relu
Rural Economy and Land Use

Harnessing the social and natural sciences for sustainable rural development

Relu Newsletter

April 2015 Contents:

1. Making policy and managing land to minimise risk to pollinators

The toxic effects of common pesticides are rarely highly specific and can pose a risk to beneficial insects such as pollinating bees. Drawing on research by the Insect Pollinators Initiative, LWEC's Policy and Practice Note no 16 looks at how these risks might be minimised by policymakers, in how they design and implement policy, and by land managers in their approach to pest control.

2. High tech mapping approaches provide new insights for BESS

BESS (Biodiversity and Ecosystem Service Sustainability) consortia have been experimenting with new high resolution laser surveying approaches to gain a better understanding of landscape structure and functioning. The Fragments, Functions, Flows and Urban Ecosystems Services project has been using laser scanner in the back gardens of Luton to measure the vegetation canopy accurately and non-destructively. Meanwhile another project - A hierarchical approach to the examination of the relationship between biodiversity and ecosystem service flows across coastal margins - has been using similar technology on salt marshes producing detailed information of the terrain. Watch their video to find out more.

3. How can companies manage their impacts on food, energy, water and the environment?

The Nexus Network which brings together researchers, policy makers, business leaders and civil society to develop collaborative projects and improve decision making on food, energy, water and the environment, is asking members of the business community, policy makers, academics and the public to tell them: What are the most important questions around business practice that, if answered, could help companies manage their dependencies and impacts upon food, energy, water and the environment? For more information, and to submit your questions between now and July, visit the Nexus Network website.

4. Defra makes new investment in the Food and Environment Research Agency

Capita plc has been selected, following a competitive procurement process, as the preferred bidder to form a joint venture with the Department for Environment, Food and Rural Affairs (Defra) to operate the Food and Environment Research Agency in York. As part of the proposal, the company has named Newcastle University as their strategic science partner to run the research part of the new organisation. The joint venture will create 50 new science

jobs in York and, in partnership with Newcastle University, an institute that will bring together around 40 researchers.

5. Results continue to emerge from Relu data
The Rural Economy and Land Use programme drew to a close in 2013 but researchers continue to publish results from the large data sets gathered over the lifetime of the programme. The latest article to be published, in the Journal of Applied Ecology, draws on research carried out by the *Improving success of agri-environment schemes* project. They found that the experiential learning of farmers was key to the success of agri environment schemes. Farmers are not simply implementing the schemes but are learning and improving outcomes. This suggests that better engagement, and working with farmers who have a history of success in implementing these schemes, could help to enhance the results.

6. Cool Farm Tool wins farming's Practice with Science award
The innovative Cool Farm Tool developed by researchers at the University of Aberdeen, with support and contributions from many stakeholders and partners, has built on its initial success by winning the Practice with Science Award run by the Oxford Farming Conference and The Royal Agricultural Society of England. The Award is sponsored by AB Agri. The Cool Farm Tool is a free-to-use greenhouse gas calculator used by the whole supply chain to measure the carbon footprint of crop and livestock products. It was originally developed in conjunction with Unilever, and is now owned by the not-for-profit Cool Farm Alliance.

7. Relu people on Defra Science Advisory Council
Sarah Whatmore who was PI on Relu's *Understanding Environmental Knowledge Controversies project* has been appointed to Defra's Science Advisory Council. She joins two other Relu project PIs: Ian Bateman who led "*Modelling the impacts of the Water Framework Directive*" and Louise Heathwaite who co-led "*Assessment of knowledge sources in animal disease control*".

8. How are pests and diseases affecting bee pollinators?
Bees are important for food production; there are over 250 species in the United Kingdom and they provide pollination services for many of our crops. Pests and diseases, sometimes in combination with other factors, can cause decline in bee populations. LWEC policy and practice note no 17 looks at the latest research from the Insect Pollinators Initiative and makes recommendations for minimising pest and disease risks to wild and managed pollinator bees.

9. Fungal diseases have scientists on their tail
Yellow rust is a fungal disease with the potential to destroy an entire crop; those plants which do survive often have a lower quality of grain. To compound the problem, UK farms are also seeing new strains which cannot easily be differentiated by traditional methods. But a new process called "field pathogenomics", developed by scientists at the Norwich Rust Group (a partnership of seven research teams from the John Innes Centre, the Sainsbury Laboratory and the Genome Analysis Centre), will enable much faster, more accurate DNA analysis of rust spores. This technology opens the door for tracking other fungal diseases, potentially adding to the armoury in the fight against ash dieback disease. The research is published in the open access journal Genome Biology.

