELU influencing: Promoting debate about interdisciplinary research and knowledge transfer

During 2005 the RELU Director and Assistant Director attended 23 conferences, gave presentations at 14 conferences and workshops and provided advice to Research Councils and other key stakeholders on the design of interdisciplinary programmes (see Annexes B and D). For example, the Director's Office was asked to advise NERC staff on the relevance of RELU's experience to a new interdisciplinary programme on environment and health. The programme also contributed influentially to the report *Interdisciplinary, Cross Cutting and Strategic Research Needs to Support the UK Sustainable Development Strategy*, drawn up by the Sustainable Development Research Network for the Environment Research Funders' Forum.

A paper was prepared on the appropriate approach to knowledge exchange for the Programme's distinctive mission. It was circulated widely throughout the RELU research community and across the Research Councils for consultation. The paper outlined RELU's approach to knowledge transfer, explored different models of knowledge transfer and their application to the RELU programme, and highlighted a range of key issues relating to knowledge transfer mechanisms, the role of knowledge brokers and the measurement of knowledge transfer outcomes. The paper palpably engaged the interest and enthusiasm of the RELU constituency. We received extensive feedback, and in revised form, the paper framed the discussion at RELU's second annual conference in January 2006.

Within an EU context, the Director addressed the national agricultural science directors from across the EU, meeting in the UK as part of Britain's presidency of the European Union. He talked about the changing agenda for public R&D in the agri-food system and called for a renewal in the justifications and roles of public research in agriculture if they are to command public legitimacy. A major contribution to this new direction for science must come from interdisciplinary research. This point was echoed in a submission on critical research gaps in research on the environmental relations of agri-food systems invited from RELU by a European Commission working group responsible for the development of part of the Seventh Framework Programme. Philip Lowe and project leader Michael Winter also debated with senior European Commission official Peter Berkowitz the importance of CAP reform to rural development in a seminar in Brussels organised by the Institute for Public Policy Research.

The programme is also making its mark beyond the EU. Great interest was shown in the programme following an invitation to address an OECD Conference on "Opportunities and Challenges in Agri-Food Research" in Rome on the RELU perspective on new directions in agri-food research. The RELU Director and project leaders Angela Karp and Jon Finch were also part of a UK delegation to China, led by Sir Gordon Conway, DFID's Chief Scientist. Sponsored by the DFID and the Chinese Ministry of Science and Technology, discussions were held with Chinese officials and scientists on the scope for research collaboration and exchange on appropriate science and technology for sustainable rural development. Considerable interest was expressed in learning from how RELU research is helping understand the socio-economic contexts in which environmental constraints and technological options are understood and acted upon.

2.3 RELU Programme Publications and Publicity

The Director's Office launched a quarterly electronic newsletter, with an initial subscription list of 1600 researchers and stakeholders. The first programme-level briefing papers were published in May: *Setting the Research Agenda* and *Rural Economy and Land Use Futures* (see section 3.3.2). Over 125 presentations and papers were given by RELU researchers at conferences and workshops (Annex C).

Preparations are underway for a Special Issue of the *Journal of Agricultural Economics* reviewing the substantial scope and interdisciplinary foundations of the programme. The publications emerging from individual RELU research projects are listed in Annex C. Despite there being no great attempt at this stage of the programme to push for a large interest by the general media, there has been a range of coverage of RELU in the general and specialist press (See Annex C).

2.4 Programme Management

A Management Advisory Group (MAG) was established to act as a steering group for the Programme. It is chaired by SAC Member Professor Mark Goodwin, and includes also Professors Maggie Gill and Louise Heathwaite, besides the Programme Management Group (PMG). The MAG met on two occasions in 2005.

Second Call Commissioning
A major element of Programme Management was completion of the assessment for the Second Call of funding under the umbrella theme of People and the Rural Environment. This was a complex, two-stage selection process which was intensely competitive. Detailed discussions and negotiations were held with the 11 PIs who were allocated conditional awards – some of the conditions were exacting and the negotiations were equally demanding. The projects funded embraced a wide range of disciplines (ecology, economics, human geography, hydrology, physical geography, social anthropology, sociology, environment modelling, environmental informatics, earth sciences, environmental chemistry, microbiology, human psychology, soil science, management studies, social policy, political science, crop science, population biology, planning, development studies and civil/water engineering).

Formulation of the Third Call
RELU's Third Call focused on the management of animal and plant diseases and sustainable rural development, which were chosen as important substantive gaps in the programme's research portfolio but also as representing lacunae in the programme's interdisciplinary coverage. The first theme in particular addresses the chronically weak relationship between the social and bio-science communities. A key criterion for funding research related to this theme will be that the proposed research brings together teams of natural and social scientists in order to address problems of contemporary concern in the management of animal or plant diseases in the UK which could not be tackled without interdisciplinary cooperation. The need for such research is evident from the environmental risk and substantial social and economic consequences of more narrowly based decision making in recent disease events, including BSE, FMD and bovine TB. Interdisciplinary research is expected to bring together different perspectives and methodologies to reframe such problems and consider, in more holistic ways, how best to tackle them, as well as other looming issues such as avian influenza and sudden oak death. The research will need to consider how the constraints on, and options for, disease prevention and management are being altered considerably by such factors as changes in

the countryside, shifting social, economic, environmental and ethical concerns, technological developments and globalisation.

The Third call topics and priorities were developed following a gap analysis and large scale consultation with stakeholders and the research community, involving: preparing of a scoping document for discussion by the SAC; a web based consultation; a mailing of 1600 RELU researchers and stakeholders; and invited submissions from the key research and policy leads in government agencies and NGOs. An excellent response to the RELU Third Call attracted 99 concept notes. The Director's Office initiated discussions with a number of stakeholders, most notably Defra, about the prospects for co-funding projects under the Third Call.

The other novel dimension of the Third Call was the possibility of funding projects on sustainable rural development with a physical science/engineering component. The Director's Office had initiated discussions with the EPSRC on the curious omission of that Council as a backer of RELU. The EPSRC had been lead Council on the Sustainable Urban Environment Programme but was not included in the line up for the largest research programme ever for sustainable rural development, potentially conveying the unfortunate impression that Research Councils regard the 'rural' as an engineering-free zone. Following discussions, the EPSRC magnanimously agreed to contribute to the funding of suitable projects under the Third Call. This has opened up the prospect of RELU forging links between the natural, social **and** physical sciences and addressing such strategically important issues as:

- Analysis of the flows of people, goods, services and waste between urban and rural areas, to assess the impact of the 'urban footprint' on rural infrastructure and ecosystem services.
- Analysis of human aural and visual interactions with the rural environment (landscape visualisation, rural soundscapes, noise and light pollution, etc.).
- The impact of sensitive and extensive land uses on rural land and environment, such as waste management, quarrying, military facilities, transport, communications infrastructure, secure institutions, abattoirs and incinerators.
- The environmental implications and sustainability of changing patterns of regional and rural development and land use, including settlements, infrastructure and non-agricultural land uses.

(3) Progress of programme

3.1 Scientific quality

RELU's Second Call for research funding operated according to a two stage process, of outline and full applications. 89 outline applications were received and 28 were invited to prepare full submissions, with 11 of those eventually given conditional awards (with a total value of *circa* £7 million and involving 96 investigators). This represents a 1 in 8 success rate.

By providing an opportunity to give feedback from the first meeting of the assessment panel on those outline proposals judged to be promising, the process was structured in such a way as to improve the quality of final bids. Aided by the redesign of the full application form, project proposals more clearly justified their approach to interdisciplinarity, research methods and data management. The Research Councils' Data Support Service has expressed praise for the clarity of the projects' data management plans.

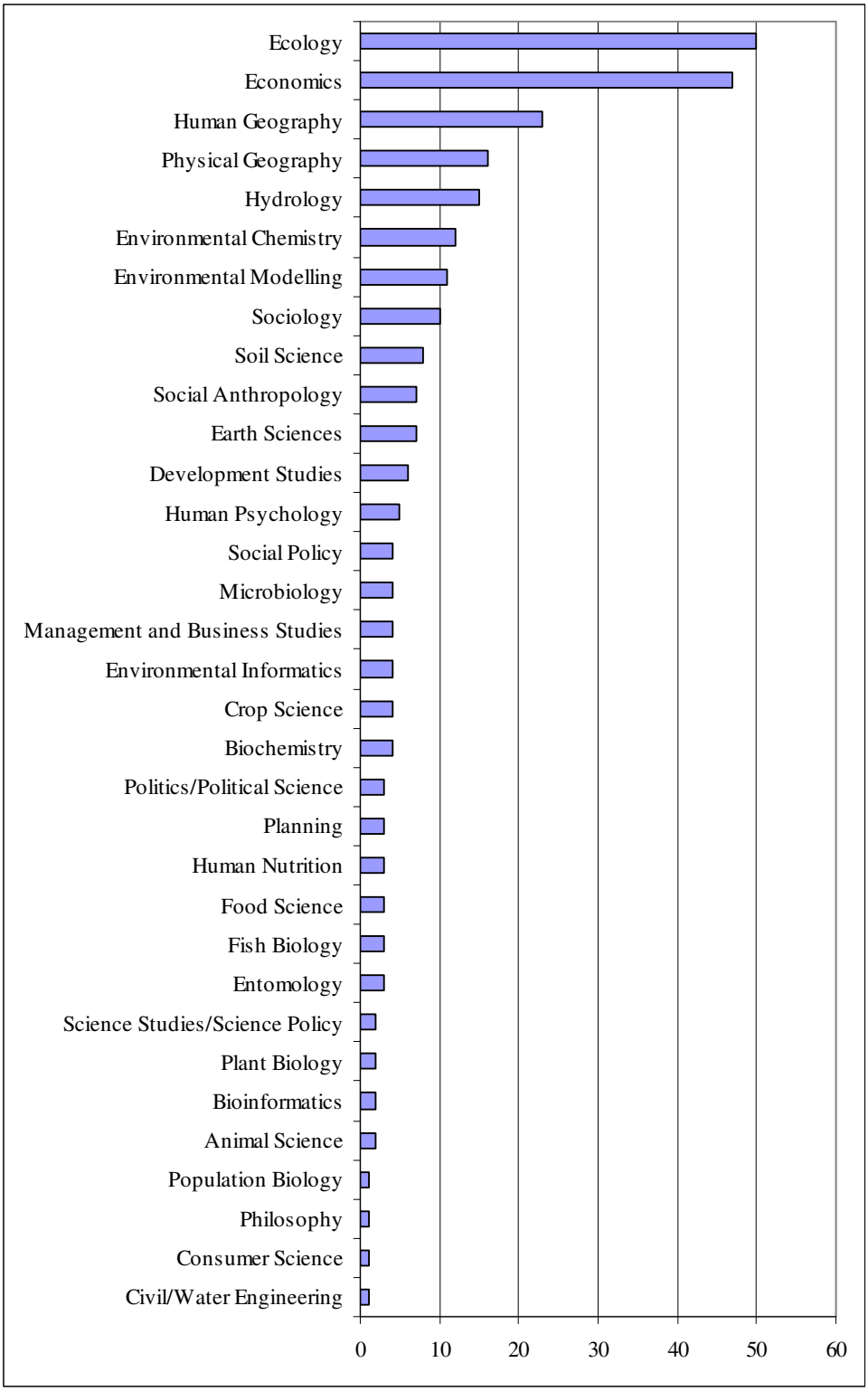
The full applications were subjected to a full disciplinary peer review and then final judgement by the assessment panel. With a mix of natural and social scientists as referees for each project, the process sought to ensure that the disciplinary components of research projects were rigorously assessed. Assessing the quality of a project's interdisciplinarity was a more demanding but critical requirement, and specific guidance was developed for referees and assessors. The assessment panel was charged with making the final judgement about the overall scientific quality and strategic value of the projects that should be funded. A difficulty the panel found was in maintaining a clear division of labour between this role and that of peer review (members indeed were inclined to rescrutinise, and often critically so, the outcomes of the peer review).

Lessons from the conduct of the Second Call are being incorporated into RELU's Third Call for proposals. This includes: replacement of the outline stage of application with a call for concept notes; establishment of an electronic 'dating service' to help prospective applicants build interdisciplinary teams; the organisation of a workshop to explain to applicants the programme's aims and what will be expected of successful proposals; and clearer guidance to the assessment panel.

3.2 Interdisciplinarity

33 disciplines are represented in First and Second Call projects (see Figure 2). Every project includes natural and social scientists. The most prominent disciplines are ecology, economics, human geography, physical geography, hydrology and environmental chemistry. RELU is also pioneering less well established disciplinary collaborations. Disciplines absent from RELU's First and Second Calls include animal pathology, archaeology, bioengineering, bioinformatics, biophysics, environmental physics, epidemiology, genetics, history, meteorology, oceanography, plant pathology, social statistics, socio-legal studies, systematics and taxonomy and veterinary medicine. The scope for attracting good interdisciplinary proposals, relevant to RELU, that incorporated a number of these disciplines was an active consideration in formulating the Third Call specification (see 2.4). In addition, to help support the development of third call consortiums we established a 'dating service' on the RELU website. This aimed to help applicants find potential collaborators. It involved applicants posting up on a message board their areas of expertise offered or sought in relation to proposals.

Figure 2: Number of investigators by discipline (First and Second Call projects)



3.3 User engagement, knowledge transfer and impact

3.3.1 Expenditure on programme-wide activities

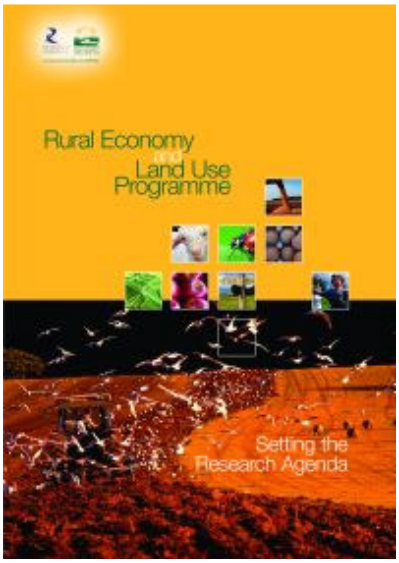
Key items of expenditure include: £37,800 on January Conference (see section 3.6.3), £4,800 on the May workshop (see 3.6.3); £3,400 on RELU National Forums (see 3.3.4); £16,200 on programme publicity and £5,900 on networking/liaison meetings.

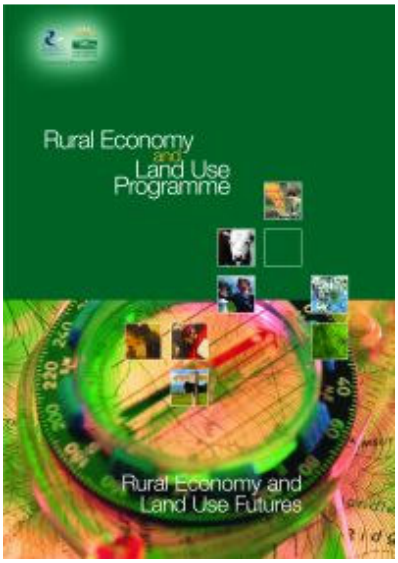
3.3.2 Significant publications

In 2005 RELU published two programme level briefing documents:

- *No 1 Setting the Research Agenda.* The briefing paper introduces the research commissioned under the first round of funding within the programme. It reviews the programme's approach to interdisciplinary research and stakeholder engagement as well as profiling research under each of RELU's main themes: Sustainable Food Chains and People and the Rural Environment.

- *No 2 Rural Economy and Land Use Futures*. Early in the Programme, considerable value was placed in establishing some consensus on the long term prospects for rural economies and land use in the UK, including key areas of risk and uncertainty. A good deal of work, with relevance to RELU, is being carried out in the broad field of futures studies, conducted by think tanks and academic researchers. The programme therefore held a 'Rural Futures Workshop' in 2004 in order to inform researchers of the significance of futures work, review its use in public and commercial organisations, and consider the relevance of the results for RELU research. The briefing paper provides a review of the outcomes of the workshop.





The briefing papers were distributed to approximately 1000 people on the RELU mailing list including Civil Servants, think tanks, academics, NGOs, and politicians.

The RELU website was further developed during 2005 (www.relu.ac.uk) to include sections on: the Second and Third Call, stakeholder engagement plans, work shadowing and new research in the Second Call. There were 172360 hits to the website with particularly high traffic being recorded for its research pages. Four newsletters were prepared and distributed in 2005 to the RELU mailbase, which comprises 2000 researchers and stakeholders.

In the second half of 2005 work also began on the preparation of a *Special Issue of Journal of Agricultural Economics*. RELU was invited by JAE to put together the special issue at the outset of the programme, to provide an insight into the research agendas and interdisciplinary rationale of the programme and its projects. RELU is an unusual research programme which is breaking new ground in its radical approach to interdisciplinarity. The Programme is also tasked with taking its methodological message to the wider research community. We have therefore taken the opportunity of this invitation from a highly respected international journal to record the Programme's rationale and objectives and its conceptual and methodological underpinnings. Authors were selected from amongst First Call PIs by internal peer review (see Section 3.6.3). Joint authorship between social and natural scientists was encouraged. The authors were specifically tasked to prepare papers addressing the methodological and conceptual challenges presented by the RELU Programme. We have been conscious that this early scientific publication could and should set down markers for the quality of the published output from the Programme. We have therefore established rigorous quality control procedures for the special issue. As well as the initial peer review in the selection of the most promising draft articles, the final submitted papers have been refereed by external social and natural scientists, as well as by the Director and Assistant Director of the Programme and the Editor of the Journal. All of the final drafts of papers have been carefully edited to ensure that they are not impenetrable to non-specialists. Without in any way dumbing down, it is vital that interdisciplinary outputs from the Programme be both of the highest quality and reasonably accessible to researchers from different disciplines.

3.3.3 Significant engagement conferences, workshops etc. sponsored by the Programme

Many stakeholders were engaged in RELU's annual conference. Keynote addresses, presentations and facilitation roles were provided by senior representatives of the Environment Agency, Countryside Council for Wales, Food Chain Centre, Defra and SEERAD. Of the 125 delegates, 33 (26%) were key stakeholders (see section 3.6.3).

A dissemination workshop, *People and the Rural Environment: Scoping the Research Agenda*, was jointly organised in May with the Land Use Policy Group, which coordinates the research and analysis on land use and the rural environment of all of the UK's conservation, environmental and countryside agencies. Of the 74 delegates, 27 (36%) were stakeholders from organisations such as Countryside Agency, Countryside Council for Wales, Department of the Environment in Northern Ireland, English Nature, Environment Agency, Joint Nature Conservation Committee, Scottish Natural Heritage, Defra, the Rural Development Service and the Welsh Assembly Government, (see section 3.6.3)

In November RELU sponsored the Mammal Society's Autumn symposium, which hosted 150 delegates to consider the latest scientific evidence and ideas on the interactions between wild mammals and the human food chain. The symposium was organised by RELU grant-holder Piran White and included papers from RELU researchers on the costs to agriculture of the depredations of wild mammals, novel ways in which humans and wild

animals interact through the food chain and infectious diseases at the wildlife-livestock interface. The RELU Director gave the closing address drawing out key interdisciplinary research themes on human-wild mammals interactions.

In February RELU sponsored a major meeting of the Northern Rural Network (a network of 750 rural development professionals in the North of England) on the theme of *Understanding Rural Economies*, which was jointly organised with the ODPM's designated Beacon Councils for the rural economy. The event focused on identifying key data sources for rural development and measuring the effectiveness of rural development policies and programmes. It included presentations by RELU researchers and the Assistant Director on the theme of research for evidence-based policies for rural economies.

3.3.4 Programme-level meetings with potential users in the private and public sectors

Formal stakeholder engagement in the programme is multi-faceted. A list of primary stakeholders has been assembled to receive Programme documentation and consultations (see Figure 3). The list currently includes over 60 organisations. Stakeholders on the list have been consulted on the Third Call and received the briefing papers published by the programme.

RELU is advised by a Strategic Advisory Committee (SAC), chaired by Sir Howard Newby, which includes representatives from Defra, Environment Agency, Countryside Council for Wales, Countryside Agency, Scottish Environment Protection Agency and the Joint Nature Conservation Committee. The SAC met on two occasions in 2005.

The Food Chain Forum held two meetings during 2005 at which RELU projects presented their work. The forum includes representatives from Unilever, Food from Britain, Marks and Spencer, Food Ethics Council, Advantage West Midlands Regional Development Agency, Soil Association, Countryside Agency, Countryside Council for Wales, Defra and the BBC.

The People and the Rural Environment Forum was inaugurated late in 2005 and includes members from Scottish Environment Protection Agency, Environment Agency, Royal Institution of Chartered Surveyors, Institute for European Environmental Policy, Joint Nature Conservation Committee, Peak District National Park, Clinton Devon Estates, Association of Rivers Trusts, National Trust, RSPB, YHA, English Nature, UK Water Industry Research, ONE Regional Development Agency and a number of farm businesses.

Meetings were held at programme level with many stakeholder organisations. A series of meetings, for example, were held with Defra in relation to various matters, including design of the Third Call, advice on rural productivity analyses, advice on ageing in rural areas and facilitation of Defra-ESRC research collaborations. Presentations were also made to OECD, the European Commission, EU national agricultural science directors and English Nature.

The call topics and priorities included in RELU's Third Call specification were developed with the Programme SAC and following large-scale consultation with stakeholders and the research community, involving: a web based consultation; a mailing of 1600 RELU researchers and stakeholders; and invited submissions from a further 17 heads of specific government departments, institutes and NGOs.

In 2005 RELU extended its suite of Stakeholder Engagement Plans (SEPs), already covering Defra, UK Water Industry Research and the Scottish Executive Rural Affairs Department, to include the Environment Agency and Welsh Assembly Government. The SEPs specify clear, simple and bespoke terms of engagement between the Programme and key stakeholders and provide a means to secure close and sustained involvement in the Programme. During 2005 SEPs were operationalised through the following activities[1]:

RELU-DEFRA

- Defra making an important financial contribution to the programme.
- Defra providing the programme with key speakers at conferences and workshops throughout 2005. For example, Lord Whitty and Peter Costigan gave keynote addresses, and further presentations were given by Daniel Instone, Philip Andrews and Helen Dunn, to the RELU launch event in Jan 2005. Defra staff also actively participated in the RELU Workshop People and the Rural Environment: Scoping the Research Agenda in May 2005.
- Defra contributing to the management of the programme with Peter Costigan as an active member of the Programme Management Group and observer at RELU assessment panels and John Mills as a member of the Strategic Advisory Committee. Dr Katherine Riggs and Dr Sue Popple (whilst Katherine is on maternity leave) are members of the RELU Food Chain Forum.
- RELU promoting Defra science and innovation documentation and resources in its second and third calls for funding. Two RELU work shadows have also been set up involving RELU researchers with the Defra Catchment Sensitive Farming Team and Pesticides Safety Directorate.
- Further SEP interactions have included: (i) Circulation to Defra of abstracts and details of projects funded under first and second call; (ii) Provision of programme level briefing papers and newsletters to Defra; and (iii) Invitation to Defra staff to contribute to consultation on RELU's third call specification, to which Defra responded with a full submission that helped considerably in drafting the spec.

