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### Rural Economy and Land Use Programme





# The UK Rural Economy and Land Use Debates 2006



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### Foreword

Each year the Economic and Social Research Council stages the ESRC Social Science Week to celebrate developments in the social sciences. In 2006 this major event joined with the British Association's National Science Week to follow a theme of increasing importance: the interaction between the social science and the natural science disciplines.

A verdant thread running through the week was a series of debates organised by RELU, the Rural Economy and Land Use Programme. This is a groundbreaking research initiative jointly funded by the ESRC, the Natural Environment Research Council and the Biotechnology and Biological Sciences Research Council. Additional funding comes from the Department for Environment, Food and Rural Affairs and the Scottish Executive, Environment and Rural Affairs Department.

The debates probed deeply into some of the issues now being faced by rural areas in the UK and which are being tackled by RELU through collaborative research between social and natural scientists.

RELU is ideally qualified to stage these debates because the main thrust of its programme is the opening up of hitherto narrowly focussed research to embrace the considerations of all those likely to be affected by the research findings and consequential actions whether directly or indirectly. This holistic approach reaches conclusions that are often very different from those gained by the more traditional, compartmentalised investigations.



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### Are energy crops running out of steam?

Crops grown specifically to produce energy could make an important contribution to the UK's commitment to reducing carbon dioxide (CO<sub>2</sub>) emissions, but is there a market for them and what would be the impact on the countryside? The government concentrates its quest for alternative sources of energy on electricity production, but the potential of energy crops may be better realised as a local source of heat or fuel. Planning decisions based on climate, soil and water must be balanced against impacts on the landscape, biodiversity and rural economy.





The search for clean, reliable sources of energy is beset with difficulties. Fossil fuels produce unacceptable greenhouse gases and acid rain pollution. In any case we are running out of them, and our present sources are fraught with political uncertainties. The public distrusts nuclear power, the long-term waste disposal and security problems seem intractable. What about renewables then? Wave-power generators have been smashed by the very forces they seek to harness, tidal power chokes on silt and wind-farms are seen as a threat to the appearance of the countryside worse than pylons.

One solution, partial though it may be, scores well on several counts: grow energy on the farm!

Biomass energy production is close to carbon neutral, the technology is proven and the benefits demonstrated. It is already well established in several countries around the world, but uptake in the UK has so far been extremely limited.

However, the Royal Con concluded:

"Sufficient biomass is already available to initiate the development of the sector, in the form of forestry products and by-products, straw and municipal arisings. Systematic use of this material will have the additional benefits of producing additional income streams for farmers and foresters, improving forest management, and diverting materials from landfill. In the longer term, the use of biomass for energy will depend at least partially on the production of energy crops." This development, the report went on, would require a significant change in the use of agricultural land.



However, the Royal Commission on Environmental Pollution, May 2004





Meanwhile, the Commission continued, biomass conversion technologies were particularly adaptable; the scale, type of fuel, and heat/power ratio could be varied according to local supply and demand. Further, and this threw the ball squarely into the RELU court, distributed generation offered opportunities to engage local communities and to develop a sense of ownership of, and responsibility for, localised energy production.

The door to biomass energy is swinging open but it still needs a hefty push.

The first RELU Debate of the ESRC Science Week brought together Dr Angela Karp, Deputy Head of the Plant and Invertebrate Ecology Division, Rothamsted Research; Professor Peter Lillford, Director, National Non-Food Crops Centre; and Sir Ben Gill, formerly the Chairman of the National Farmers Union and more recently Chair of the Biomass Task Force.

Dr Karp is leading the RELU research project "Social, Economic and Environmental Implications of Increasing Rural Land Use Under Energy Crops". Given the level of policy support that now exists, a much greater area of land may well be covered by these crops in the future. Decisions on how and where to convert the land will be based on climate, type of soil and the availability of water, but RELU maintains that these practical considerations should be balanced against possible impacts on the environment, social acceptance and the rural economy. The results of the research are intended to benefit not only farmers, but also energy producers, land planners, regional development agencies and the public. By 2006, levels of  $CO_2$  in the atmosphere had risen to record levels. "We cannot keep depleting fossil fuels and emitting greenhouse gases," Karp says, "but we can grow our own energy." As to carbon emissions, the  $CO_2$  given off when biomass crops are burned to produce heat and electricity are taken up by the next generation of crops as they are grown, so biomass energy is practically carbon neutral.

