

All-Party Parliamentary Group on Science & Technology in Agriculture

Case studies in UK agri-food innovation – challenges and opportunities

Wednesday 16 May 2012, 3.30 – 5.00pm,

Committee Room 11, Palace of Westminster

Present:

Members

George Freeman (Chair)
Bill Wiggin MP
Lord Grantchester

Guest Speakers

Robert James, Technical Director, Thanet Earth
Nigel Kerby, Managing Director, Mylnefield Research Services Ltd
Gino de Jaegher, Managing Director, British Sugar

Stakeholders

Chris Carter, British Sugar; Liz Wilson, Imperial College; John Bingham, Farmer; Martin Savage, nabim; John Peck, BASF; Andrea Graham, NFU; Keith Goulding, Rothamsted Research; Chris Atkinson, East Malling Research; Neil Hipps; Mike Young, HL Hutchinson Ltd; Graham Hartwell, BASF; Nareeda Portocarero, Food Industry; Ionwen Lewis, Women in Agriculture; David Uffindell, Government Office of Life Sciences; Helen Hicks, Parliamentary Office for Science & Technology; Dan Goodchild, Government Office for Science; Sophie Thompson, Office of Laura Sandys MP; Chris Hurne, Government Office for Science; Juliette Gerstein, abc; Bob Daniels, Scotts; Jennifer Wilson, USDA; Ian Munnery, SESVanderHave UK; Andy Mayer, BASF; Clare Wenner, British Sugar; Daniel Pearsall, Group Co-ordinator.

1. Welcome and introduction

George Freeman MP opened the meeting by reinforcing the All-Party Group's key role in raising the profile of agricultural science and innovation, not only as a means of addressing the global development and food security challenges set out in the Foresight report, but also as a platform for economic growth and export-led recovery.

While agri-food research had been treated as the 'cinderella' life science for the past 20 or 30 years, GF stressed that the UK retained a strong research base with internationally recognised centres of excellence in agriculture, nutrition and plant science.

Following the launch in late 2011 of the Government's life sciences strategy for the medical and pharmaceutical sectors, GF explained that he was working closely with Science Minister David Willetts to push for that strategy to be widened in scope to include the plant sciences and broader agri-food research.

The All-Party Group's ongoing investigation into the steps required to ensure the UK is best able to exploit the economic growth potential of research and innovation within the agri-food sector would feed directly into that process.

2. Guest speakers

[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]

Robert James, Thanet Earth

Robert James (RJ) explained the background to Thanet Earth, a hi-tech glasshouse complex on the north Kent coast near Margate. Since March 2008, the company has invested £100m and created more than 700 new jobs in a state-of-the-art facility, significantly increasing UK production of tomatoes, cucumbers and peppers and, through its commitment to energy efficiency and recycling, providing a prime example of 'sustainable intensification' in practice.

Occupying a 100 hectare site with 7 greenhouses and 55 hectares of glass, RJ explained that Thanet Earth was the first significant investment in the UK glasshouse sector for 20 years, established by creating a unique joint venture with three specialist growers. While 10ha is now regarded as the benchmark for efficient glasshouse production, the UK average is less than 1ha. Poor returns, competition from Holland and a lack of scale and efficiency meant Britain was lagging significantly behind the rest of the world and Europe in this sector.

RJ explained that Thanet Earth is now a major supplier of sustainable, high quality produce to leading UK food retailers, including Tesco, Sainsburys, Asda and M&S.

The company produces millions of tomatoes per week, all year round; 750,000 peppers per week from March to November; and 700,000 cucumbers per week from February to November – all handled through an on-site packhouse. Integrated production systems include piping carbon dioxide into the glasshouses to help the plants grow, using biological methods of pest control, introducing bees for pollination, and operating the glasshouse using computer-controlled technology.

Crops are grown hydroponically – in water – with nutrients, feed and temperature all carefully controlled. RJ explained that this was more precise and efficient than growing in soil, and allowed the water to be recycled and nutrients re-used – with soil-based systems they would end up in the water table.

Thanet Earth has also invested in a water management system, enabling the operation to be 80% self-sufficient in water by recycling, capturing rainfall, and collecting condensation from inside the glasshouses.

To provide energy for the glasshouses, Thanet Earth has invested £14m in a natural gas power station, which is now selling excess electricity to the National Grid (enough to power 50,000 local homes) and using by-products (heat and carbon dioxide) productively within the growing operation.

RJ also highlighted Thanet Earth's commitment to innovation, not only in the use of advanced growing techniques and improved varieties, but also in developing good people to help deliver innovation within the business. A lack of qualified professionals within the horticulture sector, combined with the loss of our applied R&D capabilities, meant the UK was losing out to competitors such as Holland. RJ highlighted the urgent need to develop an agreed R&D strategy for the horticulture sector – Thanet Earth would be keen to engage.

