Early in the Rural Economy and Land Use Programme (RELU), 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 October 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 Rural Economy and Land Use (RELU) Programme is investigating how rural areas are changing in the UK. The programme is a major funder of strategic research to inform rural policy and practice. It funds projects spanning the social, environmental and biological sciences.

Rural problems in the UK often suffer from partial and backward-looking perspectives. A broad outlook on future challenges for the countryside should help provide a corrective. This is a central focus for RELU.

There is a good deal of work, relevant to RELU, already going on in the broad field of futures studies, conducted by think tanks, commercial organisations and academic researchers. Government departments, including the Department for Environment, Food and Rural Affairs (Defra), are running Horizon Scanning programmes. Recent work seeking to anticipate and shape future developments, has been carried out by the Countryside Agency and the Foresight Panel for the Food Chain. The Office of Science and Technology and the Cabinet Office Strategy Unit have advised on how scientific advice and policy making should take account of risk and uncertainty.

In October 2004 RELU researchers came together with advisors and consultants engaged in futures studies to discuss the long term prospects for rural economies and land use in the UK. The workshop provided an opportunity for participants to learn about futures work in corporate and public organisations, to critically assess its significance, and to consider its relevance to RELU.

Futures studies have the potential to offer a neutral ground where questions confronting rural areas can be discussed. What are the significant social trends and technological tendencies? How might they interact, and with what environmental consequences? A consensus can then be sought across different disciplines on critical issues and choices. Stakeholders can also feed their preferences into future scenarios and thereby help set research agendas.

Academics are often sceptical of claims about the future and therefore are reluctant to engage with futures studies. However, they cannot afford to ignore them. According to Professor Neil Ward, Director of the Centre for Rural Economy at the University of Newcastle, a forward looking perspective is becoming essential to corporate strategies and anticipatory policy making.

Such an approach is also central to managing change and uncertainty in rural areas, as emphasised by the Cabinet Office report on Rural Economies (1999):

‘Change has been a constant feature of rural economies ... Continuing change is inevitable, and often desirable (e.g. CAP reform). Not all change is likely to be comfortable and popular with everyone: but it should be possible to manage the process of change to secure the best possible outcome for rural communities and for the nation.’

There are other influential endorsements of the imperative for futures thinking. Tony Blair has declared the approach as central to his government’s modernising agenda. The Government’s Science and Innovation Investment Framework 2004-2014 argues that ‘Excellent horizon scanning ... is essential to the effective governance and direction of Government policy, publicly funded research and ... the private sector’ (HMT, DTI, DfES). Futures research is being carried out both in government, such as its Horizon Scanning programme, and in corporate planning, for example the Scottish Environment Protection Agency’s “Long View Project” (see “Futures research and its use in government and corporate planning”, page 5).
Some scepticism, though, is appropriate. Rigour and precision may be difficult, even impossible, to achieve together in future projections, which often rely on modelling. For example, estimates of climate change from models range between a 1°C and 5°C increase in average global temperature over the next 100 years. The predicted consequences vary greatly accordingly. Inevitably, this leads to demands from climate scientists for even more research to improve the precision of their forecasts. However, the actual consequences of climate change will depend not only on how people, organisations and governments respond now and in the future, but also on contingent events and a host of other independent factors. It is important, therefore, that information from scientific models is not treated as stand alone predictions but is properly integrated into this debate over the future (see “Modelling, uncertainty and the future”, page 9).

Retrospective assessment of past efforts to forecast the future reveals how wide of the mark they have often proved to be because of extraneous political, social, environmental or technical developments that the forecasters at the time had not expected or appreciated. Futures work is sensibly not about predictions. Futures work is best seen as an aid to organisations and societies in rehearsing possible future outcomes. It is challenging and enlarging understandings of the long-term possibilities, threats and uncertainties, and how these may interact to structure strategic choices and constraints. “The prospects and implications for a nutrition driven food policy” (page 13) and “The outlook for exotic species and animal diseases” (page 15) provide examples of problems facing society and how futures studies can help examine the choices available.

The Rural Economy and Land Use Programme is ideally placed to feed into and learn from futures studies. An example of a RELU project is given in each section of this briefing paper to illustrate how the programme is helping to do this. Rural areas need to embrace change. Popular images of the countryside are often stuck in the past. The long dominant view that the rural economy is essentially about farming is, belatedly, changing. However, rural life is still routinely portrayed as traditional and rooted, with local villagers leading circumscribed local lives. This is an illusion. Futures work can be a means of critically questioning established framings of rurality rooted in the past. The forces shaping the rural economy and land use must be understood in their broadest context if the choices facing rural areas are to be clearly articulated. Some lessons that can be learnt from this work are discussed in “Learning from futures research” (page 17).

