

**APPG on Science & Technology in Agriculture
and
APPG on Agriculture and Food for Development**

**Notes of a joint meeting held on Wednesday 21 March 2018
Committee Room 6, Palace of Westminster**

International development opportunities for UK agri-science

Present:

Members

Lord Cameron of Dillington (co-chair)
Julian Sturdy MP (co-chair)
Professor Lord Trees
Lord Inglewood
Duke of Montrose
George Freeman MP

Guest Speakers

Jonathan Dupont, Economic and Social Policy Research Fellow, Policy Exchange
Professor Steve McGrath, Head of Sustainable Agricultural Sciences, Rothamsted Research
Duncan Barker, Livelihoods Adviser, Agriculture Research Team, DfID

Stakeholders

Professor Chris Atkinson, NRI; James Wallace IAR Agri Ltd; Justin Highstead, Gatsby Africa; Roger Freedman, Gatsby Foundation; Antoinette Sallah, Independent Agriculture/Irrigation Consultant; Steve Newman, Biodiversity International, Leeds University; Professor David Leaver, BIAC; Meera Shah, Imperial College; George Rothschild, NRI; Terry Wiles, Tropical Agriculture Association; Adrian Bell; Guy Poulter, AECF; Eleanor Hinde, Farm Africa; Yvan Biot, Farm Africa; Chris Henderson, Practical Action; Giulia Cuccato, GO-Science; Andrew Spence, Defra; Garance Hadjidj, BASF; Sam Viney, Farm Africa; Professor Graham Jellis, AFCP; Oliver Hill-Andrews, BBSRC; Tom Jenkins, Innovate UK; Laura Falk, Sainsburys; Jessica Ainley, Sainsburys; Evangelia Kougioumoutzi, BBSRC; Mark Buckingham, Monsanto; David Edge, Monsanto; Caspar van Vark, APPG AgF4D; Daniel Pearsall, APPGSTA Group Co-ordinator

1. Welcome & Introduction

Lord Cameron of Dillington welcomed members and stakeholders to the first joint meeting of the APPG on Science and Technology in Agriculture and the APPG on Agriculture and Food for Development, focusing on international development opportunities for UK agri-science. He briefly introduced the topic for discussion by highlighting the critical role of innovation and knowledge transfer in supporting development objectives such as food and nutrition security, provision of access to clean water, establishment of local energy sources and improving household incomes among smallholder farmers.

2. Guest speakers

[Guest speakers' slides are available to download via the meetings section of the All-Party Group web-site at www.appg-agscience.org.uk]

George Freeman MP

Providing a keynote introduction, George Freeman MP (GF) – a former APPGSTA chair - emphasised the UK's position as a global powerhouse of agri-science expertise. He said the joint APPG meeting was extremely timely in seeking to identify post-Brexit opportunities to boost the international impact of UK technology and innovation.

GF suggested that the UK's strengths in agri-tech and related life sciences across food, energy and medicine went right to the heart of the of the UK's vision for an ambitious and successful economic future outside the EU.

Growth of 3% - not 1% - would be needed to build a credible economic model for the UK, and GF stressed need to engage and inspire both the scientific community and the younger generation to build a positive, confident and outward-looking future for Britain.

GF considered that only by ennobling Brexit in this way would it be possible to heal the political wounds and address the fears of those who saw Brexit as an insular and retrograde step.

Sir John Beddington's 2011 Foresight Report, which highlighted the need for an agricultural revolution to double food production by 2050 using less land, water and energy, encapsulated the scale and urgency of the global food security challenge.

According to GF, UK agri-science was well-equipped to respond, although he emphasised the need for British researchers to remain an integral part of the European scientific network post-Brexit – maintaining the collaborative nature of scientific research and the spirit of openness and confidence in sharing ideas.

But while the UK must remain sufficiently aligned with Europe to safeguard this culture of collaborative research and investment, GF suggested that – in regulatory terms - Brexit also presented an opportunity to liberate the UK life sciences sector from increasingly anti-science EU regulations and for the UK to take a lead re-writing the rulebook for the 21st century bio-economy.