RELU-ENVIRONMENT AGENCY

- The Agency providing the programme with useful suggestions for speakers at conferences and workshops throughout 2005, including fielding of Bob Harris as a keynote speaker and a presentation by Jonathan Fisher at the RELU launch event in Jan 2005. Agency staff also very actively participated in the RELU Workshop People and the Rural Environment: Scoping the Research Agenda in May 2005, including a keynote presentation by Hilary Aldridge.
- The Agency contributing to the management of the programme with representation by Mike Depledge on the Strategic Advisory Committee and Bob Harris as an observer at RELU assessment panels. Paul Woodcock, Regional Director of the Environment Agency (East of England) is a member of the RELU People and the Rural Environment Forum.
- RELU promoting Agency science and research resources in its second and third calls for funding. A work shadow has also been set up involving a RELU researcher and the Environment Agency Land Quality Division.
- Further SEP interactions during the year have included: (i) Circulation to the Agency of abstracts and details of projects funded under first and second call; (ii) Provision of programme level briefing papers and newsletters to the Agency; (iii) and invitation to the Agency to contribute to a consultation on RELU's third call specification.

[1] The Welsh Assembly SEP was established in the middle of 2005 and will be reviewed in the next annual report.

RELU-SEERAD

- SEERAD making an important financial contribution to the programme.
- SEERAD providing the programme with useful suggestions for speakers at conferences and workshops throughout 2005, including fielding of Andrew Moxey to provide a keynote address to the launch event in Jan 2005, and suggestions for speakers for the annual conference in 2006.
- SEERAD contributing to the management of the programme with Linda Pooley as an active member of the Programme Management Group and an observer at RELU assessment panels.
- RELU promoting SEERAD's report 'Research needs generated by key Scottish Strategies' in its second and third calls for funding.
- Further SEP interactions have included: (i) Circulation to SEERAD of abstracts and details of projects funded under first and second call (and subsequent notification to projects of SEERAD interest in learning of key outputs); (ii) Provision of programme level briefing papers and newsletters to SEERAD; (iii) Invitation to SEERAD to contribute to consultation on RELU's third call specification, to which SEERAD responded with a full submission that helped in drafting the spec; and (iv) SEERAD communicated internally its involvement with the programme through a newsletter to its Science and Research Groups.

RELU-UKWIR

- UKWIR contributing to the management of the programme with Mike Farrimond to be a member of the RELU People and the Rural Environment Forum and with UKWIR to sponsor meetings of the Forum. UKWIR also provided suggestions for membership of the Forum.
- RELU promoting the UKWIR ADAPT data base in its second and third calls for funding.
- Further SEP interactions have included: (i) Circulation to UKWIR of abstracts and details of projects funded under first and second call; (ii) Provision of programme level briefing papers and newsletters to UKWIR; and (iii) Invitation to UKWIR to contribute to consultation on RELU's third call specification.

Figure 3: Formal Stakeholder Engagement in RELU

Stakeholder	Stakeholder Engagement Plan established	Representation on Programme Management Group or Strategic Advisory Committee	Representation on national stakeholder forum	Representation on Assessment Panel (as observer[b] or assessor)[c]	Targeted consultee in shaping call for proposals[d]	Attendee at Programme Conference or Workshop
A. West Midlands Regional Dev't Agency			√			
Action with Communities in Rural England					√	
Agri-food Partnership			√			
Association of National Park Associations						√
Association of Rivers Trusts			√			
BBC			√			
British Potato Council					√	
Central Science Laboratory						√
Clinton Devon Estates			√			
Country Land and Business Association					√	√
Countryside Agency		√	√	√	√	√
Countryside Council for Wales		√	√		√	√
Dept for Environment Food and Rural Affairs	√	√	√	√[b]	√	√
Dept of the Environment Northern Ireland						√
Diane McCrea (food consultant)				√		
Eastbrook Farm Organic Meat (organic farmer)			√			√
Elm Farm Research Centre						√
English Nature			√		√	√
Environment Agency	√	√	√	√[b]	√	√
Finnish Environment Agency				√		
Food Chain Centre						√
Food Ethics Council			√		√	
Food from Britian			√			
Food Standards Agency				√[b]		
Forestry Commission					√	√
Game Conservancy Trust						√
Henley Centre (futures / marketing consultancy)			√			
Home Grown Cereals Authority					√	

Ian Brown (diversified tenant farmer)			√			
Institute for European Environmental Policy			√			
Institute of Food Research						√
International Inst' for Environment & Dev't			√			√
Joint Nature Conservation Committee		√	√	√	√	√
Land Use Policy Group					√	√
Leckford Estate				√		
Marks and Spencer			√			
National Consumer Council						√
National Farmer's Union					√	
National Trust			√		√	
One North East Regional Development Agency			√			
P.C. Tinsley Ltd (cereal/vegetable farmer)			√			√
Peak District National Park			√			
Pembrokeshire Fish Farms			√			
Royal Agricultural Society for England					√	
Royal Institute of Chartered Surveys			√			
Royal Society for the Protection of Birds			√			
Royal Soc. for Protection of Cruelty to Animals						
Rural Development Service						√
Scottish Environment Protection Agency		√	√	√	√	
Scottish Executive Rural Affairs Department	√	√		√[b]	√	√
Scottish Natural Heritage					√	√
Scottish Water					√	
Sustainable Development Commission					√	
Swedish Environment Agency				√		
UK Water Industry Research	√		√		√	√
UNESCO						√
Unilever			√			
Water UK						√
Welsh Assembly Government	√		√		√	√
Wessex Water Company			√			
Youth Hostel Association			√			

c - Many stakeholders were also engaged in refereeing research applications; d - Open consultations also took place, including warm up events around RELU's first call for proposals and web consultations for the second and third. For the third call a mailbase of 1600 members was consulted.

3.3.5 Assessment of relevance of the research to user priorities and potential impact on policy and practice

Analysis of the First Call projects shows that the Programme is providing insights of relevance to key policy domains, notably water management, sustainable farming and food, rural development policy, biodiversity and landscape protection policy. Examples include:

Sustainable Food and Farming

- Professor Wyn Grant and his team (RES-224-25-0048, *Alternatives to Chemical Pesticide Inputs in the Food Chain: An Assessment of Environmental and Regulatory Sustainability*) prepared a detailed submission to the consultation on the draft national pesticides strategy of the Pesticides Safety Directorate. The PSD has welcomed the RELU projects external review of their work in the area of biopesticides (see Annex A).
- Prof Gareth Edwards-Jones (RES-224-25-0044, *Comparative Assessment of Environmental, Community and Nutritional Impacts of Consuming Fruit and Vegetables Produced Locally and Overseas*) was invited to several high-level strategic meetings to brief Unilever on the implications of the RELU research (see Annex A).
- Dr David Little and his team (RES-224-25-0066, *Warmwater Fish Production as a Niche Production and Market Diversification Strategy for Organic Arable Farmers with Implications for Sustainability and Public Health*) are advising the Soil Association on the development of organic standards for the aquaculture industry. They also exhibited their project at the European Seafood Exposition in Brussels in April.
- Professor Richard Shepherd (RES-224-25-0090, *Integration of Social and Natural Sciences to Develop Improved Tools for Assessing and Managing Food Chain Risks Affecting the Rural Economy*) was invited to brief the Consumer Exposure Team of the Food Standards Agency.
- Various RELU projects are engaging strategically with the team in Defra charged with establishing its new observatory on CAP and the rural environment.

Landscape Conservation Policy

- Professor Paul Selman (RES-224-25-0119, *Landscape as an Integrating Framework for Rural Policy and Planning*) was invited to present his research findings to the Countryside Council for Wales and to brief the Countryside Agency, English Nature and the Rural Development Service in the run-up to their merger to form one integrated organisation, Natural England.
- The research by Dr Klaus Hubacek and his team (*RES-224-25-0088, Sustainable Upland Management for Multiple Benefits*) has provided an in-depth case study for Defra in its review of the *Heather and Grass Burning Code*. Defra have described the submission as 'very useful … an excellent snapshot of opinion … The multi-disciplinary approach has paid off.'

Rural Policy

- Early work from the Programme is helping inform the UK debate and position on the future of the CAP. In 2005 the programme was involved with the Institute for Public Policy Research in a seminar in Brussels to brief officials in the European Commission.

Animal Disease Planning

- RELU's approach to research has encouraged Defra in understanding the desirability of incorporating interdisciplinary perspectives into the evidence base for the management of animal diseases. Defra is putting additional funding into the Third Call for the Programme which will, as a very novel departure, specifically feature interdisciplinary work on the management of animal and plant diseases.

Research Policy

- RELU has pioneered the first cross-council data management service as well as funding projects exploring methods for combining social science and natural science data and analysis at different spatial scales. This is paving the way for integrated data management systems as well as developing powerful tools for research and decision making on human-environment interactions.
- RELU has helped to promote interdisciplinarity in a number of contexts, including the EU's Seventh Framework Programme, Defra's Science and Innovation Strategy and the Environment Research Funders' Forum.

The Director of the programme has been able to inform key policy circles of the importance of the Programme through his membership of the following fora: Countryside Agency (Board Member), including its operating division the Commission for Rural Communities (Board Member); English Market Towns Advisory Forum (Chairman); English Nature's Socio-Economic Advisory Group (Member); and Defra's Science Advisory Council (Member).

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 science, bio-science and environmental science communities. The following activities took place in 2005 to achieve this objective:

3.4.1 Interdisciplinary studentships

RELU has its own studentship scheme which is open, within each of the three Calls, to applications competitively from the big research projects. The rationale is that research students will benefit from being associated with these major interdisciplinary endeavours and the diversity of scientific expertise and research experience they have to offer. The scheme has been modelled on the successful NERC/ESRC postgraduate scheme. In assessing the proposals, particular attention is given to the quality and integration of the research training and supervision. 5 studentships were allocated under the First Call and began their work in 2005:

- Mary Fredlund, *Sustainability and Animal Welfare*, Unversity of Exeter
- Alison Hodge, *Knowledge for Environmentally Sustainable Agriculture: Farmers, Scientists and Food Retailers*, University of Exeter
- Elizabeth York, *Evaluating Farmer Perceptions to the Environmental Cost of Local Versus Overseas Food Production*, University of Wales, Bangor
- Paul Cross, *Assessment of the Individual and Social Costs and Benefits of Pesticide Use in Horticultural Systems in the UK and Kenya*, University of Wales, Bangor
- Alan Poots, *Modelling Inter-relationships between Biodiversity, Land Use and Landscape: Quantifying Ecological and Economic Value of Land Use Patterns in the Chilterns*, University of Reading.

Studentships applications linked to Second Call research project proposals were also assessed in 2005, with 6 studentships awarded and to begin their work in 2006.

3.4.2 Training activity

On an ongoing basis RELU projects are considered to offer fertile ground for on-the-job training and work experience for research staff, familiarising them with different methods and techniques as well as with interdisciplinary project management. The training and research career development experience provided by projects are a specific element of project assessment and monitoring. In 2005 a number of programme level training activities were also organised:

- Training workshops were organised on 'Interdisciplinarity' and 'Integrated Data Management' at the Programme Conference in January 2005. Every RELU researcher attended the sessions.
- Projects were encouraged to take part in generic Research Council Training Events, including ESRC's 'Getting Research into Practice' sessions. Several RELU projects took up this training in 2005.
- Training workshops are being planned for the January 2006 Programme Conference on themes of Qualitative and Quantitative Research Methodologies; Pursuing the Public Interface; and Integrating Spatial Data. A specific workshop is being planned to scope RELU's training agenda.
- The programme has commissioned a review of RELU's training agenda. This will be undertaken by the team responsible for the evaluation of the NERC/ESRC postgraduate scheme.

3.4.3 Work shadowing placements

In 2005 the programme developed and launched an innovative stakeholder work shadowing scheme. The scheme involves researchers in short term placements with stakeholder organisations, raising their awareness of the policy and practice context for their research. The scheme was opened to large First Call research projects in 2005. At the end of the year work shadow arrangements were being developed with, inter alia, Defra's Catchment Sensitive Farming Team, the Environment Agency, Land Quality Division, the Health Protection Agency, the Pesticides Safety Directorate and the Food Standards Agency.

3.4.4 Building science capacity

There is evidence to suggest that RELU's introduction of specific funding mechanisms to build interdisciplinary capacity is producing benefits. Evidence for this is provided by the fact that 4 out of 16 bids to the Second Call were successful that involved teams from Scoping Studies, Capacity Building Awards, Development Activities or Networking Awards funded under the First Call. Bids from these teams had more than double the success rate of bids that had not benefited from this supported preparatory activity. A review of these mechanisms is proposed for 2006.

3.5 Data collection and management

During the year activities of the RELU Data Support Service (DSS) got underway. The service, which implements the first joint-research council data management policy, involves collaboration between specialist ESRC and NERC data staff and is setting new precedents for integrated management of environmental and socio-economic data sets. In

2005 the DSS provided a telephone and email help desk to RELU applicants and award holders; developed a web-based portal giving expert guidance on data management; developed web based metadata on RELU datasets; and ran a series of training events for RELU award holders. The DSS liaised closely with the Director's Office in approving the data management plans required at the outset from each project. RELU data management is advised by a sub-group of the Strategic Advisory Committee which met on two occasions during 2005. The sub-group reviewed the activity of the DSS at the end of 2005 and recommended continuation of the service for the remainder of the programme. The funding for this activity comes directly from the Research Councils.

3.6 Programme management

3.6.1 Expenditure on networking communication activities among investigators

Key items of expenditure include: £37,800 on the January Conference, £8,300 on the Workshops and Principal Investigator meeting, £5,900 on networking/liaison meetings and £2,300 on Research Council meetings.

3.6.2 Programme management and project oversight

The Director's Office continued to implement its system of Project Communication and Data Management Plans (PCDMPs) which provides a basis for quality assurance within the Programme. PCDMPs were received for all the large First Call research projects early in 2005 and subsequently evaluated by the Director's Office and Data Support Service. Monitoring of the PCDMPs is operationalised through a project data base system which tracks project progress against planned activities.

The PCDMPs also form a basis for discussion with projects at project visits. Bilateral meetings, aimed at discussing early project progress and encouraging inter-project collaborations and synergies, were held with all 8 of RELU's large food chain research projects. The half day meetings took the form of a discussion with the principal investigator concerning overall progress and any difficulties, followed by a mini-workshop comprising all project investigators, researchers and PhD students on the progress of the project. A resource pack was prepared for each visit and an explicit focus was placed on identifying synergies with other RELU projects and engagement of project researchers in programme-level planning.

3.6.3 Programme meetings

Three programme-level meetings took place during the year:

Annual Conference: Rural Economy and Land Use: The Challenge for Research, 19-21 Jan 2005
RELU held its major research launch conference 19-21 January 2005 in Birmingham. Lord Whitty, Defra's Minister for Farming, Food and Sustainable Energy opened the conference. A panel discussion, chaired by Sir Howard Newby, Chair of RELU's Strategic Advisory Committee and Chief Executive of HEFCE, involving the Chief Executives of ESRC (Prof Ian Diamond), BBSRC (Prof Julia Goodfellow) and NERC (Prof Sir John Lawton) on the theme: 'Why Interdisciplinary Research: The Challenges and the Obstacles' concluded the conference. The conference brought together 125 scientists and representatives from rural organisations as potential users of the results of the research,

including farmers, environmentalists, consumers and rural development groups. In his opening address to the conference, Lord Whitty stated:

"How the rural economy and natural environment are linked is a fertile area for research which can help us to develop a more sustainable approach to rural development. The challenge is to increase collaboration between natural sciences and social sciences - we have great strengths in both of these, but we require greater integration. RELU's emphasis on this fits very well with Defra's increasing focus on a strong evidence base for policy development and delivery. I congratulate the Research Councils on this important initiative and I hope that by working together we can maximise the opportunities that RELU offers."

The conference was widely considered a great success in building a community of researchers and stakeholders around the programme. The main components of the conference included:

- A day of high profile keynote addresses, including presentations from major stakeholders such as Defra, UNESCO, National Food Chain Centre, SEERAD, Centre for Novel Agricultural Products and the Environment Agency.
- A series of Policy Workshops, led by policy stakeholders, involving briefings on policies and identification of research needs. An aim of the sessions was to raise awareness among RELU researchers of some of the key policy contexts in which the Programme is operating. Four Policy workshops were organised on the Water Framework Directive, Biodiversity and Land Use, CAP Reform, and UK Food Policy.
- A series of Data Management Workshops led by the RELU Data Support services exploring the data management support needs and responsibilities of projects.
- A series of Interdisciplinary Workshops, exploring the opportunities for and ways of overcoming obstacles to interdisciplinary working.
- Two mini-conferences involving presentations from RELU Food Chains research projects and 'People and the Rural Environment' projects.
- A plenary debate on the lessons of interdisciplinary research drawing on the experience of international research programmes.
- A plenary session involving the debate on interdisciplinarity "*Why Interdisciplinary Research: The Challenges and the Obstacles"* between the three Chief Executives.

Participants uniformly praised the Conference: its various facets were judged of good or excellent quality by the large majority of attendees: including handouts (90%); the organisation of the event (96%) and the overall quality and value of the conference (95%).

RELU Workshop: People and the Environment: Scoping the Research Agenda, 18 May 2005

The Rural Economy and Land Use Programme held a workshop on "People and the Environment: Scoping the Research Agenda" at King's Manor, University of York. The purpose of the workshop was to give an overview of the achievements of the scoping studies, capacity building awards and development activities (the People and the Rural Environment projects) funded under RELU's first call. The meeting was convened jointly with the Land Use Policy Group, which coordinates the research and analysis on land use and the rural environment of all of the UK's conservation, environmental and countryside agencies. The 14 papers presented were synoptic presentations that addressed key analytical themes within RELU, including: integrated perspectives on sustainable catchment management; managing stressed environments; integrating spatial data on rural economy and land use; scale effects in the management of biodiversity and landscapes; landscapes as a focus for integrating human and environmental processes; simulation

modelling and its role in land use decision making; user engagement in research and knowledge transfer; and implications of interdisciplinarity in RELU.

The meeting involved active participation by all attendees. One academic and one senior stakeholder acted as discussants on each of the presentations to offer comments and help stimulate discussion. We also introduced an element of peer review. Members of the audience were invited to grade the presentation poor/fair/good/very good and give comments on "What were the main strengths?" and "Do you have any suggestions for how the paper could be improved?". These comments were fed back to the researchers. A selection of papers was subsequently chosen to contribute to the RELU special issue of *Journal of Agricultural Economics* (see 3.3.2).

81% of the delegates considered the quality of organisation for the workshop as good or excellent. 100% thought that the RELU research which was presented was relevant to policy and practice.

RELU Principal Investigators Meeting, 12th October 2005, Newcastle
RELU Second Call Principal Investigators (PIs) met to discuss programme-level issues and synergies and to help plan future initiatives. PIs were introduced to RELU's data management and communication plans, stakeholder engagement intentions, requirements of award holders and the responsibilities of projects to the wider programme. During the meeting PIs helped to plan future RELU Programme activities, including planning of the January 2006 conference, and explored synergies and linkages with other projects. All 11 Research Projects offered awards under the second call were present.

Other RELU workshops

Individual research projects ran over 20 workshops during 2005 which engaged a wide range of stakeholders (see Table). In addition two further workshops, which involved several RELU research projects, were sponsored by the programme:

- Northern Rural Network "Understanding Rural Economies", February 2005, York.

- Mammal Society's Autumn symposium, "Wild mammals and the Human Food Chain", November 2005, London.

REU Project workshops

Project	*Workshop*
RES-224-25-0003	RELU Project Workshops "A cross-disciplinary methodology to promote an holistic understanding of diffuse pollution issues in rural environments". - Workshop 1, 8-9 September 2004, "The Groundwater Dimensions to the Diffuse Pollution Issue: Challenges for Interdisciplinary Research", Kings College, Cambridge. - Workshop 2, 13-14 September 2004, "Delivering a Better Rural Environment: Challenges for Interdisciplinary Research on Diffuse Pollution Issues in Upland Catchments", Buckden, Wharfedale, North Yorkshire. - Workshop 3, 18-19 October 2004, "Challenges for Interdisciplinary Research on Diffuse Pollution Issues in Lowland Agricultural Catchments Exhibiting Eutrophication", Slapton, Devon. - Workshop 4, 1 November 2004, "Delivering a Better Rural Environment: Challenges for Interdisciplinary Research on Diffuse Pollution Issues", Linacre College, Oxford.
RES-224-25-0018	RELU Project Workshop, April 2005, Imperial College London "Large Scale Investigations in Ecology and Rural Land Use".
RES-224-25-0031	RELU Project Workshops "Building Networks: Exploiting Options for the Eastern US and Nearby European Continent" - Stakeholder Workshop 1, 16-17 November 2004, Imperial College London. - Stakeholder Workshop 2, 10-11 May 2005, Imperial College London, Wye Campus.
RES-224-25-0037	RELU Project Workshop, May 2005, University of York, "Data Integration". Workshop hosted by the Data Resources Scoping Study and the RELU Data Support Service.
RES-224-25-0039	RELU Project Workshop, 7th December 2004, "Understanding Loweswater: A Study to Generate New Understandings of Ecological, Economic and Social Interactions in a Lake District Environment" Kirkstyle Inn, Loweswater.
RES-224-25-0042	RELU Project workshops "Developing an Interdisciplinary Approach to Address Environmental and Social Issues Resulting from Changes in Land Use" - Workshop 1, 30 November 2004, LDNP Visitor Centre, Brockhole, Windermere. - Workshop 2, 22 March 2005, Lancaster Environment Centre.
RES-224-25-0066	RELU Project Workshop for Science Week, March 2005, Stirling, "Where Does my Seafood Come From?"
RES-224-25-0088	RELU Project Workshop: Focus group; stakeholder meeting, 6 June 2005. "Sustainable Upland Management for Multiple Benefits"
RES-224-25-0091	RELU Project workshops "Analysing Visual Quality in Relation to Landscape Change Scenarios: An Assessment of the Requirements" - Stakeholder workshop, 6 October 2004, Macaulay Institute. - Stakeholder workshop, 28 January 2005, Edinburgh.
RES-224-25-0107	RELU Project workshops: "Soils - the Foundation of the Rural Economy?", Early Summer 2005, a series of regional workshops in Ayr, Aberdeen, Newcastle, Harper-Adams, Okehampton and Rothamsted.
RES-224-25-0110	RELU Project Workshops (as part of the January 2005 RELU conference, 20 Jan 2005), "Exploring Routes to Interdisciplinarity", for the project "Calming Troubled Waters: Making Interdisciplinarity Work"
RES-224-25-0113	RELU Project Workshop, February 2005, University of Oxford, "Learning from the South: Mixed Farming in Stressed Environments".
RES-224-25-0119	RELU Project Workshop, May 2005, University of Sheffield, "Landscape as an Integrating Framework for Rural Policy and Planning".

