relu
Rural Economy and
Land Use Programme

Common knowledge?

An exploration of knowledge transfer

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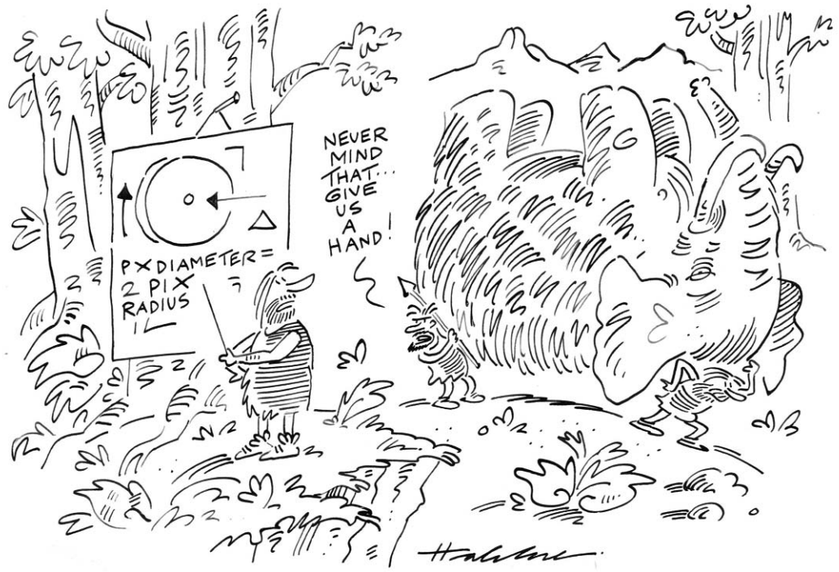
The sum of human knowledge is growing daily, but what does that really mean for ordinary people? If only scientists know about it, it may mean nothing. In the past, the results of research have all too often failed to influence the policies and practices that could help society.

If scientists tell a few people, but they aren't the ones who can make best use of it, the discovery might not be used in the most effective way.



Or if they try to tell people, but use language that nobody else understands, the message may still not get through. But if they get it right it can make a huge difference to people's lives.

Getting research into practice is a challenge that funding bodies, including the research councils and higher education funding councils are addressing with increasing vigour. When research is paid for from the public purse then value for money is a key requirement. One issue that has often caused difficulties in the past, is the lack of thought given to knowledge transfer during the planning of research projects. It has often been an "add on", rather than an integral part of the process.

The reality is, that if a scientist doesn't tell anyone about their findings, or if they go about transferring the knowledge in a way that doesn't work, or target the wrong audiences, they might as well not have carried out the research. Money, effort and expertise have been wasted. So it's an issue that must be addressed from the project planning stage.

What do we mean by knowledge transfer?

The term "knowledge transfer" is commonly used but what do we really mean by it? Research Councils UK describes knowledge transfer as "the system and processes by which knowledge, expertise and skilled people transfer between the research environment... and its user communities in industry, commerce, public and service sectors".

Knowledge transfer tends to fall into two main areas. There is still a focus on applying scientific knowledge commercially to drive technological development. This involves public-private sector research and development partnerships, as a means of encouraging new and innovative science, and spin-offs into new technology.

But there is also the issue of how research can contribute to making policy, regulation, professional and administrative practice and social innovation. This is increasingly important with the growing emphasis on evidence-based policy at European, national and regional levels.

What is happening already?

The research councils identify four 'routes to knowledge transfer':

- co-operation in education and training
- people and knowledge flows between research and user communities
- collaborative research
- commercialisation of R&D.

The knowledge transfer approaches of RELU's participating research councils display many common themes. All three councils, NERC, ESRC and BBSRC, emphasise the importance of maximising knowledge transfer from their research programmes and involving users in the planning and implementation of research. They all target policy, practitioner and business communities, but the emphasis that each of the research councils places on these has varied.

The environmental science community generates knowledge that has particular relevance for the public good. Thus, NERC has given specific emphasis to policy/regulatory clientele (such as the Environment Agency). In contrast, BBSRC has attached great importance to the exchange of ideas between the science base and industry and the industrial take-up of science. For ESRC knowledge transfer has largely implied engagement with users from policy, professional and wider public domains.