10. Researchers get a new angle on willow as biofuel
Researchers have used medical imaging techniques to explore why making willow trees grow at an angle can vastly improve their biofuel yields. Using micro-CT scans, the team showed that the trees respond to being tilted by producing a sugar-rich, gelatinous fibre, which helps them stay upright. Growing the willow trees at a 45-degree angle simulates natural stress, encouraging the trees to produce up to five times more sugar than plants grown normally. The research was conducted by a team of experts at Imperial College London, the Natural History Museum, the University of Surrey and Rothamsted Research Centre and is published in BMC Plant Biology, available online.

11. Rothamsted launches new knowledge exchange project for farmers and land advisers
The CROPROTECT project, based at Rothamsted Research, is developing a web-based knowledge exchange system to provide farmers and agronomists with guidance on pest, weed and disease management, especially in situations where effective pesticides are not available and alternative approaches are required. Log onto CROPROTECT on the Rothamsted website. Or for more information about the project contact toby.bruce@rothamsted.ac.uk.

12. Learn to play the Rufopoly game
Alister Scott and colleagues at Birmingham City University will be holding three ESRC Knowledge exchange workshops this month on using the Rufopoly Resource kit: in Birmingham on 14th April, in Aberystwyth on 17th April, and in Edinburgh on 23rd April. Rufopoly is an interactive learning tool emerging from research carried out as part of the Relu "*Managing environmental change at the rural urban fringe*" project and endorsed by government, community groups and decision-makers. It allows players to make their own journey through the hypothetical rural

urban fringe of Rufshire by throwing dice. Please contact Alister.Scott@bcu.ac.uk for details and booking. More information about the resource kit project is available on the project website.

13. Ensuring the future of potato crops in an era of climate change

Potatoes are still a staple crop in the UK. How will climate change affect their cultivation? Ruth Welters of the University of East Anglia and potato farmer, Johnny Giggins explain in a Planet Earth podcast how environmental science can help the agricultural sector plan for future weather extremes.

14. New thinking from the Nexus

How can we bring together our approaches to the major and closely interlinked challenges of ensuring sustainable food, water and energy supplies and a healthy environment? The Nexus Network has published the first cohort in its series of commissioned thinkpieces that aim to consider these problems from a fresh perspective.

15. Researchers make fungal disease of wheat show its true colours

Researchers at Durham University, working with partners from Newcastle University and Rothamsted Research, have found a way that could help to stop extensive spreading of Septoria leaf blotch. This fungal disease is currently a significant threat to wheat yields in Europe and beyond, as available fungicides become less effective against resistant strains. The long, symptomless growth of the fungus - called *Zymoseptoria tritici* - can affect the host plant's cells before it switches to the visible disease phase that eventually destroys the plant's leaves. The researchers found that a wheat protein, TaR1, was key in enabling *Zymoseptoria tritici* to maintain this symptomless growth. By manipulating TaR1 protein levels in wheat the researchers demonstrated that they could activate the plant's defences earlier, allowing for more effective disease control. The research is published in the journal New Phytologist.

16. Findings could help to reduce crop loss in waterlogged conditions

Scientists at the University of Nottingham hope new research could lead to the introduction of cereal crops better able to tolerate flooding. Persistent flooding and saturated arable land can wipe out crops and reduce harvests so the search for flood tolerant crops is a key target for global food security. The researchers have identified the mechanism used by plants in stress conditions to sense low oxygen levels and used advanced breeding techniques to reduce yield loss in barley in water-logged conditions.

17. Capitalising on the value of nature

The Natural Capital Committee launched its third State of Natural Capital report in January. The report recommends that the UK Government, working closely with the private sector and NGOs, should develop a 25 Year Plan to protect and improve natural capital. It presents a series of potential environmental investments that offer good returns such as peatland restoration and woodland planting, backing them up with economic data. It also sets out a framework for corporations to account for their natural capital.

18. Managing future water needs in the producing, food processing and packing industries

The talks and report from the joint workshop that the Agritech Water Cluster hosted with Anglian Water and Agri-Tech East are now available on line. The workshop investigated the issues of competing over a resource which is critical for not only every individual but also many businesses in the UK. How will the need for water in the Anglian region change over time and how will we prepare for changing water availability in the future? Contact Ruth Welters for more information r.welters@uea.ac.uk

19. Landwards 2015: Too much or too little water?

The Institution of Agricultural Engineers conference 2015 will be held in Newcastle, at the Great North Museum, with the support of Newcastle University on Wednesday 20th May. The conference will focus on the role of engineering in agricultural water management in an era of climate change. Details and booking details are available on line.

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