3.6.4 Advisory committee meetings

The Director's Office provided briefing, advice and background analysis for: two assessment panel meetings; two meetings of the RELU Strategic Advisory Committee; two meetings of the RELU Management Advisory Group; and two meetings of the RELU data management sub-group.

Ad hoc advice of the Director's Office was given to the Research Councils on several matters throughout the year, including the structuring of application forms, suggestions for referees, guidance for assessors, the format for end-of-award reporting, and the process for assessment of concept notes under the Third Call.

3.7 Added-value

3.7.1 Synergy between research projects

The Director's Office has undertaken several initiatives to add value and develop synergies between projects. Project visits (section 3.6.2) and programme-level meetings (section 3.6.3) have played an important role in exploring and encouraging synergy between projects.

Two sessions at the January 2005 Annual Conference were planned jointly by the Food Chain projects. The first included short presentations from all the projects to introduce themselves to other RELU researchers. In the second session papers addressed a number of cross-cutting themes including integrated food chain research; governance (ownership, policy and regulation), people (consumers, economics and communities) and the environment and land use. Two sessions were also planned by First Call scoping studies, capacity building awards and development activities, around the theme of people and the rural environment. This was based on a mental map of projects which was drawn up by the Director's Office and circulated, to stimulate inter-project linkages and collaborations. Those who spoke at the conference were asked to draw upon contributions from related projects around key RELU themes.

At the May Workshop '*People and the Environment: Scoping the Research Agenda*' synoptic presentations were also used in identifying inter-project synergies. Some papers were themselves jointly authored by researchers from several projects (section 3.6.3).

At the gathering of second call Principal Investigators in October, a specific focus was placed on exploring inter-project linkages. Breakout groups at the workshop were organised around project clusters and each was tasked with identifying commonalities and synergies, and possible scope for joint or programme-wide activities.

Various joint activities have followed from these various initiatives. For example, an effective working relationship has been orchestrated between RELU projects which, from different perspectives, are focusing on issues of the availability, management, and integration of statistical data on rural economy and land use. The projects worked closely together and organised a programme workshop in 2005 on the theme of Data Integration. A joint-project planning meeting was held between two of the major First Call projects addressing the theme of bio-pesticides (RES-224-25-0048 and RES-224-25-0093). A joint launch was planned (for 2006) by two of the Second Call projects (RES-227-25-0001 and RES-227-25-0028). A joint special issue of a journal is being prepared, including a number of inter-project articles (section 3.3.2).

3.7.2 International visitors

Several RELU projects have been successful in attracting international visiting researchers to comment and add comparative perspectives to their research. In addition, at programme level, during 2005 RELU made a successful application to the competitive ESRC-SSRC

Visiting Fellowship Scheme. Professor Clare Hinrichs from Pennsylvania State University has been awarded a fellowship to study the "Relocalization of agri-food systems in USA and UK". She brings more than 15 years of involvement with US state-level, regional, national and North American research in this area. Prof Hinrichs will be working through extended visits with four RELU food chain project teams in 2006. Supported by the fellowship, she will contribute to growing cross-national dialogue and new collaborative inquiries about the critical structures, responses and impacts associated with agri-food system relocalisation. The ESRC/SSRC Visiting Fellow will provide valuable opportunities to compare research questions and emerging findings regarding transnational changes in agri-food systems; and to build international research links.

3.7.3 Enhanced capacity to interact with and influence practitioners and policy makers

RELU's Communication Plan emphasises continuous and extensive engagement of stakeholders to ensure their active involvement and interest in shaping the Programme through all its stages. Key activities in 2005 included:

- Holding two meetings of the RELU Food Chain Forum and inaugurating the RELU People and the Rural Environment Forum.
- Organisation of a series of policy workshops aiming to introduce RELU research to the policy context for their research.
- Operationalising RELU's suite of stakeholder engagement plans.
- Organisation of an extensive consultation on the programme's Third Call specification.
- Arranging a series of RELU workshops and events with an explicit focus on the interaction between stakeholders and RELU researchers.
- Producing and distributing RELU publications, newsletters and maintaining an up to date website.
- Establishing a RELU work shadowing scheme to raise understanding among RELU researchers of the policy and practice context for their work.
- Preparations for RELU's Annual Conference 2006 which will address the theme of *Enabling Knowledge Exchange*.
- Preparation and wide circulation of a discussion paper to stimulate a debate within the RELU community about approaches to knowledge transfer.

(4) Progress of projects

29 projects (including 2 large research projects) started in 2004 prior to the reporting period. 6 large research projects and 5 PhD studentships started in 2005. 11 large research projects commissioned under RELU's Second Call for proposals will commence their research in 2006. 27 Capacity Building Awards, Scoping Studies and Development Activity awards completed their work in 2005.

£5,700 was spent on project visits during 2005. All 8 of RELU's large First Call research projects received on-site visits by the Director's Office during the year (see 3.6.2). A meeting was also convened with all 11 RELU project award holders offered conditional awards under RELU's Second Call (see 3.6.3).

4.1 Big Research Projects (up to circa £1 million)

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

This project is examining how environmental conservation of grasslands can be maintained and encouraged by linking it with the production and marketing of high quality food. The project is working closely with a number of initiatives managing semi-natural grassland, as well as with specialist producers and suppliers of animals raised on biodiverse vegetation.

The project has achieved its objectives for the first year: to compile and maintain an extensive literature review in the fields of biodiversity management of grazing land, the relationship of grassland composition to animal health and food quality, grassland management practice, local foods, indicators of food quality, consumer perceptions of food quality and so on. It was able to create an extensive list of lamb farms that use natural grassland grazing sites and commercialise the meat according, using contacts and searches. From this list, a sample was drawn up and interviews and surveys carried out on 12 lamb farms across two biodiverse grassland types (salt marsh and heath/moorland). At each farm, details of grazing management was obtained as well as information on the farm enterprise and its place/role in the lamb food chain. Ecological ground surveys were carried out on selected sites from the grazing pasture to determine the species composition of the area grazed by the lambs. A selection of lambs were purchased from sample farms and were slaughtered, under strict conditions, at the University of Bristol facility whereupon meat samples were taken and analysed for the relative presence of a number of key 'quality' indicators. The samples were than compared with a control sample obtained from the conventional food chain. Samples of the meat were also subjected to taste panels. The results of these different interdisciplinary strands of the lamb survey are currently being brought together in a 'Lamb Report', due for completion at the end of February 2006. In parallel to the lamb survey, an extensive list of beef and dairy farms is also being drawn up prior to interviews being started in March 2006. The beef farms have been selected by natural grazing habitat and by breed.

Also in parallel to the lamb survey, a sample farm of relevant land managing agencies and bodies who play a role in the management and/or regulation of biodiversity in the areas covered by the farms investigated has also been compiled and interviews with land

managers, conservation bodies and other interested organisations are currently being carried out.

A decision was taken at the 6 month meeting of the team to pursue the lamb sector as a single case study (rather than carrying out the lamb survey in parallel with the beef and cheese surveys). This enabled the team to test the interdisciplinary methodology and to obtain results within the first 12 months of the 30 month research project. During the course of the first year, the team visited a team of French researchers in Chambery who are engaged on similar research in the French Alpes. This was a rewarding exchange and a follow up is planned in the Massif Central later in the second project year. The team has met with a number of stakeholders in the South West of England and has undertaken a one-day visit to the Culm Grasslands with local stakeholders. A regional stakeholder forum is being planned for Spring 2006.

RES-224-25-0044, Prof G Edwards-Jones, University of Wales, Bangor
01 Dec 04 – 30 Nov 07
Comparative Assessment of Environmental, Community and Nutritional Impacts of Consuming Vegetables Produced Locally and Overseas

The research project is comparing local and imported vegetables for their social costs, carbon budgets, consumer acceptability, and health impacts. Field work is being carried out in Kenya, Spain and the UK with a variety of vegetables, including beans, peas, brassicas, leafy/salad vegetables, potatoes and onions.

The environmental costs of the greenhouse gases produced during growth and transport of the crops as well as downstream costs of production, transport (food miles) and storage are being brought together in a Life Cycle Analysis (LCA) of vegetables from different sources. This will help determine which system has the lowest environmental impacts. Sociological field work is also examining the local food cultures of different regions in the UK as well as consumer perceptions of health benefits of local and imported vegetables. A case study in Anglesey will help determine the advantages and disadvantages, environmentally and socially, of increasing local production of vegetables.

After overcoming a number of early setbacks in the project, good overall progress has been made in the first year. Data collection routines for the natural science components of the project have been established and are working well. The sociology work package has progressed well with the successful completion of the planned focus groups. The health economics component has been delayed, but rescheduling will allow successful completion in 2006.

There are no extensive results at this stage, however early results suggest that issues of food sourcing are far more complicated than simply 'food miles', and that the purchasing pattern of consumers can have major implications both for the climate and for local economic development and poverty alleviation in developing countries. Following a presentation at the RELU Food Chain Forum in March 2005, the project has achieved high level interaction with Unilever.

RES-224-25-0048, Prof WP Grant, University of Warwick
01 Nov 04 – 31 Oct 07
Biological Alternatives to Chemical Pesticide Inputs in the Food Chain: An Assessment of Environmental and Regulatory Sustainability

The project is based on insect pathogenic fungi, which 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, although little work has been done on their environmental sustainability. The project is also 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.

The project has fulfilled the objectives specified for the first year. The principal actors in the pesticides policy community have been identified and their roles and interrelationships examined. A start has been made in identifying inadequacies in the current system of regulation at both UK and EU levels. The parameters of the Danish regulatory system have been analysed using Danish government reports and other documentation prior to a research visit to Denmark in spring 2006. The relationship between habitat type and biodiversity at the sub-species level has been researched for naturally occurring populations of entomopathogenic fungi by collecting soil samples from a variety of locations. Molecular methods have been used to characterise fungal infraspecific diversity. The effect of land use on the natural occurrence of populations of entomopathogenic fungi within an agroecosystem has been quantified.

The project's Pilot Scheme for biopesticide registration has been welcomed by the IBMA and by firms in the industry. The Pesticides Safety Directorate (PSD) also see this as a project from which they can learn. The project submitted a detailed response to the draft national pesticides strategy of the Pesticides Safety Directorate.

The project has highlighted a continuing problem, which is persuading the small and medium-sized firms producing these niche biopesticide products to contact PSD early enough to take advantage of the help available through pre-submission meetings, which would prevent firms from making avoidable errors in their data collection and trial procedures. The United States has had more success in registering biopesticides. In part this may be because of the absence of a general efficacy requirement, but this is not transferable to the UK because of existing legislation. The project is drawing attention to the need for refinement to the system of mutual recognition in the EU, whereby a product approved by a member state needs to be approved in all states, with indications that the process is not working at the moment and careful changes are needed to help this work properly.

Through work in the project: Pesticides Safety Directorate has welcomed an external review of how they carry out their work in the area of biopesticides; the Environmental Protection Agency (US) welcomed the opportunity for an ongoing comparison of regulatory practice in the UK and US; and growers and manufacturers of biocontrol products have welcomed the exploration of changes in the regulatory system that might make alternative products more readily available.

The project has secured Funding from the British Academy for a workshop on interdisciplinarity which will take place in 2006.

RES-224-25-0066, Dr DC Little, Stirling University
03 Jan 05 – 31 Dec 07
Warmwater Fish Production as a Niche Production and Market Diversification Strategy for Organic Arable Farmers with Implications for Sustainability and Public Health

This project aims to develop technical guidelines for a sustainable system for tilapia culture as a potential diversification strategy for farmers in the UK. A comprehensive analysis of the practicality, sustainability and viability of the system is being gained through laboratory and on-site investigations and trials with two commercial partners

Overall progress of the project has been good. In addition to exploratory technical trails in Thailand being well underway and achieving interesting preliminary results. The trial provided basic insights into the most effective way to set up the system in order to optimise fish and system performance. Follow on trials have been designed and are currently being implemented at Stirling University and with the project's commercial partner in Devon. The project design partner in Scotland has been involved in the design of approaches to control floc level in AST tanks. A good deal of preparatory work has been undertaken with stakeholder groups and to understand market potential and health implications.

The project has gained valuable networking, and understanding of perceptions and attitudes towards the health and environmental implications of consuming fish as well as awareness of tilapia amongst different UK ethnic groups via interviews and presentations at the Edinburgh Mela, 3rd & 4th September 2005 and the Bangladesh Expo, 14-17th September 2005, as well as with fishmongers and consumers at Billingsgate fish market and consumer focus groups in Edinburgh. An exhibition by the project at the European Seafood Exposition, Brussels, April 2005, discussed the RELU project with exhibiting producers, processors, prospective buyers and related trade groups concerned with sustainable fish production, such as the Marine Stewardship Council.

Organic certification bodies, particularly the Soil Association, have shown interest in the research. Appropriate guidelines for organic certification of many farmed fish are still under development. The project is working on advising on a sustainable tilapia culture system as a candidate for organic certification.

RES-224-25-0073, Prof B Traill, University of Reading
01 April 2005 - 30 April 2008
Implications of a Nutrition Driven Food Policy of Land Use and the Rural Environment

Common Agricultural Policy reform is shifting farm policy away from traditional production support; meanwhile concern with diet-health relationships will move nutritional goals to the policy front-line, with major implications for food demand and land use. This project draws on a unique set of disciplines - economics, psychology, ecology, crop science, animal science and human diet and health - 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.

Soft fruit (strawberries, blueberries and raspberries) and lettuce are increasingly grown in polythene tunnels. The research team are assessing the extent to which new ultra-violet transparent films enhance the levels of phytochemicals, known to have antioxidant (cancer

protecting) properties, in these crops. In addition, it is well known that milk and meat from grass-fed animals have a lower proportion of saturated fat and more of the beneficial n-3 fats than animals fed concentrates. The team are testing the hypothesis that more biologically diverse pastures for cattle will enhance these effects.

However, there is also the question of whether consumer demand exists for these products. The research is investigating consumers' attitudes towards and their willingness to pay for such healthier foods, as well as their response to possible policy interventions to promote healthy eating. The results will allow assessment of the potential benefits to consumers and public health and the impacts on the rural landscape.

Progress has been good. In examining the growth of soft fruit in polythene tunnels, the first year crops were later in starting than was desirable, because of the timing of the project start. However by concentrating on strawberries in the first year results were obtained. It has been shown that the anthocyanin content increases with ripening, and that the ellagic acid content decreases with ripening. No differences have been detected in the levels of phytochemicals at the point of harvest for the first crop of strawberries grown under the different plastics, at least for the commercially important Elsanta variety of strawberries. Fruit yields and vegetative development of strawberry have been shown not to be greatly affected by the nature of the plastic.

In addition, four consumer focus groups were conducted at the University of Reading during June 2005. The aim of these was to examine consumers' attitudes to, and willingness to pay for, local, national and imported foods. Overall, the focus groups demonstrated that participants could clearly distinguish between local, national and imported foods both geographically and in terms of their defining attributes. Specifically, local foods were perceived to be of better quality and 'fresher' than national or imported foods; but were limited in terms of having less variety and choice than foods that were imported. Moreover, it was established that local foods were rarely purchased among our sample due to their perceived lack of availability, inconvenience and higher prices, despite a wish to support local producers. Overall, the participants felt that other members of society were less interested in issues relating to country of origin than they were, with the exception of older people who were judged to be more sensitive to and more willing to purchase local foods. Finally, although most participants currently bought few local products, many expressed a willingness to buy more in future if certain barriers such as perceived inconvenience were removed.

The project have established a stakeholder Group representing a range of food chain actors and nutritionists from government, industry, trade associations and NGOs. A successful first meeting was held in November 2005.

RES-224-25-0086, Dr D Chadwick, IGER, North Wyke
01 Feb 2005 - 01 Sept 2008
Sustainable and Holistic Food Chains for Recycling Livestock Waste to Land

Dairy and beef farmers provide consumers with reliable sources of milk and meat, but the animal waste generated poses environmental and social risks. 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.

Research to date has focussed on determining current management practices and farmer attitudes to and reasoning behind manure and livestock management in the Taw catchment. To this end, a questionnaire has been designed and will be evaluated during on-farm interviews of up to 100 farmers in the catchment. The questionnaire will deliver mainly physical information on livestock and manure management, farm size, cropping, soil type, field slopes etc. and will be used to generate indicators of risk of FIO transfers from source to watercourse. The questionnaire will be followed up with a more detailed social science interview on a selected sample of farms. A leaflet has been designed to encourage farmer engagement. In addition, 10 farms have been identified for targeted monitoring of FIO flows, and the first non-farmer stakeholder meeting took place in December 2005. This was a successful first event and generated interest in various parties (e.g. Environment Agency, NFU, Regional Development Agency) in addition to providing a stimulus for ideas for the next planned focus group meeting in 2006.

A core aspect of the research to date has been the development of the field and farm-scale indexing tool. The tool is based on the concept of critical source areas which combines the site factors considered important in influencing FIO transfers from land to water. The project have assembled a consortium of experts to help set weightings for the relative contribution of pathogens from different sources within the farming landscape, the processes by which they are mobilised and the hydrological connectivity of sources of pathogens to water courses, in order for the tool to be able to determine the risk of pathogen transfers from farms to the environment. The tool will initially be used on the 10 FIO monitoring farms to index land vulnerability and risk of FIO transfers.

The good working relationship established with the ten focus farmers has ensured that a follow up interview to elucidate the decision making process in terms of manure and land management should run smoothly and are due to start on in 2006. A series of stakeholder meetings involving farmers is also being planned in order to gauge the viability of potential mitigation options to introduce to the farms.

RES-224-25-0090, Prof R Shepherd, University of Surrey
01 Feb 2005 – 31 Jan 2008
Integration of Social and Natural Sciences to Develop Improved Tools for Assessing and Managing Food Chain Risks Affecting the Rural Economy

In recent crises in food and agriculture (e.g. BSE, *E. coli*, Foot and Mouth Disease) a narrowly technical perspective has too often 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. This is a multidisciplinary project that is incorporating the thinking and values of stakeholders into the scientific modelling of risks. The research is centred on three contrasting case studies: a chemical contamination, a microbial contamination and a mock crisis scenario. The project is developing ways to handle uncertainties in the estimates of risk, taking account of the complexity of contemporary food chains and the possible reactions of consumers to information on food safety. Various groups, including producers, NGOs, regulators, risk managers and members of the public, are helping define the problem and discussing their understanding of risk. This will enable examination of the effectiveness of different forms of risk communication.

Given the multi-disciplinary nature of the project an extensive period of discussion and development has been necessary in order to develop a common understanding of the theoretical, conceptual and methodological issues involved. A significant highlight from

the first year is the high level of mutual understanding of food chain risk that has been achieved across the contributing natural and social science teams. This has led to the development of a broad approach that has provided innovative ways of conceptualising, modelling and investigating food chain risks. A second highlight has been the development of a system for classifying and evaluating procedures for facilitating public involvement in risk issues. This development, along with a major empirical study planned for March 2006, will provide a significant body of work to differentiate these procedures and will provide important guidelines on how to choose between them. A third highlight has been the development of a new methodology for eliciting stakeholder understanding of the food chain, based on a combination of a visual methodology and cognitive mapping. This has provided an important vehicle for identifying differences between stakeholders in terms of where they perceive the risks to occur across the food chain and how these risks should be mitigated.

The first case study, concerning the use of pesticides during the growth of fruit, is an ongoing, 'active', process and is currently leading to a large stakeholder participation event, in London, during March 2006 including government authorities concerned with pesticides (PSD, FSA), the pesticide industry, NGOs, farmers and consumers. The second case study will follow and will involve microbial hazards that surround food preparation and whether these invoke an unfair burden on rural food producers. During the first year the project team has brought RELU-Risk to the attention of several interested parties including European researchers (e.g. O. Renn, L. Frewer) and groups (e.g. ILSI).

The work at Leeds has and continues to involve running focus groups with key stakeholders in order to understand their perceptions of food-chain risks and ways that they should be mitigated. This work (which is ongoing) is involving stakeholders from the rural economy (e.g. farmers; urban and rural communities; pressure groups; scientists; food industry).

RES-224-25-0093, Dr AS Bailey, Imperial College London
01 Feb 05 – 31 Jan 09
Re-Bugging the System: Promoting Adoption of Alternative Pest Management Strategies in Field Crop 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. The aim is to develop an improved research and development framework to help break pesticide dependency and support alternative pest control technologies.

The research conducted within this project is progressing in a satisfactory manner. In 2005 the large-scale field studies, conducted by staff at the Game Conservancy Trust, examined: 1) The relative value of ground and aerial dispersing predators for cereal aphid; 2) Whether floristically enhanced field margins improve levels of biocontrol; and 3) Extent and timing of aerial movement by predatory insects. This work has revealed that aerially dispersing predators such as hoverflies and parasitic wasps are the most effective at reducing aphid numbers within winter wheat crops in the field.

The socio economics team have conducted a range of face-to-face semi-structured interviews with commercial adopters of biocontrol in protected systems. This work has led to the development of a survey instrument designed to elicit responses, from field-scale

arable farmers, concerning the way in which they consider whether to trial or adopt alternative technologies with particular emphasis on alternative pest management strategies. Emphasis will also be placed on the forms of information, or data, upon which they rely, or find persuasive, when making these decisions.

Researchers at Rothamsted have found similar success during 2005. They are working with the natural defence systems in plants that can be enhanced by exposure to insects or alternatively by treatment with plant "activators" such as *cis*-Jasmone, which can be used to switch on plant defence against pest insects. The team found that using *cis*-jasmone on wheat encouraged generalist parasitoids, which attack many aphid species, to spend significantly longer on the plants. This encouragement of generalist parasitoids by *cis*-jasmone treatment has potential value in conservation biological control programmes.