What's the problem?

There are many challenges that make knowledge transfer difficult for both knowledge users and producers. It's even difficult to know whether or not the process is actually happening effectively. How can you measure knowledge exchange outcomes with any kind of accuracy?

It's possible to measure commercialisation of research by counting the numbers of new patents, licences or spin-out companies but the picture becomes much more complex, and less concrete, when we are considering the impact of research on policy and practice, whether in the public or private spheres. Although strategic research may sometimes have an immediate and obvious use in decision making, this is often not the case. It might be years after the research is carried out, before knowledge transfer impacts are felt. Those impacts may be indirect, unattributed and subtle. They might involve swaying a decision against pursuing a particular policy, or altering a particular outlook or set of beliefs. None of these outcomes lend themselves to being measured in traditional ways.

What are RELU's advantages?

RELU begins with several advantages: firstly the programme can draw on good practice being carried out across the various research councils but it is also well positioned to trial and demonstrate new approaches.

Secondly, RELU is committed to engaging stakeholders throughout the research process. This requires a new philosophy of knowledge exchange, not just knowledge transfer. It does not assume that the scientist is the only source of knowledge and expertise, but aims to facilitate sharing of knowledge between researchers and a wide range of policy makers, practitioners, businesses and other publics. Accountability is fundamental to RELU. It must be relevant and responsive to policy and practice and societal concerns. Stakeholder engagement at all stages from identification of research questions, to the conduct of the research and dissemination of the results are central to meeting this objective.

RELU's third major strength is its interdisciplinary approach. This helps to avoid the trap of approaching problems from a purely technical, or sociological perspective. It requires a more sophisticated understanding of the links, which enables more effective knowledge transfer.

How does RELU do it differently?

Because RELU works across several different research councils it is very well placed to learn from the different approaches to knowledge transfer, and also to overcome any partiality of perspective.

When social science and natural sciences work separately, they often fail to appreciate the value of each other's contribution. Social science involvement is all too often incorporated at the end of a project, to try and help smooth out social constraints that stand in the way of technical advances or to address unintended impacts. Equally, social scientists may incorporate naïve models of environmental and technological possibilities into their analyses and projections of social change.

The interdisciplinary approach adopted by RELU, however, brings the knowledge of different disciplines into a positive dialogue. It moves away from simplistic assumptions about "technology push" or "society pull" providing the overriding drive for innovation, and combines social and technical processes, which enables us to move on from traditional linear knowledge transfer. Above all, it highlights the need for new technologies that go with the grain of social change, and for social innovation that creatively exploits technological possibilities.

The approach facilitates the involvement of stakeholders from the very early stages of formulating research questions and throughout the research process. This is a continuous and two-way process of knowledge exchange. The principles that underpin the approach within RELU are that stakeholder engagement:

- is a continuous and iterative process in which stakeholders are engaged as active partners in establishing the focus and priorities of the programme and not treated merely as passive recipients of the research when it is complete
- is a two-way process of knowledge exchange between scientists and a wide range of policy-makers, practitioners, businesses and the public
- embraces a pluralistic and inclusive stakeholder community
- acknowledges that soft knowledge transfer through informal networks between research and practice can be more important than harder and more impersonal forms, such as the commercialisation of knowledge or evidence-based policy making
- places emphasis on encouraging and enabling knowledge exchange among researchers and research users.

Extensive and tailored knowledge exchange activities are taking place within RELU's 29 research projects. Researchers are engaged with various organised interests, end-users and the broader public, through diverse models of knowledge exchange. Some are involved in an advisory capacity, others as consultees, informants or research partners. At the most radical end of this activity, teams are beginning to break down the traditional boundaries between knowledge producers and knowledge users, recognising the contribution of multiple forms of expertise. Many projects are also taking a reflective approach to their engagement with stakeholders, and thinking seriously about how the very processes they employ for identifying stakeholders influence how they define research problems.

