relu
Rural Economy and Land Use

Harnessing the social and natural sciences for sustainable rural development

October 2016

Contents:

1 Policy evaluation for a complex world

The Centre for the Evaluation of Complexity Across the Nexus (CECAN), funded by ESRC and partners, showcased its work in London on 13 September and the event may be viewed on line. CECAN will pioneer, test and promote innovative evaluation approaches and methods across nexus problem domains where food, energy, water and environmental issues intersect. The new centre brings together a unique coalition of experts to address some of the greatest issues in policy making and evaluation. At "Policy Evaluation for a Complex World" the day's events were introduced by Jane Elliott (Chief Executive, ESRC), followed by a keynote speech from Sir Mark Walport (Government Chief Scientific Adviser) and a panel discussion involving key experts.

2 Sustainable intensification is key issue for land advisers

Sustainable intensification is an important approach for farmers and land advisers but how practical or useful are the techniques and tools being developed, and how willing will clients be to adopt new systems? In association with the Sustainable Intensification Research Platform (SIP), Landbridge (the knowledge exchange network for rural professionals led from Newcastle University) hosted a workshop at Nafferton Farm in Northumberland in September, providing opportunities for advisers to explore these issues and learn more about the SIP. With a keynote from Michael Winter and presentations from SIP Study Farm leads Gillian Butler, Chris Stoate and Dave Chadwick, the day also featured a farm walk to examine the interventions being tested at Nafferton. The workshop included lively breakout sessions where advisers, their professional associations, representatives of agricultural and ancillary industries, researchers and knowledge exchange specialists considered how advisory professionals might use the findings emerging from the SIP and further refine these in providing advice to clients.

3 Building resilience across the energy-food-water-nexus

The concept of the energy-food-water nexus captures interconnections, dependencies and linkages between production and use of environment, energy, food, and water resources. Academics, policy makers and practitioners can learn from each other to shape and build more resilient responses to climate and weather related shocks. LWEC Policy and Practice Note No 34 "Informing national and global responses to shocks to the energy-food-water-environment nexus" reflects on these interconnections and how policymakers need to respond to them.

4 Tipping point projects funded

Three projects have been awarded funding from the Valuing Nature Tipping Points Call "Understanding ecosystem stocks and tipping points". The funding will support interdisciplinary research projects that, through developing a better understanding of the complexities of the UK natural environment, help to avoid abrupt and damaging change in delivering benefits. The funded projects are:

Identifying potential tipping points in the benefits derived from the UK's land ecosystems. Lead: Prof Tim Lenton, University of Exeter.

Understanding ecosystem stocks and tipping points in UK blanket peatlands. Lead Prof Mark Reed, Newcastle University.

Mechanisms and consequences of tipping points in lowland agricultural landscapes. Lead Prof Adrian Newton, Bournemouth University.

5 Water in developing countries supplies UK shopping baskets

Our dependence on overseas water resources depends on what we eat, where it comes from, and how it was produced. Eating more fresh fruit and vegetables, for example, may increase our reliance on water resources in already water-stressed places such as Spain and South Africa. LWEC Policy and Practice Note No 33 "How does the UK rely on water in other countries to produce our food?" looks at the demands that imported food we eat in the UK makes on water resources across the globe and what the implications are for policy makers and businesses.

6 Meadows can be beneficial for people and wildlife

Access to nature is beneficial to human health and well-being, yet over 80% of the UK population now lives in urban areas and experiences nature as "urban green infrastructure", a mosaic of greenspaces including parks, gardens and semi-natural areas. Replacing some mown grass areas with designed urban meadows has been shown to enhance the value of individual greenspaces for both people and wildlife. Local authorities and other organisations that are responsible for management of public space are in a position to make this change. LWEC Policy and Practice Note no 32 "Improving urban grassland for people and wildlife" draws on the latest research on the best approaches for local authorities and other public land managers.