In 2003 the UK had some 2,000 ha of land producing energy crops: principally miscanthus grass, short rotation coppice willow and poplar. Dr Karp quotes a target of 6% of UK electricity by 2020. A school, hospital or even farm could have its own bio-power station with the national grid used only as back-up!

A large-scale change of use of land to biomass crops will have wide ranging implications for the countryside. The visual appearance and character of the landscape will change, but farm income could well increase. Income from tourism needs to be monitored as does water use and biodiversity. "Meanwhile," Karp asks, "in a situation where we badly need extra sources of energy, what would you rather have? More nuclear power stations? More wind farms? Or more fields of crops?"

Sir Ben Gill sees as his point of departure the global oil situation. Something has to be done urgently, he says, because the total oil reserve remaining worldwide is 1,000 billion barrels; at current consumption levels this means we only have enough oil for the next 33 years!

Meanwhile, oil production is at its peak, while demand and price are soaring. "Our gas supply is at the far end of a very long pipeline, with Germany and the rest taking their share first. The recent dispute between Russia and the Ukraine over gas should make anyone nervous," Gill says. "Add to this the concerns over climate change, population explosion, world trade liberalisation, Common Agricultural Policy reform and food chain issues and we are living in a time of enormous pressure for change."







viable heat and power installations.

and reduce waste."

Meanwhile, we need to change our mindset. When the Swedes start a new building complex, they begin by building a biomass heat and power plant, and only then proceed with as many houses as the power plant will supply. On the other hand, in their quest to curtail their dependence on oil, there are plans for the UK to import ethanol from Brazil. This is certainly economic, but should we be concerned about the wider environmental impacts of bioethanol production in Brazil?

As is typical with many of the issues with which RELU is actively engaged, nothing is simple and straightforward, but RELU is now ensuring for the first time that all the relevant factors, disciplines and interests are explored and mapped out in detail. Then there will be no excuse if they are not taken into account when decisions have to be made.

Taking examples from mainland Europe, Austria in 2006 is producing an astonishing 70% of its electricity from renewable sources of which biomass accounts for 11% of the total energy supply and 21% of heat production (FT 3 Feb 2006). It does help that Austria is heavily forested and subsidises biomass by covering as much as 50% of the investment cost. The result is a thriving industry that promises to strengthen the Austrian economy and stimulate further, more cost-effective innovation.

The use of land for energy production has to compete with demands for its use for food production, as well as environmental and recreational use. We are further constrained by the availability of water. "People glibly talk about going up to 10 or 20% land use for biomass." Gill says, "We need to consider whether this would affect not only the price of foodstuffs, but also their use." World sugar prices have rocketed recently as Brazil has turned from sugar as a food to sugar as a source of ethanol fuel, which is far more profitable. Even in the UK it is now cheaper to burn feed wheat to produce heat (provided you have invested in the appropriate boiler) than to burn oil.

A comparison with oil shows that crops can trade blow for blow in the arena of applications. Fuel and energy yes, but also lubricants, monomers, plastics, pharmaceuticals, adhesives, paints, packaging, construction and one extra: food. This leads Professor Lillford to ask "So why isn't it all happening? One of the problems is, which do you do first? Plant hectares of willow or build the power station? Each faction says you go first." Another obstacle is the mindset of chemical engineers who have to design plant. They are used to oil, or perhaps powders which flow easily. "The idea of chunks of biomass gives them nightmares," Lillford says. This again is where wheat might come in. It does not clog up the works because it comes in pellets naturally. And it is economic - at least, it is now because the farmer is subsidised for growing it. In five years time it may not be, but in the interim, wheat could be one way of drawing attention to the advantages of biomass through the building of commercially

Although the government's emphasis is on electricity production, biomass does not have to be burned to be useful. Anaerobic digestion, hydrolysis, pyrolysis and gasification produce chemicals, fuels and heat. Where electricity is a requirement, more efficient conversion rates are achieved by combined heat and power schemes.