RELU has also developed a range of methods for knowledge transfer at programme level, within the framework of a communication strategy and regularly updated communications plans. As well as the usual range of tools, including newsletters, media contacts, academic publications, conferences, a website, and regular briefing papers like this one, RELU's more unusual forms of knowledge exchange include:

- Regular meetings of national stakeholder forums, where researchers present their work to a broad constituency of key national organisations from the public, private and voluntary sectors. These forums often spark off follow-up activities involving stakeholders and projects.
- A tailored communications plan produced by every project.
- Workshops and other knowledge exchange events that bring together researchers and stakeholders from relevant sectors, with opportunities for open discussion and feedback.
- Building up links with knowledge brokers as partners. The Royal Institution of Chartered Surveyors (RICS) for example, which has links with thousands of farmers, land managers and rural businesses, includes a regular slot in its journal "Land".
- RELU's work shadowing scheme which enables researchers to spend time in commercial, voluntary or public organisations where their research may be used.
- Visiting fellowships which enable staff from these organisations to move in the other direction, and spend time with research teams.
- Production at the end of every project of a very focused document to highlight key findings and their implications for future policy and practice.

How does knowledge exchange work?

Underlying these different approaches to transferring knowledge, are various ways of thinking about the relationship between scientific research and putting the findings into practice. Most of these focus on the processes that move knowledge from the producers to the users.

Knowledge Producer(s)

Knowledge User(s)

The linear model is based on the assumption that knowledge users passively receive knowledge. The knowledge is packaged into technological products or training. This model has a continuing role to play, but is not the end of the story.

The feedback model involves a dialogue between knowledge producers and users that allows the latter to give feedback and so influence subsequent research. But they only give feedback on the outcomes, not the process of knowledge production itself.

Feedback Model of Knowledge Exchange: Modelling the Impacts of the Water Framework Directive

The UK Government is currently in the process of implementing the Water Framework Directive. This ambitious legislation aims to ensure that the water in our rivers, lakes, beaches and drinking supplies is of the highest possible quality, and could mean major changes in the way land is used and managed in river catchments. A RELU project is working on "Modelling the Impacts of the Water Framework Directive", aimed at predicting how the changes in practice that will be necessary in order to comply with the Directive could affect farming and land use.

As this is the most sophisticated exercise of its kind currently taking place, the work is proving invaluable to officials in Defra and the Environment Agency, who are responsible for implementing the Directive. Meetings were held at an early stage so that the researchers could explain their approach, and the officials could explain the options they were considering for putting the Directive into practice. This meant that the researchers could prioritise their tasks in line with policy requirements. Defra has provided additional funds to enable the project to address specific policy questions, including an early analysis of how alternative proposals for implementing the Water Framework Directive would impact on farm incomes, in advance of forthcoming government decisions.

The collaborative model puts knowledge producers and users side by side and enables them to talk to each other throughout the research process, from problem framing, through discussion of research methods to dissemination of research outcomes.

Collaborative Research: The Role of Regulation in Developing Biological Alternatives to Pesticides

This RELU project has succeeded in opening up a new dialogue among a range of stakeholders from regulators through manufacturers, consultants and retailers to growers, and is helping to prime the emergence of a new industrial sector around bio-pesticides. Naturally-occurring insect-pathogenic fungi can be used to control insect pests of crop plants. Although they promise to displace chemical pesticides, changes in regulations might be needed to encourage a move towards active use of such bio-pesticides. Political scientists at the University of Warwick are working closely with the Pesticide Safety Directorate (PSD) to support their efforts to improve the registration process for bio-pesticides. One area of concern is their environmental sustainability, which is the focus of the research of Warwick biologists who are working alongside the political scientists in the RELU project.

This project has emphasised active engagement with a range of stakeholders and has contributed to the resolution of the regulatory challenges faced by a new and innovative high-tech industry that is capable of making a significant contribution to sustainability by providing natural alternatives to conventional chemical pesticides. It has also helped, through workshops, to open up dialogue between manufacturers and environmentalists. The project has been able to bring to the policy debate lessons from regulatory experience in the United States and the Netherlands. In particular it has closely monitored the development of the Biopesticides Scheme by the PSD that seeks to facilitate the cost effective registration of biological control agents. The project team and PSD have together identified training needs and the team is providing training for PSD on the underlying science of biopesticides and the influence of the general regulatory context.

