



# Innovation in agriculture

## Learning from IAASTD

A report of the Business Forum  
meeting on 15<sup>th</sup> September 2008

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## Introduction

We need innovation in agriculture, in the UK and internationally. Growing demands are made of farming for food and fuel, yet it is squeezed by tightening constraints on land, oil, water and other inputs. But how should we innovate and who decides?

What should be our top R&D priorities? Who should set priorities in the public and private sectors? What parts should farmers, policy makers, scientists and the public play? The September meeting of the Food Ethics Council's Business Forum discussed these questions and more.

We are very grateful to Professor Bob Watson, Chief Scientific Advisor to the UK Department for Environment, Food and Rural Affairs (Defra), who spoke at the meeting. Through his previous role working at the World Bank he directed the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) – the most ambitious initiative ever to identify priorities and challenges for innovation in agriculture. The assessment process involved over 400 scientists and 60-member bureau of governments and stakeholders ([www.agassessment.org](http://www.agassessment.org)). Our meeting was chaired by David Croft, Director of Conformance and Sustainability at Cadbury and a member of the Food Ethics Council.

This report outlines points raised during the meeting. Contributions are not attributed. The report was prepared by Tom MacMillan. It does not represent the views of the Food Ethics Council, the Business Forum or their members, or Defra.

## Key points

- Trends in population and consumption suggest that we should expect to have to **double food production** over the next 20-50 years.
- Yet increases in production over recent decades have failed to eradicate hunger, have seen increased diet-related disease and have caused major environmental damage - we need innovation in agriculture to feed a growing world population in ways that are **fair and environmentally sustainable**.
- IAASTD – which assessed strategies for meeting this challenge – concluded that **business as usual** is not an option.
- The assessment calls for agroecological approaches that combine **scientific research** and **farmer know-how**, and that involve **stakeholders** from the start.
- IAASTD also highlights the **social and economic** innovation, for example to improve market access or help farmers share knowledge, can be at least as valuable as new technologies in the field.
- One of the most controversial issues in IAASTD was genetic modified (GM) crops. It was cautious on **GM crops**, though not opposed to them on principle.
- Critics argue that current GM crops are anti-innovation, because they are the product of **intellectual property** (IP) systems that restrict the sharing of technology and knowledge.
- As well as shaping and enforcing IP systems, **governments** get involved in innovation by funding and procuring research, by creating new markets and by regulating new technologies.
- England should look other countries, including Scotland, for **models** to help improve its agricultural innovation systems.

## Why innovate?

We need innovation in agriculture to meet the challenge of feeding a growing world population in ways that are fair and environmentally sustainable.

For the past five decades, except perhaps for the last few years, increasing food production has outstripped growth in population. There have been some major successes in reducing hunger and poverty, for example in China

But 850 million people go to bed hungry. Even in parts of India, where the ‘Green Revolution’ gave a big boost to productivity, half of children are malnourished. History shows that hunger can exist amid plenty – it is more fundamentally a matter of distributional justice than of food production – yet rising food prices will make life harder for people who are already poor and may drive more into hunger.

The part that stock market speculation has played in pushing up prices over the past 18 months is uncertain but other factors, such as competition from biofuel production and high oil costs, look set to increase.

Further pressure will come from the demand side if China, India and other fast growing economies continue current trends in consumption towards more resource-intensive, Western-style diets (which in turn have seen increases in diet-related disease). Changes in per capita consumption are likely to have a much bigger and faster influence on world food demand than increases in population –

population might grow 50% by 2050, but average resource use per person would increase several times over if current trends remain unchecked.

## Environmental problems

Even at current rates, food production contributes to major environmental degradation. Climate change is probably the greatest global threat to humanity of any kind and agriculture will need to play its part in contributing to an 80% cut in greenhouse gas emissions by 2050. But, in addition, agriculture contributes to other forms of atmospheric pollution, water depletion and biodiversity loss: the Millennium Ecosystem Assessment found that we are degrading all of the 25 most important services for sustaining biodiversity world-wide – and we are doing little to stop it.