Outlining the premise of his foreword to the recent Policy Exchange report '*Global Britain, Global Solutions: How British R&D can transform international development*', GF highlighted the international opportunities for the UK to leverage the aid and trade budget and to 'turbo in' on emerging economies - GF highlighted Kenya as one potential example - applying UK scientific and technical expertise to transform their economic performance in key sectors such as agriculture and horticulture.

Welcoming Environment Secretary Michael Gove's vision and ambition to balance production and environmental objectives in developing a new domestic agricultural policy, GF also stressed the need to recognise the potential of agri-tech to ensure the 'Health and Harmony' consultation was not seen as the harbinger of UK farmers becoming a nation of park-keepers.

He urged the APPG and its supporters to ensure Defra fully understand and support the critical role of agricultural science and innovation in building a sustainable low input, high output agricultural economy for Britain's farmers outside the CAP.

Jonathan Dupont, Policy Exchange

Presenting the headline recommendations of the recent Policy Exchange report '*Global Britain, Global Solutions: How British R&D can transform international development*', Jonathan Dupont (JD) highlighted the challenge of global poverty and the huge disparity in wealth distribution, with around 700 million people still living on less than £1.45 per day, and GDP per capita more than 12 times higher in advanced economies than in sub-Saharan Africa.

JD noted that although the UK is the world's third largest international aid donor behind the USA and Germany, the British public remains generally sceptical about the aid budget. Survey data suggest that while most British people (89%) consider it important to provide aid to developing countries, only a quarter would support an increase in the aid budget.

The reasons for this scepticism ranged from a belief that corruption in poor countries makes it pointless to donate money, through to perceptions that international aid is ineffective and extreme poverty in developing countries is either static or increasing.

In fact, JD pointed to data which showed that the proportion of the world population in extreme poverty had fallen from 60% to 10% since 1970, and the prevalence of undernourishment had also decreased significantly in both South-Eastern Asia and Sub-Saharan Africa over the same period.

JD suggested that spending more of the aid budget on R&D provided an opportunity to sidestep public concerns about aid spending not reaching the right people. It would also plug a gap unlikely to be filled by the private sector, and there was strong evidence of a high return on taxpayer investment, particularly in the agriculture sector. Data from the Copenhagen Consensus Centre indicated a rate of return for agricultural R&D as a whole of 34:1, based on an analysis of 40 promising development R&D interventions.

JD also observed that while the UK was one of the largest funders of aid-related R&D, this did not apply to agricultural research, in which the UK invested significantly less than OECD counterparts as a proportion of the aid budget.

While technology adoption in UK agriculture had reduced the number of people working in the industry, JD noted that the sector was still highly subsidised, with 87% of real income in agriculture derived from taxpayer support. In practical terms, this equated to a 27% premium on food costs in the EU - a major barrier to developing countries trying to trade their way out of poverty. JD further suggested that increasing UK aid expenditure on agricultural R&D could also improve prospects for British farmers, noting that growth in UK agricultural productivity had fallen behind other countries in recent decades.

JD suggested that the Sustainable Development Goals, and specifically Goal 2 to end global hunger, should frame decisions over how to allocate increased support for agricultural R&D. This should include efforts to increase food production and availability, with global food demand expected to increase 70% by 2050, as well as to address challenges such as climate change and water shortage.

In conclusion, JD summarised the recommendations contained in the Policy Exchange report as follows:

- **Spend more:** The UK should double the proportion of ODA spending on R&D from 5% to 10% of the total budget, and work to create a steady ramp up of research capacity.

- **Be more strategic:** UKRI should create a new institution, the UK Innovation Challenge Agency, to jointly manage the Industrial Strategy Challenge Fund and the Global Challenges Research Fund.
- **Experiment with new funding mechanisms:** The Innovation Challenge Agency should create a new series of Advanced Market Commitments for solutions to Global Challenges.
- **Use Brexit as an opportunity:** The UK should aim to be a world leader in emerging technologies in agriculture, medicine and transport, eg by reducing regulatory barriers to automation and gene editing.