"Technology is not the issue; capital investment is," Lillford says. If we are to benefit from the energy crop opportunity, we need a commercial scale pilot plant to demonstrate the viability of the process, the product performance, and market acceptance. This must be backed by a robust feedstock supply at full commercial scale. "But we cannot at the outset rely simply on market forces; the government needs to tilt the level playing field and provide incentives for industry to adopt renewables as mainstream raw materials, and restructure the regulatory framework to increase the benefits





The draconian approach to stamping out Foot and Mouth Disease in 2001 caused huge disruption to the countryside and its economy. Have any lessons been learned, and would we act differently in the face of another outbreak?

February 20th 2006 marked the fifth anniversary of the official notification of the outbreak of Foot and Mouth Disease in the UK. The FMD crisis cost an estimated £8 billion, wreaked havoc on farming and the countryside, and caused the postponement of a General Election. Within seven months the epidemic was stamped out, but not before more than 2,000 premises had been infected and more than 10,000 farms had suffered the culling of animals. Almost 6.5 million were slaughtered, making this the largest butchering of its kind in history.

The government's "Lessons to be learned" inquiry (22 July 2002) says "The way ahead for agriculture, including animal disease control, must be seen in the context of an overall strategy for the rural economy in which agriculture is but one of a number of interests. In the heat of the 2001 epidemic, policy was driven mostly by the urgent needs of the agricultural sector. In longer term planning for future contingencies, a wider range of interests must be considered."

In response to this declaration of intent RELU plans to fund a number of interdisciplinary research projects starting in 2007 which will take a wider, more comprehensive look at problems of animal diseases to inform management of not only Foot and Mouth Disease but also tricky or looming issues such as bovine TB or avian influenza. The research will reframe "technical problems" as "societal problems" because scientific analysis and knowledge can no longer be separated from the wider social values, ethical concerns and public

understanding. Rural communities, especially farmers, are struggling to adapt to change, where social, economic, environmental and ethical concerns have to be balanced, and technological developments absorbed in an increasingly globalised market. RELU's research will throw light on how the restraints on, and options for disease prevention and management are being affected.

The second RELU debate heard presentations by Professor Neil Ward, Director, Centre for Rural Economy, Newcastle University; Professor Jeff Waage, Director, Centre for Environmental Policy, Imperial College, London; and Dr Fred Landeg, Deputy Chief Veterinary Officer, Department for Environment, Food and Rural Affairs.

It is generally agreed, Dr Landeg says, that the FMD virus entered the UK in late January 2001 on a farm in Heddon on the Wall, NE England, where pigs were fed with unprocessed waste food imported from the Far East. The virus was spread by the wind, and by 12 February had infected sheep 5 km away. FMD is not easy to spot in sheep so these animals were transported and traded right across England and Wales before the disease was suspected. By the time it was diagnosed on 19 February, 57 farms in 16 counties had been infected.



Foot and Mouth not only caused havoc for those farmers, vets and officials involved, but also laid bare a host of issues connected with farming that had previously not been evident. For example, it disclosed complacency over the ways that animal disease issues had come to be approached and managed within the farming industry. Higher stocking densities and the surprising fact that many more animals were being moved about more frequently and across longer distances than was realised compounded sloppiness in precautionary disease control measures.

"Today we have a new animal health and welfare strategy," Landeg says. "Import checks have produced a substantial increase in seizures. Swill feeding was banned in May 2001, meteorological data on how wind could spread the virus is also now much more sophisticated, and we have a standstill rule in which once cattle or sheep have been moved to other premises, they must be kept there for 6 days, or 20 days for pigs, before being allowed to be moved elsewhere. That should greatly limit any disease spread." However there are reports that this rule is widely misunderstood and broken.