RES-227-25-0001 Dr K Hubacek, University of Leeds
Project starts 2006
Managing Uncertainty in Dynamic Socio-Environmental Systems: An Application to UK Uplands
Natural and social scientists plan to join forces with locals and policy makers to develop a framework that could be applied throughout the country's uplands to find new ways for people to detect change and harness it for their advantage. Much of Britain's drinking water comes from uplands, they contain many plants and animals found nowhere else in the country, and are important for tourism, sheep faming, game and fishing. But inappropriate land management has been blamed for reduced biodiversity, and increased water colour, downstream flooding, sediment yields and carbon loss. By building on local knowledge and experience, the research will combine new ideas from local people with cutting edge natural and social science. The result will be a choice of solutions to future challenges that could never have been developed by either group alone. The project will start by identifying the current needs and aspirations of those who work, live and play in three upland areas and explore their concerns for the future. The driving forces behind these concerns will be modelled with computers to build up detailed scenarios of possible future social, economic and environmental conditions. It will then seek innovative ideas from local people, policy makers and researchers about how people could adapt to these scenarios. The suggestions will be fed into the models to explore what effect they might have on future society, economy and environment. This will help the researchers identify the most appropriate ways for the people to adapt in each upland area. The research will also identify indicators that people can use to monitor how successfully they are adapting and improve their practice. Communication and understanding between different stakeholders and researchers will be fostered through a series of joint field trips and workshops.

RES-227-25-0002 Dr E Oughton, University of Newcastle
Project starts 2006
Angling in the Rural Environment: Social, Economic, Ecological and Geomorphological Interactions
Nearly 4 million anglers contribute an estimated £6 billion to the UK economy every year. Such leisure activity will be increasingly important as the rural economy and its land uses move 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 analyses the complex natural and socioeconomic inter-linkages 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. The research focuses on the Esk, Ure and

Swale. These catchments show environmental degradation affecting aquatic biodiversity including fishes; include distinct types of angling; and demonstrate different social organisations of angling and access by different socioeconomic strata. The research is holistic, drawing researchers from natural and social scientific disciplines – ecological and earth sciences, anthropology, social economics and cultural geography – as well as stakeholders from government, NGOs, and the local community into a common dialogue. Each research theme involves natural and social scientists, and one work theme establishes, and researches, the processes of communication between researchers and between institutions.

RES-227-25-0006 Dr S Stagl, University of Sussex
Project starts 2006
An Integrated Analysis of Scale Effects in Alternative Agricultural Systems
Changing land cultivation from conventional to organic practices can have significant impacts on environmental factors such as wildlife, soil and water quality, as well as change the ways in which food is supplied, the economics of farm business and indeed the attitudes of farmers themselves. A factor that is little understood is how these depend on the scale and concentration of alternative farming systems across the landscape, from local up to the national scale. This project addresses two key questions: (1) what causes organic farms to be arranged in clusters at local, regional and national scales, rather than be spread more evenly throughout the landscape? And (2) assess how the ecological, hydrological, socio-economic and cultural impacts of organic farming may vary due to neighbourhood effects at a variety of scales. The project will undertake an intensive study of existing clustered and isolated organic farms, and their surrounding neighbourhoods, to address these questions. It will culminate in mapping 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.

RES-227-25-0010 Dr J Bullock, CEH Dorset
Project starts 2006
Improving the Success of Agri-Environment Initiatives: The Role of Farmer Learning and Landscape Context
Traditional farming in Europe produced landscapes which supported a high variety of plants and animals, but technological intensification of farming over the 20th century led to huge declines in wildlife. Agri-environment schemes (AES) encourage farmers to carry out management which should lead to increases in wildlife. However, AES do not always give the desired results. The failure has been linked to both social and ecological problems. Firstly, if farmers have poor understanding of the science and aims of AES, they may not carry out the best management. Secondly, management may create the environments that certain plant and animal species need, but their ability to colonise these habitats may be limited by both the rarity of these species in the landscape, and obstacles to movement in modern landscapes. The research will involve a five year study of how well wildlife habitats are created under AES, and whether training of farmers leads to creation of better habitats. This will be linked to studies of how farmer's attitudes to wildlife-friendly farming may be shifted by training. The project will analyse how the distribution of species and habitat types in wider landscape affects colonisation of new habitats. This will lead to improved methods for wildlife-friendly farming.

RES-227-25-0014 Dr J Irvine, Macaulay Institute
Project starts 2006
Collaborative Frameworks in Land Management: A Case Study on Integrated Deer Management
Many people that make their living from the countryside argue about how to make best use of ecological resources. The management of deer provides an ideal case study because there are many associated costs and benefits. Deer management provides jobs for stalkers on forestry and sporting estates and people in the meat industry. Tourists are drawn to particular landscapes which deer help to create and to see the deer themselves. However, in some areas, high deer numbers are causing overgrazing and damage to sensitive natural habitats, agricultural and forestry crops and even suburban gardens. Deer are increasingly involved in road traffic accidents. Therefore there are many different attitudes to deer and conflicts on how best to manage them. This project will investigate 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. To achieve this we need to increase understanding between ecologists, economist and social scientists and combine this knowledge with management objectives. The lessons from investigating deer management will be used to see how well they apply to the management of other natural resources where multiple management objectives exist.

RES-227-25-0017 Professor J Morris, Cranfield University
Project starts 2006
Integrated Land and Water Management in Floodplains: The Experience of Agricultural Flood Defence Systems in England and Wales
During the period 1950 – 1980, considerable public funds were spent in Britain on Agricultural Flood Defence Schemes to reduce flooding and improve land drainage in low-lying floodplain and coastal areas. As a consequence, and with government support, farmers intensified their production, in some cases switching land use from grassland to arable cropping. Since the mid 1980's, however, more importance has been placed on the protection of nature and wildlife and the enjoyment of the countryside. Radical changes in Government policy now encourage farmers to use less intensive, environmentally beneficial farming practices, including the return of floodplain land to its previous wetland condition for nature conservation. This research explores changes in land use over the last 40 years in floodplain areas which were 'defended' under the aforementioned schemes. Case studies of selected schemes, which were previously studied by the researchers in the early 1980's will show how and why land use has changed livelihoods and the management of flooding problems will be assessed. The project will help inform decisions about the future management of floodplains.

RES-227-25-0018 Professor S Whatmore, Oxford University
Project starts 2006 (subject to pre-award conditions)
Knowledge Controversies in Rural Land Management: Science, Democracy and Environmental Expertise
The GM saga shows the difficulties generated by the ways in which scientific knowledge is variously used and understood by policy-makers and citizens. Scientific activities that were once hidden in laboratories and journals have become more open to public scrutiny through technologies like the internet. This means that scientists, and those who use their work, have to think again about how science should inform democratic decision-making. 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 what we call '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).

RES-227-25-0020 Dr A Karp, Rothamsted Research
Project starts 2006
Social, Economic and Environmental Implications of Increasing Rural Land Use Under Energy Crops
Future policies are likely to encourage more land use under energy crops: principally willow, grown as short rotation coppice, and a tall exotic grass miscanthus. These crops will make an important contribution to the UK's commitment to reducing CO2 emissions. However, it is not clear how planning decisions based on climate, soil and water should be balanced against impacts on the landscape, social acceptance, biodiversity and rural economy. This project integrates social, economic, hydrological and biodiversity studies in an interdisciplinary approach to develop a scientific framework for Sustainability Appraisal (SA) of the medium and long term conversion of land to energy crops. Researchers will provide scientific tools for updating Best Practice Guides and Environmental Impact Assessments, Strategic Environmental Assessments or SAs involving projects, policies or programmes where increased planting of energy crops is proposed or anticipated. The project profits from involvement of the Regional Development Agencies of the East Midlands and South-West regions used as study areas, industry representatives and DEFRA. It supports the "sustainable rural development", "protection of the rural environment" and "economic vitality of rural areas" priorities of RELU. Results will benefit farmers, energy producers, land planners, regional development agencies, policy makers, environmental agencies and the public.

RES-227-25-0024 Professor I Bateman, UEA
Project starts 2006
Catchment Hydrology, Resources, Economics and Management: Integrated Modelling of WFD Impacts upon Rural Land Use and Farm Incomes
This project combines front line natural science with socio-economic research to assess the costs and benefits to the rural community of changing farming and community practices to produce a healthy and sustainable river environment of good amenity value. A key focus of the analysis is to examine how (within a context of reforms of the Common Agricultural Policy and complicating issues such as climate variability and non agricultural sources of pollution) the EU Water Framework Directive is likely to affect agricultural activities concerning fertilisers, pesticides and faecal matter and so impact upon incomes within already fragile farming communities. The researchers will also assess the potential water amenity and recreational benefits arising from such policies and compare this to their likely cost. The work combines physical environment models with economic analyses and surveys of farmer attitudes and behaviour to provide a highly interdisciplinary study of this multifaceted issue. The study also makes use of over £8 million of prior research and uses a case study of the Humber catchment which covers a fifth of the area of England from the midlands to north Yorkshire and across to the east coast.

RES-227-25-0025 Professor W Sutherland, UEA
Project starts 2006
Evaluating the Options for Combining Economically, Socially and Ecologically Sustainable Agriculture
The aim of this project is to bring together social and natural scientists to understand the social, economic and political factors underlying farming practice, and the implications of changing these decisions for biodiversity. The researchers will use economic models to determine what actions by farmers are financially optimal. Using interviews with farmers, the research will determine why they deviate from these model predications, and why farmers vary in the way they manage farms. The variation in management between farms is known to be an important determinant of biodiversity and one of the project's key objectives is to understand the basis for this. It will use ecological models to predict how weed and bird populations (i.e. key biodiversity indicators) will respond to changes in management practices. To develop these models the research will use long-term data available from the British Trust for Ornithology, together with detailed farm surveys. These models will be used to answer a range of policy questions such as: What would be the best policy measures to achieve the targets on bird populations set by the government? What determines which new farming methods and agri-environment schemes will be adopted by farmers? What will be the social and economic consequences of biodiversity conservation?

RES-227-25-0028 Professor P Armsworth, University of Sheffield
Project starts 2006
A Landscape-scale Analysis of the Sustainability of the Hill Farming Economy and Impact of Farm Production Decisions on Upland Landscapes and Biodiversity
Moorlands support traditional hill farming communities, are home to species of international conservation concern and provide emblematic landscapes with high recreational value. This project aims to discover how we can manage moorland ecosystems in a way that delivers sustainable hill farming communities while also protecting the environment. Taking the Peak District as a case study, the researchers will examine how farmers respond to policy changes and how they can design business plans to cope with these changes most effectively. The project will explore the impact that hill farming has on moorland species and predict how those impacts are likely to change over the next 20 years. To do this, it will develop new modelling tools that allow examination of the dynamics of moorland change across whole landscapes, tools that determine how the actions of one farmer affect those of neighbours and how upland bird species rely on a diversity of habitats across the landscape. The project will involve valuation workshops with the general public to discover what it is they most value about moorlands. Finally, it will combine these results to evaluate how effectively different policies balance the multiple demands on moorlands.

4.2 Scoping Studies (up to £50,000)

RES-224-25-0002, Prof N Hanley, University of Glasgow
01 Oct 04 – 30 Sep 05
Climate Change, Non-Point Pollution and Land Use: Modelling Interactions

This project was an exploration of the possibilities and problems of developing a modelling framework to consider the interlinked environmental phenomena of climate change, low river flows, and non-point pollution from agriculture. The team undertook the research in a manner which would enable practical management advice to be generated, particularly in the context of integrated catchment management and the search for cost-

effective management solutions under the Water Framework Directive. This included a consideration of the effects of using a combined package of economic instruments and managerial measures on non-point pollution levels.

The research work involved the use of a number of interlinked models. Climate change scenarios from UKCIP were run through a "weather generator", known as LARS-WG, to produce location specific dynamic data on a number of climate variables. These were then input into a crop growth model known as CROPSYST, which was used to produce predictions of changes in both potential crop yields and pollution run-off from different crops under different fertilizer regimes on different soil types in two case study catchments in SE Scotland. A hydrological model IHACRES was used to simulate how many days a year farmers would need to be restricted in terms of irrigation water abstraction to conform with minimum river flow levels. These restrictions were also run through CROPSYST. Finally, a bioeconomic model was constructed based on input data from CROPSYST to simulate farmer's optimal land use allocation decisions, under a variety of policy scenarios. This model assumes farmers choose what to grow and how to manage these crops on the basis of maximising profits. The policy scenarios to be considered are a pure regulatory regime, a pure economic incentive regime, and a mixed instrument package which combines elements of both.

This quantitative modelling approach to study the best way of controlling diffuse pollution from farming takes into account both the effects of climate change and the need to maintain minimum river flows for ecological quality reasons. The research team found that, for their two case study catchments in Scotland, climate change to 2080 was predicted to result in increases in both minimum and maximum temperatures, and an increasing variability in rainfall. Crop yields for certain key agricultural crops were predicted to fall over the next 80 years, by a greater amount for winter sown crops than for spring sown crops. The research also found that, for most scenarios, the amount of pollution (nitrate) leaching from farmland would rise over the next 80 years due to climate change, although how farmers adapt to a changing climate in terms of what crops they choose to grow and how they manage them will also have a big effect.

Work is on-going to produce results on the cost-effectiveness of different management strategies for controlling non-point pollution and minimum river flows, and on the treatment of uncertainty over dose-response relationships.

This project has shown both the potential and the problems in applying interdisciplinary quantitative modelling to the issues of climate change and catchment management. At a more case-specific level, it also illustrates the gains from using economic instruments, and packages of measures, to achieve water quality improvements in catchments where diffuse source pollution is a major reason for failure to meet Water Framework Directive targets.

RES-224-25-0009, Dr J R Franks, University of Newcastle
11 Nov 04 – 10 Nov 05
Co-operative Management of the Agricultural Environment

The aim of this study was to evaluate whether the UK would benefit from extending and developing "group application" options within agri-environment schemes (AES). It considered whether in the UK there is a role for organisations like the Dutch Environmental Co-operatives (ECs) in helping to further integrate farming and environmental objectives and thereby improve the environment. ECs are local organisations of mainly farmers, often including non-farmers, who work in close

collaboration with each other and with various local and national agencies, to integrate nature management into farming practices, by adopting a pro-active approach based on a local and regional perspective.

The mis-match between the spatial characteristics of the environment and land ownership and land management suggests that scheme prescriptions that permit goods to be produced by clubs of land managers which reach across land ownership and management boundaries - so as to be contiguous with natural features and geographical boundaries – would benefit environmental management by allowing the landscape to be worked whole rather than piecemeal.

This research addressed the theoretical problems and benefits of club provision of agri-environmental goods. The evidence was derived from a literature review and face-to-face interviews with farmer and non-farmer members of ECs, academics, representatives from the Dutch Ministry of Agriculture (MinLNV), scientists and the Forestry Commission.

There are about 124 ECs, with approximately 9,500 members, in the Netherlands. Besides being involved in environmental enhancement, the research found that they play an important role in developing the rural economy. Support from an extensive range of government and quasi-government organisations has been a key factor in their formation, as had been a positive attitude to co-operation.

There are substantial similarities between the UK and the Netherlands with respect to the policy environment, agricultural production techniques and the increasing dependency of farms on diversified income and the wider rural economy. Historically, Dutch environmental policy has used different instruments, in particularly the use of land purchase, but in recent years the instruments and mechanisms employed in both countries have converged. The UK rural development strategy, for example, as expressed in Rural Strategy 2004, aims to empower regional and local partners by "bringing resources and decision-making at a more local level", thereby playing to the particular strengths of ECs.

The research concluded that ECs could play an important role in addressing current environmental problems in the UK and in contributing to environmental targets related to water quality, flood management and water abstraction. ECs offer an additional instrument through which win-win solutions to these problems can be identified at a scale above that of the individual farm business.

RES-224-25-0018, Dr M Thomas, Imperial College, London
27 Sept 04 – 26 Sept 05
Designing and Implementing Large Scale Experiments in Land Use

Perturbations in climate, technology, and the variation in subsidy systems brought about by CAP and WTO reform, have the potential to cause landscape-scale changes in farming systems. In particular the total area and spatial distribution of land in different food and non-food crops, or assigned to different land management schemes, may change markedly. A key issue that emerges from this is to define the most appropriate way to distribute these different land use categories to achieve biodiversity, environmental, production and socio-economic benefits.

The aim of this scoping study was to consider what experimental and modelling approaches are necessary to understand how biodiversity and socio-economic factors respond to large-scale changes in the spatial distribution of land use. The project centred

around a workshop which brought together scientists and social scientists to enter into discourse on large scale experimentation, to examine the different approaches which have been taken to large scale investigations in ecology and evaluate them in terms of their strengths and weaknesses. The study aimed to investigate the extent to which scientific experimentation can be used to inform socio-economic factors and policy, given the different scales at which they operate, and to consider at what stage in the investigative process natural and social scientists should be working together.

The outputs of the workshop were used to develop an opinion paper asking why so much good ecological scientific research does not have a greater policy impact. The research team identified two potentially important and related reasons for this observation. First, much current ecological science is not being conducted at a scale that is readily meaningful or useful to policy makers. Second, to make much of this research policy relevant requires collaborative interdisciplinary research integrating ecologists and social scientists. However, the challenge of undertaking meaningful interdisciplinary research only re-emphasise the problems of scale: ecologists and social scientists traditionally frame their research questions at different scales. This paradox and inherent tension is apparent in collaborative research efforts of ecologists and economists examining the many facets of natural resource management. If evidence-based research is to become a meaningful policy requirement, much greater attention needs to be given to the scale of the research efforts as well as to the interaction with social scientists at every stage of the research process.

RES-224-25-0036, Dr R Baines, Royal Agricultural College
01 Oct 04 – 01 Oct 05
Private Sector Environment Standards: Impact on Ecological Performance and International Competitiveness of UK Agriculture

Private environmental standards for agriculture have emerged as a key tool to manage quality, food safety and various intangible attributes relating to production practices - including impacts on the environment - within the supply chains of multiple food retailers and branded manufacturers and processors. UK supermarkets have been actively involved in the development of UK (and overseas) farm level standards and multiple retailers' claim that their integrating suppliers only source agricultural inputs from such 'assured' producers. At the same time UK supermarkets are under continual pressure to improve their own environmental performance. Part of their response has been to address environmental issues linked to their supply chains. Are such strategies aimed at reducing environmental impacts along the whole chain or only at the production level, or are the supermarkets using the environment for other purposes, for example to differentiate themselves in a fiercely competitive marketplace?

The research involved the following approaches:

- Benchmarking the scope of existing farm standards in relation to environmental regulations, market requirements and branding of such products.
- Verification of the findings from the benchmarking study for selected commodities from producer to consumer in order to define chain linkages.
- Interviews with standards makers and takers along selected supply chains including importers of produce (to compare UK with Import requirements).
- Evaluation of sectoral impacts on UK agriculture in terms of environmental performance, production costs and market access in terms of buyer-seller power.

- Development of policy proposals for public and private sector actors in order for them to consider the viability and consequences of such standards on the competitiveness and environmental responsibility of UK agricultural businesses.

The research found that:

- In the UK the mainstream farm standards, those promoted under the British Farm Standard, have been shown to address some elements of environmental protection with both crop and livestock schemes.
- There are examples of where 'environment' is taken further by some supermarkets, e.g. Farm Biodiversity Action Plans (Sainsbury's for premium fresh produce suppliers), conservation plans linked to FWAG (Tesco's Natures Choice), and the development of additional audit requirements for the Assured Produce Scheme linked to the LEAF audit (Waitrose's LEAF Marque brand). In addition, the main organic standards include requirements to address biodiversity.
- For overseas suppliers to UK supermarkets there is strong support from most of the main retailers for the EUREP scheme for fresh produce. This scheme mirrors the requirements of the Assured Produce Scheme with additional requirements for worker welfare and environmental conservation practices.
- Private baseline standards *are* a relatively level playing field. If producers can comply, then they can trade irrespective of country. Identifying private standards as 'barriers to trade' or sources of competitive disadvantage is therefore inaccurate.
- Where retailer requirements go beyond this baseline (such as the requirement to develop conservation or farm biodiversity action plans) it appears that the costs are being mainly borne by the producer and benefits trapped by the retailer. The research draws attention to the question as to whether it is possible to address this through policies relating to terms of trade between suppliers and retailers.

RES-224-25-0037, Dr N Boatman, Central Science Laboratory
01 Sep 04 – 31 May 05
Data Resources for Rural Sustainability Research: Realising their Combined Potential

This project explored generic and interdisciplinary issues of data management and integration relevant to the aims of the RELU programme, and aimed to provide a wider perspective on the policy and organisation of rural economy and land use data in the UK. Activities included a questionnaire survey of the RELU research community; targeted consultation with specialists; and hosting a workshop on data integration.

The survey indicated that problems in gaining access to data are widespread and commonly relate to cost and/or confidentiality. Environmental datasets (e.g. land use/cover) are currently widely used, whilst socio-economic datasets (e.g. waste, recreation) are likely to be more so in the future. Interdisciplinary working places particular demands on data availability and use; information on the existence of datasets, as well as documentation and metadata are generally organised by discipline. Once identified, datasets from different disciplines frequently use different scales or frameworks and require integration prior to joint analyses. Language is a major barrier to interdisciplinary working, particularly between social and natural scientists. Availability of tools for data integration is less of a problem, but methodologies and implications of integrating different datasets are often not well understood. Recommendations on the way forward include: data management for interdisciplinary research should be adequately resourced, and be considered before projects begin; stakeholder engagement is essential; as well as service provision and training; and effective enforcement.

This project has contributed particularly to the capacity building objective of the RELU programme: "To enhance capabilities for interdisciplinary research on rural issues, between social, natural and biological sciences", by providing insight into issues concerning data management and integration, indicating the needs of researchers with regard to data access and support, and providing pointers for the Data Support Service (DSS) to assist in the delivery of their own objectives of implementing the Programme's Data Management Policy. The RELU DSS has shown considerable interest in applying the results of this scoping study in the development of their service to RELU award holders.

RES-224-25-0039, Dr S Maberly, Lancaster University
01 Jul 04 – 31 Dec 04
Understanding Loweswater: A Study to Generate New Understandings of Ecological, Economic and Social Interactions in a Lake District Environment

This scoping study looked critically at the nature of different kinds of knowledge (social, ecological, economic, cultural) that may be brought to bear on the ecological problems in Loweswater. Through the study, it was possible to begin to understand the importance of linkages between the ecological, social and economic condition of the Loweswater catchment, to realise the value of integrated working between scientists and the fundamental nature of interacting with stakeholders.