Professor Steve McGrath, Rothamsted Research

Providing practical examples of the impact and benefit of international development research supported by UK agri-science, Steve McGrath (SM) described the following four case studies:

1. Innovative Solutions for Decision Agriculture (iSDA Ltd) is a legacy of the Africa Soil Information Service (AfSIS), a project supported by the Bill and Melinda Gates Foundation to deliver new digital solutions to map the soils and cropland of Africa. The research combines highly innovative remote sensing and crowdsource data techniques with pioneering dry spectral technology enabling hand-held soil sample testing kits to be developed and used on site. The project aims to provide advice to smallholder farmers on predicted topsoil pH levels and lime requirements, as well as developing a fertiliser recommendations map identifying soil nutrient deficiencies, eg in potassium, sulphur, zinc etc.
2. Funded by BBSRC and the Bill and Melinda Gates Foundation, the GeoNutrition project takes a geographical approach to alleviating micronutrient deficiencies, integrating and interrogating large-scale soil, agricultural and landscape datasets to understand the factors affecting the supply of micronutrients to crops and food systems. Layers of data help determine which crops to grow and which nutrients they provide, and support the development of agriculture-for-nutrition strategies such as crop and soil biofortification.
3. UK-led research to monitor the development of invasive plant pathogens in Africa provides a vital early warning system to prevent the spread of devastating crop diseases such as Cassava Brown Streak Virus and Wheat Septoria fungal leaf blotch. The integrated monitoring and control methods developed through this research can also be applied in other areas such as trees with potential relevance to wider challenges such as ash dieback and citrus canker.
4. Push-pull is a novel farming system developed to end hunger and poverty in sub-Saharan Africa. It involves growing a carefully selected mixture of crops to attract natural predators and repel pests, and has been shown to increase yields by a factor of two or more. With a focus on East Africa, the geographic distribution and uptake of push-pull technology among smallholder farmers is increasing, with more than 170,000 farms in Uganda, Kenya and Tanzania already using the system alongside climate smart (drought tolerant) crop varieties.

SM concluded from these snapshot examples that UK involvement in agricultural development research not only provides benefits for farmers in developing countries, but also strengthens the research base supporting UK agriculture and the Industrial Strategy - by attracting investment and stimulating innovation from outside the UK, and by supporting advances of relevance to UK agriculture.

Duncan Barker, DfID

Describing DfID's approach to supporting agricultural research for international development, Duncan Barker (DB) noted that the UK Aid Strategy, launched just over two years ago, sought to address issues of peace and security, resilience and response to crises, tackling poverty and helping the world's most vulnerable. DB emphasised that the primary focus of the Aid Strategy was on providing support to developing countries, although it could also deliver secondary benefits for the UK.

DB explained that DfID's conceptual framework for agriculture focused on the contribution of the agri-food sector towards three interconnected goals – poverty reduction, food and nutrition security, and sustainable food systems. In delivering these objectives DfID sought to work with smallholder farmers, as well as larger agribusiness and agri-food companies, to improve productivity, market access and responsible investment. DB noted that access to technology and innovation was needed in all areas.

DfID's agricultural research priorities were not only focused on the development of innovative products and technologies to intensify production sustainably in developing countries, but also on testing interventions and delivery mechanisms to identify what works and what doesn't work, and on gaining a deeper understanding of the complex political, social and economic context that influences the success of investments in agricultural development.

DfID's overall approach was to be challenge-led - understanding the demands and then deciding how to address them - and to be generally technology agnostic.

DB used the ZELS programme (Zoonoses and Emerging Livestock Systems) as a case study to highlight opportunities in development R&D for UK agri-science, which ranged from supporting delivery of the UK Aid Strategy and increasing the capacity of developing country research organisations to establishing international research partnerships and building UK expertise in global challenges such as zoonotic diseases, which may one day also affect UK livestock production.