7 Herbicide resistance test could help beat black-grass

A simple test which can detect the presence of herbicide resistance in black-grass could act as an early warning for farmers to help slow the spread of the UK's most devastating weed. The "pregnancy-test"-style prototype detects a protein that is found in high concentrations in populations of black-grass that have evolved resistance to multiple classes of herbicides. The test takes just 15 minutes to work, and a red band appears in a small window on the hand-held device if the protein is present. Sensitive enough to detect the molecule in the early stages of black-grass growth, the test aims to help farmers make management decisions early in the crop cycle and prevent costly losses later on. Funded by BBSRC and the AHDB the underpinning science for the new test has been developed by scientists at Newcastle University, as part of the Black-Grass Resistance Initiative, a partnership with Rothamsted Research, Sheffield and York Universities and the Institute of Zoology. The prototype device has been developed with diagnostics company Mologic, in Bedfordshire.

8 Pickering flood scheme scoops awards

Pickering's pioneering "Slowing the Flow" flood alleviation scheme continues to attract keen interest at the highest level of government and from academics worldwide. Now the scheme has been awarded both the Vision and Sustainability prize and the overall Chair's Prize at the Research Innovation Sustainability & Enterprise (RISE) awards of Leeds Beckett University's Sustainability Institute. At a ceremony in the Hotel Metropole the judges were unanimous in praising the scheme and its benefits to the wider community. Completed in September 2015, Slowing the Flow combines natural flood

management measures such as woody debris dams, riparian tree planting, moorland management and drain blocking in the upper catchment, with a flood water storage bund 1.5 miles above the town. It came about as a result of a scientific collaboration between the local community and academics from Durham, Oxford and Newcastle universities working on the Relu project *Understanding environmental knowledge controversies*, followed by the community lobbying for action.

9 How can dynamic models of macronutrient behaviour guide environmental policy?

Human activities such as industrial production, transport, agriculture, urbanisation, domestic detergent use and sewage treatment interfere with natural macronutrient cycles, unbalancing them, with unintended and largely undesirable environmental consequences. These macronutrient elements - carbon, nitrogen and phosphorus - are central to life processes and their biogeochemical cycles are intertwined in air, land and water. LWEC's Policy and Practice Note no 35 "The unbalanced cycles of carbon, nitrogen and phosphorus: national scale forecasting" outlines the latest evidence on how models can be used to help policymakers and environmental regulators to address this problem by demonstrating how multiple pollutants interact and alter in response to changes in climate, land use and atmospheric pollution.

10 Report card gives overview of climate change effects on agriculture and forestry

The agriculture and forestry sectors play a major role in UK primary production contributing to economic activity, jobs and the wellbeing of society; they produce food, fibre and fuel with UK agriculture currently providing around 50% of the food consumed in this country. A new LWEC Report Card gives an overview of how climate change is affecting agriculture and forestry in the UK, and how it might affect these two types of land use in future. It focuses on both threats and opportunities from climate change relevant to crop, livestock, wood and other production in the agriculture and forestry sectors.

11 Heritage values of parks and gardens

Recent research has shown that parks and gardens have considerable heritage value for people, suggesting that their appreciation extends beyond obvious aesthetic and/or recreational values. These essential environmental and cultural assets provide areas for recreation, leisure, and social activity; contribute to our health, local economies and wellbeing; offer space for nature to flourish; and enhance the environmental resilience of the built environment. LWEC PPN 36 "Taking account of heritage values of parks and gardens" considers the implications of this for managers of these important open spaces.

12 Northern Ireland pilot of Nexus multi stakeholder model

The Energy-Climate-Food Security Nexus is developing a multi-stakeholder deliberative governance model in Northern Ireland. The aim is to explore and address regional impacts of the interrelated issues of energy-climate-food security and will be a pilot for multi-stakeholder, participatory scenario planning to address nexus issues in a global North context, and provide a framework for similar initiatives in other regions of the UK and Ireland. The project is led by Professor Sally Shortall (Newcastle University) and Professor John Barry (Queen's University Belfast).

13 New grants awarded to improve sustainability of UK farming

Ten new interdisciplinary projects have received a share of £3M to improve the sustainability of UK farming. The funding was awarded by BBSRC, NERC and ESRC, alongside 12 industry partners, in the second round of the Sustainable Agriculture Research and Innovation Club which supports interdisciplinary projects to provide solutions to key challenges affecting the efficiency, productivity and sustainability of the UK crop and livestock sectors. Among the funded research studies is work to improve the weather resilience of crops, sensing soil nitrogen, and advanced technologies for crop management. The translational studies include work to establish decision tools for slurry usage and potato cyst nematode management, devices to assess and improve the use of animal nutrients, and an assessment of the risks of pesticide run-off.

