systems, provide additional public goods such as clean water and healthy soils, adding to the resilience required for future food production. They should be central to discussions, not marginalised or excluded from the debate about UK agriculture and its importance to society.

Genuine public consultation should be an evolving, ongoing and integral process, and corporate power in the food system must be challenged. All this is vital, or UK agricultural research will continue to be dominated by a few narrow interests. The importance of agriculture goes way beyond narrow issues of yields, or even production, and there are many key issues to research, from the way we use our land to the nature of our food systems, especially in the context of climate change and biodiversity loss.[25,26]

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1 www.rcuk.ac.uk
2 www.ukri.org
3 www.bbsrc.ac.uk
4 www.nerc.ac.uk
5 www.nib.ac.uk
6 Rothamsted Research Annual Review 2015 /2016 [link]
7 www.bbsrc.ac.uk/innovation/sharing-challenges
8 www.bbsrc.ac.uk/innovation/sharing-challenges/circ
9 www.nerc.ac.uk/innovation/activities/sustainablefood/saric
10 www.openplant.org
11 Helen Wallace (2010) Bioscience for Life? Who decides what research is done in health and agriculture? [link]
12 See the European Network of Scientists for Social and Environmental Responsibility statement: [link]
13 www.rothamsted.ac.uk/projects/wheat-genetic-improvement-network
14 www.jic.ac.uk/research/designing-future-wheat/
15 https://www.rothamsted.ac.uk/projects/wheat-genetic-improvement-network
16 Also called new genetic engineering techniques (NGETs)
17 e.g.: the Agricultural Biotechnology Council [link], consisting of BASF, Bayer, Dow AgroSciences, Monsanto, Pioneer (DuPont) and Syngenta
18 For example see this report [link] on the Bakubung workshop: Capacity building for the bioeconomy in Africa, which focuses on synthetic biology for 'low-cost, breakthrough technologies' that do not need GM regulation
19 the word appears 27 times in the 28 pages of the Rothamsted Research Strategic Report 2017 2022
20 UK Government consultation outcome (2012) Shaping a UK agri-tech strategy: call for evidence [link]
21 Rothamsted Research (2014) Guiding principles for working with industry. Public dialogue on how Rothamsted Research should engage with industry [link] see pages 93-6
22 www.bbsrc.ac.uk/engagement
23 www.bbsrc.ac.uk/about/governance-structure/panels/society
24 www.bbsrc.ac.uk/engagement/dialogue/activities/food-nutrition-health
25 More than 75 percent decline over 27 years in total flying insect biomass in protected areas: Hallmann C.A., Sorg M., Jongejans E., Siepel H., Hofland N., Schwan H., Stenmans W., Müller A., Sumser H., Hörren T., Goulson D., de Kroon H. (2017) More than 75 percent decline over 27 years in total flying insect biomass in protected areas PLOS ONE [link]
26 M.J. Ascott, D.C. Gooddy, L. Wang, M.E. Stuart, M.A. Lewis, R.S. Ward & A.M. Binley (2017) Global patterns of nitrate storage in the vadose zone Nature Communications 8:1416 [link]

Research strategy for food and farming

Steve Tones, AHDB Horticulture's Strategy Director

The food and farming industry is large, complicated and fragmented. It consists of tens of thousands of farmers and growers who produce our crops and livestock. There are also many consultants, distributors, engineers, government departments and agencies, levy bodies, lobbyists, manufacturers, marketing organisations, processors, researchers, retailers and suppliers who help put the safe and nutritious food we enjoy on our tables.

The structural and technological complexity of the industry requires an overarching government research strategy to deliver a secure future for the sector, and for the food on our plates. ADHB's Feeding the future[1] (2013) and Inspiring success[2] (2017), both recognise the need to re-focus agri-food research and associated knowledge exchange on industry innovation. Ultimately, such focus will drive up productivity, increase competitiveness, build resilience and restore the UK to its former position as a global leader in agri-technology.

The big challenge lies in setting out how this might be achieved by the many providers of research and knowledge exchange involved. The key is in the way the various private and public funding streams available are directed and aligned; not just with each other and with the strategic outcomes, but in the synergies that can be created by bringing together organisations and people with the same purpose.

The proof of the pudding will be in the eating. Decades of fragmentation may take more than a few years to overcome. But a worthy start has been made and a clear common goal agreed, which can now be carried forward into the government's Industrial Strategy.

1 Chris Pollock et al. (2013) Feeding the Future – Innovation Requirements for Primary Food Production in the UK to 2030 [link]
2 AHDB (2016) AHDB Strategy 2017 - 2020 [link]