Given Thanet Earth's achievements to date in growing a successful UK horticulture business, RJ considered the major factors deterring other potential investors.

Location was a key consideration. In this respect light levels, and therefore latitude, was a restricting factor, since every 1% more light translated into 1% more yield. Securing a large

enough site, of 200 acres or more, was also a potential obstacle, while proposed large-scale glasshouse developments all too often met with planning objections and difficulties.

The need for access to utilities, and identifying a location close to the customer base and transport infrastructure were further complications.

The nature of the market itself was likely to prove a deterrent to potential investors, given the vagaries of the weather, tight net returns of 2-5% and lack of contract security from one delivery to the next.

Another fundamental challenge encountered by Thanet Earth was raising finance. In RJ's opinion, UK lenders do not understand the nature of the horticulture sector, and despite a healthy bank balance the business was forced to seek finance in Holland, on less competitive terms than producers on the Continent.

While location and the fresh produce market would always remain a challenge, much could be done in relation to issues such as planning, R&D funding, sector skills training and development, and access to finance which could support the further development of an innovative UK-based horticulture sector.

Nigel Kerby, Mylnefield Research Services Ltd

Nigel Kerby (NK) opened by introducing The James Hutton Institute (JHI), a new research organisation formed in April 2011 by a merger between the Scottish Crop Research Institute and the Macaulay Land Use Research Institute. With centres in Aberdeen and Dundee, 60 staff and £33m turnover, JHI was Europe's largest sustainability and land use research centre, with a mission to help meet global demands of food, water and energy security on our finite natural resources.

NK explained that Mylnefield Research Services Ltd (MRS) was a wholly-owned commercial affiliate of JHI, responsible for the innovation function – ie commercialising the products, intellectual property, research output and expertise of the Institute. He suggested that while science was the conversion of money into knowledge, innovation was the process of converting knowledge into money. MRS was required to pay full economic cost of its activities back to JHI, but had also provided over £3m in charitable gifts to the institute. Recent economic research had indicated that every £1 of Scottish Government funding at JHI generates £17 in the UK economy, a very favourable ratio when compared with the return on Regional Development Agency or Scottish Enterprise funding at around 1:8.

NK highlighted the successful products developed by plant breeders at JHI and commercialised through MRS, from the blackcurrant varieties bred exclusively for use in Ribena through to market-leading raspberry and potato varieties. All had been brought to the market through partnerships with companies in the private sector.

NK also underlined the economic and societal importance of UK plant breeding, now largely concentrated in the private sector. But despite increased recognition of the need to maintain crop improvement through plant breeding to address global challenges of food security and climate change, NK expressed concern that the relationship between education and plant breeding was breaking down, with no recognised MSc in plant breeding in the UK and the number of science graduates entering the plant breeding industry on the decline.

Highlighting the importance of plant breeding to a vibrant UK agri-food sector, NK pointed to the conclusions of a 2010 study conducted by independent economists DTZ, which found that the economic contribution of UK wheat, barley and maize breeding – in terms of

increased yields, import substitution and improved end-use quality - was equivalent to a 40-fold return on each £1 invested by plant breeders.

Alongside the products developed at JHI, NK explained that MRS also took the lead in developing new market opportunities. Exporting UK potato breeding and seed potato expertise to the rapidly expanding Chinese market remained a key focus. As the world's leading potato producer, average yields in China at 14t/ha were a third of UK yields, suggesting significant scope for improvement and a major export opportunity for UK-based knowledge and technology. However, despite positive inward and outward missions organised in partnership with the China-Britain Business Council, the raft of statutory plant health and inspection measures to export seed potatoes to China was a major trade barrier, and a potential issue for Government to address.

China was also a primary target market for MRS to export the soft fruit cultivars, breeding technology and expertise developed over the years at JHI. This had been progressed through a co-operative joint venture organised through the Danish IFU (Industrialisation Fund for Developing Countries). Initiated by the Danish Government in 1967, the IFU was essentially a de-risking mechanism to stimulate commercially viable joint ventures with developing countries, offering access to equity capital, finance and advice but without investment of taxpayer revenue. At the end of 2010, IFU had supported 719 projects in 85 countries, with total investments exceeding £10 billion.

NK also highlighted major opportunities to exploit Chinese intellectual property outside China. Comparing Chinese, UK and US patenting activity for horticulture, plant breeding and biotechnology, NK noted that 98% of Chinese patent applications were issued domestically, whereas the equivalent figures for the UK and US were 33% and 58% respectively. Building on Mylnefield's expertise in plant breeding IP (with 821 licences in 34 countries for 57 plant varieties) MRS was in active discussions with Chinese research institutes to help facilitate the commercialisation of IP to outside investors.

