

**SIP
says
page 2**

**SIP in
focus
page 4**

**View-
point
page 10**

**SIPPETS
page 12**

Editorial: Developing the community and enabling change



Photograph copyright D. Ballam 2014

Welcome to the Spring 2016 edition of the newsletter for the Sustainable Intensification Research Platform. This issue highlights the ongoing work of the SIP community both in individual aspects of research, and in finding new ways of bringing about SI on farm and in the wider landscape.

One of the great strengths of the SIP is its role in having brought together a community of researchers and practitioners – many of whom have never worked together before – to enable a step change in SI in England and Wales. It has encouraged coordination and cooperation among individuals working across a broad range of specialities, including social scientists, economists, environmental scientists and on-farm researchers. We are forging links with external stakeholders – including farmers, land managers, supply chains, NGOs and policy makers – and increasing communication at all levels.

This issue of SIPScene highlights the work the SIP is doing to encourage practice change, with pieces from

David Rose (University of Cambridge) introducing work exploring decision support tools, and Steven Anthony (ADAS) describing the landscape typology: a new database of national maps that describe the diversity of farm systems in a landscape, and their surrounding features/characters, designed to enable decision-making for SI at a region-specific scale. Also in this issue, Gillian Butler (Newcastle University) introduces Nafferton Farm, the most northerly of the SIP study farms, and describes the ongoing experiments in dairy systems, spelt and rye.

And finally, we are very happy to feature a guest piece from Jemma Batten of the Marlborough Downs NIA, presenting a case study of effective collaboration at the landscape scale, delivering tangible benefits for wildlife and the community.

Jennifer Preston is Project Co-ordinator for SIP Project 1 and is based at NIAB in Cambridge



SIP Says

Views from in and around the Platform

Integral Integration



Chris Stoate, Head of Research for the Allerton Project, highlights the importance of integration in achieving sustainable intensification on farm

Sustainability is generally regarded as meeting our needs today without compromising those of future generations. We are all becoming increasingly comfortable with the idea that a range of environmental factors underpin our ability to produce food, clean water and, to an increasing extent, fuel. Look no further than the recent flurry of activity around soil health on farming-related social media as evidence of this. Integrating environmental objectives with agricultural ones is fundamental to productive land use, both in the short- and long-term.

There are two further ways in which integration is key to our productive management of the land. The first is a response to the polarisation of farming systems. While this may have delivered economic efficiencies in the short-term, there is an increasing realisation of the benefits associated with the integration of food production systems, not least in terms of waste management, weed and disease control, and security of feed supply. The second relates to knowledge exchange. A long history of one-directional knowledge transfer, from scientists to farmers, is gradually giving way to a more enlightened

approach, in which the skills and knowledge of the most pioneering farmers are recognised as having equal, or more, relevance to the current challenges associated with food production. Put the best scientists and the most forward-thinking farmers together and we have real dynamism that can help us to achieve sustainable intensification.

'Intensification' now is not measured in tonnes of fertiliser or litres of diesel or plant protection products, but through the knowledge and technology that are developed and applied to improve the efficiency with which those resources are used. As well as ensuring economic and environmental benefits arising from improved resource-use efficiency, this approach harnesses natural processes for nutrient cycling and control of pests, weeds and diseases.

Integration of environmental and production objectives, arable and livestock systems, and scientific and farmer knowledge, is integral to the activities on the SIP study farms. Together, our farms provide a platform on which science can be applied in a practical setting, and a focus for discussion with visiting farmers and advisors.

The Allerton Project at Loddington has been integrating its environmental research with its farm business objectives since its start in 1992. As our contribution to the SIP, we are conducting research into various cover crop mixtures, as well as crop establishment methods with differing levels of soil disturbance. Both areas of research have potential for improving soil function, with associated benefits to crop performance and water-related objectives.