Early in the FMD outbreak, the then President of the Farmers Union, Ben Gill, said "It is imperative that every local council which has rural footpaths and rights of way within its boundaries closes them immediately. There must be a blanket ban across the country. I implore everyone again: please, please stay away from the countryside." This plea was backed up by an Internet message from the Prime Minister. As a result, 40% of rural businesses outside of farming were adversely affected. Over a third in the South West said they had lost more than a quarter of their revenue and 20% in Devon said they had lost more than half. The Government estimated that the loss to the English tourist industry from March to October 2001 exceeded £3 billion.

tens of millions?" Ward asks.



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Professor Ward points out that a subsequent veterinary risk assessment of the dangers of the public spreading FMD by using the footpaths found the risk to be minimal. Closing the countryside was a costly mistake and the relative economic role of farming in rural communities is now seen to be far less than had been assumed. "Why, then, did the Government allocate £1.34 billion to farmers for their loss of livestock, but although severe damage was done to the non-farming sector, new money allotted to a recovery fund for businesses in the wider rural economy ran to just



In 2001 we did have a contingency plan of sorts, but only for an unspecified outbreak. Now the Civil Contingency Secretariat can call on cross-government action via the Cabinet Office Briefing Room to provide an effective command and control facility designed to deal with FMD. This will be able to ramp up resources, quicken diagnosis, and decide on vaccination. Footpaths within 3 km of infected premises will be closed but the countryside itself will be kept open.

The culling strategy of 2001, Professor Waage says, was based on relatively simple mathematical models which demanded slaughter not only on the premises affected but also those adjacent to prevent the disease from spreading. This strategy, described by Waage as "Carnage by computer" was criticised as insensitive "overkill" with little reference to the complexity of local situations. While mathematical models are certainly needed to predict how the disease will spread and what to do to prevent it, predictive tools must be as good as possible and engage more efficiently with local information. "Maths is important but a dialogue on the ground is vital," Waage says.

State of the art mathematical modelling predicts that with the new livestock movement rules we should not see anything like the past scale of outbreak. The next FMD outbreak (and there is almost certain to be one) will have a very different context from the last one, and vaccination will have to be considered before culling, Waage says. Vaccination has some serious political and economic downsides, however, because countries that vaccinate face trade restrictions, and recovery of trading rights from control-by-vaccination takes longer, all other factors being equal, than recovery from control-byculling. So "Vaccinate, cull or both?" will be the first question that will arise in a future outbreak, and the question to which the government will be held to account. Whatever the decision, there will be a demand that it was made on the best scientific grounds.

The Department for Environment, Food and Rural Affairs' Science Advisory Council scrutiny of FMD has reaffirmed what the Rural Economy and Land Use Programme asserts, namely that the problems of animal disease control are profoundly interdisciplinary, and need an interdisciplinary approach to research, which includes not just natural science but social science as well.











Over the centuries, traditional farming has produced landscapes which, in the past, supported a wide variety of wild plants, animals and insects. Technological intensification of farming throughout the 20th century has led to devastating declines in wildlife. Large amounts of money have been spent on so-called agri-environmental schemes to encourage farmers to manage in a way that pays more attention to conservation and the environment, but wildlife on farmland continues to decline. In the efficiency-driven economy of today, can agriculture and wildlife realistically be expected to thrive on the same territory?

One of the key indicators of sustainability of UK lifestyles is the population index of farmland birds, and here there have been huge declines not only in the UK but also right across Europe. Spain, Italy and the Balkans do show smaller declines and even in France the effect is not as pronounced as in Britain. This variation reflects the differing degrees of intensification of farming.

Together, governments and the European Union spend around 3.5 billion Euros a year on schemes aimed at encouraging less-intensive farming to try and promote gains in biodiversity, landscape preservation, soil quality and water conservation. Whole stretches are "set aside" and grants are given for unprofitable field margins and corners to be left uncultivated to allow soil to regenerate, nests to be built and seed to ripen for the birds. The wholesale uprooting of ancient hedges may not have stopped but it is regarded with disapproval.

