

All-Party Parliamentary Group on Science & Technology in Agriculture

Notes of a meeting held on Tuesday 22 November 2016,
Committee Room 5, Palace of Westminster

Can UK agri-science help the State of Nature?

Present:

Members

Julian Sturdy MP (Chair)
Lord Cameron of Dillington

Guest Speakers

Dr Mark Eaton, RSPB
Richard Bramley, NFU Environment Forum
Dr Jonathan Storkey, Rothamsted Research

Stakeholders

Dr Jonathan Clarke, John Innes Centre, Les Firbank, University of Leeds, Abigail White, abc; Will Peach, RSPB; Diane Mitchell, NFU; Sam Durham, NFU; Ian Waller, NFU; Phil Jarvis, GWCT; Jennifer Preston, NIAB; Mark Pettigrew, PepsiCo Agriculture; Claire Feniuk, RSPB; Matina Tsalavouta, Rothamsted Research, Claire Smith, RSPB; Alice Turnbull, Bayer; Mark Buckingham, Monsanto; Martin Savage, nabim; Naheeda Portocarero, Devenish Nutrition; Joe Brennan, nabim; Jonathan Carruthers, Royal Society of Biology; James Somerville-Meikle, Countryside Alliance; John Bingham, farmer, ret. wheat breeder; Daniel Pearsall, Group Co-ordinator

1. Welcome & Introduction

Julian Sturdy (MS) welcomed Members and stakeholders to the meeting and briefly introduced the topic for debate, noting that the meeting was very timely not only in view of the issues highlighted in the recent State of Nature Report but also given that agriculture and the environment would be key elements of the Brexit negotiations. The importance of striking a sustainable balance between the need to maintain a viable and productive agricultural sector while protecting and enhancing farmland wildlife and biodiversity, and the role of agri-science in doing so, would be central to those discussions.

2. Guest speakers

[Please note that speakers' slide presentations are available to download via the meetings section of the All-Party Group web-site at www.appg-agscience.org.uk]

Mark Eaton, Principal Conservation Scientist, RSPB

Dr Mark Eaton (ME) summarised high level findings of the second State of Nature report, published in September 2016. He explained that the state of nature partnership, a growing coalition drawn from a wide range of organisations covering research, recording and conservation, had produced its first report in May 2013. The 2016 report involved 51 partner organisations – the intention behind both reports was to bring together available data on UK biodiversity to provide a robust, objective assessment of the state of nature alongside contextual information on the pressures on biodiversity.

ME explained that the 2016 report included more robust data, covered more species – eg measures of change in 4000 species rather than 3000 - and provided a new analysis of the

causes of change. Despite these improvements, ME acknowledged that the report still had significant gaps in its coverage, for example in relation to earthworms and fungi.

The 2016 report found that, over the long term (since 1970) 56% of species were declining, but ME suggested that this was not regarded as a genuine improvement on the 60% reported in 2013, simply a better measure, covering more species and data.

Over the shorter term (2002-2013), the balance had improved slightly, with 53% of species declining, although ME pointed out that the proportion of species showing a severe decline was up considerably.

ME reported that a further development for the 2016 report was the ability to measure change on an annual basis to produce a status index based on abundance and occupancy data for 2,500 species. This index had declined by 16% since 1970 - 0.4% per year. More recently, however, between 2002 and 2013, the rate of decline had slowed to 3%, or 0.2% per year, which could offer some grounds for optimism.

ME explained that the State of Nature report also presented results in eight habitat sections by classifying species as belonging to different habitats, including farmland.

The key finding in relation to farmland species was that over both the long and short term, the same proportion of species – 52% - were declining, slightly better than across all habitats in the UK, although ME emphasised that invertebrates were doing more poorly, with almost 40% showing a severe decline since 2002.

The species status index, however, showed a steeper rate of species loss over both the long term (20%, or 0.6% per year) and the short term (8%, or 0.7% per year) for the 762 species defined as farmland species. ME indicated that this was a steeper short-term rate of loss than reported for any habitat other than urban.

To analyse the drivers of change, ME explained that over 50 scientists and species experts had collaborated to consider all possible impacts – positive and negative – on a random sample of 400 species. This work had been published in the peer-reviewed scientific journal PLOS One prior to its use in the 2016 State of Nature report.