14 Season and method is important for safer application of slurry

Dairy farming generates large volumes of liquid manure - or slurry - which is ultimately recycled to agricultural land as a valuable source of plant nutrients. Research carried out by the *Governance of Livestock Disease* project as part of the Relu programme show a significant increase in faecal indicator organism (FIO) persistence when slurry was applied to grassland via shallow injection and significantly higher decay rates for FIOs applied to grassland in spring relative to summer and

autumn. Significant differences in the behaviour of E. coli and intestinal enterococci over time were observed, with E. coli half-lives influenced more strongly by season of application relative to the intestinal enterococci population. While shallow injection of slurry can reduce agricultural greenhouse gas emissions to air it can also prolong the persistence of FIOs in soil, potentially increasing the risk of their subsequent transfer to water. The research is published in the Journal of Environmental Management.

15 Biobed reduces pesticides by over 90% after vehicle wash-down

Research by the University of East Anglia, in partnership with the Environment Agency, farm managers and precision farming experts Farm Systems & Environment, found that a biobed reduced pesticide concentrations by 91.6%, thus protecting waterways. A biobed is a pit filled with a 1:2:1 mix of compost, straw and topsoil. Contaminated machinery washings were contained in an enclosed wash-down facility and then run through the biobed, where bacteria and fungi break down the pesticides. The research was carried out by the Wensum Demonstration Test Catchment Project with financial support for pesticides analysis from the Environment Agency. For more information contact Kevin Hiscock K.Hiscock@uea.ac.uk..

16 Researchers crack barley fungus genome

Since the late 1990s, UK farmers growing barley have seen the yields and quality of their harvests hurt by an emerging disease called Ramularia leaf spot. The disease is caused by the pathogenic fungus ***Ramularia collo-cygni***. Now a team of scientists from Scotland's Rural College, The University of Edinburgh's Institute of Evolutionary Biology and Edinburgh Genomics facility, and Rothamsted Research who have been studying this fungus have sequenced and explored its genome. Their work helps to illuminate how the fungus causes disease in barley, and enables future studies to investigate why Ramularia leaf spot has become a threat to barley production and a serious economic problem. The study is **published** in the journal BMC Genomics.

17 Submissions invited for Innovation in Plant Biosecurity 2017

Innovation in Plant Biosecurity 2017 will be held in York on 15 and 16 March next year, hosted by Fera. Aimed at researchers, innovators, technologists and policy makers, it will be a national forum for knowledge sharing and networking on the topic of biosecurity. This year Fera also wants to attract people not generally involved in this field. Deadline for submissions to the conference under four themes: movement and borders; behaviours; emerging risks; or technology, is 30 November 2016. For submissions and early bookings visit the event webpage.

18 Managing habitats to benefit crop production - what's stopping us?

Could you complete an anonymous, brief, three question survey on what you see as the main challenges, and possible opportunities, for using semi-natural habitats in farmland (e.g. field boundaries) to increase the sustainability of pollination and control of crop pests by natural enemies (e.g. predators) in agriculture? Your ideas will help shape a Europe-wide research proposal on this topic. All your suggestions will be considered by a group of stakeholders and scientists, and a priority set will guide the research project being carried out by researchers at Reading and Cambridge universities in the UK and the Swedish Agricultural University. **Please respond before the end of Monday 10 October.**

19 Early detection of tree pests and pathogens technology workshop

New approaches for the early detection of tree health pests and pathogens is funded through the LWEC Tree Health and Plant Biosecurity Initiative. The project is examining new technologies for detecting changes in plants and for detecting arrival of potential pests and pathogens, and exploring how these technologies can be developed better, in partnership with practitioners involved in the use of technologies and with industry representatives. The project is running a workshop on Tuesday 1 November in London. For further information and bookings contact Mariella Marzano Mariella.marzano@forestry.gsi.gov.uk or book on line.

Produced by the Rural Economy and Land Use Network in association with Landbridge
Edited by Anne Liddon and Jeremy Phillipson
Centre for Rural Economy
School of Agriculture, Food and Rural Development
Newcastle University
Newcastle upon Tyne
NE1 7RU
Tel: 0191 208 6623
Fax: 0191 208 5411
Email: relu@ncl.ac.uk to subscribe/unsubscribe