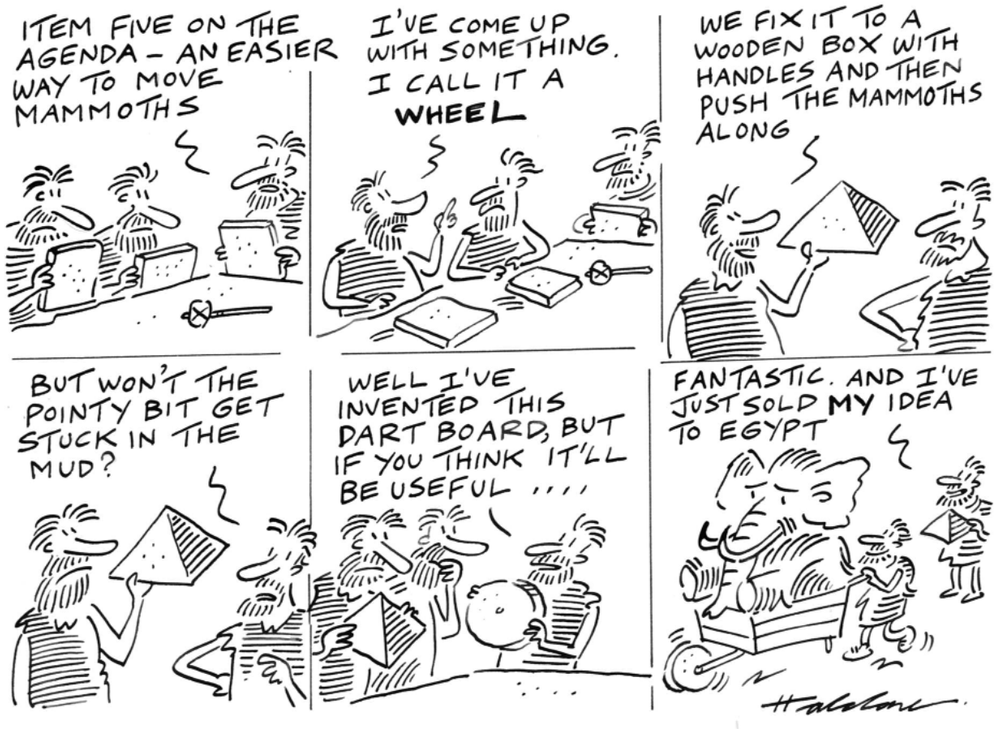
The joint production of knowledge model dissolves the boundary between knowledge producers and users. Multiple forms of expertise, among academics, practitioners, businesses, land managers and the public are considered valuable and contribute to knowledge production. There is an emphasis on how scientific and non-scientific knowledge can be mutually enriching. It underlines the need to move from ideas about one-way "knowledge transfer" to mechanisms that will facilitate "knowledge exchange".

Joint Production of Knowledge: Understanding Environmental Knowledge Controversies

A RELU project led from Oxford is investigating how government and commercial organisations use models to measure flood risk and predict flooding, and how these become subject to scientific or public dispute. Locating and managing flood risk is controversial as it affects people's properties and livelihoods. And it is increasingly assumed that models are now able to predict how land management practices might be responsible for flood events and can connect up those responsible and those affected. Model predictions are subject to further dispute when they face counter claims from those with actual experience on the ground.

The project is developing a new method for public engagement in science that involves social and natural scientists working closely with non-scientists who help plan, guide and review the research from the outset. These "competency groups" engage different forms of expertise and place attention on generating new collective understandings and skills among the participants – a group of participants is able to expose their respective knowledge claims to the scrutiny of one another and to reframe research problems and approaches. This is an extremely novel and innovatory approach to science and knowledge exchange.

These models are not mutually exclusive. They may be joined up to create more complex systems. For example, research might be carried out using a joint production of knowledge model, then transferred to a new group using the feedback model to obtain comments and further information for future research.