Europe's agri-environmental schemes (AES) represent one of the world's biggest ecological experiments, although not planned very scientifically. Given the enormous budget, one would assume that specific targets would be set, proper monitoring would be done and the baselines from which any progress would need to be measured would be defined. This is generally not the case, and in a report issued in 2005 the European Court of Auditors pointedly said "If a measure cannot be adequately checked it should not be the subject of public payment".



Meanwhile a Dutch AES project intended to help ground-nesting meadow birds by delaying the mowing of fields has been shown to have no effect. In this case, birds actually seemed to prefer intensively farmed habitats. Schemes that allowed river margins to flood periodically to encourage certain birds resulted in drowning the very larvae the birds were supposed to feed on. The Dutch ecologist who pursued these investigations has since worked with the University of East Anglia to evaluate a wide range of AES schemes across Europe. Depressingly minimal success rates have been discovered.

Under these circumstances, what incentive is there for governments to continue to invest in schemes aimed at preserving wildlife on agricultural land? And why should farmers risk putting an eco-friendly brake on their efforts to produce more economically in an already cut-throat market? The third RELU debate brought together Professor William Sutherland, Populations and Conservation, University of East Anglia, Professor Nicholas Hanley, Environmental Economics, Stirling University and Dr Richard Bradbury, senior research biologist, RSPB to discuss the situation and ask whether and on what terms it is realistic to expect farmers to pay attention to the needs of wildlife.

A major RELU research project, "Evaluating the Options for Combining Economically, Socially and Ecologically Sustainable Agriculture" headed by Professor Sutherland, knits together social, ecological and agricultural research to predict how economic, regulatory and technological changes will impact on farming practice, farm livelihoods and biodiversity.





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Professor Sutherland compared the UK and the US approaches. The UK's agri-environmental schemes reduce the intensity of farming over the areas to which they are applied, but partly because we have a long history of seeing England as a green, pleasant and relatively tidy land, farmers like to ensure that AES areas do not simply revert naturally to scrub. "Americans, by contrast, cannot believe it when they see areas of our national parks being put to the plough to keep them under control," Sutherland says. They are used to and like the idea of wilderness, of which there are vast tracts in the States. As a result they can afford to be more relaxed in the face of other areas being farmed very intensively, even to the point of accepting GM crops. From an economic point of view it makes sense to devote minimal management effort to areas that are not going to show much return anyway and concentrate efforts on potentially high-yield farmland.

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So rather than paint agri-environmental schemes across the countryside with a broad brush, should we rather focus on areas where they will be of tangible and rapid benefit to the environment and wildlife? One of many examples would be actively to restore the wild down-land above Brighton, which would at a stroke provide a massive improvement to the water supply and boost bio-diversity. This patchwork approach would generate a more segregated countryside with some farmers making money from competitive agriculture and others becoming specialists in farming for the public good and receiving AES grants to do so.

Hard questions, however, need to be asked. Professor Hanley asks whether it makes economic sense to persuade farmers to heed the needs of wildlife, and if so, whether it makes sense for the tax-payer to reimburse farmers for the cost of doing so. Do people really care about and value the positive effects that farming in a particular way can have on nature conservation and the countryside? "People interviewed say they are willing to pay for improvements in wildlife, the quality of their habitat and the landscape, and water quality but policy needs to be changed to improve the tax-payers' value for money" Hanley says. "Willingness to pay for habitat improvements, for example, varies across the UK and across habitats, and a more differentiated agri-environmental scheme is needed to reflect this." We also need to be sure about who benefits from any one scheme and who does not. Take the thorny problems associated with geese conservation in Islay. Although the overall consensus is that the migrating geese should be welcomed and preserved, they wreak havoc on many of the farmers' crops.

Economics apart, the RSPB's Dr Bradbury argues that it is crucially important to encourage wildlife on farms and that is where the real challenge lies for conservation. "We are good at protecting wildlife in special places such as the beautiful Insh Marshes reserves. However this strategy fails to benefit many species like the corn bunting, which has specialised in life on the farm. Also, for most people, farmland is the only countryside to which they have regular access. That is where they want to see wildlife – on their doorstep, not in a national park or reserve miles away."