Our other area of research is on optimising the use of grass fields for sheep production, through better understanding of the role of sward minerals in those fields. This is highly relevant to the integration of farming systems. As well as improving the live-weight gain of lambs, grass leys within an arable rotation help to reduce parasite burdens in sheep, and grassweed populations in the subsequent arable crops.

The Allerton Project works with a wide range of research partners, with NIAB TAG and the University of Nottingham being our key partners on the SIP. We also work closely with retailers and a range of agricultural supply companies. But, most importantly, we work with farmers and their advisors. Last year, more than 2,000 agricultural professionals from across the country visited us at Loddington, providing numerous opportunities for two-way exchanges of information and ideas.

There is similar activity in the local area around Loddington,

with a range of initiatives providing mechanisms through which researchers and farmers can exchange information and ideas, and develop plans for research. These specific opportunities for practical approaches to mutually beneficial collaboration between farmers, form part of our contribution to the SIP landscape scale work. Collaboration between local farms can have social as well as economic and environmental benefits. As one local farmer put it to me recently, 'It makes life worth living'.

So integration is integral to all we are doing. Coming from a flour milling family, adopting a career in agri-environmental research, and running a small farm business with my wife, integration has personal resonance too! But that is something that everyone with whom we are trying to engage should be able to say.

Chris Stoate is Head of Research at the Allerton Project for the Game and Wildlife Conservation Trust at Loddington



SIP in Focus

The what, how and who of SIP

Farm in Focus – Nafferton



Gillian Butler describes the experiments underway at Nafferton Farm

The most northerly part of the SIP platform is Nafferton Farm in Northumberland, run by Newcastle

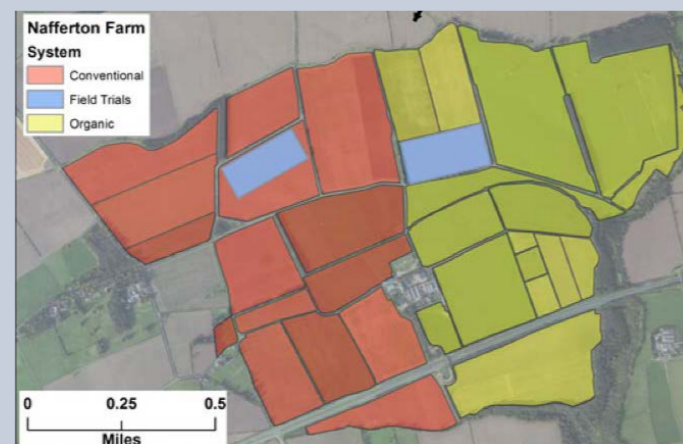
University. Nafferton is a 300 ha mixed arable and dairy farm which 20 years ago would have been typical of those surrounding it in the Tyne Valley. However, these days, dairy cows are a minority in a county dominated by beef and sheep production. But this is not the only reason activities at Nafferton set it aside from many of the other farms.

The commercial farm

Nafferton is run on a commercial basis with the added complexity of being managed as two comparable but independent farms; one certified by the Soil Association to organic standards, and the other, 'conventional'. The farm is on fairly light loam and a track running north/south through the centre of the farm forms a convenient dividing boundary (see picture). This 'experiment' began in 2000, when half of the land underwent conversion to organic status over 5 years. Half of the 180 head dairy herd qualified to produce organic milk in 2006. To allow robust scientific comparison between conventional and

organic production, considerable investment was made, particularly in the dairy buildings. This allows both herds to be milked simultaneously in what appears to be a standard herringbone parlour, but with each side as a separate, isolated system.

Like many dairy/arable units, Nafferton manages the cropping rotation to allow grazing in fields close to the steading for milking cows, although forage in other fields can be used for youngstock, dry cows and silage making. As a result there are four separate rotations on different blocks of land.



Experimental Plots at Nafferton

In addition to the farm scale comparison, Nafferton has two sets of long-term field plots, which allow more detailed investigation into the influence of various aspects of management on crop output and quality, as well the wider environmental impact.