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Box 1: Glossary of Futures Terminology

| Analytical forecasting | “Use of causal models” |
| Backcasting | “What routes are there to a possible future?” |
| Foresight | “Forward thinking” |
| Horizon scanning | “What issues are coming up?” |
| Prediction | “The extrapolation of trends” |
| Scenario construction | “What range of possible futures can be identified around this issue?” |
| Visioning | “What is the desired future?” |
| Wind tunneling | “Would these proposals work in a different set of circumstances?” |
Government research: Horizon Scanning

Futures research is playing an increasingly important role within government planning. There are several departmental and central government initiatives planned or underway. Defra’s Horizon Scanning programme is one of the longest running and most diverse initiatives involving a cluster of futures studies (Box 2). Rohit Talwar, who manages the programme, describes Horizon Scanning as the ‘systematic examination of potential threats, opportunities and likely future developments which are at the margins of current thinking and planning’.

The intention is to improve ‘Defra’s resilience and capability to anticipate and prepare for new science risks and opportunities’.

The Horizon Scanning programme anticipates a range of social changes including: an ageing population; more single-occupancy households; an erosion of rural community structures; an increase in social exclusion; an upward drive of overall consumption but decline in real prices for most goods and many services; an explosion of eco-design, eco-construction, product stewardship and whole-life services; a reversal of the polarity of supply chains; a shifting of services from the public to the private sector; and a hollowing out of government, with a transfer of responsibilities to agencies and community structures.

Why Horizon Scanning?
- Scanning: develop anticipatory skills and spot potential risks and opportunities
- Future proofing: introduce tools and techniques to test ideas and strategies against possible futures and identify blind spots
- What if: rehearse the future and consider alternatives
- Insight: understand the critical trends and forces driving change
- Interaction: explore what happens when trends (and policies) collide, what second and third order effects could emerge?
- Future context: explore changes in public attitudes and needs
- Wildcards: look for low probability/high risk events

Defra Horizon Scanning Projects
- Future Landscapes
  Development of models for sustainable rural policy and land use
- Coping with Threats
  The potential of alternative strategies for national biosecurity against introduced diseases, pests and alien species
- Meeting People’s Future Needs
  Rural Futures: scenario creation and back casting
- Re-thinking the Food Economy
  Future of the food chain (jointly funded with the Department of Health)
- Environmental Constraints
  Development of a virtual fisheries model
  Greenhouse gas stabilisation
  Alternative scenarios for marine ecosystems
  Impact of future energy policy on biodiversity
  The future of healthy ecosystems
  Integrated knowledge management of environmental datasets for future environmental analysis
- Future environmental effects of non-synthetic chemical use

Box 2: Defra Horizon Scanning
http://www.escience.defra.gov.uk/horizonscanning/fstMain.asp
Corporate research: Long View Project

The Scottish Environment Protection Agency (SEPA), a stakeholder closely involved in RELU, gives an example of how futures thinking is influencing policy decisions. The SEPA Long View Project ran between 2003 and 2005 and built a picture of a favoured future environment for Scotland in 2025, in order to guide SEPA decision making. James Curran, SEPA’s Environmental Futures Manager, argues that the project has enabled SEPA staff and its partners to systematically explore salient priorities, opportunities and threats.

The Long View Project collated inputs from five main sources in order to construct an environmental vision of the future. These inputs were:

1. Environmental Issues Prioritisation: SEPA staff were asked to rate a number of environmental issues against such criteria as degree of impact, irreversibility, geographical scale, and the level of influence or regulatory control that SEPA could exercise.

2. Horizon Scanning of trends and expert forecasts of social and economic developments were drawn from Defra’s Horizon Scanning programme.

3. An Environmental Forecast for 2020 was based on the outcomes anticipated and trends identified in an array of contemporary EU, UK and Scottish policies and strategies.

4. Sustainable development scenarios were derived through interviews and a workshop involving Scottish Natural Heritage, Scottish Enterprise, Visit Scotland, Communities Scotland, and the Scottish Executive. These scenarios examined the interchange between society’s concern about sustainable development and contrasting policy stances towards economic growth and sustainable development.

5. Environment scenarios were then formulated by SEPA staff, informed by the sustainable development scenarios, and the environmental forecast. An agreed scenario matrix was formulated based on the critical governmental and economic uncertainties affecting Scotland’s environment (Figure 1).