Although many agri-environmental schemes across Europe are not delivering, the principle itself deserves to be defended, Bradbury says. The key requirements are to set targets and collect evidence and in England especially the RSPB reports that we are having some success with common and rare arable weed margin plants, bumble bees (especially rare species) and fledgling birds. By using geographic targeting and farmer liaison, the population of the rare cirl bunting has increased from 118 pairs in 1989 to nearly 700 in 2002. Compared to the regional trend, the RSPB's Grange Farm has seen a great increase in the farmland bird index by using very basic AES prescriptions, and crop yields are still good. The farm has deliberately targeted its options, such as wildlife seed mixtures, at low yield areas like the edges and corners of fields.

Wildlife conservation is not the only virtue of AES schemes. Properly applied they can protect our soil and in doing so protect our water resources - a vital consideration given the growing water shortages particularly in Eastern and Southern England. Conservation tillage, buffers, detention ponds - resource protection can also be good for wildlife, a win-win situation!

There is no room for complacency, however. The story was told of a farmer whose heart was in the right place. He reported half a dozen active skylark nests with eggs in a silage field he wanted to cut. "How much do you think I could be paid to delay my operations?" he asked the RSPB. The Society said he would need to hold up proceedings by six weeks, and he might be able to find recompense of around ten pounds per site. The farmer rang off. Six weeks delay in planting would cost him £6,000.

Just one real-life example of the need to integrate practical considerations with a growing sense of environmental responsibility; a living microcosm of the complex web of interactions in the rural economy that RELU is designed to elucidate.





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### Food Miles: should we be buying food from abroad?





Did you notice that your last Christmas dinner cost less than usual? According to the Soil Association, most of the meat and vegetables on your dinner plate were probably cheap imports. Your carrots are likely to have come from Morocco, the Brussels sprouts from the Netherlands, the potatoes from Egypt – even the crackers will have been made in China.

The Soil Association tracked 26 items in a basket of groceries and found they had travelled in total 241,000 miles, a one-way trip to the moon! Flying in one calorie of lettuce from Los Angeles uses 127 calories of aviation fuel.

The final debate in RELU's Science Week series brought together Professor Gareth Edwards-Jones, Agriculture and Land Studies, University of Wales, Bangor; Professor Mike Winter, Professor of Rural Policy and Director of the Centre for Rural Research, Exeter University; and Ms Malini Mehra, Founder, Centre for Social Markets (UK/India).

A key RELU research project "Comparative Assessment of Environmental Community and Nutritional Impacts of Consuming Vegetables Produced Locally and Overseas" headed by Professor Edwards-Jones is comparing the carbon budgets, social costs, consumer acceptance and health impacts of locally produced vegetables with those imported. Fieldwork with beans, peas, brassicas, lettuce, potatoes and onions is being carried out in Uganda, Spain and the UK.

"Food miles", the mileage travelled by an item of food before it reaches the consumer's plate, has come to be regarded as a good indicator of its impact on the environment. So does locally produced food score highly almost by definition? Not necessarily, Edwards-Jones says. The growing of any food item is unavoidably associated with some degree of environmental impact, the severity of which varies with local soil and weather conditions. Carrot production can lead to soil erosion; wheat production to nitrogen leaching; lamb production to greenhouse gas emissions. Simple models indicate that the impact of totally local production can actually be significantly detrimental to the environment compared with models that assume some sourcing from outside.

So local may not always be best, and early results of the RELU research indicate that a truly ethical choice of food sourcing has to take into account multiple criteria across the whole food chain including considerations of greenhouse gas emissions from transport and soil, soil erosion, pesticide hazard, employee health, employee income, and the effect on the landscape. "As things stand this finding is too complicated to indicate the best course of action for politicians, industrialists or individual consumers," Edwards-Jones says. So what can we do for the best?