What role can networks play in knowledge exchange?

Whereas knowledge transfer can just be linear, the more complex processes and models of knowledge exchange need networks to thrive. It is via networks that ideas, information and innovation flow.

RELU has considered how it can promote these and increase capacity for knowledge exchange within the programme. The evidence suggests that people, physically moving between organisations and communicating on an individual basis, are the best means of conveying knowledge and building links, so two innovative schemes have been set up and funded by RELU: work shadowing and visiting fellowships.

Work shadowing enables researchers to experience the everyday contexts in which their research may be used. This could be a commercial organisation, voluntary body or public agency which is relevant to the research project.

The visiting fellowship is the mirror-image of the work shadowing scheme; it gives practitioners from the commercial, voluntary or public sector an opportunity to see research in action, visiting a RELU research team or cluster of teams and exploring the implications of the research for their work. This also helps to raise awareness of their interests with the researchers and any potential applications of the research.

These processes have immediate benefit in that they enable people to gain knowledge and experience in an organisation or team. But equally important are the networks and links they build for future exchange of knowledge.

The wide range of organisations that have taken part in these schemes include fish farms, gastro-pubs, horticultural consultants, Defra, the Food Standards Agency, the Health Protection Agency and the Pesticides Safety Directorate. All report benefits from their experiences.

Work Shadowing

Kathleen Grady is a research associate working on the Stirling University RELU project on farming the warm water fish tilapia as a diversification strategy for farmers. She took part in the RELU work shadow scheme, spending time at the Stag Inn restaurant, Rackenford in Devon.

Kathleen shadowed proprietor and head chef Mark O'Donnell. The Stag Inn serves hearty traditional meals alongside modern dishes, with an emphasis on home made foods using fresh, high quality ingredients sourced locally. Mark has recently opened another restaurant, in the nearby town of Tiverton, where home made, low calorie menu options are the theme. After Kathleen had shadowed Mark for a few days, gaining insights to his restaurants' ethos, atmosphere and food purchase decision-making, fresh whole tilapia was sourced from the project's commercial partner in Devon, for Mark and his assistant chef to prepare for the menu at The Stag Inn. Mark decided on the recipe, and price, demonstrating to his assistant chef how he wanted the tilapia to be filleted and prepared. Kathleen observed this decision-making process, noting reactions to tilapia, regarding quality, texture, ease of preparation and comparison with other fish. She carried out informal and semi-structured interviews with customers and found out more about how people reacted to this unusual menu option.

It was also an opportunity for Mark to learn about the possibilities. He said that he would be keen to feature tilapia on his menus again, most likely as a special option. He thought tilapia would be most appropriate as a fish of the month or fish of the week at monthly/quarterly intervals.

This work shadow enabled Kathleen to learn about the challenges faced by small restaurateurs who are offering local, high quality produce to their customers and the implications this has for the farmers producing the tilapia.

Who are the knowledge brokers?

Visiting and talking to individuals is one of the most effective ways in which anyone can convey knowledge and build networks, but researchers cannot possibly communicate directly with every potential knowledge user. So knowledge brokers can also play a significant role, particularly in rural communities.

In the post war period, the government tended to play the major part, providing advice and technical consultancy to farmers via the Agricultural Development and Advisory Service (ADAS) and public service information campaigns from the Central Office of Information. In the modern countryside, knowledge brokers tend to be more diverse and may include a wide range of individuals and organisations, consultancies, development agencies, knowledge networks, regulatory bodies, business advisers or professions such as veterinary surgeons and land agents.

RELU is beginning to explore this area. The RICS journal "Land", the professional publication of the Royal Institution of Chartered Surveyors, carries regular articles about projects to its large scale membership and this could provide an interesting model for other professional outlets and knowledge brokers. Similarly, RELU's projects regularly feature in the NFU on-line news outlets as well as the RELU newsletter which is widely distributed to several thousand stakeholders.