The Nafferton Factorial Systems comparison, set up in 2003, consists of a set of four experiments comparing conventional and organic (a) crop rotation, (b) crop protection, and (c) fertility management. Each experiment is identical in design, but starts at a different stage in the rotation in order to give a range of crops in any given year.

The other set of replicated plots is currently used in the SIP to evaluate improving sustainability in cereal production. Current UK cereals (central for food security) are highly dependent on mineral fertilisers and crop protection inputs, and in some sectors there is also concern that intensification has reduced their nutritional value. We are halfway through a two-year trial with Rye and Spelt cereals, comparing a combination of varieties (four of rye and four of spelt) using a range of wastes for fertility management: composted cattle manure, green-waste compost, anaerobic digestion (AD) digestate and mineral nitrogen. This is in a low-input system following grass clover, with no crop protections (to allow competitive, resistant varieties to thrive) and with nitrogen inputs at 50 of 100kg/ha. Assessment has been (or will be) made for crop health (disease and pest incidence/severity), competitiveness against weeds, nitrogen-supply pattern, grain yield, processing, and nutritional quality. Initial

analysis of the first year's performance shows AD digestate to be comparable with the nitrogen fertiliser, and there are clear yield differences between varieties of both cereals.

At Nafferton, the SIP has also been looking at 'home-grown' feeds (full-fat rape and oats) in order to boost the nutritional quality of milk from cows over the winter. We know that milk from cows denied access to grazing has relatively low levels of beneficial fats; this can be boosted by using oily feeds in their diet – hence the rape and oats trials.

As well as on-farm focussed work, we have also been engaging in the wider landscape around Nafferton. We have been talking to farmers about their attitudes to, or understanding of, SI; their adoption of sustainable practices; and cooperation with their neighbours. Two workshops are planned at Nafferton and Hexham to explore these issues further and investigate the scope for increased collaboration and implementation of SI practices.

Gillian Butler is a Senior Lecturer in the School of Agriculture, Food and Development at Newcastle University



Farm Scale SI - Decision support tools and Integrated Farm Management

David Rose outlines the context of work led by the University of Cambridge on effective decision support tools

Decision support tools in agriculture are usually thought of as sophisticated, software-based tools, which can manipulate data and suggest the best decision path for a farmer or adviser to take. However, farmers and advisers also use a range of other 'tools' to inform their decision-making. These include paper-based guidance, verbal advice from trusted colleagues, and websites.

The University of Cambridge has been leading part of the SIP research aiming to explore the use of decision support tools by farmers and farm advisers, and also to assess their attitudes towards the idea of Integrated Farm Management, with a view to improving understanding of what makes for effective decision support. One of the ways to achieve sustainable intensification may be to improve decision-making guidance to farmers (including

increasing uptake of effective decision support tools); the findings of this project can be used to inform future guidance that is produced.

The project asked farmers and advisers which particular types of decision support tools they used, and why they found specific tools more useful than others. This helped us to develop a list of key characteristics of effective decision support tools, which will encourage manufacturers to design relevant and user-friendly tools in the future.

Understanding the knowledge held by practitioners relating to Integrated Farm Management is crucial for guiding future strategies aimed at encouraging uptake. The project asked farmers and advisers whether they had heard of the term 'Integrated Farm Management', which is important for sustainable intensification. We asked whether certain aspects of Integrated Farm Management were prioritised over others, and how farmers and advisers made links between different parts of their farm business.

The results of this work are currently being analysed for publication. We look forward to describing the findings in a future newsletter.

