All-Party Parliamentary Group on Science & Technology in Agriculture

Annual General Meeting

Beyond Foresight: What does 'sustainable intensification mean for UK agriculture?

Tuesday 29 November 2011, 4.30 – 6.00pm,
Committee Room 9, Palace of Westminster

Present:

Members
George Freeman MP (Chair)
Earl of Selborne
Lord Grantchester
Lord Cameron of Dillington
Earl of Lindsay
Lord Walpole

Guest Speaker
Professor Sir David Baulcombe, Regius Professor of Botany, Royal Society Research Professor and Head of the Department of Plant Sciences, Cambridge University

Guest Panel
Peter Kendall, President, NFU
Gareth Morgan, Head of Agriculture Policy, RSPB
Professor Wayne Powell, Director, IBERS

Stakeholders
Neil Hipps, East Malling Research; Martin Savage, nabim; Caroline O'Leary, nabim; David Alvis, TSB; Julian Little, Bayer CropScience; Dr Andrea Graham, NFU; Mark Buckingham, Monsanto; Ben Keeley, FCRN; Penny Maplestone, BSPB; Paul Rooke, AIC; Tina Barsby, NIAB; Jennifer Wilson, US Embassy; Shamal Mohammed, HGCA; Andy Whitmore, Rothamsted Research; John Young, BASF; Matt Keirle, abc; Richard Whitlock; Ray Elliott, Syngenta; Peter Sutton, Syngenta; Mike Rowe, Defra; Colin West, MAGB; David Leaver, BIAC; Robin Upton, John Bingham; Andrew Kuyk, FDF; Nick von Westenholz, NFU; Andrew Barnes, SAC; Tara Garnett, FCRN; Mike Coffey, SAC; Daniel Pearsall, Group Co-ordinator

1. Welcome & Introduction
George Freeman MP welcomed Members and stakeholders to the third Annual General Meeting of the All-Party Parliamentary Group on Science and Technology in Agriculture. He presented the All-Party Group's Annual Report for 2010/11, which Members endorsed as a positive record of yet another busy year for the Group in raising the profile of agricultural science and technology within Parliament and beyond.

2. Election of Chair and Officers
All Members present agreed that the Group should continue to exist and operate as an approved All-Party Group within Parliament.

The nomination of George Freeman MP to continue as Chair of the Group was approved by all Members present.

Nominations for the Earl of Selborne and Lord Haskins to continue as Vice-Chairs of the Group were approved with the agreement of all Members present. No other nominations were received.

3. Guest speaker

Professor Sir David Baulcombe, Cambridge University

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

With rapidly increasing global demand for food now outstripping supply, DB highlighted the urgent need to increase agricultural productivity.

While some commentators suggested that new sources of demand could be met by increasing the land area put down to agriculture, DB cited research in the UK and US which showed that the landsparing associated with increased intensification of production on existing farmland was the most effective way both to preserve biodiversity and reduce greenhouse gas emissions from agriculture.

Measures to mitigate demand, improve processing efficiency and reduce waste all had a role to play in ensuring future food sufficiency, but delivering sustainable increases in productivity was vital.

Citing Jules Pretty's definition of sustainability, DB highlighted the need for ***persistence*** (delivering predictable outputs over long periods of time), ***resilience*** (capable of withstanding shocks), ***autarchy*** (not over-using finite resources), and ***benevolence*** (delivering desired outputs without depleting natural resources or ecosystems).

A range of disciplines would be needed to contribute to this 'sustainable intensification' of agricultural production, including advances in agronomy, engineering and agroecology, but DB focused on the crucial role of genetics.

Major improvements were now possible thanks to the revolution in DNA sequencing which meant the data for a whole plant genome could be available within a week, allowing gene sequences to be readily linked with the phenotype of a crop plant. This offered enormous benefits for the speed and accuracy of conventional plant breeding programmes – DB highlighted the example of marker-assisted selection in rice breeding, which had been instrumental in developing flood tolerant varieties.

DB also highlighted the key role of genetic modification in crop improvement. While first generation GM crops offered benefits in terms of improved weed control and reduced chemical sprays, DB considered that the potential of first generation GM technology had not yet been fully exploited, citing Vitamin A enriched Golden Rice and the scope to develop virus resistant crops as key missed opportunities.

Second generation GM crops – eg late-blight resistant potatoes - would allow conventional plant breeding targets to be delivered without affecting the desired characteristics of the original variety. The technology could also be used to develop several new varieties at the same time. Key breeding targets would include drought and stress tolerance, improved post-harvest storage and modified plant architecture, eg to reduce lodging or increase nutrient

uptake. Often the use of second generation GM would involve transferring genes between plants of the same species – cisgenesis.

DB predicted that third generation GM crops would enable radical changes to crops grown for food and fuel. Increasing the photosynthetic efficiency in key crops could allow a 50% increase in yields using the same level of inputs, while the development of perennial crops and nitrogen fixation were among the scientific grand challenges for more sustainable crop production. Furthermore, DB highlighted the scope to remodel existing crop species or to exploit the potential of entirely new species – some 70,000 species of flowering plants had been identified globally yet only around a dozen were in widespread use in agricultural production.