The main findings of this impact research were summarised in the State of Nature report in terms of the 10 most significant drivers behind nature loss. This concluded that the largest single impact, overwhelmingly negative, was the intensive management of agricultural land – including the loss of mixed farming, increased use of pesticides and fertilisers, and the widespread switch from spring to autumn sowing dates.

ME also noted that this conclusion in relation to the impact of intensive farming was not unique to the State of Nature report, but was backed up by Defra 'evidence statements', produced by a consortium led by the Centre for Ecology and Hydrology to summarise the science underpinning official biodiversity indicators.

ME added that the causal relationship between farming methods and loss of farmland biodiversity was well-established, particularly for birds, by tens if not hundreds of scientific papers. Nor was it a pattern unique to the UK, with the European wild bird index showing similar declines, indicating that this was a consequence of the production-oriented policies of the CAP. Importantly not the result of poor farming, but of policy.

Turning to the development and spread of agri-environment schemes, ME noted that although well over 50% of English farmland was covered by Entry Level Stewardship (ELS), this had not produced the positive response hoped for, possibly because farmers were able to choose

options which paid better, were easier to implement or made more agro-economic sense, but which had lower benefits for wildlife.

But ME suggested that well-designed and targeted agri-environment schemes had been shown to deliver conservation recoveries, pointing to the recent Cirl Bunting survey in Devon which showed a ten-fold increase in breeding pairs since the 1980s thanks to research led by the RSPB and the hard work of farmers, supported by Countryside Stewardship and then Higher Level Stewardship (HLS) to provide the winter stubbles and field margins needed to meet their food and habitat needs. ME added that the farmland bird index showed a 61% increase in species targeted by HLS compared with a 4% decline in non-HLS areas.

ME concluded that the State of Nature report was the best assessment of UK biodiversity, showing significant and ongoing species declines over recent decades, driven in large part by the intensive management of farmland as farmers responded to production-focused policies.

While recent years had seen concerted efforts to improve farmland nature, with some benefits detected, there had not been a widespread recovery in farmland biodiversity. But more targeted scheme design and better use of science had demonstrated that a wildlife-rich countryside could be achieved efficiently and effectively.

ME suggested that the UK now had the opportunity to deliver this through the new environment, farming and rural development policies to replace the CAP, with conservationists working alongside farmers to provide the public benefits that market forces could not.

Richard Bramley, Farmer, NFU Environment Forum

Offering a farmer's perspective on the issues raised by the State of Nature report, Richard Bramley (RB) highlighted the importance of balancing food production with nature conservation, and the key role of science and technology in achieving that balance.

While RB was acutely aware of the impact of farming on the countryside and associated farmland biodiversity, and he understood why farming came under so much scrutiny, he considered that a central flaw in the State of Nature report was the baseline of 1970, when the world was a very different place – for example 4 billion mouths to feed compared with 7.2 billion today (and predicted to rise to 9.6 billion by 2050), UK population 55.7 million vs 64.9 million today, and life expectancy of 72 compared with 82 today.

RB suggested that while going so far back did help give the headlines more impact and raise the report's profile, in doing so it fundamentally failed to highlight the farming and conservation advances made in recent decades, or to acknowledge the hugely different circumstances facing society today.

RB highlighted the environmental progress made by UK farmers since the early 1990s, including 50% less pesticide active ingredients applied, 35% less Nitrogen fertiliser, 60% less Phosphorus, 30,000km of hedges planted, a peak of 71% of farmers in stewardship schemes, and over 37,000km of grass margins managed to protect water courses and provide habitat.

A third generation farmer trained in agriculture whose grandfather first took on Manor Farm in 1935, RB described his own 500 acre farm just south of York, growing wheat, barley, potatoes, sugar beet and oilseed rape and annually producing enough calories to feed over 12,000 people for a year – including enough wheat to bake 600,000 loaves of breads. RB considered this was good value in return for an EU support payment of around £3 per person per year. In the face of uncertainty and challenges such as the weather (including a significant increase in flooding), volatile markets, rules and regulations and the impact of Brexit, he explained that his philosophy was to produce good quantities of good quality produce while trying to improve the environment

on the farm and make a good living – and not, as suggested in the State of Nature report and associated media coverage, to cause harm to the countryside.

When the conclusions of the report were so universally negative against probably the most important group who could make a difference to its objectives, RB questioned whether a major opportunity was being missed. In RB's view, the critical issue was to work out realistic expectations of the countryside in 2016 and beyond, not what they were back in 1970.