Researcher in Focus – David Rose



I was fortunate to grow up in a house surrounded by both farmland and a wetland nature reserve in rural Leicestershire. Consequently, I developed a keen interest in farming issues, particularly those connected to the natural environment. As common farmland birds, such as the Corn Bunting, began to disappear from the fields near my home, I became acutely aware of the relationship between farming and the environment. Through my undergraduate and Master's Degree studies in Geography at the University of Cambridge, I was able to pursue this interest, and I wrote a dissertation on the impacts of agri-environment schemes in the UK. For my PhD, which was also undertaken at Cambridge, I studied the relationship between scientific knowledge and policy

in environmental issues, including nature conservation.

I am now an environmental geographer working at the interfaces between knowledge, policy, and practice. I am fascinated by the ways in which knowledge (scientific or lay) interacts with policy and practice; and particularly how knowledge created in practice can influence decisions made at higher levels of governance. I have worked to provide tangible advice for conservation scientists seeking to improve the knowledge-policy interface for evidence-based policymaking.

For the SIP, I looked at how scientific knowledge can influence on-farm management through the use of decision support tools in order to generate productive, evidence-based decisions. My previous work has indicated that the relationship between scientific knowledge and practice is rarely linear or top-down; the SIP project looks at the ways in which uptake of decision support tools in practice can be encouraged.

David Rose is a Research Associate in the Department of Zoology at the University of Cambridge



Thinking at a landscape scale – Landscape Typology

Steven Anthony and team describe the landscape typology: a database of national maps that describe the diversity of farm systems and the character of the surrounding landscape, to aid in developing regionally differentiated pathways towards delivering sustainable intensification.

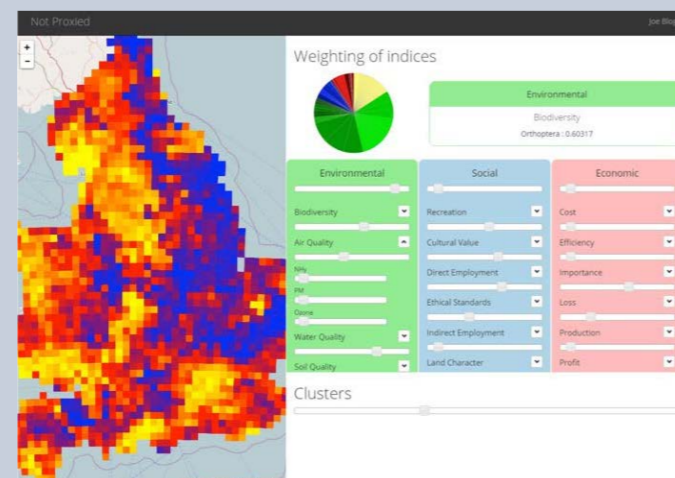
Sustainable intensification involves the adoption of new ways of managing animals and land, including technical innovations such as precision farming; more integrated and resource efficient approaches to production including agro-ecological approaches; and the deliberate sparing of land of high nature value.

The adoption of new practices will reflect local priorities set by farm managers and the wider rural community. However, adoption decisions should also reflect regional and national priorities for improvement and the importance of the attributes of a landscape relative to the national picture. The diversity of farms and landscapes in England and Wales means that no single practice is generally applicable. Yet, efficient knowledge exchange and networking between farmers and advisors requires a regional focus and targeting of limited resources.

The landscape typology aims to support the prioritisation process by providing a database of national maps. These maps will describe the diversity of farm systems within a region and the need or opportunity for improvement in specific outcomes that can be delivered by sustainable intensification practices. The outcomes are organised by the three pillars of sustainability, and relate to measures

of: farm profitability and efficiency; environment quality and the extent of wildlife habitats; and the recreational use and heritage value found in a landscape.

Considerable effort has been made to draw upon trusted data sources, such as the Farm Business Survey, and of existing data sources that have not previously been publicly accessible, in order to combine and map the outcome indicators in a consistent way. Each outcome is scored relative to other parts of the country, and statistical tools have been used to identify regions that have similar needs.