In 2006, RELU organised a major conference on the theme of "Enabling Knowledge Exchange" where delegates explored mechanisms and approaches to exchanging information and knowledge, as well as the role of knowledge brokers. Interactive workshops on themes such as Research and Policy for Land Management Advice, and Mechanisms for Commercialisation were held, each led by a key knowledge broker in the field of rural economy and land use. More recently RELU has targeted local and regional government and public and voluntary sector organisations in a major workshop organised jointly with the Local Authority Research Council Initiative and the Northern Rural Network.

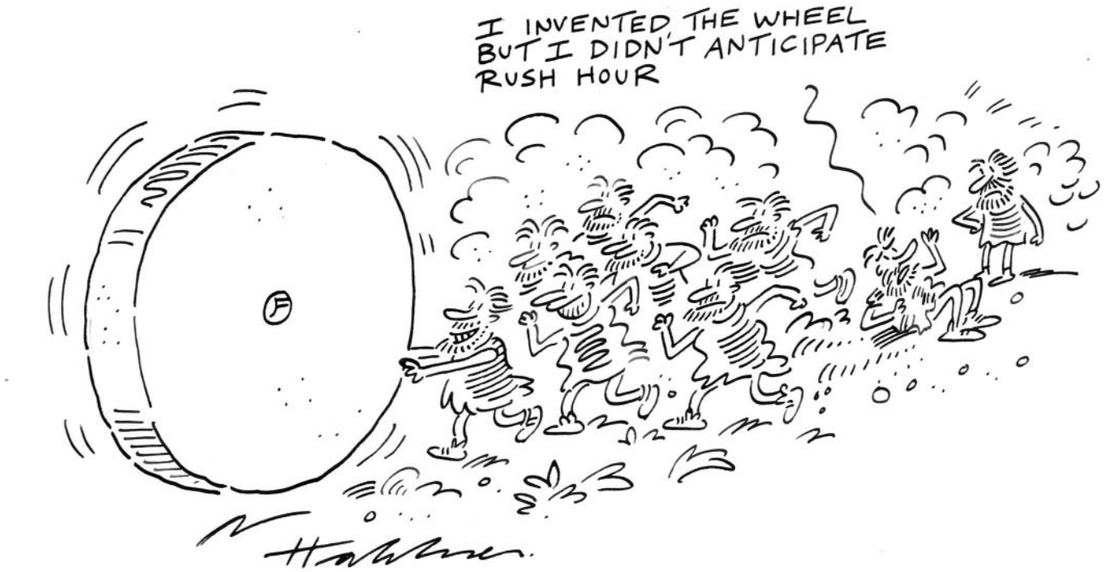
But there is more work to be done here and more potential knowledge brokers to be engaged. As the Visiting Fellowship scheme is launched this could provide another new source of knowledge brokers who will provide new links and networks with key organisations and bodies.

What more for the future?

There are always new and more effective methods that we can develop for conveying and exchanging knowledge. Some research is guaranteed to grab tabloid headlines and the media will have a role to play. But there is a huge amount of research that is never going to make it onto the front page, which could make a difference to someone, somewhere, so it's important to look for new ways of communicating in the right language, with the right audience.