Describing his own farming operation, RB explained that crops were produced sensitively, with attention to detail on fertiliser and pesticides used, and with around 7% of the land maintained as unfarmed habitat including difficult to farm areas and buffer strips on water courses sown with flower and seed mixes.

Over a period of ten years RB had received a modest payment under ELS, used to develop the farm's environment further, with bird and bat boxes, hedge and tree planting and extensive cover cropping. Species monitoring around the farm, conducted in partnership with RSPB, had shown a positive increase in species diversity and abundance over time.

But subsequent changes in EU farm policy meant that that this work was no longer recognised or rewarded, largely due to the so-called 'greening' of the CAP. RB suggested that time would show what a folly this policy change had been, driven by the 'green lobby' in Europe.

As a member of the NFU Environment Forum, RB noted that one of his biggest frustrations was the time and effort spent reacting to these very policies - to get them reformed or removed to prevent adverse knock-on effects.

He added that the current pressure on vital plant protection products such as glyphosate was another example of science being over looked in an otherwise emotional debate, and which would result in further collateral damage.

RB also described his involvement in a pilot project based at York University, as part of the N8 Agri-food strategy. (N8 are the leading research universities in the north of England). This project focused on how to design and implement environmental management policies to deliver results at farm level, and its conclusions highlighted the importance of farm-specific practical measures, strong farmer involvement in creating policy, and the need to strengthen collaboration between farmers and researchers.

RB considered that farmers were best placed to deliver the best value to managing nature, but farmers also needed education and incentive. Policy-makers must recognise that home-produced food is strategically essential, and look to build on the UK's advantages of professional farmers and good land.

Science and technology would have a key role to play, for example by delivering sustainable increases in productivity through improved genetics and optimal use of resources – and recognising the need for improved understanding of soil health and resilience.

Likewise, RB called for a more realistic, science-based approach to delivering sustainable increases in biodiversity, recognising not only the complex interactions at work but also the costs involved which must be met if valued by society – the economics of farming could not be ignored and these ancillary benefits to food production needed to be properly recognised and rewarded.

RB also cautioned that the UK had a limited land base and that looking to build biodiversity by reducing that land base could mean some difficult choices in 20-30 years time.

In conclusion, RB suggested that there was a need for all parties to work in partnership, to make good farming easy and properly rewarded, to give new approaches a chance to work, and to

keep farmers as practitioners at the heart of the policy development process. Above all, it was imperative to look forward from here rather than keep looking backwards to a period in life which would never return.

Jonathan Storkey, Senior Research Scientist, Rothamsted Research

Dr Jonathan Storkey (JS) focused on the issue of timing in relation to the headline conclusions of the State of Nature report, noting that the process of agricultural intensification had not been a continuous process and therefore changes in farmland biodiversity had not taken place in a linear fashion as intimated.

JS highlighted the difference between the 1970s and 1980s, which saw a step change in the way pesticides and fertiliser were used – and certainly impacted adversely on farmland biodiversity – as compared with the early 1990s onwards, which had been characterised by a well-documented wheat yield plateau. This slow-down in productivity reflected a trend towards reduced input use, as well as the large-scale introduction of agri-environment and habitat creation schemes, supported recently by an increase in spring cropping and use of cover crops.

The steep decline in farmland biodiversity, correlating with a step change increase in farming intensity between 1970 and 1990, was well-documented, and JS noted that the same graphs showing a decrease in bird numbers as UK wheat yields increased could be reproduced for species after species.

JS also highlighted a study published in 2000 by Dan Chamberlain providing – in his view - the most comprehensive analysis yet produced of the timing of major agricultural changes affecting farmland bird populations – such as a decline in the area of stubbles. This research offered further confirmation that the changes introduced during the ‘green revolution’ between 1970 and 1990 were the most significant in terms of their impact on abundance of farmland birds.

Given the direct trade-off between yield and farmland biodiversity indicated by these studies, JS therefore seriously questioned whether the same factors were at play in terms of the impact on farmland biodiversity over the second half of the period covered by the State of Nature report.

JS therefore suggested that more research was needed to understand the factors behind changes in farmland nature over the past 20 years, noting that at the same time agricultural change had slowed, climate change had accelerated, and that trends in farmland bird populations had become more mixed and complex, with no consistent response between species. If the Chamberlain analysis was repeated for 1996-2016, JS challenged whether it would still identify agricultural change as the primary driver of continuing nature loss.