There is considerable evidence on factors affecting investment decisions and restricting or delaying the adoption of new management practices on farms. These include issues of land tenure, access to capital and attributes of the farm manager. The landscape typology includes maps of these factors, with guidance on how they can be used to derive further indicators of likely uptake, to further inform the targeting of farm engagement activity.

The landscape typology combines the indicators of need and uptake with an 'influence matrix' that scores the linkages between individual practices and outcomes, allowing us to calculate an opportunity score for each part of the country. The scoring can be adjusted according to the importance that you place on each outcome, and to provide a variety of maps and summary statistics that compare your surroundings to the rest of the country.

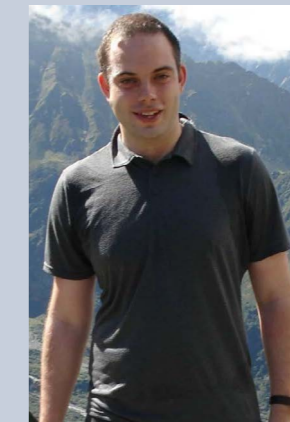
The indicator datasets that we have developed have immediate value in identifying landscapes that share similar opportunities and prompting stakeholder discussion in the preparation of local action plans for sustainable intensification. However, resource limitations and the complexity of comprehensive landscape planning mean that a trade-off is likely to exist between the selection of practices that best enhance productivity, environment or community outcomes. Recognising this, and acknowledging the different priorities that users can have for each of the outcome indicators, an interactive web-based version of the typology has been created. The aim of this is to show the change in opportunity scores under user-specified scenarios.

The web-based tool utilises all of the typology datasets and allows users to interactively select and weight the individual map layers to define regions having similar needs and opportunities. It further offers the ability to create a typology map with a specified number of "types" and for the user to easily obtain detailed information on each dataset included. A screenshot showing the opportunity typology map together with the interactive weighting functionality is shown below. Allowing user interaction with the typology and creation of user-specific scenarios is critical in order to support decision making for sustainable intensification. Users will be encouraged to give feedback on the tool and to build links to this from other web tools.

The typology will be taken to stakeholder workshops in early 2016 in the Taw, Conwy and Upper Welland study areas in order to develop case studies of how it can be used and to receive feedback to guide the final web version.

Steven Anthony is a Principal Scientist in Soils, Crops and Water at ADAS; David Lee is an Environmental Modeller at ADAS; Pete Henrys is Statistician at CEH, and Nigel Boatman is Head of Agri-Environment at Fera.

Researcher in Focus – David Lee



Growing up with a strong interest in the outdoors and environment, I went to the University of Nottingham to do a BSc in Geography and followed this up with an MSc in River Catchment Dynamics and Management at the University of Leeds. My interests and studies gave me insight into the opportunities (and difficulties!) of managing the landscape for many conflicting priorities.

After finishing my MSc, I joined ADAS as an environmental modeller, and have worked here for the last five years. My work at ADAS can be very varied, but generally requires assessing the impacts of government agri-environmental policies on the environment and farming systems, such as looking at the likely effects of changes in farm practice on the environment, and the impacts this will have on the finances of the farm.

In the SIP, my main focus is the landscape typology work. This has involved a significant scoping and data collection exercise; sourcing a large number of indicator datasets to show social, economic and environmental outcomes across England and Wales; and detailed information on local farming systems. Some of these build upon datasets I have used previously, but many have involved working in new subject areas. Combined in the SIP typology tool, these selected datasets can guide the selection of SI practices most relevant and beneficial to a local area.

It is rare that you get the opportunity to consider such a wide range of issues in a single project, and I feel this is the real opportunity of the SIP platform, as this integrated approach can provide the best balance between improving farm performance and providing wider benefits.

David Lee is an Environmental Modeller at ADAS.

Viewpoint

Creating Space for Nature



Back in the spring of 2012 something ground-breaking happened when a group of farmers began to work co-operatively to make space for nature on 25,000 acres of land on the Marlborough Downs. Jemma Batten explains...