In conclusion, NK highlighted a number of essential components for agri-food innovation to drive economic growth and technology-based exports, from continued investment in a strong science base to the development of new partnerships between public and private sector. UK agri-science was well-placed to exploit global opportunities, although other countries, such as Denmark, had shown the way in establishing effective access to information, advice and investment to minimise the risk of dealing with developing and rapidly emerging economies.

Gino de Jaegher, British Sugar

Marking 100 years since the first UK sugar beet factory opened in Cantley, Gino de Jaegher (GJ) described how British Sugar had consolidated its operations from 17 factories to 4 factories, today serving 4,000 growers, supporting 13,000 jobs, producing 1 million tonnes of sugar and contributing £1 billion a year to the UK economy. Over the past five years, BS had invested £200 million to improve the efficiency and competitiveness of UK beet production, processing and co-product use, to become the lowest cost sugar processor in Europe, with productivity now on a par with Australia and Brazil and increasing at a faster rate.

But GJ warned that, as a regulated business exposed to EU sugar reform, continued investment and progress in the UK sugar sector would require deregulation of the EU sugar regime to be implemented at a pace the industry could respond to. This would mean extending the current regulatory framework and quota system to 2020.

GJ highlighted key achievements of British Sugar's partnership with the farming community in driving improvements in the productivity and sustainability of the UK sugar beet crop. These included a 60% increase in UK sugar yields since the 1980s, faster than the rate of

increase in other arable crops and releasing 90,000 acres of productive farmland for other uses. Over the same period, fertiliser use had been cut by between 40% and 70%, while insecticides had been reduced by 90%. Sugar beet also provided a valuable break crop in the UK arable rotation, requiring minimal use of irrigation and providing an important habitat for birds and wildlife.

Putting science into practice on-farm was the core remit of the British Beet Research Organisation (BBRO), managed and co-funded by UK growers and British Sugar. With R&D programmes led by researchers at Broom's Barn Research Centre, GJ explained that BBRO invested £1.8m/year in research to improve the competitiveness and sustainability of beet production, and to promote the transfer and uptake of research by farmers. As an example, GJ highlighted BBSRO's ongoing 4x4 project, whose objective was to help growers increase sugar beet yields by 4% per year for the next 4 years to 2015.

Innovation was also at the heart of British Sugar's drive to improve manufacturing efficiency and to eliminate waste. The company had a record of continuous investment, with over £1bn invested over the past two decades. This included the installation of Combined Heat and Power (CHP) units at all BS plants, whose combined 110MW exported to the National Grid was equivalent to a medium-sized power station. A 'no-waste' culture ensured all raw materials and co-products were transformed into sustainable products, from animal feed, topsoil and aggregates reclaimed from the sugar manufacturing process to the use of recycled water, heat and carbon dioxide to supply the largest tomato glasshouse in Britain – covering 18 hectares, producing 140m tomatoes per year and supplying the UK's major supermarkets.

In addition, BS had invested in the UK's first bioethanol refinery at its Wisington site. Opened in 2007, the plant was capable of producing up to 55,000 tonnes of bioethanol per year.

In conclusion, GJ noted that the UK sugar industry was a closely integrated sector whose approach to investment, innovation and knowledge transfer had driven significant improvements in sustainability, productivity and efficiency at all levels. But while BS supported progressive reform of the EU sugar regime, this must be at an orderly pace which would support continued progress and investment, not abrupt deregulation in 2015.

3. Questions and discussion

GF thanked all three speakers, whose presentations demonstrated world-class vision and ambition along the length of the UK agri-food chain, including successful examples of innovation and the potential to unlock further significant economic opportunities given the right business and regulatory environment. GF noted that speakers had highlighted a commitment to environmental sustainability - from energy efficiency to recycling and waste reduction - as a key driver of today's progressive, competitive agri-food businesses.

Key issues raised during discussion included:

- the need to ensure public sector R&D outputs were freely available for commercial exploitation, with no exclusive links between research institutes and individual companies;
- a view that broadly-based patents in the agri-food sector were increasingly used as restrictive tools to prevent competition rather than as a mechanism to share knowledge and promote innovation;

- concern that despite high-level commitments to bridge the hiatus in applied R&D activity (eg through TSB, BBSRC initiatives), the direction of such research in supporting the strategic objective of 'sustainable intensification' still lacked focus and direction;
- a need to re-focus R&D funding on the demands of sustainable, commercially viable production, moving away from the current emphasis on policy-related research and recognising the need to ensure research findings were translated into improved business practice through effective knowledge transfer onto farm.

4. Conclusion

GF thanked all participants for their contribution to the meeting. It was clear that scientific and technological innovation within the UK agri-food chain offered significant opportunities for economic growth and export-based recovery.

The immediate challenge was to develop a business-led strategy capable of harnessing and exploiting that potential, including a clear role for Government and the UK's public sector science-base to support and partner in that process.