A clear issue in trying to understand Loweswater was the need to take on board how both the researchers and the stakeholders in the catchment have very different ways of understanding the catchment. Thus, a large part of the research was about thinking through one another's ways of interpreting the catchment. Good progress was made in developing understanding of each other's frames of reference particularly between the ecologists and the social scientists and between the social/natural scientists and the farmers in the valley.

Whilst the lake pollution did not change during the course of the research, the social conditions in the catchment did. With large shifts in countryside policy imminent, issues of lake pollution became secondary. It was clear that changes in the prevailing socio-economic conditions in the catchment would inevitably impact on the lake. Understanding the catchment in an holistic way included taking into account the differences between reaction time in social and natural systems as well as the recognition that the need for economic survival is likely to come at a cost to the environment.

The research between different actors involved in the project suggested that 'communication' was very important and was not occurring as fluidly as might be needed to achieve integrated sustainable management of the catchment. Communication between scientists and farmers was historically poor but improving. It was apparent that scientists too often stand outside of rural issues and were not seen as integral to the process of helping to resolve them. Scientists need to be seen as part of the stakeholder body and as far as possible locally involved. They also need to be able to communicate their science openly and honestly, be able to translate it into practicable solutions where relevant and be willing to invest time in developing trust with other stakeholders.

Communication between policy bodies and farmers was patchy – some relationships were well established, others not. Government targets for the rural environment and a lack of trust on the part of land-owners both impacted on these relationships. Institutional flexibility played a role in facilitating more effective communication and in Loweswater this has been used to try to encourage more constructive working towards common aims. Communication amongst farmers was found to be very sensitive and intricate, particularly

under conditions of uncertainty. The apparent importance of identifying local champions and building on their potential emerged as an important issue through the scoping study.

RES-224-25-0058, Dr E A Oughton, University of Newcastle
01 Oct 04 – 31 Mar 05
Developing Tools for Interdisciplinary Research: Physical and Social Science Perspectives on the Use of Rural Catchments

This research has developed a conceptual framework to link social and physical sciences in the study of changes in the natural environment. The project involved physical and social scientists together with other stakeholders in exploring the ways in which natural and physical processes are linked and understood. The catchment of the upland river Esk in the North York Moors was used as a case study. A series of seminars with stakeholders discussed four themes: knowledges, entitlements, livelihoods and regulation, linking human activities to the natural environment.

The first objective was to understand knowledges, claims and practices within the rural landscape. People drew on both formal and non-formal knowledges at different scales and were clearly aware of the interconnections between social behaviour and the natural environment. It was widely acknowledged that groups had different knowledges that could play a role in their behaviour. However, love of the landscape united practising scientists, locals, incomers and visitors. Claims ranged from the material to the spiritual including direct livelihood claims from fishing, farming and shooting. Private property proved overwhelmingly important in framing claims. Debates on entitlements (the broad category of rights, claims and access) were dominated by issues of access in various forms and discussion revealed issues of conflict and ambivalence.

The second objective was to explore the ways in which information was communicated between different stakeholders. Seminar participants were good at identifying gaps in knowledge, and had a lively awareness of where to obtain information and how to plug in to appropriate networks. Local champions were very significant for communication and action. Communication could be seen as both horizontal – between people at the same level; and vertical – within a hierarchical system. The communication of formal regulations brought up issues of reconciling regulations at different scales, whether European, national or local.

The third objective was to identify the points at which human behaviours map on to river catchments, paying particular attention to the scale of human activity. Sources for livelihoods were grouped according to three scales: intra catchment livelihoods, based entirely on resources and the environment within the catchment; livelihoods earned outside the catchment, but within daily commuting distance; and livelihoods which derived from a market beyond any daily commute. Seminar participants gave clear interpretations of how livelihoods at each of these scales affected the physical and social environment.

The fourth objective was to develop a framework to explore relationships between human behaviour and the physical landscapes. We built on environmental entitlements analysis which explicitly links the natural and the social, incorporating the role of institutions and therefore of power. The framework was designed to capture systematically the processes at work in the development of natural resource use. Thus the model was designed to follow the processes by which an innovating stakeholder brings about a deliberate change to the environment. Its usefulness lies in drawing attention to some of the key

relationships involved in introducing new ways of acting. It is a conceptual framework that can be tested by interdisciplinary researchers in other contexts.

The final objective was to build interdisciplinary capacity. Interdisciplinary capacity was developed at each stage of the design implementation and analysis of the project with both physical and social scientists working together. Throughout the project the team took great care to be self reflexive.

RES-224-25-0062, Dr M Huby, University of York
01 Oct 04 – 30 Sep 05
Developing Spatial Data for the Classification of Rural Areas

Sustainable development demands that the economic and social needs of rural communities be considered in relation to needs for environmental protection. This study, conducted by both social and environmental scientists, brings together environmental data and information about lifestyles and living standards in different areas. It recognises social as well as environmental diversity as important in defining the kinds of policies needed for rural development and the information it provides can be used as a basis for selecting specific kinds of rural area for further research.

The main product of this study is the dataset on social and environmental conditions in rural areas (SECRA), intended to encourage and enable researchers and policy makers to include both social and environmental perspectives in their consideration of rural problems. It provides information about the 6,027 Super Output Areas (SOAs) in rural England. These areas were specifically designed for the collection and publication of the 2001 Population Census statistics. They are smaller than administrative wards but big enough to allow the release of data that, for reasons of confidentiality, are unavailable at smaller area levels. SOAs are roughly consistent in population size and each contains, on average, 400 households and 1500 residents. Rural SOAs are classified by the nature and sparsity of their settlements - towns, villages, hamlets and dispersed dwellings.

The dataset combines two approaches for choosing information to be included. One way was to think about the nature of the rural environment in England and to consider ways in which it faces threats to its biodiversity and productivity as a result of social, economic and political change. The other was to consider the ways in which the English countryside is used or valued by human populations and how their livelihoods, welfare, leisure activities and spiritual wellbeing are dependent on the prevailing environmental conditions. These approaches were combined in a conceptual framework that views all rural issues as having contemporaneous implications for the environment, society and economic vitality. The framework recognises the interdependencies between what is physically there, what it is like (the qualities of the place and its residents), the living and working conditions it offers, and the prevailing political and economic context.

These elements are all discussed in the SECRA report, which explains the definition of ‘rural areas’ and the use of SOAs as the base spatial units for the data. The report provides a brief literature based rationale for the relevance of sets of selected variables to rural conditions. Under natural and constructed features we include the size and topography of areas, types of vegetation cover and the presence of settlements, roads, industrial sites, facilities and cultural amenities. Characteristics of the areas and the people who live there are discussed and indicators of demography, human health, ecosystem health and environmental quality are included. The report then moves on to discuss indicators of the living and working conditions in different areas – housing, access to services, income and

employment, education, tourism and leisure. In each section of the report a list of variables finally included in the dataset is listed and more detailed information on variable construction is given in the metadata and in the Technical Appendices. The report concludes with a discussion of the potential for extending the dataset to Wales, Scotland and Northern Ireland.

The dataset consists of the boundaries of the SOAs and associated tables in formats that allow data to be easily transferred into commonly used computer packages for analysis. A set of metadata for each variable provides full information about the sources and calculations used for its construction. The report, dataset and metadata use the same variable codes so that they can be cross-referenced with one another. SECRA (social and environmental conditions in rural areas) is the first publicly accessible dataset to describe both social and environmental characteristics of rural England at a common small area level. The interdisciplinary nature of the dataset makes it suitable for use in the production of integrated typologies of rural areas based on characteristics relevant to sustainable development. The dataset also allows practitioners to identify the SOAs falling within larger administrative units such as wards, districts and regions, so that these can be described in terms of their SOA characteristics.

RES-224-25-0068, Prof D MacDonald, University of Oxford
20 Jul 04 – 20 May 05
Development of a Landscape Intervention Decision Support System (LIDDS) to Maximise Net Social Benefit

This project scoped the possibility of directing agri-environmental work across landscapes to maximise the net environmental benefits of agricultural costs. It considered how to model the reactions of wildlife populations, the probability of participation by landowners, the use of the area by local people, and how that might bias decisions, and how to make changes in biodiversity commensurate with monetary costs.

The changes in agriculture which are ongoing in the UK are shaped in no small part by desires to conserve and replace wildlife threatened by farming over the last 60 years. Agri-environment schemes (AES) have been evolving to meet these needs but have been directed towards assumed public desires. In the coming years, as funding for AES continues to increase, measurements of the relative efficacy of the schemes will be required. Currently indicators of uptake and general trends in bird numbers indicate little about what is being achieved in relation to the cost and don't allow a comparison of successes between schemes in time or space. The research in this project provides a grounding for the development of indicators which would allow the UK to critically assess its agri-environmental activity.

The project laid the groundwork for investigating what the public wants from agri-environment initiatives and how to measure their benefits. The research considered the activities of some of those people living in and around AES. It found that many did not regularly leave the towns and villages, nor did they express a preference as to where agri-environment schemes should be carried out. They nevertheless valued it highly, regardless of direct use. The research also considered how to value small changes in wildlife population traded against agricultural costs. Through a mixture of economics and ecology the project produced a method for achieving this. It concluded that that directed landscape scale ecological work may be more cost effective than the more passive approach which is favoured currently.

Findings of the research have been presented to a local wildlife trust, FWAG, the Environment Agency, English Nature, DEFRA, Butterfly Conservation, Oxfordshire County Council, Thames Valley Environmental Records, RSPB, Game Conservancy Trust, Ponds Conservancy Trust, Tubney Charitable Trust, Peoples Trust for Endangered Species and Mammals Trust UK.

RES-224-25-0076, Dr M Phillips, University of Leicester
13 Dec 04 – 12 Dec 05
Gentrifying Rural Natures: An Investigation of the Enrolment and Modification of Nature within a Gentrifying Village

This research highlighted the significance of flora and fauna within the boundaries of villages, and to the residents of these villages. Using a complex suite of natural and social science research methods, the project has shown that high levels of biodiversity exist within the fabric of the rural built environment, a feature that has hitherto been poorly recognised both within research and policy contexts. Many rural residents greatly value contacts with nature and this forms a key component in attracting many rural in-migrants. The research demonstrated that nature in village space is not a static entity but is being continually reworked through complex socio-nature processes. Of clear importance in many rural areas are processes associated with rural gentrification. While this term is often associated with transformations in buildings and the social composition of villages, this research demonstrates clearly how, in many instances, it also involves considerable transformation in the flora, fauna and physical landscapes of villages. The research also reveals the value of multi-method interdisciplinary research, drawing together social and ecological survey methods which range in form and scale of analysis.

The development of this scoping study greatly benefited from the involvement of Infoterra, a leading provider of geo-information products and services, including high resolution aerial photography, and also by permission from the Ordinance Survey to make use of MasterMap data and software. In November 2005 a workshop was organised to inform stakeholder groups and other academics about the focus of the project and some of its principal themes. Representatives from organisations such as English Nature, the Environmental Agency, the Countryside Agency, the Countryside Council for Wales, Scottish Natural Heritage and the Scottish Executive have all expressed interest in the project and its research methods.

RES-224-25-0081, Prof CL Spash, Macaulay Institute
01 Jul 04 – 30 Sept 05
Achieving Sustainable Catchment Management: Developing Integrated Approaches and Tools to Inform Future Policies

The overall purpose of this project was to critically reflect on current practice and contribute to policy makers' needs for better guidance on how to conceptualise and achieve integrated catchment management (ICM). The scope of this project is also relevant to the implementation process of the European Water Framework Directive (WFD).

The project brought together a group of 27 researchers from a range of disciplines in the social and natural sciences, with very different perspectives on catchment management, to consider integrated approaches and learn from one another in a series of interactive workshops and bilateral meetings. The workshops formed the main venue for interaction and learning and participatory approaches, including café methodology and open space

technology, were used to encourage discussion. Particularly helpful was a session on terminology and jargon, which highlighted the difficulties and ambiguities in defining some terms, but also clarified concepts. The results of an internal evaluation of the project suggest that most researchers experienced modest to significant learning. This includes both personal learning, mainly procedural aspects about how to conduct interdisciplinary research, and subject-specific learning by picking up information from and becoming aware of concepts typical of other disciplines and perspectives in the field of ICM.

A review of literature on good practice reiterated the need for an integrated approach to catchment management. For many years, science and policy have been considerably fragmented in terms of both objectives and means. Now, a more holistic approach is seen as necessary to achieve long-term sustainable outcomes. The research findings relate to the obstacles and rewards of interdisciplinary working and social learning that are necessary for holistic and integrated approaches. From the collective discussions and work in preparing scoping reports, it seems that a great deal of information exists that could inform ICM in the UK. There are still gaps and problems within individual disciplinary approaches. Examples include how to measure what (i.e. what is regarded as key or most useful and how can or should this be accurately measured with available means); how to achieve consistency in measurement; lack of understanding of catchment processes and how to deal with uncertainties.

Several methodologies exist to assist in integrating knowledge and assessing different values and interests. Of particular relevance are various models and spatial technologies, multi-criteria assessment, scenario development and participatory approaches. The project developed a proposal describing how these might be brought together to provide a framework for ICM which can accommodate different geographical levels (e.g. field, regional, national) and consider short, medium and long time scales. Rather than being an 'independent' variable, scale was found to be a highly subjective and contentious factor that shapes our understandings and therefore the delivery of sustainable ICM. This means that the choice of scale(s) crucially affects what data is gathered, which processes are observed (or overlooked), what types of knowledge are constructed and considered important, and thus the viewpoints and policies which emerge from these. Thus, much of the learning that took place during the project revolved around the issue of who decides what is 'sustainable' and the importance of involving the public and stakeholders who might have many different, often conflicting, views on how to manage catchments.

The project was designed to building interdisciplinary understanding within the team. Energy was devoted to building team dynamics and shared understandings. End user communication occurred via active links with the Environment Agency, SEPA, SNH and SEERAD, and such bodies were kept appraised of progress and reviewed the developed framework. Lessons on interdisciplinary working were shared with representatives from SEPA, Scottish Water, SNH and Aberdeenshire Council.

RES-224-25-0084, Dr F Lyon, Middlesex University
01 Sep 04 – 31 Aug 05
Learning and Research for Sustainable Agro-Ecosystems by both Farmers and Scientists

The aim of this project was to understand the processes of innovation from the perspectives of farmers and scientists working at the level of whole farm systems. Through examining examples of interaction, the project has identified those factors that encourage collaboration between farmers and scientists.

This project is based on the premise that knowledge production on rural environmental issues requires a collaborative systems approach that involves a range of stakeholders (especially farmers) and crosses disciplinary boundaries. The term agro-ecosystems is used to refer to the relationships of humans and natural resources in the production of agricultural goods and environmental services. However, the complexity and diversity of such agro-ecosystems presents challenges to researchers who are conducting research. This requires greater understanding amongst scientists and between scientists and farmers, recognising each other's strengths and weaknesses, and finding ways of working together.

The project report explored how researchers can examine whole systems, how farmers learn about their systems, how researchers can carry out interdisciplinary research, and how farmers and researchers can collaborate. This was done by examining 10 case study research projects with qualitative interviews of the researchers and farmers involved.

The study of farmers own research found that while formal science has to ignore local complexity in order to generate a technology for a wide recommendation domain, farmers' research is based on local complexity, with farmers having to cope with many conflicting demands. The process of carrying out interdisciplinary research involving farmers is dependent on a range of relationships that are shaped by both power and trust. There are challenges of bringing disciplines together, although funders were found to be important factors in encouraging people to work across the disciplinary boundaries.

The project found that there are degrees of farmer participation with differences in the extent to which researchers hand over power to the farmer in terms of the design and evaluation of the experiment or research. Relinquishing power was found to be in conflict with the need to have statistically rigorous research as farmers may not ensure that treatments remain unchanged through the research.

The specific lessons coming out of this research for researchers, policy makers and others include:

- The need to ensure good communication and team building between researchers and with farmers. This takes time and is often not costed into research proposal.
- Farmers' own research and holistic assessments of technologies and practices can make a vital contribution to knowledge production although its approach can be very different to scientific method.
- Farmers and different types of scientists have differing agendas that have to be negotiated.
- The ability of some researchers to participate in interdisciplinary participatory research can be limited by institutional pressures (such as the need to publish in academic journals) unless there are alternative incentives and specific funding for interdisciplinary projects.
- Boundary spanners who have an understanding of the needs of scientists and farmers may be required to facilitate the development of relationships.
- For statistical research, the selection of sites should take into consideration the likely loss of some sites from the research due to the uncertainties of farming. Statistical advice should be sought from the start.

RES-224-25-0087, Dr K Matthews, Macaulay Institute
01 Aug 04 – 31 Oct 05
Integrated Modelling and Assessment of Agricultural Sustainability - Scoping How to Support Policy Relevant Assessments

The scoping study aimed to develop a sustainability assessment framework, implemented through an integrated modelling approach, to facilitate the assessment of agricultural systems and agricultural, environmental and land-use policies. The research team initially developed a framework that used computer-based simulation models to provide indicator values for assessments of sustainability. The assessment was intended to allow as many perspectives on sustainability as possible to be supported. A framework within which it would be possible to compare sustainability perspectives was seen as a useful means by which groups with differing views could debate issues and learn from each other as part of the policy formulation or assessment process. The study undertook the following activities:

- A stakeholder survey – looking at the perspectives on sustainability, current approaches and information requirements.
- The development of indicator selection and model testing protocols.
- A review of peer reviewed articles where modelling contributed to sustainability assessment.

The stakeholder survey indicated that the initial framework and the model-based approach to sustainability assessment were seen as too rigidly engineered and had failed to convince stakeholders of the usefulness of the proposed approach. The lack of freedom, ability or willingness of stakeholders to define perspectives and priorities also meant that the emphasis on multi-perspective comparisons was misplaced. The process of engagement with stakeholders had also failed to identify the policy niche for which the tools were relevant. This led to a revision of research priorities and a subsequent further phase of stakeholder engagement which focused on finding stakeholder-led initiatives that could be effectively supported.

The review of the use of modelling within sustainability assessment found that despite the inherently multi-objective nature of sustainability many studies treat this informally and with ad hoc sets of indicators. This limits the effectiveness of the studies since it is not possible to make direct connections between changes in individual indicators and driving forces such as policy and management changes. There was little evidence of effective stakeholder engagement despite the importance of stakeholder values in defining the standards against which progress (or its lack) can be judged.

The assessment of the sustainability of farming systems in the UK has important implications since it seeks to understand the decisions being made by land managers that result in changes to local economies, communities and the wider rural environment. The project has looked at farming systems in a joined up way, seeing managers and their farms as being at the heart of a complex web of influences and pressures. Sustainability assessment raises difficult issues for government and the public relating to spending priorities, minimum standards, trade-offs between desirable benefits and how best to identify opportunities for win-win outcomes. This scoping study has looked at ways in which tools and approaches to sustainability assessment that are being developed in academia may be used in support of initiatives by government departments, agencies and NGOs.

RES-224-25-0088, Dr K Hubacek, University of Leeds
01 Aug 04 – 31 Jul 05
Sustainable Upland Management for Multiple Benefits

In this scoping study, natural and social scientists teamed up with local interests and policy makers to develop a "learning process" that could help people better anticipate and monitor future change throughout UK uplands, and harness it for their advantage. Building on local knowledge and experience, the learning process combined new ideas from local people with the latest science to develop a choice of options for the future. The initial stages of the proposed learning process were tested in the study, in preparation for a major research project (RES-227-25-0001) in which the full process will be implemented and refined.

The researchers used a combination of stakeholder analysis and social network analysis to identify relevant stakeholders in the uplands of the Peak District National Park. Scoping interviews highlighted managed burning as a key issue which incorporated social, economic and environmental aspects of future rural change. The researchers explored the current needs and aspirations of those who work, live and play in the Park, and explored their concerns for the future. Current and future drivers of change were identified and a range of future scenarios and sustainability indicators developed.

This study has developed a learning process that is designed to help people better anticipate, monitor and respond to rural change. It has identified data sources, gaps and methods that can be used to further develop, test and streamline the process in the next phase of the research. Descriptions of the learning process, data and analyses have been disseminated through project publications sent to stakeholders and made available at meetings, conference and workshop presentations in the Peak District, nationally and internationally.

The research team briefed members of Defra's Uplands Management Branch about the research at its outset. Synergies were identified between the proposed work and Defra's ongoing work to review the Heather and Grass Burning Code, and the team was asked to provide an in-depth case study from the Peak District in response to the review consultation.

4.3 Capacity Building Awards (up to £50,000)

RES-224-25-0003, Prof L Heathwaite, University of Sheffield
01 Aug 04 – 12 June 05
A Cross-Disciplinary Methodology to Promote an Holistic understanding of Diffuse Pollution Issues in Rural Environments

Diffuse pollution has some distinctive properties, setting it aside from other types of pollution. The causes of diffuse pollution are both temporally and spatially distributed and patterned and the sources are often minor when considered individually, but are significant when combined. These properties make sources of diffuse pollution difficult to identify and control. Diffuse pollution is an economically important problem, with DEFRA estimating the cost of tackling the currently known aspects of diffuse pollution at around £300 million. Further to this, reductions in diffuse pollution must be central to compliance with the Water Framework Directive, and to the Public Service Agreement to bring 95% of SSSIs into 'favourable' status by 2010.

The project sought to develop a methodology for social and natural scientists to work together on 'diffuse' agri-environmental challenges. The team had four key objectives:

- To examine the different ways in which natural and social scientists might understand the concept of diffuse pollution.
- To bring together these different concepts to find common ground in the research needs of social and natural scientists to produce a more holistic understanding of the diffuse pollution problem in rural environments.
- To learn from international expertise in developing interdisciplinary approaches to tackling diffuse pollution.
- To learn from stakeholder experience in order to understand how they might contribute to, and benefit from, improved understanding and consensus decision-making with regard to diffuse pollution.

To understand the causes of diffuse problems the research team moved outside traditional disciplinary boundaries in order to understand the social and environmental dynamics of those causes. The project involved four workshops that sought to tackle different elements critical to an understanding of diffuse pollution. The workshops involved academics, end users and, for two of the workshops, stakeholders from the local communities in which the workshops were held. Each workshop was sponsored by a key end user with concerns or responsibilities with regard to diffuse pollution. Four themes were explored: The groundwater dimensions to the diffuse pollution issue: challenges for interdisciplinary research (sponsored by the Environment Agency in conjunction with the EU Intereg-IIIb project Water4All); Delivering a better rural environment: challenges for interdisciplinary research on diffuse pollution issues in upland catchments (sponsored by DEFRA); Challenges for interdisciplinary research on diffuse pollution issues in lowland agricultural catchments exhibiting eutrophication (sponsored by RSPB); and Delivering a better rural environment: challenges for interdisciplinary research on diffuse pollution issues (sponsored by UNESCO).