Following the 2010 publication of Professor Sir John Lawton's report 'Making Space for Nature', the Marlborough Downs farmers were horrified to learn that across England, countless native wildlife species were in decline or, at best, just about holding their own. To add insult to injury, this was the case despite a long history of farmland conservation supported by Government Stewardship schemes, in which many of the group had participated for years.

Consequently, when Defra launched a competition inviting partnerships to submit proposals for new ways of working for wildlife, the farmers asked me to put together a business plan and apply on their behalf. We wanted to show how a farmer-led, bottom-up approach could result in real gains for the habitats and species found on the Downs.

Happily, of 76 initial applications submitted, ours was one of only 12 which were successful, and in April 2012, the Marlborough Downs became a new Nature Improvement Area (NIA). At the heart of the Downs lies an expansive landscape of open rolling downland, defined by the crest of a chalk scarp along which runs part of the Ridgeway National Trail. A predominantly arable landscape, remnants of chalk grassland cling to steeper slopes and on protected sites. The Downs are sparsely populated with no significant watercourses. However, what we lack in people we make up for in wildlife including farmland birds and many species associated with chalk grassland.

The concept of landscape-scale conservation has been around for decades but, as far as we know, had never before been applied in this context in the UK. Even within the NIA 'family', our farmer-led partnership was unique, and from the very beginning we rose to the pioneer challenge. We were determined to show that by being allowed to make our own decisions about wildlife management on the Downs, together – whether as a landowner or tenant farmer – we could accomplish greater and more wide-reaching benefits than those who do not have the responsibility that comes with custodianship.

Three years on, we were able to demonstrate an impressive list of achievements including:

- Over 150 acres of chalk grassland habitat created / undergoing restoration
- Seven new sites identified as being of local importance for wildlife
- Over 600 acres of rough grassland managed for owls and raptors
- A necklace of 16 new or restored ponds across the Downs
- More widespread populations of tree sparrow, corn bunting and short-eared owl
- Improved public access on 47 miles of footpath and bridleway
- 8.5 miles of permissive access for disabled carriage drivers
- Over 4,300 people attended 42 talks, 25 farm walks, 2 Open Farm Sundays, 24 volunteer workdays, 13 best practice workshops, and 10 celebration events
- Collaboration with representatives of over 50 conservation and community organisations

Funding for NIAs came to an end in March 2015, but the partnership lives on thanks to the continued commitment of the farmers and their supporters, most notably the Game and Wildlife Conservation Trust and Wiltshire Council. We did away with the old NIA geographical boundary in order to encompass new land and new members, and have evolved into the Marlborough Downs Nature Enhancement Partnership, working together to create Space for Nature on a landscape-scale.



For the past year we've kept things going on love and a shoestring, but recently we've been offered a grant through Defra's new Countryside Stewardship Scheme to continue with some of our projects.

Space for Nature is owned by the farmers and their supporters. We have invested a lot into it and are therefore committed to the responsibility of ensuring that our achievements are sustainable. Wildlife conservation is not all about money and we have shown that it is undertaken far more enthusiastically by people who are genuinely motivated at a personal level, rather than merely incentivised by financial reward.

We have also discovered that by working together – with one another, with specialists and with local residents – we can create a vibrant community that is able to achieve so much more than we would alone. Furthermore, we've seen how what started out as a fairly straightforward wildlife project has grown into something that has social,

health and economic benefits as well as bringing about better awareness, understanding and management of our local biodiversity.

For more information on the Marlborough Downs NIA and Space for Nature project see our YouTube channel, website www.mdnep.org.uk, and facebook page www.facebook.com/MarlboroughDowns, where you can also see details of upcoming events.

Jemma Batten is a farm environment adviser who founded Black Sheep Countryside Management in 2002 after various jobs including wildlife film-making with the BBC and lecturing at land-based colleges. Black Sheep is a consultancy with a broad client base ranging from individual farmers to local and national wildlife organisations and government agencies. While we are committed to making farms better places for wildlife, we are aware that this needs to be achieved within the context of a working landscape, and have a reputation for our success in achieving this.