Finally, DB emphasised the need to combine advances in genetics with innovations in agronomy to improve yields and reduce inputs. He cited the concept of push-pull or companion cropping, for example intercropping a legume with a main crop to provide a nitrogen source while trap crops grown at the margins could be used to attract beneficial insects and repel crop pests.

In conclusion, DB highlighted the enormous potential for new genetic advances to support improvements in sustainable and efficient agriculture, but warned that access to such innovation would require a functioning regulatory framework and effective IP protection to support investment and development in this area.

Comments / questions from the floor

The same genetic knowledge base will underpin progress in both crop and livestock production – traditional divisions between plant and animal science need to be bridged with a more joined-up focus on the challenge of producing more, impacting less.

GM cannot be forced on an unwilling public, but there is a need to set out the facts, independent of industry or campaign groups, to promote a more balanced discussion.

4. Panel discussion

Professor Wayne Powell, IBERS
Meeting the challenge of ‘sustainable intensification’ presents an exciting opportunity for UK agriculture and the entire food chain, as the importance of securing our domestic food supply is increasingly recognised by retailers and policy-makers.

It will require changes in our science base, with greater focus on translation and extension activities, and closer involvement of industry at all stages.

Examples already exist of how scientific innovation can support advances in sustainable efficient production, eg high sugar grasses can improve profitability for the farmer while reducing GHG emissions.

This new agenda will also require new sustainability indices to ensure productivity gains are balanced against improvements in resource use and environmental impact. It will mean forging new partnerships and exploring new ways of working between farmers, food producers and retailers, Government and the science base.

Gareth Morgan, RSPB
RSPB is a pro-science organisation but agnostic on the question of technology. Would urge caution on assuming that a food shortage catastrophe is around the corner - instead prefer to start by considering how we want the world to look in 2050.

With ingenuity and science, 9 billion people can be fed by 2050 even allowing for the impact of climate change. A key question is how to use land in the most intelligent way without depleting habitats and tropical forests.

Intensification and landsparing thesis referred to by DB relates to tropical agriculture. It cannot be taken as a read across to other farming regions or systems and the authors are only now examining how the relationship works in a European context.

But landsparing itself is not a new concept – every farmer is practising landsparing in environmental areas. The critical issue is what to do with the land spared to make it work most effectively for wildlife and biodiversity – RSPB and BTO know what needs to be done, just need to get on with it.

Peter Kendall, NFU
Thanks to George Freeman and the All-Party Group for work in highlighting the positive role of science and technology in agriculture.

When Defra was formed in the aftermath of BSE and FMD, farming was seen as a problem. Today agriculture is increasingly recognised as the source of potential solutions.

But UK farmers must be equipped and enabled to play their part. Meeting the challenge of 'sustainable intensification' will require more investment in agricultural research, reversing the declines of recent decades and returning to a time when the UK exported agricultural solutions around the world.

It will require access to technology, more support for precision farming systems, and more balanced debate about developments such as large-scale livestock enterprises which can deliver improved production efficiency alongside benefits for animal welfare and the environment. The UK must champion smart solutions by harnessing our scientific and practical expertise.

Key discussion points / questions

How to develop GM solutions without frightening people – should third generation GM crops be left out of the equation?

UK agriculture cannot reject GM technology – livestock sector already dependent on GM crops for imported protein. Key challenge is to communicate the technology's benefits through real-life examples – eg aphid-resistant GM wheat and blight resistant GM potato.

Retailers urged to provide consumers with a choice on GM products.

Farmers need to be enthused in relation to wildlife and biodiversity protection, not criticised all the time. Management of margins and hedgerows also needs scientific input to understand how to make the resource work smarter for environmental objectives.

Sustainable intensification best defined in terms of the optimisation of available resources – eg sunlight, land, energy, water etc. It does not always relate to increased production – eg large tracts of UK uplands are grazed extensively as the best use of that land.

New sustainability indices are needed to balance output (tonnes of food produced) against resource use (eg land, water, energy) and environmental impact (eg GHG emissions, soil quality, biodiversity). This would enable different production systems to be compared on the same basis, and would provide an evidential basis for policy development, setting R&D targets and funding priorities etc.

Agricultural research facilities and systems of the past cannot be recreated, but new partnerships and ways of working can be established linking industry, Government and the science base. Establishment of a food and agriculture Technology and Innovation Centre (TIC) could play a role in harnessing the scientific excellence within a fragmented UK agricultural research base.

While CAP reform proposals support increased investment in research the overall direction is to penalise productive agriculture.

Urgent need to take Foresight messages on food security and climate change to European decision-makers and to address the politicisation of decision-making on scientific issues within the EU. Appointment of UK scientist to the new post of EU Chief Scientific Adviser seen as a positive step forward in promoting a more science-based approach.

Concluding the meeting, GF thanked all speakers and attendees for their contribution, noting that a combination of higher food prices, rising energy bills, global population growth and the impact of climate change is bringing wider recognition among consumers that food choices are not black and white, and that the application of improved scientific knowledge and innovation can help in addressing these challenges.