

# FARMING NEEDS SCIENCE: SMART SOLUTIONS FOR AN INNOVATIVE INDUSTRY



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**Farmers and growers are innovators and experimenters to the core, even if they do not always realise it. The history of modern agriculture shows how science has transformed farming from a small-scale, largely subsistence activity 300 years ago into an industry that contributes £9.2 billion Gross Value Added to the UK economy (Defra Agricultural Accounts, 2013).**

Step-changes in productivity over the past century enabled a rapidly growing population to be fed. Key advances that drove this revolution included mechanisation, rotations, synthetic fertilisers, crop protection and genetic improvement of both crops and livestock. For all its image of rolling countryside, mud and flocks of sheep, in many ways farming is a high-tech industry, reliant on tools and practices grounded in scientific research.

The UK has a world-leading tradition in life sciences. However, we are now paying

the price for a period of significant underinvestment in agricultural research, and our farm productivity is suffering. In particular, it is in making the link between research and commercial application where the UK is falling behind.

Addressing this situation is an important goal of the Government's Agri-Tech Strategy, launched in July 2013. This recognises the potential of both the industry and the agricultural research base to grow and

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deliver economic benefit for the UK. I am hopeful that the added emphasis the Strategy places on applied research and knowledge exchange, as well as the injection of 'catalyst' funding into the sector will make a genuine and long-term difference. The Centres for Innovation should provide a clear link between science and practice. To deliver this there must be genuine collaboration between research centres; knowledge exchange that fosters a culture of equality of expertise between scientists and farmers; and a skills and training infrastructure that is fit for purpose.

We appreciate that there remains a challenge for the Department for Business, Innovation and Skills in delivering this Strategy for the farming sector. Agriculture is not the same as aerospace, automotive or pharmaceutical industries. The vast majority of farm businesses are not carrying

out any R&D themselves. They are very much the end users, usually with no direct link or input to the underpinning science. Also, it is easier for economic impact to be envisaged and quantified for agricultural technologies and 'kit' like GPS and sensors on tractors, robotic milking parlours, hydroponics or even decision-making software. While such tools are certainly valuable to farmers, they also need innovation in managing the

whole system including soils, water, nutrient flows, animal welfare etc. The route from science to commercial and production gain is far less clear, is subject to a wide range of influencing factors and can take a long time. I would urge the Leadership Council to ensure that practices as well as products

are given sufficient weight and can be captured by their delivery mechanisms.

In 2013, the National Farmers' Union (NFU), Agriculture and Horticulture Development Board (AHDB), Agricultural Industries Confederation (AIC) and Royal Agricultural Society of England (RASE) published a report "Feeding the Future: Innovation Requirements for Primary Food Production in the UK to 2030" ([www.feedingthefuture.info](http://www.feedingthefuture.info)). It is designed to tell research funders such as BBSRC what the industry's research priorities are:

1. Use of modern technologies to improve the precision and efficiency of key agricultural management practices.
2. Applying modern genetic and breeding approaches to improve the quality, sustainability, resilience and yield-led profitability of crops and farm animals.

## *... genuine collaboration between research centres ...*



3. Use of systems-based approaches to better understand and manage interactions between soil, water and crop/animal processes.
4. Developing integrated approaches to the effective management of crop weeds, pests and diseases within farming systems.
5. Developing integrated approaches to the management of animal disease within farming systems.

6. Develop evidence-based approaches to valuing ecosystem service delivery by land users, and incorporate these approaches into effective decision-support systems at the enterprise or grouped enterprise level.

7. Extending the training, professional development and communication channels of researchers, practitioners and advisors to promote delivery of the targets above.

8. Improving the use of social and economic science to

productivity compared to our competitors.

There is now a significant opportunity to look at how public/private partnership and a boost in knowledge exchange could work better in this vital area. Who are the advisers going on to farms already? How can existing initiatives be better harnessed and coordinated to provide a translation role? How equipped are advisers and consultants with the latest science and research? Critically, what motivates and prevents



promote the development, uptake and use of sustainable, resilient and profitable agricultural practice that can deliver affordable, safe and high-quality products.

In the NFU's evidence to the 2012 Science & Technology Committee Inquiry "Bridging the 'valley of death': improving the commercialisation of research" we stated that, in England, the privatisation of our national knowledge transfer capabilities and replacement with short-

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term, and often environmentally-focused projects, has further fragmented delivery channels for research and commercialisation opportunities in agriculture. The translation of science into practice is arguably one of the biggest challenges for agriculture in making a functioning connection between research and the industry. Several reports have gone on to link this with our lower level of relative

farm businesses from adopting innovative practices and technologies?

The European Innovation Partnership (EIP) concept could be hugely beneficial for my farmer and grower members in addressing these questions. The new EIP on Agricultural Productivity and Sustainability supports closer links between researchers and farmers through the new rural development programme budget. Therefore Defra must ensure that the

necessary administration is in place now for the UK to benefit in the future. The EIP will be delivered at a national level via Operational Groups, which should include farmers, researchers, businesses etc. and support activities such as sharing information and knowledge transfer, provision of advice, or testing out new ideas through projects which adapt existing techniques/practices to new



geographical/environmental contexts. Importantly, the European Commission insists that the EIP must be a bottom-up instrument driven by businesses and not researchers. The link to new science is made

*... delivery channels for research and commercialisation opportunities in agriculture ...*

through the Horizon 2020 programme, the new research funding framework across the EU that runs from 2014 to 2020. Again, there is a particular emphasis on involving SMEs at the earliest stage.

The NFU is a founding stakeholder of the All Party Parliamentary Group on Science and Technology in Agriculture [www.appg-agscience.org.uk](http://www.appg-agscience.org.uk). For those parliamentarians with an interest in science and in farming, the group's meetings are always engaging,

*... food and the environment can be highly emotive subjects ...*

enlightening and thought-provoking. The group highlights not only the research and innovation that underpins modern farming, but also the regulatory, commercial and cultural barriers to progress. It regularly has ministers and Government science advisers speaking at its meetings, and hears from leading scientists and companies from around the world. It is currently running a series of meetings about building public support for UK agri-science. I am very aware that food and the environment can be highly emotive subjects,

and those of us working in that field need to be very aware of the impact of our communications.

To make a real difference we have to go wider than just academic activity, innovative technologies, upskilling and optimising farm management. The whole regulatory context in which we work must support and not hinder progressive, efficient and innovative businesses. There remain some serious barriers to the British

farming industry making full use of innovative technologies. The anti-technology, backward looking culture that seems to pervade so many EU institutions continues to amaze and frustrate me, given the huge challenges of global food security. Food and environment are always going to be highly emotive topics, but I think it is the responsibility of politicians to press strongly for policies and legislation to be firmly based on sound scientific evidence. Without this our ability to

respond to national and global needs, to fulfil our environmental obligations and to boost our productivity and profitability for the good of economy and society will be severely constrained.