Moving forward, JS highlighted the need for innovative research to break the trade-off between the productivity of farming and nature loss. The BBSRC/NERC funded ASSIST programme, bringing together scientists from Rothamsted, CEH and the British Geological Survey was focusing on this objective, firstly by managing habitats to provide a win:win for farming and the environment by increasing the functional component of biodiversity for agronomic benefit (eg insect pest control), and secondly by optimising the multi-functionality of the farmed environment to minimise the area of land that needs to be taken out of production for habitat creation.

3. Questions and discussion

The following key points were highlighted during discussion:

The critical role of crop genetic improvement in developing pest and disease resistant varieties capable of delivering higher yields with fewer chemical inputs.

The importance of treating field margins in the same way as a crop, with careful selection of species mix and management practices to optimise productivity. Effective stewardship also needed targeted, national farm-level advice services (eg FWAG) to help farmers choose the right options, while consistent funding and incentives for ecosystem services over the long term were essential, not only to reward conservation practices properly but also to give farmers the confidence to treat conservation as an integral part of the business.

In designing and managing conservation schemes, the importance of understanding the blueprint for success in balancing productivity and biodiversity, eg the target for abundance and geographical spread of different species – recognising that not all landscapes or farmed environments will deliver the same biodiversity returns from the same schemes.

Changes in the structure of UK research councils could make it easier to design and conduct interdisciplinary research projects such as ASSIST, bringing together a range of different perspectives to farming-related research.

Concern was expressed that concentrating financial support for environmental schemes on less favourable regions such as the uplands (eg on socio-economic grounds) could prove counter-productive in terms of both production and conservation objectives – productive land can not only produce more food but is also capable of sustaining more biodiversity.

The need to include farmers centrally in partnerships such as the State of Nature coalition, alongside other sectors of society, recognising and remembering that society also wants cheap food alongside a thriving countryside.

There was concern from conservationists that although the process of agricultural intensification may have slowed or stopped, current farming practice is still intensive and agri-environment schemes have been applied at the margins. Other significant changes in agricultural practice over the past two decades which could have been damaging to wildlife include the loss of 10% set-aside virtually at a stroke in 2008, and the increasing trend towards spraying out cereal stubbles with glyphosate, turning a food-rich stubble into a sterile stubble in early autumn.

There was increasing recognition of the value of cover crops, not only in providing a food resource and habitat for wildlife, but also in improving soil quality and reducing water run-off. But it was also noted that cover cropping has been completely devalued by recent greening changes to the CAP at EU level.

A number of stakeholders highlighted the need for a stable economic model – moving away from loaded terms such as farm subsidies - to value and recognise the ecosystem services and ancillary benefits provided by farmers, otherwise they would not happen.

The scientific need was highlighted for more up to date and more realistic baselines for farmland and soil bank biodiversity to reflect changes in farming practice, recognising that biodiversity is an evolutionary process. But there was reluctance from conservationists to convey the impression that everything is fine and ignoring the cliff-face of biodiversity decline in the post-1970 period.

There was general agreement that farmers and conservationists needed to be less confrontational and more collaborative in addressing these issues, particularly as farmers are facing a more competitive trading environment post-Brexit – at the same time ensuring the research pipeline functions more effectively to get a rapidly advancing knowledge base of what works and what doesn't work in this area onto farms and into the hands of practitioners.

The challenge for farmers to observe the highest food safety, animal welfare and environmental standards while at the same time competing on a world market offering no premium or advantage for those higher standards. A consequence of reducing the productivity of domestic

agriculture would be to export the UK's food needs elsewhere with damaging consequences for other countries' environments, underlining the need for balance and consistency between production and conservation objectives.

A question over whether there is a close enough understanding and dialogue on the R&D side between environmental science and farming innovation, ie with a focus on how to produce high yielding crops and a species rich biodiversity at the same time. Also, the importance of early and regular engagement with farmers as the end-users of R&D as a prerequisite for effective, industry-facing research and subsequent on-farm uptake.

Concluding the meeting, Julian Sturdy MP thanked speakers and attendees for their contribution to a stimulating and informative session, highlighting the overriding need for stakeholders to identify shared objectives and work together in developing practicable, realistic and effective policies in this area.