DB highlighted the strength and diversity of DfID partnerships with universities and research institutes throughout the UK, and noted that through links with CGIAR, UK research organisations are already involved 236 collaborative international research projects with a total value of £346m.

DB also highlighted other opportunities for engagement between the UK agri-science base and international development research programmes, including the recently launched Centre for Tropical Livestock Genetics and Health, bringing together researchers from the University of Edinburgh, Roslin Institute, SRUC and ILRI, as well as the Alliance for Accelerated Crop Improvement in Africa, supported by DfID and the Gates Foundation, involving crop scientists at the BECA-ILRI hub in Nairobi and from the UK's John Innes Centre.

DB suggested that for UK research organisations seeking increased involvement in development research, the key was to identify the right partners in developing countries, working to broker those linkages for example through UK NGOs, the Science and Innovation Network hosted by the FCO and UK embassies, as well as agriculture teams within the Department for International Trade.

DB concluded with positive examples of UK agri-science delivering successful outcomes in developing countries as a result of the £10m allocated by DfID to 24 projects through the Agri-Tech Catalyst – such as a 90% reduction in the vaccine costs for East Coast Cattle Fever; the development of new breeding technologies to select for improved disease

resistance in rice varieties; the push-pull crop production system previously described; and the development of a lightweight, low-cost, solar-powered irrigation pump in response to a challenge set by DfID and Innovate UK's Small Business Research Initiative.

3. Questions and discussion

The following key points were raised during discussion:

Importance of avoiding agri-science becoming a stand-alone silo and connecting agricultural R&D with other sectors, eg in engineering;

What the *modus operandi* should be to deliver best outcomes in developing countries, ie does the doctor-patient relationship work?;

Whether the UK can learn anything from the unsupported agricultural systems of developing countries in planning for a post-CAP future;

Concern over the levels of public scepticism reported in relation to the value and effectiveness of UK aid funding, and the need for strategies to transform those perceptions to avoid the aid budget becoming the next target of Brexiteers;

Concern expressed over the future for science funding and the impact of Brexit on UK R&D capabilities of relevance to developing world agriculture;

The need to empower African scientists and research organisations to ensure agricultural innovation is targeted and tailored to areas of greatest need;

Demonstrable benefits of bringing African research students and scientists to the UK to study then return home to spread the word, eg through the East of England Agricultural Society's Marshall Papworth Fund – supporting 6-8 MSc student placements per year (despite problems with visas and no support from DfID).

Suggestion that improved outcomes for smallholder farmers are not necessarily about hi-tech innovation or proprietary technologies. Often very mundane challenges must be overcome to unlock potential – eg roads and infrastructure - and low-tech solutions, eg text messaging to share information between farmers, can be transformative;

Concern expressed over the tendency within Governments and aid funders to support 'silver bullet' technological solutions rather than investing over the long-term to improve standards of agricultural education and support locally-based extension services;

Important to get farmers themselves to share information about best practice and for researchers to plug into existing networks on the ground – although also need to be realistic about the timescales required to build an understanding of the political and institutional landscape in each country, no two developing countries are the same and cannot be treated as such.

In terms of building UK agri-science capabilities, concern expressed about the UK Government and the Gates Foundation co-funding wheat research at Cornell University, ie why DfID is not supporting wheat scientists in the UK.

Closing the meeting, Julian Sturdy MP thanked guest speakers and attendees for their contribution to a fascinating and informative session. He noted that to meet food and nutrition security targets, developing countries would need to undergo the kind of revolution

in their agricultural systems over the next 30 years that has taken 300 years in the industrialised world, balancing the requirements of production, environmental protection and sustainable resource use.

He suggested that access to innovation in agricultural science and technology would be critical in meeting this challenge, highlighting the importance of the UK's international contribution as a world leader in agri-science, and the need to ensure a future domestic policy for food, farming and the environment supports a progressive and productive agricultural sector post-Brexit.