Photographs in this article are credited to David White

Sippets

Latest news from the platform

Project 1 - Updates from the 2015 Rye and Spelt Event Series at Nafferton Farm

As part of both the Healthy Minor Cereals and Sustainable Intensification Platform projects, the Nafferton Ecological Farming Group (NEFG) hosted two information sessions about spelt and rye growing in Northeast England.

On 11th July 2015, attendees visited the first year of field trials established at Nafferton, which compare four different varieties of spelt and rye, respectively, over five different fertiliser types. At the time, differences in crop height were clearly visible as both crops had completely flowered.

On 21st November, delegates discussed the food supply chain for minor cereals and artisanal bread. The

group discussed the initial yield results from the NEFG trials and considered their implications for a potential grower. The broader considerations of creating demand, not just supply, for rye and spelt products were also deliberated, with input from growers, millers and bakers in attendance. The group also viewed spelt de-hulling, which is an additional step to seed cleaning to obtain individual grains from a spelt spikelet.

Nafferton is holding an open event in the summer - a unique opportunity to see the SIP work and compare varieties under different fertility inputs, as well as getting further insight into the 1st years' findings. The provisional date is the 2nd of July; please visit the NEFG website (<http://www.nefg-organic.org/>) for confirmation nearer the time.



NEFG Field Trials Manager Gavin Hall (L) and HMC Project Leader Dr Paul Bilsborrow (R) (photo by Jessica Byam)

Project 2 - SIP Year 2 Scientific Conference – Bangor, 13th - 14th April 2016

Researchers, agricultural practitioners and decision-makers met up at the annual SIP Scientific Conference with the aim of maximising the impacts and effectiveness of SIP research. This event provided a platform for the SIP research teams to present and discuss their findings thus far.

As well as knowledge-sharing, the event was also a key knowledge generating event, where academics, farmers (some are both!) and policy-makers sat together to work out some of the key questions facing the SIP. For example, how the SIP tools and frameworks, collaboration and national policy all work together for the benefit of farmers, wider-society and the environment.

There is a report on the conference on our website www.siplatform.org.uk



The SIP Year 2 Scientific Conference in Bangor

SIP Partners

SIP 1

NIAB (lead) with Aberystwyth University, ADAS, AFBI, Bangor University, BioSS, University of Bristol, University of Cambridge, Centre for Ecology and Hydrology, Carbon Trust, Duchy College, East Malling Research, University of Exeter, Fera, Game & Wildlife Conservation Trust, Harper Adams University, University of Hertfordshire, Linking Environment And Farming (LEAF), University of Leeds, Newcastle University, University of Nottingham, Organic Research Centre, University of Reading, Rothamsted Research, RSPB, SRUC, Soil Association, Velcourt

SIP 2

University of Exeter (lead) with ADAS, Bangor University, BioSS, University of Bristol, University of Cambridge, Centre for Ecology and Hydrology, Eden Rivers Trust, Fera, Game & Wildlife Conservation Trust, Glasgow Caledonian University, The James Hutton Institute, Lancaster University, Linking Environment And Farming (LEAF), University of Leeds, Newcastle University, NIAB, The University of Nottingham, Rothamsted Research, Westcountry Rivers Trust



Tell us what you think!

Come to our events: www.siplatform.org.uk/events

Follow SIP on Twitter: @SIPResearch

E-mail:
Jennifer Preston, SIP 1 Project Co-ordinator
(Jennifer.Preston@niab.com) or
Gavin Huggett, SIP 2 Project Manager
(g.huggett@exeter.ac.uk)

Or Join the debate at the BBSRC SI Discussion Forum
www.sustainableintensification.org.uk





SIPSCENE

Follow us on Twitter @SIPResearch