The Long View Project introduced SEPA staff and some of its close partners to structured futures thinking. It provided space to explore priorities, opportunities and threats and helped to prepare the agency for possible surprises. The project has also enabled the development of clearer corporate aims and objectives. Principally, the outputs will feed directly into the 3-year corporate planning cycle to inform prioritisation and resource allocation to meet the future needs of Scotland’s people and environment.

A RELU example: Sustainable upland management for multiple benefits

Various projects within RELU are opening up the debate further on rural futures and encouraging stakeholders in the development of futures scenarios. Klaus Hubacek and his team at Leeds University are collaborating closely with stakeholders and natural and social scientists in order to develop a multidisciplinary methodological framework to evaluate sustainable land management in the Peak District National Park (PDNP). Management strategies and indicators will be adapted and short-listed with stakeholders to minimize trade-offs and optimize synergies, and then integrated into preliminary land use plans. This information will be used to support ongoing moorland restoration by Moors for the Future, a not-for-profit research institution in the PDNP, and will help to promote sustainable multiple use of the moors through adaptive management.

Figure 1: Environment Scenario Matrix
Modelling and uncertainty and the future

Predictions and forecasts of the future often rely on modelling. Models are based on a combination of observed generalisations and causal reasoning, to allow projections from current or past states to future states. In fields such as hydrology, climatology and demography, modern computing means models can handle huge amounts of data and complex processes. However, Stuart Lane, Professor of Physical Geography, University of Durham discusses here how the very precision of such models can convey a false clarity about what lies ahead.

Modelling is largely about making the invisible more visible. It can be used: 1) to examine the ways in which widespread and spatially different processes produce localised consequences (e.g. diffuse pollution); 2) to give an idea as to what the future will look like, given what we know about the present and the past. There are two loose categories of approaches to modelling the rural environment.

Firstly models can be a balance between data-driven extrapolation and process-based forecasting. Data driven extrapolation relies on the prediction of future events from a statistical generalisation of current existing patterns and their relation to a set of explanatory variables. This method works well if the variables have been well measured. However when future forecasting all possible variability cannot be derived from existing relationships between variables, and the system may not be captured well. Process-based forecasting (or deterministic modelling) assumes that relationships between relevant variables can be expressed as a set of mathematical equations and that the associated system can be modelled computationally, by simultaneous solution of these equations. This method has been used to model flood inundations, the export of nutrients from agricultural land, the dispersal of species across rural landscapes, and the social dimension of the rural economy. The distinction between data-driven and process-based models is more like a continuum as the former also need a conceptualisation of how the system works as a series of interacting cause and effect variables, while the latter are heavily dependent on data, in order to tune the model so that its predictions match known measurements.

Secondly models can aggregate smaller into bigger units, usually to allow computational feasibility. For example, it is possible to model the hydrological response of a river catchment with a 5-10m resolution (the resolution necessary to capture runoff generation). However, in order to understand the risks posed by rural land management on downstream flooding or water quality, the model must be extended so that it can forecast to much larger spatial scales. The interactions of individual units may generate effects collectively for example, of people within communities, or farmers within sectors, or fields within catchments) that are not simply a sum of the individual effects.

All modelling is bound by what we know. Models may perpetuate and even compound the gaps and limitations in our knowledge. Uncertainty is an endemic characteristic of all modelling efforts. The standard determination of uncertainty in models is largely about quantified estimates of the risk of being right or wrong. However, this is only one type of possible risk. Wynne (1992) outlines four types of risk or uncertainty: 1) quantifiable uncertainties; 2) unquantifiable uncertainties; 3) uncertainties that we are ignorant about, but which we may find out about through further experience or investigation; 4) indeterminacies, or uncertainties that cannot be determined through any form of investigation, prior to them happening.

Attempts to reduce uncertainty are tempting, by adopting more sophisticated modelling approaches, or improving specification of boundary conditions. However, such efforts may simply smuggle in other types of uncertainty. Greater experience and insights from research will help, but the indeterminacies can never be addressed. Thus, model predictions of the future will always be flawed in ways about which we cannot be certain. Wynne (1992), moreover, suggests that it is naïve to look to science to eliminate or even to minimise uncertainty. On the contrary, he portrays the dynamics of science as the main generator of uncertainty in the contemporary world, through the way it challenges orthodoxies and reveals novel possibilities and hidden dangers. Paradoxically, it is this continuous creation of uncertainty that provides the impulse for further modelling.
Communicating uncertainty in forecasts

