



GM Foods – Feeding the World or Destroying the Planet?

THIS BIBLIOGRAPHY

The British Library is providing background information and sources for further reading about each topic featured in Speakers' Corner Trust's *Forum for Debate*.

The focus of each bibliography will be on recent work that is accessible to someone with a general interest in the topic. It does not aim to be comprehensive, and does not cover in detail works written mainly for professional and academic audiences. All of the references in this resource guide are to materials that are either available without charge through the internet, or that may be accessed at the Library reading rooms in London. Many should also be readily available through local public libraries or bookshops.

Speakers' Corner Trust is a registered charity which promotes free expression and public debate. The *Forum for Debate* series is intended to cover issues of general public interest, with invited contributions from policy workers, commentators, academics and campaigners on either side of the debate. More information can be found on the Speakers' Corner website at:

<http://www.speakerscornertrust.org/forum/forum-for-debate/>

THE TOPIC: 'GM FOODS – FEEDING THE WORLD OR DESTROYING THE PLANET' – DECEMBER 2011

In recent years, the issue of 'food security' has gained greater prominence in international and national debates about development and conservation, as well as in considerations of future security risks. The growth in populations, coupled with increasing meat consumption in some countries, has raised fears about the global ability to produce enough food for people and livestock over the long term. In arguments about international development, the needs of poverty alleviation, reduction of malnutrition, and the improvement of the livelihood of farmers are also vital factors in deciding agricultural policy.

The adoption of new agricultural technologies and learning has long been accepted as making an important contribution to meeting demands for more, and more efficient, food production. However, over the past 20 years, the use of agricultural biotechnologies, in particular those employing genetic modification (GM), has become a prominent and controversial issue in many countries.

Proponents of GM argue that use of the products of this technology improves agricultural efficiency and sustainability by improving crop yields while requiring less use of chemicals in pesticides and fertilisers. The needs of a growing population can be met, while individual farmers can be better protected against risks of damage to crops. Use of GM technology has developed from increasing yield or introducing resistance to pests, to improving the nutritional content of some staple foods, thereby helping to reduce malnutrition.

However, despite these successes and possibilities, public attitudes in many countries (including the UK) towards the use of GM technologies remain sceptical if not hostile. Anti-GM campaigners have been successful in recognising that debates around the use of technology in food production are driven by more than scientific or technological concerns. Public opinion has been influenced by economic arguments, such as the potential dominance of big industries and issues around ownership of intellectual property (IP), as well as social and political concerns. Pollen and pests do not observe boundaries of ownership, so the decision of an individual farmer to adopt a particular type of technology has implications for neighbouring concerns that can be hard to predict. Public opinion on GM is marked by a low level of trust and correspondingly high tolerance of regulation.

Some supporters of the use of GM technology in agriculture have expressed frustration by the use and acceptance of 'unscientific' arguments, and argue that the science and evidence is misunderstood and misrepresented in popular debate. Some also argue that debates have focussed on problems related to early applications of the technology, and don't consider the potential of future improvements in the use of GM. Conversely, opponents suggest that the evidence is more in favour of use of different forms of agricultural technology and learning.

What we eat, where it comes from, and how we produce it are questions that are social, political and economic as much as they are scientific and technical. The future of food is one of the largest and most pressing policy debates being conducted in the world today.

BOOKS AND REPORTS

Baulcombe, D. chair. 2009. **Reaping the benefits: Science and the sustainable intensification of sustainable agriculture**. London: The Royal Society.
available online at: <http://royalsociety.org/policy/publications/2009/reaping-benefits/>
The report examined the challenges for global food production and surveyed the technologies available for improving efficiency of agricultural production. It argued that no solution should be automatically ruled out, and that greater research funding and capacity building in UK universities was needed.

Bridge, J. & Johnson, N. ed.s. 2009. **Feeding Britain**. London: The Smith Institute.
available online at: <http://www.ahdb.org.uk/publications/documents/FeedingBritain.pdf>
This book was produced by the Smith Institute with the Agriculture and Horticulture Development Board, to describe the challenges facing food production, security and sustainability in the UK.

Directorate-General for Research and Innovation, European Commission. 2010. **A decade of EU-funded GMO research (2001- 2010)**. Brussels: European Commission.
available online at: <http://bookshop.europa.eu/en/a-decade-of-eu-funded-gmo-research-2001-2010--pbKINA24473/>
A review of 50 research projects, including public opinion research, summarising their results. Topics include food safety, risk assessment, risk management and the production of biofuels.

Directorate-General for Research and Innovation, European Commission. 2004. **Genetically Modified Crops in the EU: food safety assessment, regulation, and public concerns**. Brussels: European Commission.

available online at: <http://bookshop.europa.eu/en/genetically-modified-crops-in-the-eu-pbKI5703079/>

Reports from the Entransfood research network, to investigate issues relating to the regulation, detection, traceability, and safety testing of GM food crops, as well as societal aspects of the introduction of GM foods. The network invited participants from different disciplines and perspectives.