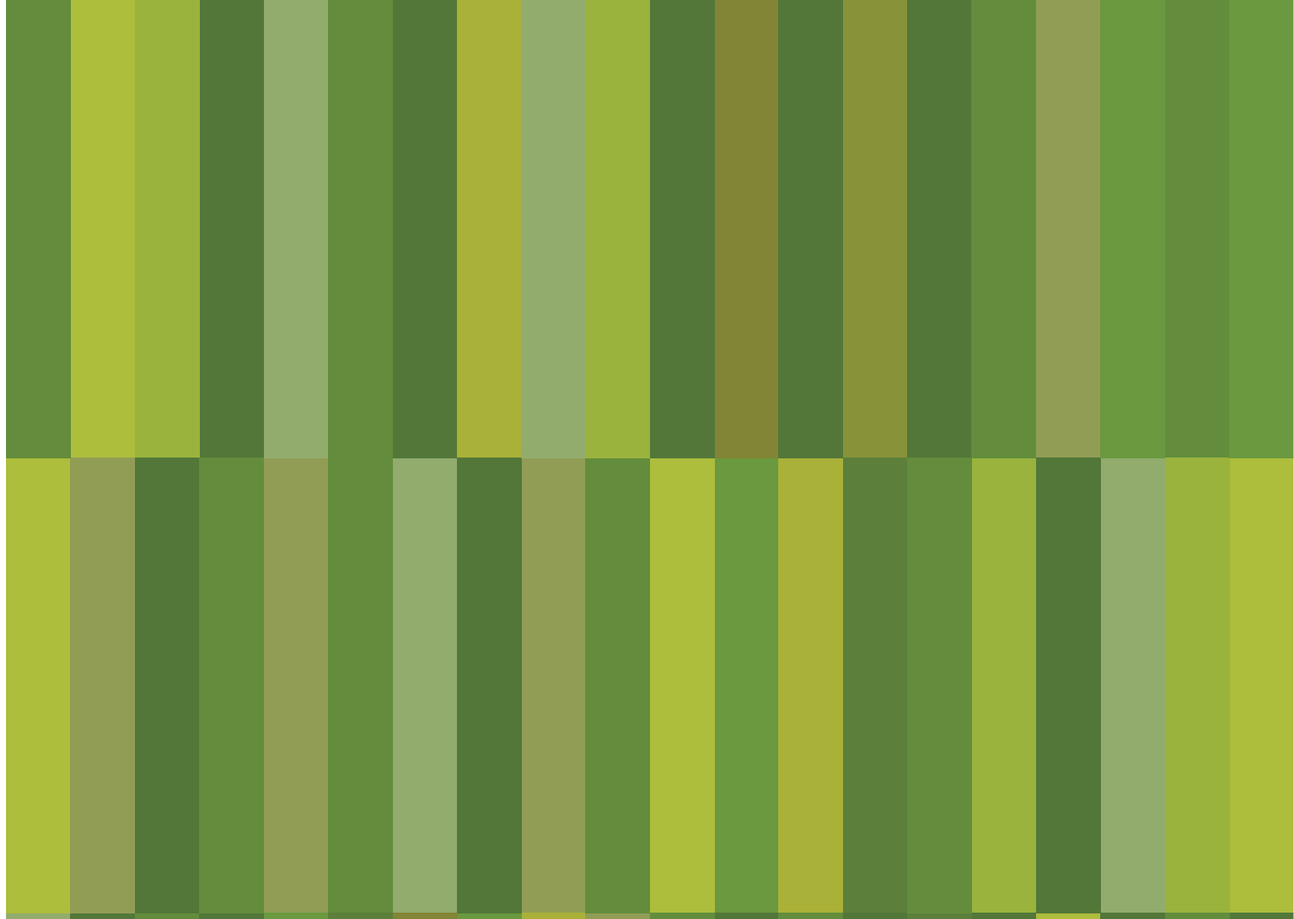
Looking at models of knowledge transfer, there may be more knowledge brokers who could act as conduits, and more routes via professional training and development to be exploited. Most professionals are obliged regularly to update their knowledge and expertise. Perhaps this provides opportunities for knowledge transfer that researchers could link into.

It is also clear that we need networks, drawing in academics across traditional disciplinary boundaries and involving stakeholders at all stages, to help us to mine the richer seam of successful knowledge exchange that needs to take place if we are to get research into policy and practice.



RELU

The Rural Economy and Land Use Programme is a prime example of using joined-up science to tackle key challenges facing the UK's rural areas. It is a radically interdisciplinary programme, funded by an unprecedented collaboration between the Economic and Social Research Council (ESRC), the Biotechnology and Biological Sciences Research Council (BBSRC) and the Natural Environment Research Council (NERC). It has a budget of £25 million, with additional funding from the Scottish Executive Environment and Rural Affairs Department (SEERAD) and the Department for Environment, Food and Rural Affairs (Defra).



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Rural Economy and Land Use Programme Briefing Series No 6.
Common knowledge? An exploration of knowledge transfer. June 2007.
Design: www.infinitedesign.com. Cartoons by David Haldane.