Environmental problems come back to bite production in the shape of resource constraints: the effect of bee colony collapse in the USA underlines the importance of biodiversity; across a third of the world, including parts of the UK, farmers are already having to cope with water stress; modest increases in global temperature may boost productivity but climate change will also bring a higher risk of floods and droughts.

## The challenge in brief

The challenge facing agriculture can be summed up as follows:

- To double food production within 25 to 50 years.
- To do so in ways that reduce hunger in agricultural communities (hunger also exists in urban areas but that cannot so readily be tackled by farming differently).
- To turn around the damage agriculture causes the environment.

## Needs assessment

IAASTD reported this April and has now been signed by over 60 governments, including the UK. Its headline finding was that business as usual is not an option. We need rapid innovation in agriculture – and new ways of innovating – if we are to rise to this challenge.

The assessment focuses on the needs of smaller farmers in the global South – they make up the majority of farmers worldwide and it is among them that all three of the challenges facing agriculture coincide.

IAASTD calls for agroecological systems that bring the best knowledge from science together with farmer know-how. It emphasises that putting women at the centre of this – through equal access to property rights and finance, for example – is crucial to unlocking agricultural development. It highlights that forms of social or economic innovation that improve market access, make micro-finance accessible or share learning between farmers can be just as important – or more so – than new seed or other production technologies.

The assessment also argues for research and innovation to be participatory processes, involving stakeholders from the start, rather than processes that cook up ill-conceived ‘solutions’ solutions to society’s problems in labs or board rooms. It also calls for major trade reform, highlighting the devastating social toll of agricultural dumping, which undercuts incentives for small farmers, and arguing that it is time for a rethink on how international trade can best benefit small-scale farmers.

## Lessons for the UK

Although IAASTD is focused on the needs of small-scale farmers in the global South, it has important implications for agriculture in the UK and for our international supply chains.

The point that the most crucial innovations may be social or economic – such as new methods of communication, skills, business models or management systems – is as true in the UK as it is in Sub-Saharan Africa. One failing of UK agricultural research is that it has tended to be focused on products – crops and fertilizer, for example – instead of knowledge, systems and processes. Public sector agricultural research in the UK stands accused of being too focused on ‘stuff’ ahead of on needs and outcomes. By contrast, for example, developing common standards on environmental performance offers a different way for the state to drive innovation.

The assessment also highlights that access to markets can be as important as agricultural conditions in shaping what gets produced, how, and what benefits it brings to producers. This is about knowledge as well logistics: farmers can benefit from finding out more about the markets they are selling to – locally or internationally – not just understanding the aspirations of their customers but also practices such as quality control. One UK organic box scheme ran an exchange programme for its Ugandan suppliers, though this has been frustrated by visa restrictions.

UK agricultural innovation could also benefit from giving greater weight to farmers' knowledge, and to the exchange of ideas between farmers and scientists. That agroecological approaches including organic agriculture are heavily focused on farmers' knowledge may be one reason they have been relatively neglected by the research community. We do a disservice to farming know-how – even where practices might seem quirky – if we dismiss it without testing its claims through research.

## GM crops

One of the most controversial issues in IAASTD was genetic modification. The report was cautious on GM crops. Far from being 'anti-science', however, it promotes an open-minded approach to knowledge-based problem-solving. According to such an approach, if GM crops do come into wider use then it

should be through partnership-based innovation processes that earn public trust by being open to scrutiny. Indeed, it is an evidence-based rebuttal of assertions – for example by the US government and by former UK Chief Scientific Advisor Sir David King – that people in Africa are starving because Europeans have opposed GM and supported traditional approaches to agriculture.

One reason GM crops are high on the agenda in the UK and EU this year is that poultry producers are keen to gain access GM animal feed in the face of concern that non-GM supplies are becoming scarce and expensive. GM feed is already in use by other EU livestock sectors. The situation that some animals in the EU are fed on GM feed and others are not may represent a reputational risk – but whether it is a risk for campaign groups who have argued GM feed is a dangerous or for the companies that use GM feed is a matter for debate.