The outcome of this series of workshops is that science, both social and natural, must be brought into the public consciousness for the best management practices to be effective. Bringing science to the community allows the public to become familiar with the issues and prevents them becoming detached from the consequences of diffuse pollution and disappointed in the results of scientific studies.

RES-224-25-0031, Dr H F Cook, Imperial College, London
01 Jul 04 – 30 Jun 05
Building Networks: Exploiting Options for the Eastern US and Nearby European Continent

The objectives of the project were to build capacity for evaluation and importation to the UK of transferable water management measures as deployed in the eastern seaboard of the USA and the nearby European continent. These include catchment or watershed agricultural programmes for water quality protection and sustainable abstraction. The work completed has:

- developed a sustainable 'network' of appropriate water professionals and stakeholders;
- promoted international and intra-national communication and events between catchment interest groups and management agencies;
- achieved integrated and interdisciplinary assessment of the natural environmental and socio-economic aspects of catchment management for water quality protection;
- identified candidate approaches and measures, setting an agenda for further evaluation.

Farming is the main source of diffuse water pollution but also produces goods, livelihoods and landscape attributes that sustain rural communities. These are generally desired by society, raising the question of how the costs of water resource protection should be distributed. Diffuse pollution of water cannot easily be controlled as the sources are numerous and dispersed, and pathways into the environment are diverse and difficult to trace. Thus the monitoring and enforcement costs of regulation are potentially high. The knowledge base from a natural science perspective is strong, particularly in the USA, but gaps remain and micro-level investigation can be needed to account for local conditions. The central challenge is how to determine and implement the best combination of measures for a specific catchment, given local conditions and wider policy constraints.

This capacity building project identified lessons from surface and ground water protection initiatives in the USA and nearby European continent. Common features of success are land management changes achieved through voluntary agreements supported by appropriate regulation, financial incentives and public awareness creation. A range of technologies exist in the form of 'whole farm planning', farm best management practices and stream corridor barriers. Partnerships between all agencies and stakeholder groups and an adaptive approach to problem diagnosis and implementation are important. Land management and diffuse sources of pollution have a local basis and it is important to foster local instruments and participation of stakeholders supported by sound scientific understanding and an enabling policy and regulatory environment. A catchment management template is needed that compiles and integrates scientific understanding and governance procedures that have been tested in leading improved catchments.

The project's activities have contributed a genuinely holistic and interdisciplinary perspective on land and water management. It has also effectively drawn on international expertise and experience in catchment management, and has usefully highlighted legislation and governance as key areas. An international network has been created which will continue to operate productively in the future.

RES-224-25-0042, Prof E Tipping, Lancaster University
01 Sep 04 – 31 Aug 05
Developing an Interdisciplinary Approach to Address Environmental and Social Issues Resulting from Changes in Land Use

The aim of this project was to develop ways for social and natural scientists to work together in order to address environmental and social issues resulting from changes in land use in the English Lake District. To achieve this aim four young scientists from the Lancaster Environment Centre engaged in a part-time year long process of learning how to work together and exploring ways of effectively working alongside stakeholders to address issues in the Lake District. The Lake District proved an excellent study area. As Foot and Mouth in 2001 revealed, whilst the landscape is very much a cultural (farmed) landscape, much of the population is dependent on income from the tourism sector. In order to try to understand potential futures in the Lake District it is clear that a holistic understanding of the links between the resident and visiting populations and rural land uses is essential.

The project mainly consisted of meetings where those involved discussed issues ranging from ways of studying and understanding the world, ways of doing research in groups of scientists with very different skills, to the current issues affecting the Lake District. In all, six main meetings took place, three of which were confined to scientists, and three

involving both scientists and representatives of stakeholders. The first meeting engaged stakeholders in a discussion of the issues currently affecting the Lake District, and was instrumental in providing a focus for ideas on ways in which social and natural sciences could be applied jointly to provide useful advice and direction on such issues. As the project progressed and the young scientists' ideas on how and what to propose for future work clarified, the focus of meetings moved towards discussing draft proposals for future research among scientists and stakeholders, to ensure that the proposals were both achievable scientifically and were of value to stakeholders. The project enabled:

- The development of a group of young scientists with an increased individual and group capacity for undertaking interdisciplinary work through their enhanced understanding of the factors contributing to effective interdisciplinary science. A large number of small meetings took place between the scientists aimed explicitly at understanding their different approaches and assumptions.
- The wider development of an awareness of interdisciplinary potential and its importance within the Lancaster Environment Centre at Lancaster University.
- Establishment of links between the academic community and a range of stakeholders in the Lake District National Park resulting in increased awareness amongst stakeholders of the relevance of interdisciplinary science to an understanding of the rural environment. The research involved a range of stakeholders such as the National Trust, United Utilities and Cumbria Tourist Board to representatives from Commoner Associations.
- Increased awareness of the environmental and societal issues impacting on rural land use in the Lake District National Park and how these relate to particular stakeholders.
- Production of a proposal for work in the Lake District National Park which will incorporate public values into an exploration of potential future land use. If funding is gained for this proposal it will allow the young scientists to develop research techniques for the integration of natural and social science including public value towards developing potential scenarios of future land use.

RES-224-25-0091, Prof D Miller, Macaulay Institute
1 July 05 – 31 Jan 05
Analysing Visual Quality in Relation to Landscape Change Scenarios: An Assessment of the Requirements

The project aimed to raise the capacity of the Macaulay Institute to undertake interdisciplinary work in the field of landscape preferences, drawing on complementary skills and expertise offered in landscape architecture, by supporting the visit of a social scientist (landscape architect) from Sweden to a research group focusing upon natural sciences to:

- Develop a common understanding of key issues associated with landscape value and visual quality (where landscape value refers to the relative importance attached to a landscape by designations or the preferences of people, and visual quality refers to the character and condition of a landscape as perceived by people).
- Identify gaps in knowledge or activities in relation to visual quality.
- Produce a prototype set of methods for analysing and testing visual concepts, such as 'stewardship' and naturalness'.
- Contribute towards a proposal to a full call on issues of landscape quality.

The capacity building project brought together expertise in landscape and computer modelling from the United Kingdom with landscape architecture and interpretation from Sweden. In combination, these skills have enabled a study of preferences people express for landscapes. Specific factors, highlighted in the scientific literature (e.g. complexity and

abandonment of land) as being of potential significance, were represented in computer visualisations and tested using PC or internet-based surveys.

The results show that the highest preference values were given to landscapes with few and large patches of woodland, a high level of abandonment (and hence a high level of naturalness) and a medium level of shape complexity, and that country of residence was a significant factor in the preferences expressed.

Members of the public, including schools, participated in the surveys, and comprised audiences to presentations in which the means of communicating issues associated with landscape change were outlined and explained. Stakeholders with professional interests in landscape planning and management have contributed to development of the imagery used and feedback from the different types of audience has informed the style and approach to communicating such issues in further fora, including at a demonstration in the Scottish Parliament in 2005.

Other issues of significance identified during the project included a need for greater public awareness and understanding of drivers of landscape change, and the potential consequences of such change on the landscape as heard and experienced, in addition to what can be seen.

The timing of the research and engagement activities fitted with that of the development of strategic plans that take account of landscape issues (e.g. for the new national parks in Scotland), indicators of change in landscape quality (Scottish Natural Heritage), and the management of specific rural areas (e.g. new areas of native woodland expansion at Clashindarroch Forest, Huntly). It is hoped that the network of researchers and stakeholders formed through the project discussions will aid in the dissemination of knowledge relating to landscape change with respect to the conservation or enhancement of specific areas (e.g. Scottish Forest Alliance sites at Clashindarroch, Huntly; and Loch Lomond and the Trossachs National Park). The media and techniques for collecting quantitative and qualitative information about landscape change (e.g. using the visualisation tools) have been used in practice, and demonstrated to elected representatives (e.g. Members of the Scottish Parliament at Holyrood), with a view to illustrating some means of consultation during development phases of policy and implementation. Specific outcomes from this type of activity may be evident in the revisions to planning policy currently underway in Scotland.

RES-224-25-0095, Dr N Russell, University of Manchester
01 Oct 04 – 31 Jul 05
Building Capacity to Investigate the Potential Role of Sustainable Agricultural Intensification in Agro-Ecological System

Given an ever-growing population, the global agro-ecosystem is required to deliver increasing levels of food production from a non-expanding stock of land, water and other natural resources. While this clearly implies increasing the productivity of finite resources, there are widely differing views as to how this may be achieved without degrading or destroying the bio-ecological foundations on which agricultural productivity depends. In the absence of exogenous growth in productivity arising from technical change, this implies a need to develop strategies for sustainable intensification.

This project investigated the potential contribution of sustainable intensification in agricultural ecosystems from an interdisciplinary perspective. An important focus was to

build capacity in cross-disciplinary research into the economic and ecological processes in agro-ecosystems. The specific objectives were to: (1) Investigate the ecological implications of sustainable intensification and the ecological mechanisms that would be required to support it; (2) Explore the potential usefulness of alternative economic incentive structures that could support sustainable intensification, including 'club' type institutions and other aggregate and multi-level structures; and (3) Examine how the impact of potential or actual reforms to the policy system on incentives, land use change and ecological process might be jointly modelled in a way that appropriately represented the dynamic and spatial structure of the economic and ecological processes involved.

A key finding is that the sustainable intensification approach could have a sound ecological basis especially in food and fibre producing systems that are already intensified. The main results can be summarised as follows:

- Distinguishing between vertical intensification (agricultural production processes are intensified on a given land area) and horizontal intensification (land used by these processes is expanded), provides a useful synthesis of the work of economists and ecologists in this area and an important element in any framework for joint economic-ecological investigation of agro-ecosystems.
- The Sustainable Intensification approach takes a broad view of sustainable agricultural production processes and sets them within a global evolutionary context that recognises both the physical limits of available productive land and ecological services, and the expanding demand for food.
- Trophic Cascade theory can be seen as an ecological based approach that can facilitate joint economic-ecological investigations of ecosystems.
- It is important to consider ecological thresholds when investigating intensification processes in agro-ecosystems.
- While recent CAP reforms may have moderated incentives for over-intensification and significantly broadened incentives for ecological conservation, the current policy system does not provide effective incentives for efficient ecological management over time and space.
- An ideal framework for joint economic-ecological modeling should incorporate suitable measures of intensification, productivity, sustainability and the relationships between them, while allowing sufficient spatial articulation to represent positive as well as negative ecological responses to intensification, and would include a behavioural component representing the influence of market- and policy-based incentives on land use and ecological structures.
- Data to support this type of model is more likely to be available from larger data sets collated at national level that could provide a long time series of observations on both economic and ecological aspects of identifiable farms and habitats.

The research has involved close collaboration between ecologists and economists and has enhanced capacity for interdisciplinary research by promoting mutual understanding and a sharing of expertise between disciplines. In particular the team could take advantage of the contrast between the empirical focus of members with ecological training and the more abstract approaches favoured by those with economics training.

4.4 Development Activities (up to £15,000)

RES-224-25-0099, Dr P White, University of York
11 Nov 04 – 14 Apr 05
Integrating Spatial Data on the Rural Economy, Land Use and Biodiversity

The emphasis of government policy on sustainable development has highlighted the importance of biodiversity conservation, but the problem of integrating data across different disciplines has limited research on the interactions between biodiversity and socio-economic and cultural conditions.

In this project, the research team developed a novel method based on Genetic Algorithms to integrate data from the natural and social sciences and investigate associations between biodiversity (measured here as bird species richness) and agricultural, social and economic factors. The number of birds of medium conservation concern and the number of rare breeding birds showed a negative correlation with agricultural productivity, suggesting that there is a trade-off between agricultural productivity and biodiversity, although this negative association was not consistent for all measures of bird richness used. Further analysis, incorporating additional environmental, agricultural and socio-economic variables, showed that some of these socio-economic factors also had strong associations with patterns of bird biodiversity at the landscape scale. These results demonstrate clearly the added value that can be gained from incorporating socio-economic and cultural information in understanding spatial patterns of biodiversity. The availability of methods to integrate information from both the natural and social sciences is essential if this is to be achieved.

This research has established new interdisciplinary research partnerships between the university sector and the BTO, one of the key research institutes on bird conservation in the UK. The results of the project are being written up as an article for the BTO's membership newsletter, *BTO News*. This will ensure that the results are communicated to the nature conservation sector, and in particular to the many amateur naturalists and ornithologists, who collect the bird data as part of BTO-organised surveys.

RES-224-25-0100, Prof D Raffaelli, University of York
15 Nov 04 – 14 Apr 05
RELU: The International Context

Research agendas similar to those of RELU have been initiated by many international bodies, as well as many non-UK national and regional (e.g. European) funding agencies and international foundations. This project reviewed these initiatives to identify progress and best practice with regard to mechanisms for establishing interdisciplinary research, for capacity building in interdisciplinary science and in transferring knowledge to stakeholders and policy makers.

Those programmes with the closest fit to the aims and objectives of RELU were identified using an objective scoring procedure and 174 questionnaires were sent out to these organisations, 47 (27%) of which were returned, providing information on the degree and nature of the disciplines involved, the motivations for interdisciplinarity and individual experiences about what factors promoted success of these programmes as well as whether there were any barriers to interdisciplinarity.

Findings of the questionnaire survey indicate that for the majority of international programmes which share common aims and objectives to RELU, leadership, participant commitment, respect, trust, time and resources, and common frameworks are all important in making interdisciplinarity work. Barriers to interdisciplinary research included poor career rewards, the nature of funding cultures and a lack of trust between participants from different disciplines.

Building groups of researchers with these attributes is not easy and is probably self-selecting: those with the necessary vision who are also ready and willing to put the time and energy into such research will be those who make interdisciplinary projects succeed. The nature of the barriers to interdisciplinarity declared by the respondents, especially academic success, implies that there may be a greater risk involved in working in interdisciplinary research for early stage researchers than for well-established researchers. The presence of such barriers is likely to slow the building of a RELU-type interdisciplinary community within the UK.

Several specific mechanisms for facilitating interdisciplinarity in programmes like RELU emerged from analyses, in particular, the use of clear language without jargon, regular face-to-face informal meetings, availability of forums to facilitate discussions, regular self-evaluation and learning sessions and the use of participatory methods. These help to establish a team philosophy, promoted further by sharing of all information and data freely and agreeing ground rules on intellectual property in advance, especially authorship on published outputs.

RES-224-25-0102, Dr R Matthews, Macaulay Institute
01 Sep 04 – 31 Mar 05
Development of a Rural Economy and Land Use Simulation Modelling Strategy

Simulation modelling, with explicit representation of space and time, is a way in which the diverse data from a number of different disciplines can be brought together under a common framework, to allow different hypotheses of how the system can be changed in order to be tested, without the time, expense and moral implications of altering a real system. Although integrated simulation models have been in existence for some time, most of these are based on approaches from economics that assume optimum use of resources such as capital or labour to maximise a particular output.

Convenient as such assumptions are for mathematical purposes, there is a growing realisation that many human decisions are not made on this basis. This has motivated the use of a new modelling approach called agent-based modelling (ABM). Still in their infancy, ABM represent processes of decision-making at the level of an individual or institution, and are able to take into account many of the constraints faced in real life, such as limited information, communication between individuals, and interactions with the environment.

The project reviewed existing agent-based land-use modelling approaches, assessed their suitability within the context of the RELU Programme, and developed a strategy for integrated simulation model development. This project indicated that there is considerable potential in agent-based modelling approaches for simulating human decision-making processes and the interactions between these and the natural environment, but while significant progress has been made, there is still much work to be done. Research identified the following questions to be addressed in future in this area:

- How do perceptions and attitudes influence decision-making in relation to the planning and management of socio-ecological systems?
- How are the decisions of landscape actors (e.g. land managers, land users) influenced by new information, regulations, and incentives?
- How do institutions and social networks evolve (form, operate, interact, adapt, decay, and disappear) in relation to the drivers of the system?
- What possible institutional arrangements and social networks are appropriate for delivering desired visions of landscape and rural communities?
- How do we link processes that occur at different spatial and temporal scales – what and how much information should be transferred between scales?

There is also a need to resolve the tension between, on one hand, further development of ABM approaches as research tools and the inevitable level of complexity required, and on the other, the requirements by end-users for relatively simple, transparent, easy-to-understand decision aids. This could be partly addressed through end-users interacting with the developers of the research tools rather than using the tools directly.

Stakeholder involvement in the project took three forms. The first was the involvement of the Principal Investigator in a RELU Network Activity ('Modelling and Social Learning in Rural Landscape Analysis and Management') with other academics and Environment Agency representatives, during which the idea of modelling different processes of social learning and their effect on system resilience were discussed and received enthusiastically. The second involved input to the Defra-funded SURPLUS project scoping study, in which a number of in depth interviews and a workshop were conducted to gain an idea of end-user requirements in relation to policy analysis tools in general. Thirdly, interviews with a number of potential end-users in Scotland were conducted (SEERAD, SEPA, SNH, SNIFFER), specifically to explore possible applications of agent-based modelling, from which emerged the need to better inform end-users of the potential of different modelling approaches.

RES-224-25-0105, Prof H Buller, Exeter
Completed 2005
A Review of Recent and Current French Initiatives in Rural Economy and Land Use Research

This project looked at French research programmes, which could be seen as parallels to the RELU programme. The Principal Investigator interviewed a number of people involved in setting up these research programmes, commissioning research under such programmes, as well as to people involved in doing the research. This award focused specifically upon how interdisciplinarity is constructed within such programmes and within research on the rural in general.

As a result of the research, the Principal Investigator has been invited to write a paper for the leading French journal *Nature, Sciences, Sociétés* on the RELU programme and the specific role of interdisciplinarity in rural research within it.

In addition, arising out of the project, the Principal Investigator has been invited to sit on the French 'Groupe de Prospective' on the future of French rurality, a coordinating and reflexive body that will commission research and look into French rural futures. This body will meet three or four times a year over the next couple of years.

RES-224-25-0107, Dr C Watson, Scottish Agricultural College
01 Sep 04 – 31 Dec 05
Soils – The Foundation of the Rural Economy?

The soil beneath our feet is something most of us take for granted. However, it is a precious resource that governs agricultural sustainability and environmental quality both locally and globally. It is the foundation for all rural land use and, through the industries and businesses directly and indirectly dependent on it, affects the viability of the rural economy.

The aim of the study was, though a series of regional meetings, to determine a range of stakeholder perceptions of the value of soil in a regional context across the UK, with an inclusion of socio-economic effects.

Approximately 720 invitations were sent out to stakeholders in England, Scotland and Wales. The resulting 131 delegates represented a wide spectrum of stakeholders and interests. There was considerable similarity in the distribution of interests by delegates at the six regional meetings. Across all meetings, the top interests were Agriculture, Habitat and Wildlife, Forestry, and Planning and Infrastructure. The meetings were held at Aberdeen, Ayr, Newcastle, Harper Adams, Rothamsted and Okehampton.

A number of key issues were raised that were of practical concern:
- What role does soil management have in the conservation of farmland birds?
- Will we have enough land and/or the right type for graveyards in the future?
- How can soil management help maintain a landscape that people want to see?

The project report, to be published March 2006, will inform soil land use research and be used to support the development of regional soil protection policies.

RES-224-25-0110, Dr S Bell, University of Durham
01 Sep 04 – 28 Feb 05
Calming Troubled Waters: Making Interdisciplinarity Work

The aim of this study was to investigate several important themes relating to interdisciplinary collaboration, including: the processes involved in undertaking interdisciplinary research; an exploration of research outcomes and formats which best address stakeholders' requirements; and investigating issues surrounding the refereeing and publication of interdisciplinary research findings. This project was based on lessons learned from two EU funded projects and interviews with project participants. In addition, the research team synthesised material derived from three workshops on the theme '*Exploring Routes to Interdisciplinarity*' that they organised at the first RELU conference (Rural Economy and Land Use: the challenge for research) held in Birmingham, 19-21 January 2005.

Findings suggest that researchers do face difficulties in understanding what others do and that involving a range of disciplines in a project does not necessarily produce interdisciplinary research or successful communication. In some cases, interdisciplinarity is not needed. However, where interdisciplinarity is deemed important, it is essential that efforts are made to build and develop effective communication channels.

One building block towards better communication is to ensure that project participants have a clearer understanding of disciplinary frameworks and that disciplinary

contributions are mutually intelligible. Working towards interdisciplinarity will take time and require resources. Several suggestions were put forward including meetings and/or workshops where researchers spend time learning about, and teaching, different methodological approaches in order to enhance understanding and engender trust and respect. Projects will also need to reflect on the processes involved in building and maintaining interdisciplinary integration throughout the lifetime of the project and, potentially, beyond. Discussions with RELU researchers highlighted the need for an open dialogue on needs (e.g. trust, respect, incentives) and concerns (e.g. bad for your career) surrounding collaboration.

Publication and dissemination of outputs was an issue consistently raised during this project and we were concerned with two aspects of the dissemination process. Firstly how to meet the needs of stakeholders with different information requirements and, secondly, how researchers and Journal Editors deal with the challenges of publishing interdisciplinary academic papers. Key issues appeared to be the influence of the RAE, the availability of appropriate (top-ranking) journals, and difficulties in evaluating and refereeing interdisciplinary research.

The research team found that interdisciplinarity is dynamic, being the integration of 'ways of thinking' as part of the development of a 'way of working' and thus it cannot be produced by following a predetermined recipe. By concentrating on presenting people's experiences, perceptions, ideas and concerns rather than providing 'recommendations' for interdisciplinarity, it has become clear that there is a level of agreement between the people interviewed and the literature read. Taking a route to interdisciplinarity is not easy but with the right incentives (e.g. greater understanding of the research problem), it is ultimately more rewarding. Nevertheless, the direct responsibility for ensuring successful collaboration (however that is defined) must lie collectively with the researchers, project manager and the funding agencies. Indirectly, the institutions that reproduce the current 'mono-disciplinary' environment in which many interdisciplinary researchers are trying to work, must also move towards breaking the weight of old disciplinary conventions which conspire to inhibit the growth and success of interdisciplinarity and interdisciplinary researchers. There is however a keen willingness amongst researchers to undertake more interdisciplinary work despite their broader concerns over currently wider institutional support.