The purchasing pattern of consumers can have major implications for the climate, for local economic development and the alleviation of poverty in developing nations, but local food is not just about saving the rain forests through reducing food miles, nor even about an "Eat the View" policy aimed at protecting local landscapes and biodiversity. It is also, perhaps primarily, about communities that inter-connect. Professor Winter found that following the Foot and Mouth Disease calamity, the farmers who coped best were those with "social capital", those linked into the community through economic and social ties. One strand of these ties was often through local retailing. Conversely, people often want to feel rooted in their immediate community, and one psychologically effective means of doing this is to eat locally grown food. Given a mix of farmers facing turbulent times and an influx of new people coming to live in rural communities, we need to address the problem of social re-connection.

"Re-connection is a political and moral imperative," Winter says. "In facilitating connection, local food is part of an answer to social needs as well as to economic and environmental ones." Provided we take care to determine which are the appropriate agricultural products to grow locally, "policies that promote and support local food initiatives are a plus for social and economic sustainability, for local environmental stability and probably for global environmental sustainability too."



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Director of the Centre for Social Markets, Malini Mehra quantified some of the issues of food miles. Food travels 50% further than it did 20 years ago, she said. Quoting a Defra study she noted that food transport produced 19 million tonnes of  $CO_2$  in 2002 and the environmental, social and economic cost of transporting food is estimated at £9 billion a year. It accounts for 25% of all HGV km in the UK and increases congestion, road accidents, infrastructure damage, air pollutants and noise.

Yes, it may be more environmentally efficient to buy tomatoes from Spain but apples are a crop ideally suited to our climate. "Why is it, then, that we import half a million tonnes a year, half from outside the EU, and over 60% of the UK's apple orchards have been lost?" And in 1997 the UK exported 270 million litres of milk but imported 126 million. "Is this logical?" Mehra asks.

The food sourcing drama already affects a long list of interests including suppliers, planners, logisticians, farmers and fishers, governments, policy makers, traders, workers, manufacturers, wholesalers and retailers, caterers, consumers, scientists and pressure groups. Ethnic minority producers and consumers in the UK and producers in the developing countries tend to be left out, Mehra says. "Strategies to encourage their engagement could contribute to a better informed, if more complex food miles debate," she says, "and result in more forward looking action."

It is precisely the wider approach to the food sourcing conundrum that RELU is designed to illuminate. The Programme is in direct contact with and able to draw on the experience and expertise of the many and diverse players in the food sourcing drama. As the plot thickens, RELU will be increasingly in a position to ensure that any action taken is backed by the best and most complete information available.





The UK Rural Economy and Land Use Debates provide a vibrant illustration of the value of encouraging a discourse between natural and social scientists and stakeholders as a sound basis for action towards sustainable rural development. This approach is at the heart of the RELU Programme.

The National Science / Social Science Week Debates considered four major challenges facing rural areas in the UK: how to mitigate the effects of climate change and develop renewable energy sources; how to tackle animal disease in a socially acceptable manner; how to encourage biodiverse farming systems; and how to enhance the sustainability of food chains.

RELU researchers are working across the social and natural sciences, together with research users and policy makers, to elucidate these and other countryside challenges, to provide choices on how to manage rural economies in the future:

- The UK government is keen to see a major expansion of energy crops. RELU is funding research on the sustainability of energy crops to determine which areas in the UK are suited for crop production taking into account environmental, economic and social considerations.
- Narrowly based decision making around the management of animal and plant disease can wreak havoc and be very costly. In 2007 RELU will fund a fresh wave of research on how the options for disease prevention and management are responding to shifting social and economic priorities, environmental and ethical concerns, technological developments and globalisation.
- Wildlife, particularly birds, is struggling to survive on farms. RELU is funding research aimed at addressing why agri-environment schemes aren't working as hoped and what improvements can be made.
- "Food miles" is regarded as one way of measuring the environmental footprint of food. RELU is funding research to determine more broadly the carbon dioxide production, social costs, consumer acceptability and health impacts of food grown locally and abroad.

This all-embracing research programme is unique in its aim not only to promote holistic science on the rural economy, but also in working closely with those interested in its successful management.



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The views expressed in this document reflect those of the speakers in the debates and are not necessarily those of RELU itself.

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