Critics argue that, far from being innovative, current GM crops are anti-innovation. They are socially and economically conservative technologies, because they are the product of IP systems that restrict the sharing of technology and knowledge.

## Role of government

Governments can be involved in innovation in many ways, including by supporting research and extension, creating new markets, enforcing

intellectual property rules and regulating new technologies.

In England, the Biotechnology and Biological Sciences Research Council (BBSRC) funds basic research. Defra focuses on research that is not considered 'near market' – this informs, but does not determine, its 'evidence-based' policies. It is left to the levy boards to support 'translational research'.

The best way to approach these different activities and the level of public funding that they warrant are hotly debated. England is widely thought to suffer from not having a state agricultural extension service yet the demise of ADAS as a public institution – which had performed this function prior to privatisation – is not universally lamented. Scotland, the Netherlands, France and Israel, where research and extension are closely integrated, are thought to offer better models.

Across all these areas, it is important that state intervention is co-ordinated and that governments work in partnership with businesses and civil society. It is crucial that farmers and the public help set priorities for research and innovation in the public and private sectors.

Defra has made some progress in joining-up its different activities and working better with other departments. Public Service Agreements (PSAs) have been a particularly useful tool in encouraging departments to work together.

## Intellectual property

The public sector's influence on innovation extends internationally through collaborative research and, more controversially, global rules on intellectual property (IP). It is not just state funding and research outputs that warrant critical scrutiny, but also these governance frameworks.

Critics argue that global IP rules are the product of the most significant regulatory capture ever, heavily shaped by the industries the benefit from them most directly. The concern is that, by enclosing knowledge, IP rules move innovation systems in the wrong direction: farmers innovate by copying and learning from each other, so rules that systematically preclude copying, for example through patents, are counterproductive. They encourage ownership by the few and discourage agricultural and economic diversity.

The world's current IP system has been moulded by the OECD countries and major US and European-based multinationals. However, power is shifting within multilateral trading system as India, China and Brazil gain economic power. How this will reshape agricultural IP is uncertain.

## Speaker biographies



**David Croft** is Director of Conformance and Sustainability at Cadbury, where he is responsible for quality assurance, environmental management, health and safety and ethical trade practices in a global supply chain with around 40,000 suppliers. He joined Cadbury as Director of Ethical Sourcing and Sustainability in June 2005, having previously worked for more than ten years at the Co-operative Group. He has contributed significantly through this work to the development of the UK Fairtrade market by launching new products and ranges, and by developing consumer awareness and marketing campaigns. He has been involved in numerous initiatives to improve supply chain standards within companies and across the food sector, and has engaged extensively with government departments and NGOs. He is a member of the Food Ethics Council.



**Professor Robert Watson's** career has evolved from research scientist at the Jet Propulsion Laboratory: California Institute of Technology, to a US Federal Government program manager/director at the National Aeronautics and Space Administration (NASA), to a scientific/policy advisor in the US Office of Science and Technology Policy (OSTP), White House, to a scientific advisor, manager and chief scientist at the World Bank, to a Chair of Environmental Sciences at the University of East Anglia, the Director for Strategic Direction for the Tyndall centre, and Chief Scientific Advisor to the UK Department of Environment, Food and Rural Affairs. In parallel to his formal positions he has chaired, co-chaired or directed international scientific, technical and economic assessments of stratospheric ozone depletion, biodiversity/ecosystems (the GBA and MA), climate change (IPCC) and agricultural S&T (IAASTD). During the last twenty years he has received numerous national and international awards recognizing his contributions to science and the science-policy interface, including in 2003, the Honorary Companion of the Order of Saint Michael and Saint George from the United Kingdom.

## About the Business Forum

Ethical questions around climate change, obesity and new technologies are becoming core concerns for food businesses. We have launched the Business Forum to help senior executives gain expert insights into the big issues of the day. Membership is by invitation only and is strictly limited.

The Business Forum meets six times a year for in-depth discussion over an early dinner at a celebrated London restaurant. The forum members shape the meeting agenda.

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