When models are used to forecast the future, it is vital that the uncertainty surrounding any prediction is effectively communicated. This is necessary to avoid false faith being placed in model predictions. The quantification of the uncertainty, however, can only ever be a partial estimate of the real uncertainty and therefore, when presented on its own, may itself convey a misleading sense of certitude. When modelling predictions are made, appropriate scepticism should be conveyed concerning the unquantifiable uncertainty, the ignorance and the indeterminacy that are intrinsic to any forecasting efforts. A further issue is that models perpetuate incorrect assumptions about the world because they have wrong assumptions embedded in the design in the first place (e.g. the Department of Transport’s model of traffic use which assumed that increased road provision would mitigate demand rather than increase it). Increasingly, now, modelling predictions are being contested especially when they are used to underpin normative futures that have contentious policy implications. As models are increasingly developed for smaller spatial units (e.g. publically-available flood inundation maps), and as the implications of some of these predictions for those units can be severe (e.g. flood insurance problems), both local experience (“my house has never been flooded, but it is in the indicative floodplain”) and web-based resources can be marshalled to challenge particular visions of the future. It must be remembered that modelling predictions are a circumscribed indication of what the future could be, not what it should be.

Melanie Howard, co-founder of the Future Foundation, believes that the creation of alternative visions of the future through scenario building provides a neutral, democratic platform in which everyone can have a stake and all views are valid. Such visions can be invaluable in stimulating fresh thinking that bypasses everyday operational concerns and helps policy makers and researchers to concentrate on the direction and nature of underlying drivers and the impacts and likelihood of policy decisions; as well as the effective engagement of the public and stakeholders. Making a better future requires a shared purpose. Rigorous tools that communicate the options can work as an effective means of bringing powerful, competing interests onto a level playing field to encourage open debate.

The Future Foundation and the Centre for Rural Economy have developed scenarios of rural living in 20 and 50 years time. For the 20 year scenarios, rural areas were envisioned to reflect the geographical diversity of the English countryside. The social and economic make-up of the countryside was then projected 20 years forward, on probabilistic assumptions about such driving forces as population and economic growth rates. Creating the 50 years scenarios was deliberately a more imaginative and speculative exercise, incorporating assumptions of major qualitative shifts in forms of living and working, and generating both utopian and dystopian visions of the future of rural living. A distinctive feature of the project was the employment of a graphic designer to generate visualisations of what life might be like in the different rural typologies (Figure 2). In various exercises these visualisations were used to facilitate debate with groupings of policy makers, stakeholders and rural communities, to identify favoured rural futures and to clarify some of the necessary steps that would need to be taken to realise them.

Opening up choices

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A RELU example: Understanding Loweswater

The RELU programme is funding only interdisciplinary projects in order to provide holistic views of rural problems. A project headed by Dr Stephen Maberley at CEH Lancaster is generating new understandings of ecological, economic and social interactions in a Lake District catchment. It is looking 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. By developing dialogue between those with a stake in the catchment (notably the 13 farming families that live and work there), environmental agencies and natural and social scientists, the study is aiming to provide an opportunity to address issues of problem ownership, definition and characterisation and ways of working through the solutions to these problems.
The prospects and implications for a nutrition driven food policy

Consumers and food choice

The supply of food and the patterns of consumer food choice are in the process of change, with implications throughout the food chain. Drivers for change include household relationships, rises in oil prices, food regulation, the rising cost of healthcare, the retail power in food chains, GM and personal health and wellbeing. A lot of these drivers have little to do with food directly. This introduces critical uncertainties in predicting the future of food chains. Perhaps the biggest uncertainty is within the household: an individual’s sense of wellbeing is of great and increasing importance in food choice.

Futures analysts have been examining public perceptions of food and the choices available for the consumer. Taking obesity as an example, Andrew Curry, a director of the Henley Centre, explains that there are different ways in which policy, economics and public perception may be used in the future to influence how this problem is handled.

In the UK in 2002 more than 1 in 5 adults were obese and more than half were overweight. Obesity among 6-15 year olds trebled from 5% in 1990 to 16% in 2001. Tackling the obesity issue can be thought of as a personal or social responsibility. The Henley Centre have examined scenarios which consider these different senses of responsibility and how quickly or slowly the situation ought to be ‘fixed’ (Figure 3). The scenarios show that there are serious implications for the UK food market and consumer. In the future, food and food choice could be a question of personal choice, i.e. self-regulatory (like the alcohol industry, left hand side Figure 3) or a social responsibility and thus policy driven (like the tobacco industry, right hand side Figure 3).

The Henley Centre scenarios suggest that critical strategic questions for the food industry are about perceptions of responsibility for obesity, and the extent to which personal and political responses to obesity are ‘joined up’ rather than fragmented. The consensus of the last 25 years about the production and distribution models of the food and drink industry could be about to end with the emergence of increasingly volatile markets and changing consumer attitudes. According to Mr Curry the obesity issue is just the starting point. The issue of additives is already attracting attention. Industry distribution and logistics models are increasingly likely to be questioned. Companies will need greater organisational agility to prosper. The long-term winners will be those who start to re-think their business models sooner rather than later.