RES-224-25-0113, Dr C Twyman, University of Sheffield
25 Oct 04 – 24 Apr 05
Learning from the South: Livestock Farming in Stressed Environments (LIFE)

This study informs the RELU programme by setting and addressing a range of key questions concerning the transfer of experience of agricultural research and practice in Europe and developing areas to the UK. It is based on the premise that many 'process related' practices/approaches transcend different bio-physical (climate, ecology) contexts and by sharing experiences from different parts of the world, it could lead to new and creative ways of thinking about issues in the UK. This project aimed to facilitate a two-way learning process by stimulating a dialogue between researchers and practitioners in the UK, Europe and developing areas, to engender the transfer of ideas and 'ways of thinking' about common challenges within small-scale mixed farming in stressed environments. This also challenged conventional assumptions of one-way flows of information, aid and learning from the developed 'north' to the less developed 'south'. This was achieved through a two day workshop in February 2005, which brought together researchers, NGOs, farmer association representatives and policy makers. During this

meeting, workshop participants evaluated the transferable components of 'process-related' best practice approaches, in order to put forward a question-setting agenda for identifying and progressing key issues in small-scale mixed farming in stressed environments.

Based on the analysis of the experiences of the workshop participants, there is increasing evidence of the gains to be made in looking more widely, to experiences and responses from different sectors of societies, and from different parts of the world. Harnessing this potential could lead to new and creative ways of thinking about issues within the UK and developed areas. The outcomes of the 2-day workshop demonstrate that placing the focus on understanding the 'process-related', rather than 'place-based' dimensions of best practices and experiences from elsewhere could have beneficial results for UK policy, planning and research. Despite identification of a number of mechanisms for such transfer, the knowledge transfer process is not straightforward, particularly given that the continuation of agriculture in the face of increasing stresses may not always be the optimum strategy. Further exploration is needed of the overall framework of the rural economy and the multi-functionality of agricultural systems. This includes broadening assessments away from focusing solely on food production.

Key mechanisms for knowledge transfer and learning need to be established, together with 'learning spaces' within and between research institutions, policymakers, NGOs and farming communities. We need to continue to ask how best to transfer knowledge, at what level this should take place and which types of knowledge are most effectively transferred. With further exploration of soft-systems approaches and reconsideration of the multi-dimensionality of power relations, experience sharing could, with time, lead to processes of knowledge transfer.

RES-224-25-0119, Prof P Selman, University of Sheffield
Completed 2005
Landscape as an Integrating Framework for Rural Policy and Planning

Many future decisions about the British countryside will be made in a landscape context. Several landscape based characterisation/ assessment methods are gaining currency as means of identifying areas in which to analyse environmental processes, valorise local assets, devise policy, target expenditure, forge partnerships and engage stakeholders. Whilst 'landscape' has often been treated as an afterthought in land use decisions, it can more positively be viewed as an over-arching framework for comprehending and interpreting patterns and processes of countryside change.

This Development Activity investigated the concept of 'landscape' as an interdisciplinary and integrated basis for intervening in rural conservation and sustainable development. It entailed a literature review, workshop and exploration of an outline model. The literature review synthesised evidence on how a landscape-based approach could help to achieve joined-up action in relation to policy targeting, formation of partnerships, stakeholder participation, data capture, research and promotion of sustainability. In particular, it reviewed the scope for instilling a virtuous circle between landscape stewardship and economic development, in ways that helped simultaneously to sustain countryside character and quality of life. A model was sought for more detailed investigation of this mutually beneficial relationship, and two approaches were considered: one based on qualitative analysis of feedback loops within rural systems; and one drawing upon theories about the resilience of 'socioecological systems'. The workshop reflected on these issues, and drew together academics and practitioners both within and beyond the RELU community, including participants from continental Europe. The Development Activity

concluded that there are important future lines of enquiry relating to the detailed operation of virtuous circles, and to the scope for increased local activity to achieve particular landscape objectives within a wider context of globalisation.

(5) Key Performance Indicators

The Tables present the Key Performance and Activity Indicators for Year 2 of the Programme. All indicators and measures were satisfactorily achieved or exceeded.

KPI for Measuring Performance	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 2005 was on: the development of the Third Call (ensuring its strategic importance in terms of both science policy and public policy) – section 2.4; the formulation and dissemination of RELU's perspective on interdisciplinarity (2.2); initiation of a debate within RELU about knowledge transfer and exchange (2.2); establishment of a collective sense of scientific purpose among the RELU research community (2.1 and 3.6.3); and preparation of a scientific publication covering the First Call projects (3.3.2).
1.2 RELU applications and awards	a) To improve upon the grades and success rates of earlier calls b) Over 17% EOA reports rated outstanding and less than 10% rated problematic[2]		a) A proxy measure of quality (in advance of any scientific output) is competitiveness of the funding calls. While the First Call was oversubscribed a little less than 4 times, the Second Call had a 1 in 8 success rate. b) A report on progress of projects is included in section 4. [ESRC to report evaluation grades to PMG/SAC].
2. Interdisciplinarity			
2.1 To ensure that the Programme engages the wide range of disciplines within the natural and social sciences that can make important contributions to its research	To engage under-represented disciplines in the third call. Number of applications received and funded involving these disciplines	Draft third call to attract key disciplines.	In drafting the Third Call, the following steps were taken to attract key disciplines: gap analysis; call design; setting up a dating agency; and informal matchmaking. The discipline gap analysis identified absence of, and lack of linkages between, certain biological and social science disciplines, which were targeted in third call. In particular the call included the theme of the Management of Animal and Plant Disease as an approach to engaging the less well represented disciplines. A discipline analysis is presented in section 3.2 for the second call. A discipline analysis of the third call projects will be prepared in 2006 when applicants prepare their full proposals.
2.3 Facilitation of interdisciplinary training and		Number of opportunities taken up by award holders	Various interdisciplinary training workshops were organised (see section 3.4). A workshop is being planned for January 2006 to scope RELU's

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

advice opportunities			interdisciplinary training requirements.
3. User Engagement, Knowledge Transfer and Impact			
3.1 Stakeholder engagement	To establish and maintain Stakeholder Engagement Plans	Establish plans and review annually with stakeholders	Currently RELU has SEPs with five organisations and these will be reviewed early in 2006 (see 3.3.4).
3.2 Links created between award holders and stakeholders	a) Number of work shadows b) Number of stakeholders engaged in projects		a) We inaugurated the work shadowing scheme late in 2005, with several applications in preparation from projects (see 3.4.3) b) A commentary on project stakeholder engagement is presented at section 3.3. c) A commentary on actions taken to engage stakeholders with award holders is presented in section 3.3. d) 14 presentations were given to stakeholder events by the Director or Assistant Director. The Director's Office held a further 11 bilateral meetings with key stakeholders and attended 23 conferences and workshops (see Annexes B and D).
3.3 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	To contribute to and/or co-ordinate these inputs	The main foci for informing policy during 2005 have been: science policy (including the framing of FPVII and a contribution to the SDRN consultation on research needs for sustainable development); the future of agricultural policy (including discussions with Natural England on the future of farm advisory services and various presentations on national and EU rural development policy) (see 3.3.5).
3.4Award holders' Communication Proformas	To be completed 3 months after start of award		All first call research projects completed their Project Communication and Data Management Plans early in 2005, which were reviewed and signed off by the Director's Office and RELU Data Support Service (see 3.6.2).
4. Research Capacity and Training			
4.1 RELU studentships	Four year submission rate to be the same as the ESRC/NERC scheme	Director to report any potential problems and to suggest ways to improve submission and success rates	No problems perceived.
5. Data Collection and Management			
5.1 Data Support Service	Data Support Service in place by November 2004		[PMG to report on service provided and feedback from award holders].
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 2nd call by July 2005	Review and provide advice at assessment panel meetings	Advice provided on 42 applications at Second Call assessment panel and Studentship assessment panel.

6.2 Applicants and Award holders		Provide telephone and email advice to applicants and award holders (acknowledgement of enquiry within two working days, full response within seven working days) Meet with individual award holders annually to discuss progress	A system in place which ensures prompt responses to all enquiries. The Director's Office keeps all correspondence in relation to the programme. The Director's Office has visited all of the major projects and has convened meetings of all PIs (see 3.6.2 and 3.6.3).
7. Added Value			
7.1 Support effective networking between project teams		Hold an annual award holders meeting and other networking activities as appropriate	The Director's Office held a hugely successful conference in January 2005 which established a strong sense of collective identity amongst the projects and also raised the profile of the programme with key stakeholders. The event was subject to full delegate feedback (see 3.6.3). Other networking activities included a major workshop jointly hosted with the Land Use Policy group to review the outcomes of first call scoping studies and capacity building awards and organisation of an induction meeting for second call research projects (3.6.3).

RELU: Key Activity Indicators for 2005

KPI for Measuring Performance	Programme Target/Measure	Director's Office Target/Measure	Statement of Achievement
1. Scientific Quality			
1.1 Refereed journal articles	Number per annum		8 journal articles published in 2005 and 120 papers given at conferences (Annex C).
1.2 Books authored	Number per annum		0 books produced in 2005.
2. Interdisciplinarity			
2.1 Number of disciplines engaged in RELU	a) Total number per call/phase b) Number of less engaged disciplines per call/phase		a) A disciplines analysis is presented in section 3.2. The Director provided a commentary on range and combination of disciplines involved under each call/phase to the RELU SAC in July 2005.
2.2 Publications jointly authored by natural and social scientists	Number per annum		[Not recorded as data not collected by Research Councils as part of End of Award Reports].
3. User Engagement, Knowledge Transfer and Impact			
3.1 Stakeholder engagement a) Meetings, events etc b) Forums		a) Number per annum b) Number per annum	a) 1 Annual Conference; 1 Thematic Workshop (see 3.6.3). 14 presentations were given to stakeholder events by the Director or Assistant Director. The Director's Office held a further 11

c) SEPs d) Long-term contacts		c) Number per annum	bilateral meetings with key stakeholders and attended 23 conferences and workshops. b) 2 Food Forum meetings held (see 3.3.4) c) 2 further SEPs established. SEPs to be reviewed in 2006 (see 3.3.4). d) Forum membership is steady. SAC attendance is declining.
Reports or briefings produced for stakeholders	Number per annum	Number per annum	2 programme level briefing papers produced (3.3.2), 4 newsletters and 1 stakeholder consultation; [We have not been able to identify number of briefing papers produced by projects as this data was not effectively collected by the Research Councils in End of Award reports].
3.3 Media coverage of research and outputs	Number press releases issued per annum	Number press releases issued per annum	The Director's Office issued 1 press release in 2005. A list of RELU publicity during 2005 is listed in Annexe C. [Data on project level press releases is not recorded or collected by Research Councils in End of Award Reports].
3.4 RELU website		Number hits per annum	See 3.3.2.
4. Research Capacity and Training			
5. Data Collection and Management			
6. Programme Management			
6.1 SAC Meetings	Number of meetings held		[PMG to report]
7. Added Value			

(6) Forward Look

2006 will be a key period for the RELU Programme. During the reporting period:

- 8 major Research Projects, addressing sustainable food chain themes, will embark on the second year of their investigations
- 11 major Research Projects, addressing People and the Rural Environment themes, will embark on the first year of their investigations
- RELU will assess and commission its third and final round of research

Planning is well underway for the second major Annual Programme Conference in January 2006. The conference will have a particular focus on the theme of knowledge exchange. We will be exploring approaches and issues at the interface between research, policy and practice and arranging a variety of sessions involving knowledge producers and brokers. Late in 2005 we circulated a paper to inform the discussions in the conference and to seek views about models and mechanisms of knowledge exchange. The conference will also focus on inter-project networking and learning. We are planning a number of interactive sessions exploring the challenges of data integration within interdisciplinary research, qualitative and quantitative methodologies, interfacing with the public, and the training and career development issues presented by interdisciplinary research. A final dimension of the conference will be to welcome a number of delegates from North America and continental Europe who will provide a valuable international perspective on the RELU agenda.

A major RELU Thematic Workshop is planned for May 2006. The workshop will explore the implications for regional and rural development of RELU's sustainable food chain research projects. The workshop is being hosted by Advantage West Midlands Regional Development Agency. The audience will consist of RELU researchers, national regional and rural development professionals, including Regional Development Agency representatives from across England and their equivalents in Scotland, Wales and Northern Ireland.

Planned and potential activities and outputs for the year include:

January 2006	Annual Award Holders Conference
	Briefing Paper on the Unfolding Research Agenda
February 2006	Assessment Panel Third Call Concept Notes
March 2006	RELU Newsletter 5
	Science Week/Social Science Week: RELU debates
	Third meeting of RELU Food Chain Forum
April 2006	Third Call Concept Note Workshop
May 2006	RELU Rural and Regional Development Workshop
	First meeting of RELU People and the Rural Environment Forum
	Briefing Paper on Enabling Knowledge Transfer
	Briefing Paper on RELU 'Science Week' debates
June 2006	RELU Newsletter 6
September 2006	RELU Newsletter 7
October 2006	Second meeting of RELU People and the Rural Environment Forum
	Fourth meeting of RELU Food Chain Forum
	Third call assessment panel (full proposals)
November 2006	End of current tenure of Director's Office

(7) Budget Matters

No matters of concern to report.

Annex A: NOMINATED HIGHLIGHTS

RESEARCH HIGHLIGHT: RELU CASTS NEW LIGHT ON FOOD MILE DEBATE

Prof G Edwards-Jones (University of Wales, Bangor) and his RELU project team '*Comparative Assessment of Environmental, Community and Nutritional Impacts of Consuming Vegetables Produced Locally and Overseas*' are comparing local and imported vegetables for their social costs, carbon budgets, consumer acceptability, and health impacts. Field work is being carried out in Kenya, Spain and the UK with a variety of vegetables, including beans, peas, brassicas, leafy/salad vegetables, potatoes and onions.

The environmental costs of the greenhouse gases produced during growth and transport of the crops as well as downstream costs of production, transport (food miles) and storage are being brought together in a Life Cycle Analysis (LCA) of vegetables from different sources. This will help determine which system has the lowest environmental impacts. Sociological field work is also examining the local food cultures of different regions in the UK as well as consumer perceptions of health benefits of local and imported vegetables. A case study in Anglesey will help determine the advantages and disadvantages, environmentally and socially, of increasing local production of vegetables.

Early results suggest that issues of food sourcing are far more complicated than simply 'food miles', and that the purchasing pattern of consumers can have major implications both for the climate and for local economic development and poverty alleviation in developing countries.

For example, results suggest that the proportion of greenhouse gases emitted from transporting food into and around the UK are a relatively small proportion of the total amount of greenhouse gases emitted from the entire food chain. In the case of a UK produced potato, 48% of total greenhouse emissions are related to home preparation and cooking. Whereas in the case of UK produced chicory, the energy used in storage and packaging is far greater than that used in transport. These results suggest that, while any reduction in transport will inevitably reduce greenhouse gas emissions, it is unclear if targeting transport for consumer or Government-led action will actually provide the greatest benefit in the shortest period. It is emerging as a possibility that seeking to reduce energy consumption in packaging and in the home may have a far greater impact on the level of greenhouse emissions than simply reducing 'food miles'.

A further complication relates to the fact that soils themselves emit greenhouse gases, through the activity of soil microbes. The level of emissions can vary with soil type, temperature and management, and early estimates suggest that up to 20t of CO_2 may be emitted from one hectare of horticultural land per year. These emissions also need to be factored into the Life Cycle Assessment, and should it appear that some locations emit fewer gases than others, this again will complicate the simple logic of 'food miles'.

Unfortunately, by considering the whole food system, it also becomes apparent that there is variation in other elements of the system which may be of concern to citizens and Government. These include variation in the use of inputs such as pesticides, fertilisers and irrigation, but they also relate to socio-economic benefits. These social issues become very apparent when considering, say, African producers, when it could be argued that through UK consumers supporting horticulture in poor countries they are contributing

significant economic benefits to local people, which in turn lead to improvements in health and general well-being.

While this research is less than half way through at the moment, it is apparent that simple assumptions that 'local food' is best may not always be correct. Further to concentrate policy action solely on reducing 'food miles' may be inefficient in delivering environmental and social benefits.

DISSEMINATION HIGHLIGHT: RELU ADVISES PESTICIDES SAFETY DIRECTORATE

Wyn Grant (University of Warwick) and his RELU project team provided a strategic submission to the national PSD consultation 'Pesticides Safety Directorate: a Draft National Strategy for the Sustainable Use of Plant Protection Products'. The final version of the national strategy was published in March 2006. The PSD launched a new Biopesticides scheme in April 2006.

The RELU project '*Biological Alternatives to Chemical Pesticide Inputs in the Food Chain: An Assessment of Environmental and Regulatory Sustainability*' is based on insect pathogenic fungi, which 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, although little work has been done on their environmental sustainability. The project is also examining the rules governing the introduction of bio-pesticides in the UK, Europe and the USA to assess whether changes in regulations and the way in which they are applied might encourage a move towards biopesticide use. This is relevant to the Defra objective of turning the concept of sustainability into a reality.

The project has highlighted a key problem, which is persuading small and medium-sized firms producing these niche biopesticide products to contact PSD early enough to take advantage of the help available through pre-submission meetings which would prevent firms from making avoidable errors in their data collection and trial procedures. There is no doubt that the reducing number of available constituents for chemical pesticides, together with the fact that retailers have restricted the use of approved pesticides, is presenting growers with a real challenge, particularly in relation to horticultural products.

The project has drawn attention to the need to ensure that the system of mutual recognition in the EU works properly. This should allow a product approved by one member state to be easily approved for use in each member state, but this is not happening yet.

There is insufficient information available on the ecology and natural ecosystem functions of microbial agents. Filling in knowledge gaps in these areas is enabling a better understanding of the environmental sustainability of using biopesticides. The researchers have found that the structure of natural populations of species of insect pathogenic fungi is affected by habitat type. This may indicate local adaptation of populations, which could affect the ability of introduced biopesticide genotypes to interact and compete with local populations.

Through work in the project: PSD has welcomed an external review of how they carry out work in the area of biopesticides; the Environmental Protection Agency (US) has welcomed the opportunity for an ongoing comparison of regulatory practice in the UK and US; and growers and manufacturers of biocontrol products have welcomed the exploration

of changes in the regulatory system that might make alternative products more readily available.

Through the RELU work shadowing scheme, Wyn Grant is now attending meetings at PSD with the objective of offering constructive feedback on the way in which the regulatory process operates in the area of biopesticides.

Annex B: PROGRAMME CHRONOLOGY

Month	Programme Events	Project Start/End Dates and Director's Meetings with Projects
Jan 05	RELU Programme National Conference, "RELU: The Challenge for Research" Birmingham	End date project RES-224-25-0091 *Analysing Visual Quality in Relation to Landscape Change Scenarios: An Assessment of the Requirements* (David Miller), Macaulay
	RELU Strategic Advisory Committee meeting, Birmingham.	Start date project RES-224-25-0041 *Eating Biodiversity: An Investigation of the Links between Quality Food Production and Biodiversity Protection* (Henry Buller), Exeter
	RELU Data Sub-Group, Newcastle.	Start date project RES-224-24-0066 *Warmwater Fish Production as a Niche Production and Market Diversification Strategy for Organic Arable Farmers with Implications for Sustainability and Public Health* (David Little), Stirling
	ESRC Directors' Meeting, Swindon.	
Feb 05	RELU Project Workshop, "Learning from the South: mixed farming in stressed environments", University of Oxford.	Start date project RES-224-25-0086 *Sustainable and Holistic Food Chains for Recycling Livestock Waste to Land* (David Chadwick), IGER, North Wyke.
	1st Meeting of RELU Food Chain Forum, London.	Start date project RES-224-25-0090 *Integration of Social and Natural Sciences to Develop Improved Tools for Assessing and Managing Food Chain Risks Affecting the Rural Economy* (Richard Shepherd), Surrey.
	RELU sponsored conference, with Northern Rural Network "Understanding Rural Economies", York (Assistant Director's presentation on *"Research for Evidence-Based Policies for Rural Economies"*).	Start date project RES-224-25-0093 *Re-Bugging the System: Promoting Adoption of Alternative Pest Management Strategies in Field Crop Systems* (Alastair Bailey), Imperial College London
	Director's Presentation on *"RELU's Approach to Knowledge Transfer"* to English Nature, Peterborough.	
	Meeting with Defra/Age Concern staff to advise on research needs on demographic ageing and rural areas.	
Mar 05	Programme meeting with ESRC/Defra, London (to promote stronger links on rural research).	End date project RES-224-25-042 *Developing an Interdisciplinary Approach to Address Environmental and Social Issues Resulting from Changes in Land Use in the English Lake District* (Edward Tipping), Lancaster
	Programme meeting with EPSRC, Swindon (to explore possible scope for collaboration).	End date project RES-224-25-0058 *Developing Tools for Interdisciplinary Research: Physical and Social Science Perspectives on the Use of Rural Catchments* (Liz Oughton), Newcastle
	RELU Management Advisory Group, Swindon.	
	RELU Newsletter January – March (http://www.relu.ac.uk/news/news1.pdf)	
Apr 05	RELU Project Workshop, "Large Scale Investigations in Ecology and Rural Land Use" Imperial College London. (Director gave summing-up address)	Start date project RES-224-25-0073 *Implications of a Nutrition Driven Food Policy for Land Use and the Rural Environment* (Bruce Traill), Reading
May 05	Director's presentation on *"Agenda Setting and Accountability in Interdisciplinary Research Programmes"* to ESRC-sponsored "Interactive Agenda Setting in the Social Sciences" seminar, Abingdon.	End date project RES-224-25-0037 *Data Resources for Rural Sustainability Research: Realising their Combined Potential* (Nigel Boatman), CEH Lancaster
	RELU Project Workshop, "Landscape as	End date project RES-224-25-0068 *Development of a*

	an Integrating Framework for Rural Policy and Planning" University of Sheffield.	*Landscape Intervention Decision Support System (LIDSS) to Maximise Net Social Benefit* (David MacDonald), Oxford
	RELU Programme Workshop with the Land Use Policy Group of the UK conservation agencies "People and the Rural Environment: Scoping the Research Agenda", York	
	RELU Project Workshop on "Data Integration", York.	
	Programme meeting with Defra Rural Economics Unit to advise on rural productivity analysis (for Defra's report on *"Rural Productivity")*.	
	Director's presentation on *"Sustaining Agri-food Systems: the Need for Interdisciplinary Research"* to OECD/Italian Government Conference on "Opportunities and Challenges in Agri-Food Research", Rome.	
	"Setting the Research Agenda" Rural Economy and Land Use Programme Briefing Series No 1.	
	"Rural Economy and Land Use Futures" Rural Economy and Land Use Programme Briefing Series No 2.	
Jun 05	Director's presentation on *"Accountable Science: Improving the Social Responsiveness of Research Programmes: the Case of RELU"* to ESRC-sponsored Transdisciplinary Seminar Series on Sustainable Agriculture, School of Geography, University of Nottingham.	End date project RES-224-25-0003 *A Cross-Disciplinary Methodology to Promote an Holistic Understanding of Diffuse Pollution Issues in Rural Environments* (Louise Heathwaite), Lancaster
	Director's presentation on *"The Changing Politics of the Countryside"* to ESRC-sponsored Governance of Sustainability Conference, Norwich.	
	Second Call Assessment Panel, Swindon.	
	Studentships Assessment Panel, Swindon.	
	RELU News April – June (http://www.relu.ac.uk/news/news2.pdf)	
	Programme meetings re Third Call with Fiona Stuart and Fred Landeg, Animal Health and Welfare Division, Defra, London.	
Jul 05	Programme meeting re Third Call with Stephen Hunter and Alan Inman, Plant Health Division, Defra, York.	Director's Office visit to Food Project 0048 *Biological Alternatives to Chemical Pesticide Inputs in the Food Chain: An Assessment of Environmental and Regulatory Sustainability* (Wyn Grant), Warwick.
	Programme meeting with Jim Knight, Defra Minister of State with responsibility for the countryside.	End project RES-224-25-0088 *Sustainable Upland Management for Multiple Benefits* (Klaus Hubacek), Leeds
	RELU Strategic Advisory Committee, London	End date project RES-224-25-0095 *Building Capacity to Investigate the Potential Role of Sustainable Agricultural Intensification in AgroEcological Systems* (Noel Russell), Manchester
Aug 05	Programme meeting with NERC staff, Swindon (to discuss the relevance of RELU's experience to the new interdisciplinary programme on environment and health).	Director's Office visit to Food Project 0093 *Re-Bugging the System: Promoting Adoption of Alternative Pest Management Strategies in Field Crop Systems* (Alastair Bailey), Wye