A RELU example: Implications of a nutrition driven food policy

If public and official attitudes are shifting us towards a nutrition-driven food policy what would be the implications for the whole food chain, including land use and the rural environment? This is the question being posed by a research project based at Reading University.

Professor Traill and his team are examining the potential for the development of sustainable food chains capable of delivering healthy foods at prices consumers are willing to pay; and assessing the impact on land use and the rural environment and economy. The research studies extensive livestock production systems and their effects on the fat composition of ruminant meat and dairy products. Likewise, it studies fruit and vegetable production systems, transport and storage and their effects on nutrient levels. The team will investigate consumers’ attitudes, behaviour and willingness to pay for local and nutritionally improved foods. This information will be fed into models of demand, land use and employment. The implications of alternative policy scenarios for landscapes and biodiversity will be assessed.
The Foot and Mouth epidemic of 2001 revealed the vulnerability of rural economies to animal disease outbreaks. Climate change, moreover, raises the prospect of increasing pressures on the UK countryside from invasive species. To clarify the scale of the threats posed by animal and plant pests and diseases, Defra has funded futures work on “Exotic species and diseases: anticipating risks; avoiding crises?” at Imperial College Wye.

Jeff Waage and his team have developed a framework to examine the impacts of non-native species on the rural economy over a 20 year time horizon. The framework combines an ecological model with an economic model to predict species spread and the cost per unit infestation for different types of species. Several important issues emerge:

Different non-native species have differing impacts on the economy and the environment. The biggest problems are caused by those species that have an impact on both the economy and the environment. Different invasives have distinct cost-time impacts. For example, if a standard agricultural commodity is invaded by a pathogen then the economic impact may be felt immediately, with dramatic losses in production and exports. In contrast, the environmental impacts of invasive species are likely to build up over several years. It may be that, in the future, there will be a cross over between environmental and agricultural priorities as a result of non-native species (Figure 4).

If the trend towards free-er trade continues into the future, this will increase imports and reduce prices. CAP reform/decoupling will reduce the value of farming versus other uses of the land. This may lead to the development of an ‘invaders treadmill’ whereby trade leads to a price-related decline in local production and therefore more imports from abroad, which in turn bring the risk of new invasions that may harm local production.

The study raises core dilemmas about the conservation of the rural environment, raising questions about society’s preferences for and constructions of nature. Future attention to the conservation of native species and the management of invasive species (and the associated costs) will depend on whether society perceives non-native species as bad news, or whether a new generation will object to their eradication given their own role in enhancing biodiversity.

**Figure 4: Impact profiles for different kinds of non native species**

**A RELU example: The management of animal diseases**

Within RELU research is being undertaken in order to understand how to achieve a sound environmental foundation for rural conservation and regeneration.

A potential future avenue for RELU research concerns the management of animal diseases. The need for such research is clear from both the environmental risk and the substantial social and economic consequences of science-based decision making in recent disease problems such as BSE, FMD and bovine TB. Interdisciplinary research with teams of social and natural scientists can bring different perspectives and methodologies to bear in reframing these and other problems and considering how best to tackle them. Such research can also consider how changes in the countryside, together with shifting social perspectives on animal welfare, ethics, and public priorities, as well as the processes of technology and globalization, will alter considerably the constraints on, and opportunities for, disease prevention and management. These problems could not be tackled without interdisciplinary collaboration.
What might RELU learn from Futures Studies?

- Horizon scanning is helping to identify serious challenges or threats that society may face, which could fruitfully inform research agendas.
- Futures work offers specific techniques and methods for envisioning the future, and for engaging stakeholders and communities in establishing long-term priorities. RELU could learn from and contribute to these techniques and methods.
- Future studies employ imaginative means to synthesise evidence and expertise from multiple and diverse sources to characterise complex issues and trends. There may be lessons here for the operation of interdisciplinary research projects and programmes.

What might Futures Studies learn from RELU?

- RELU is pursuing fundamental understandings of drivers and processes of change in rural economy and land use. The analysis and insights generated could contribute to much more robust futures studies.
- RELU is looking at the integration of various spatially distributed social, economic and environmental data to improve the diagnosis of human environmental impacts at different spatial scales. This integrated data framework will provide a more differentiated and rich analysis for rural futures work.
Cabinet Office (1999) Rural Economies, Performance and Innovation Unit


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