	Programme meeting with Martin Fitton, Chief Executive, Association of National Parks Authorities, to discuss joint stakeholder activities, Newcastle.	End date project RES-224-25-0031 *Building Networks for a RELU Capacity Building Programme: Exploiting Options from the Eastern US & Nearby European Continent* (Hadrian Cook), Imperial, Wye
	Assistant Director's presentation on *"The Social Sciences and Agri-food Research")* to European Society for Rural Sociology Congress, Keszthely, Hungary.	End date project RES-224-25-0084 *Learning and Research for Sustainable Agro-Ecosystems by both Farmers and Scientists* (Fergus Lyon), Middlesex
Sept 05	Director's presentation on *"Sustaining Agri-food Systems: Rethinking Public Research"* to EURAGRI Members' Conference "Anticipating the future: knowledge based policy for European Agriculture", bringing together the Directors of Research and Chief Scientists from EU Agriculture Ministries, York.	Director's Office visit to Food Project 0073 *Implications of a Nutrition Driven Food Policy for Land Use and the Rural Environment* (Bruce Traill), Reading
	2nd meeting of RELU Food Chain Forum, London	Director's Office visit to Food Project 0044 *Comparative Assessment of Environmental, Community & Nutritional Impacts of Consuming Vegetables Produced Locally and Overseas* (Gareth Edwards-Jones), Bangor
	Teleconference with PMG to discuss Second Call Conditional Offers	Director's Office visit to Food Project 0041 *Eating Biodiversity: An Investigation of the Links between Quality Food Production and Biodiversity Protection* (Henry Buller), Exeter
	RELU Newsletter July – September 2005 (http://www.relu.ac.uk/news/news3.pdf)	Director's Office visit to Food Project 0086 *Sustainable and Holistic Food Chains for Recycling Livestock Waste to Land* (David Chadwick), IGER, North Wyke, Devon
		End date project RES-224-25-0062 *Developing Spatial Data for the Classification of Rural Areas According to Socio-Economic and Environmental Sustainability Factors* (Meg Huby), York
		End date project RES-224-25-0081 *Achieving Sustainable Catchment Management: Developing Integrated Approaches and Tools to Inform Future Policies Clive* (Spash), Macaulay
Oct 05	Second Call Principal Investigators' Induction Workshop, Newcastle	Director's Office visit to Food Project 0066 *Warmwater Fish Production as a Niche Production and Market Diversification Strategy for Organic Arable Farmers with Implications for Sustainability and Public Health* (David Little), Stirling
	Assistant Director's presentation on *"The Changing Research Agenda for Sustainable Agri-food Systems"* to Strategic Research Review of FPVII, Working Group on 'Environmental Issues Related to Food and Feed', European Commission, DG12, Brussels.	Director's Office visit to Food Project 0090 *Integration of Social and Natural Sciences to Develop Improved Tools for Assessing and Managing Food Chain Risks Affecting the Rural Economy* (Richard Shepherd), York
		End date project RES-224-25-0002 *Climate Change, Non-Point Pollution and Land Use: Modelling Interactions* (Nick Hanley), Stirling
		End date project RES-224-25-0087 *Integrated Modelling and Assessment of Agricultural Sustainability - Scoping How to Support Policy Relevant Assessments of Agricultural Sustainability* (Keith Matthews), Macaulay
Nov 05	Director's presentation on *"Promoting Diversification into Non-Farming Activities and Developing the Rural Economy" to* Rural Development in	End date project RES-224-25-0009 *Co-operative Management of the Agricultural Environment (Co-ManAge)* (Jeremy Franks), Newcastle

	Europe**:** Funding European Rural Development in 2007-2013. Agra Europe Conference, London.	
	Director's presentation on *"Reflections on Nature and Society and Interdisciplinarity"* to the Mammal Society's Autumn Symposium on Wild Mammals and the Human Food Chain**,** London Zoo.	
	Director's presentation on "*Strategies For Rural Development: Past, Present and Future"* to China-UK Symposium on Appropriate Science and Technology for Rural Sustainable Development – The Challenges and Opportunities**,** sponsored by DFID. Yangling, Shaanxi Province, China.	
	RELU Management Advisory Group meeting, London.	
	RELU Data Sub-Group, London.	End date project RES-224-25-0018 *Designing and Implementing Large Scale Experiments in Land Use (*Matt Thomas), Imperial College
Dec 05	Director's presentation on *"Towards Rural Development Policies for Europe for the 21st Century" to* IPPR seminar 'A New Rural Agenda' seminar, Brussels	End date project RES-224-25-0076 *Gentrifying Rural Natures: An Investigation of the Enrolment and Modification of Nature within a Gentrifying Village* (Martin Phillips), Leicester

Annex C: PROJECT PUBLICATIONS

JOURNAL ARTICLES

Bruce, T.J.A, Birkett, M.A., Blande, J., Hooper, A.M., Martin, J.L., Khambay, B., Prosser, I., Smart, L.E., and Wadhams, L.J. (2005) Response of economically important aphids to components of *Hemizygia petiolata* essential oil. *Pest Management Science* **61**: 1115-1121.

Cook, H. (2005) Publication of "Catchment Management", a special issue of *Waterlines,* Vol 24, No. 1, July.

Cross P. A. and Edwards-Jones, G (in press) Variation in pesticide hazard from arable crop production in Great Britain from 1992 to 2002: pesticide risk indices and policy analysis, *Crop Protection*

Grady, K., Murray, F., Young, J., Watterson, A. and Little, D. (2005) Can tilapia be grown successfully in the UK?, *Aquaculture News* **32**, p 14-15.

Holden, J., Trotter, S., Hodson, S., Lindup, S., Milner, S., McHale, S., Worman, C., Flitcroft, C., Buckler, M., Bonn, A., Evans, M., Allot T., Crowe, S., Liddaman, L., Hobson G., Irvine B., Maxfield, E., James, T. (2005) Understanding gully blocking in deep peat, *Geophysical Research Abstracts*: 7: 00796.

Hopkins, A. (2005) Cashing in on biodiversity. *Grass and Forage Farmer*, 81, Spring 2005, page 20.

Norton, L. (2005) Understanding Loweswater NERC *Planet Earth* Autumn 2005

Phillipson, J., Daymond, J., Lowe, P. and Lee, R. (2005) Harnessing the social and natural sciences for sustainable rural development: introducing the rural economy and land use programme. *Journal of Farm Management*, **12** (5), 277-286.

CONFERENCE PAPERS AND PRESENTATIONS

Andrews, P., Dunn, H. (2005) *"The strategy for sustainable farming and food"* Presentation to RELU conference Rural Economy and Land Use: The Challenge for Research 19-21 Jan 2005, Birmingham.

Bailey, A. (2005) *"Adoption of alternative pest management strategies in field crop systems"* Presentation to RELU conference Rural Economy and Land Use: The Challenge for Research 19-21 Jan 2005, Birmingham.

Barker, G. (2005) *"Tools for assessing and managing food chain risks"* Presentation to RELU conference Rural Economy and Land Use: The Challenge for Research 19-21 Jan 2005, Birmingham

Bilsborough, S. (2005) *"Biodiversity and land use"* Presentation to RELU conference Rural Economy and Land Use: The Challenge for Research 19-21 Jan 2005, Birmingham.

Blackstock, K.L. (2005) *"Stakeholder involvement, representation and scale in environmental governance*" Presentation to RGS-IBG Conference, Power in the Countryside Session, Royal Geographical Society, London, 31st August - 2nd September, 2005.

Bonell, M. (2005) "*The scientific challenge"* Presentation to RELU conference Rural Economy and Land Use: The Challenge for Research 19-21 Jan 2005, Birmingham

Bowles, D. (2005) "*Science for sustainable development"* Presentation to RELU conference Rural Economy and Land Use: The Challenge for Research 19-21 Jan 2005, Birmingham.

Buckwell, Allan. (2005) *"Economic, environmental and social consequences of CAP reform"* Presentation to RELU conference Rural Economy and Land Use: The Challenge for Research 19-21 Jan 2005, Birmingham.

Buller, H. (2005) "*The links between quality food production and biodiversity protection"* Presentation to RELU conference Rural Economy and Land Use: The Challenge for Research 19-21 Jan 2005, Birmingham.

Buller, H. and Winter, M. (2005) *"Overview of integrated food chain research: where are we now*?" Presentation to RELU conference Rural Economy and Land Use: The Challenge for Research 19-21 Jan 2005, Birmingham.

Buller, H. (2005) *"*Ma*nger la biodiversité*" Presented INRA/RELU workshop, Chambery, France.

Buller, H. (2005) "*Cows, sheep, grass, biodiversity… and wolves"* Presentation to the Mammal Society symposium, 'Wild mammals and the human food chain', London, November 2005

Buller, H. (2005) "*Mountains, cows, grass, cheese*" Presentation to the CRE, University of Newcastle, November 2005.

Carss, D., Marzano, M. and Bell, S. (2005) *"Calming troubled waters: interdisciplinary approaches to environmental conflicts"* Presentation to RELU Workshop 'People and the Rural Environment: Scoping the Research Agenda' 18 May, York.

Chadwick, D. (2005) *"Sustainable and holistic food chains for recycling livestock waste to land"* Presentation to RELU conference Rural Economy and Land Use: The Challenge for Research 19-21 Jan 2005, Birmingham.

Chadwick, D. (2005) *"Environment and land use"* Presentation to RELU conference Rural Economy and Land Use: The Challenge for Research 19-21 Jan 2005, Birmingham.

Chandler, D. (2005) *"Biological alternatives to chemical pesticides in the food chain: an interdisciplinary approach"* Paper given to Tetrapartite Group visit to Warwick HRI, 7 June 2005.

Cook, H. (2005) P *"The economics of participation*" Presentation to the Association of Rivers Trusts Autumn Seminar, "Community Partnerships", 27-28 September 2005, Haverfordwest, Pembrokeshire.

Cook, H. (2005) *"Protecting water supplies at their watershed source*" Presentation to the Pace University Eastern Water Law Symposium, October 22, 2005.

Costigan, P. (2005) "*A food and land use perspective"* Presentation to RELU conference Rural Economy and Land Use: The Challenge for Research 19-21 Jan 2005, Birmingham

Duff, Keith. (2005) *"Research challenges"* Presentation to RELU conference Rural Economy and Land Use: The Challenge for Research 19-21 Jan 2005, Birmingham

Dunn R.M., Hopkins A., Buller H., Jones O., Morris C., Wood J.D., Whittington F. and Kirwan J. (2005) "*Farm scale investigations of the links between pasture biodiversity and quality food production in the UK"* Presentation to the 13th Meeting of the FAO-CIHEAM Mountain Pastures Network (Quality Production and Quality of the Environment in the Mountain Pastures of an Enlarged Europe) September 15-17, 2005, Udine, Italy (to be published in FAO REUR technical series).

Dutton, A. and MacDonald, D. (2005) *"Maximising the net benefits of wildlife conservation on farmland"* Presentation to RELU Workshop 'People and the Rural Environment: Scoping the Research Agenda' 18 May, York.

Edwards-Jones, G. (2005) "*Assessment of environmental, community & nutritional impacts of consuming fruit and vegetables produced locally and overseas"* Presentation to RELU conference Rural Economy and Land Use: The Challenge for Research 19-21 Jan 2005, Birmingham.

Edwards-Jones, G (2005) "*People - consumers, economics, communities"* Presentation to RELU conference Rural Economy and Land Use: The Challenge for Research 19-21 Jan 2005, Birmingham.

Edwards-Jones, G. (2005) "*Comparative assessment of environmental, community and nutritional impacts of consuming fruit and vegetables produced locally and overseas"* Presentation to RELU Food Chain Forum, February 2005, London.

Edwards-Jones, G. (2005) "*Comparative assessment of environmental, community and nutritional impacts of consuming fruit and vegetables produced locally and overseas"* Presentation to Welsh Health Economics Group, May 2005.

Evans M.G., Allott T., Holden J., Flitcroft C., and Bonn A. (2005) "*Understanding gully blocking in deep peat*" Presentation to Moors for the Future Conference, Castleton, September.

Ferris, R. (2005) *"The UK biodiversity action plan; strategic research needs"* Presentation to RELU conference Rural Economy and Land Use: The Challenge for Research 19-21 Jan 2005, Birmingham.

Fisher, J. (2005) *"Collaborative research programme on economics for WFD"* Presentation to RELU conference Rural Economy and Land Use: The Challenge for Research 19-21 Jan 2005, Birmingham.

Franks, J. and A.McGloin (2005) "*Environmental co-operatives: A Dutch farmers' initiative"* Presentation to 41st National farm management conference : What is - Farming? Bedford.

Grant, W. (2005) *"The challenge of interdisciplinary environmental research: the case of biopesticides"* Presentation to Northeastern Political Science Association Conference, Philadelphia, Pa., 17 November 2005.

Grant, W. (2005) *"Biological alternatives to chemical pesticide inputs in the food chain: environmental and regulatory sustainability"* Presentation to RELU conference Rural Economy and Land Use: The Challenge for Research 19-21 Jan 2005, Birmingham.

Grant, W. (2005) *"Governance - ownership, policy, regulation"* Presentation to RELU conference Rural Economy and Land Use: The Challenge for Research 19-21 Jan 2005, Birmingham.

Grant, W. and Chandler, D. (2005) *"Biopesticides: an assessment of environmental and regulatory sustainability"* Presentation to International Biocontrol Manufacturers Association, Whittlesford, 15 September 2005.

Hanley, N., Tinch, D., Black, A. and Aftab, A. (2005) *"Integrated catchment modelling and climate change"* Presentation to RELU Workshop 'People and the Rural Environment: Scoping the Research Agenda' 18 May, York.

Harris, Bob. (2005) "*An environmental management perspective"* Presentation to RELU conference Rural Economy and Land Use: The Challenge for Research 19-21 Jan 2005, Birmingham.

Heathwaite, A.L. (2005) *"Water, water everywhere – but usually too much, too little or too late"* Presentation to Sustainable Development Research Network Annual Meeting, London, 22 September.

Heathwaite, A.L. (2005) *"Catchment sensitive science into policy"* Presentation to UNESCO Workshop on surface - groundwater interactions in river corridors, Session IV Knowledge transfer into catchment management practices Oxford, UK, 12-14th September.

Heathwaite, A.L. (2005) *"Connectivity: linking land to water: processes, pathways and risk assessment for water quality*" Presentation to Joint FAO/IAEA Division Nuclear Techniques in Food and Agriculture. International meeting on Water and Land Resources Management within the Plant Rooting Zone for Food and Security and Environmental Sustainability, Vienna 18-20th May 05.

Heathwaite, A.L. and Harris, R. (2005) *"Integrated catchment science"* Presentation to NERC LOCAR Science meeting, Reading, UK, 20th March. Invited contribution.

Dougill, A., Reed, M., Hubacek, K., Burt, T., Chapman, P., Fraser, E., Holden, J., Kirkby, M., Prell, C., Sendzimir, J., Shotbolt, L., Stagl, S., Stringer, L., Turner, A. and Worrall, F. (2005) *"Managing uncertainty in dynamic socio-environmental systems: an application to UK uplands"* Presentation to RELU Workshop 'People and the Rural Environment: Scoping the Research Agenda' 18 May, York.

Hubacek, K., Dougill, A.J., Burt, T., Chapman, P., Fraser, E.D.G., Holden, J., Kirkby, M.T., Prell, C., Reed, M.S., Sendzimir, J., Shotbolt, L., Stagl, S., Stringer, L., Turner, A.G.D. and Worrall, F. (2005) *"Doing Adaptive Learning Rural Research: Lessons from the Peak District National Park*" Presenation to Bioscience 2005 - Biodiversity Conservation and Sustainable Development in the Mountain Areas of Europe: the challenge of interdisciplinary research, Greece, September.

Huby, M., Cinderby, C. and Owen, A. (2005) *"An overview of rural data sources"* Presentation to the Northern Rural Network, RELU and SPARSE Workshop: Understanding Rural Economies, York, February.

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OTHER OUTPUTS (WORKING PAPERS, BRIEFING PAPERS, SUBMISSIONS TO STAKEHOLDER CONSULTATIONS)

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PRESS AND PUBLICITY

Dec	The Times	*"Beetles are back on top of the crops"* by Mark Cocker, Times 4 Dec 2004. On "Re-Bugging the system: promoting adoption of alternative pest management strategies in field crop systems", PI Alastair Bailey.
Mar	Farmers Weekly	*"New food comparison study",* p 14, March 18-24 On "Comparative Assessment of Environmental, Community & Nutritional Impacts of Consuming Fruit & Vegetables Produced Locally and Overseas", PI Gareth Edwards-Jones.
	HDC News	*"Making Science Acceptable",* pp28-29, March 05 On "Biological Alternatives to Chemical Pesticide Inputs in the Food Chain: An Assessment of Environmental and Regulatory Sustainability ", PI Wyn Grant.
	Biocontrol	*"Towards a Green and Pleasant Land: Biocontrol in UK Agriculture"* March 2005, Volume 26 No. 1 PEST CABWeb On "Re-Bugging the system: promoting adoption of alternative pest management strategies in field crop systems", PI Alastair Bailey.
Mar	Bangor and Anglesey Mail: Rural affairs section. Hereford Journal: Daily Post: Double page centre spread. Hereford Times: Farmers Weekly: Farmers Guardian: Regional page	A range of newspaper and specialist press articles on project. RES-224-25-0044 "Comparative Assessment of Environmental, Community and Nutritional Impacts of Consuming Vegetables Produced Locally and Overseas" PI Gareth Edwards-Jones
May	Social Sciences ESRC Newsletter	Note on the launch of the *RELU Newsletter*.
	Social Sciences ESRC Newsletter	*"Sustainable Food Chains"* Introduction to "Implications of a Nutrition Driven Food Policy for Land Use and the Rural Environment", PI Bruce Traill
July	NERC Planet Earth and BBSRC Business	Advert for Briefing Papers, NERC Planet Earth and BBSRC Business
Sept	ESRC Social Science Newsletter	A number of articles in ESRC Social Science Newsletter, September 2005 pp 5, 13, 14, 18
October	Game Conservancy Trust	Press release Game Conservancy Trust "Flying predators are top at saving crops" Game Conservancy Trust, 10 October 2005 press release http://www.gct.org.uk/article.asp?PageId=78&ArticleId=148
	BBSRC: Business	Article in BBSRC: Business "Harnessing social and natural sciences for sustainable rural development" BBSRC: Business, October 2005 p22-23
	Aquaculture News 32, Issue 32	Tilapia in the UK, Kathleen Grady *et al* http://www.aquaculture.stir.ac.uk/AquaNews/

Annex D
CONFERENCES/WORKSHOPS ATTENDED BY MEMBERS OF DIRECTOR'S OFFICE

Jan 2005	RELU National Conference, "RELU: The Challenge for Research" Birmingham
Feb 2005	RELU Project Workshop, "Learning from the South: mixed farming in stressed environments", University of Oxford.
	1st meeting of RELU Food Chain Forum, London.
	RELU sponsored conference, with Northern Rural Network "Understanding Rural Economies, York.
April 2005	RELU Project Workshop, "Large Scale Investigations in Ecology and Rural Land Use" Imperial College London.
May 2005	RELU Project Workshop, "Landscape as an Integrating Framework for Rural Policy and Planning" University of Sheffield.
	RELU Programme Workshop with the Land Use Policy Group of the UK conservation agencies "People and the Environment: Scoping the Research Agenda", York
	RELU Project Workshop on "Data Integration**",** York.
	OECD/Italian Government Conference on "Opportunities and Challenges in Agri-Food Research", Rome.
	ESRC-sponsored "Interactive Agenda Setting in the Social Sciences" seminar, Abingdon.
	Environmental Research Funders' Forum (ERFF) "Enhancing the Use of Science for Environmental Policy Making and Regulation" Workshop, University of Warwick
Jun 2005	ESRC-sponsored Transdisciplinary Seminar Series on Sustainable Agriculture, School of Geography, University of Nottingham.
	ESRC-sponsored "Governance of Sustainability" Conference, Norwich.
Aug 2005	"European Society for Rural Sociology" Congress, Keszthely, Hungary.
Sept 2005	2nd meeting of RELU Food Chain Forum, London
	Sustainable Development Research Network /Environment Research Funders' Forum, *"Sustainable Development Research Priorities and Coordination Workshop",* London
	EURAGRI Members' Conference, "Anticipating the future: knowledge based policy for European Agriculture" York.
Oct 2005	Strategic Research Review of FPVII, Working Group on 'Environmental Issues Related to Food and Feed', European Commission, DG12, Brussels.
	Second Call Principal Investigators' Induction Workshop, Newcastle
Nov 2005	Rural Development in Europe**:** Funding European Rural Development in 2007-2013. Agra Europe Conference, London.
	Mammal Society's Autumn Symposium on Wild Mammals and the Human Food Chain, London Zoo.
	China-UK Symposium on Appropriate Science and Technology for Rural Sustainable Development – The Challenges and Opportunities, Yangling, Shaanxi Province, China.
Dec 2005	IPPR seminar 'A New Rural Agenda' seminar, Brussels.