Erb, K. et al. 2009. **Eating the Planet: Feeding and fuelling the world sustainably, fairly and humanely – a scoping study**. (Social Ecology Working Paper 116). Vienna: Institute of Social Ecology.

available online at:

http://www.ciwf.org.uk/what_we_do/factory_farming/eating_the_planet.aspx

Research commissioned by Compassion in World Farming and Friends of the Earth. The report argues that the food needs of a growing population could be met without recourse to intensive farming techniques by improving equality in global food production and promoting lower-meat diets.

Fedoroff, N. & Brown, N. M. 2004. **Mendel in the Kitchen: a Scientist's View of Genetically Modified Foods**. Washington D.C.: Joseph Henry

available in the British Library at: YC.2005.a.9955

Securing food supplies up to 2050: the challenges faced by the UK. House of Commons: Environment, Food and Rural Affairs Committee. July 2009.

available online at:

<http://www.publications.parliament.uk/pa/cm200809/cmselect/cmenvfru/213/21302.htm>

This report provides an analysis of the claims and evidence regarding increased demand for food worldwide, food production in the UK, and suggested strategies for the UK to meet rising demand.

Government Office for Science. 2011. **The Future of Food and Farming: Challenges and choices for global sustainability**. London: Government Office for Science.

available in the British Library at: OPA.2011.x.906

available online at: <http://www.bis.gov.uk/assets/bispartners/foresight/docs/food-and-farming/11-546-future-of-food-and-farming-report.pdf>

This report, intended for policy-makers, describes challenges for the production and distribution of food globally over the next 20 to 40 years. It argues that the demand for increased production should be balanced against the need to ensure greater sustainability, and that a wide range of policy options will be required to meet all the challenges.

Institute of Food Science and Technology. 2008. **Genetic Modification and Food**.

London: IFST

available at:

<http://www.ifst.org/learninghome/engaging14to18yearoldsinscience/factsabouteverydayfoodsandissues/>

An information statement, describing the development of GM technology, examples of its use in food production, and discussing the regulation of GM foods and arguments about their use. The statement is written from a pro-GM research perspective.

Lemaux, P. G. 2008 & 2009. 'Genetically Engineered Plants and Foods: A Scientist's Analysis of the Issues'. Parts 1 and 2. **Annual Review of Plant Biology**. vol 59, 2008 pp 771- 812 (part 1); and vol 60, 2009 pp 511- 59 (part 2).

available in the British Library STM Reading Room at: (P) CR 00 -E(2)

available online at:

<http://www.annualreviews.org/doi/pdf/10.1146/annurev.arplant.58.032806.103840>

and <http://www.annualreviews.org/doi/pdf/10.1146/annurev.arplant.043008.092013>

Part 1 deals with the methods involved in genetic engineering for food production and issues around food safety, and part 2 discusses questions on the environmental, social and economic impacts of the use of GM technology.

Lenné, J. M., & Wood, D. ed.s. 2011. **Agrobiodiversity management for food security: a critical review**. Wallingford, Oxfordshire: CABI.

available in the British Library STM Reading Room at: (B) 631.58

An introduction to concepts and a review of current research in the science-based management of animal and plant diversity, including the use of GM technology. Essays in this book also consider the policy considerations for food security.

McIntyre, B. D. et al. ed.s. 2009. **The International Assessment of Agricultural Science and Technology: global report**. Washington D.C.: Island.

available in the British Library at: m09/.16608

available online at: <http://www.agassessment.org/>

The International Assessment of Agricultural Science and Technology (IAASTD) was established as an independent, international review of Agricultural Knowledge, Science and Technology, and its use in meeting the challenges of hunger, poverty and the livelihoods of people worldwide. The process represented the views of many different groups and 58 countries, including the UK, participated in the research and reporting.

McIntyre, B. D. et al. ed.s. 2009. **The International Assessment of Agricultural Science and Technology: synthesis report: a synthesis of the global and sub-global IAASTD reports**. Washington D.C.: Island.

available in the British Library at: m09/.16293

available online at: <http://www.agassessment.org/>

Murphy, D. J. 2007. **Plant Breeding and Biotechnology: Societal Context and the Future of Agriculture**. Cambridge: Cambridge University Press.

available in the British Library STM Reading Room at: (B) 631.52

Murphy reviews the development of plant breeding techniques over the past 200 years and the current state of technology, attitudes and regulation of plant breeding. The book provides a wider context within which arguments around GM technology have come to dominate.

Neal Stewart Jr., C. 2004. **Genetically Modified Planet: Environmental Impacts of Genetically Engineered Plants**. Oxford: Oxford University Press.

available in the British Library Social Sciences Reading Room at: (B) 631.5232

In this book, written for a general audience, the author sets out to explain the 'science behind the headlines' relating to genetically engineered plants.

Organisation for Economic Co-operation and Development. 2011. **Challenges for Agricultural Research**. Paris: OECD.

available in the British Library at: YD.2011.b.981

This book collects papers delivered at a conference examining issues such as demand on natural resources, scientific development, safety and regulation. Several chapters examine the role of genetically modified crops, and other new technologies, in delivering sustainable agricultural production for food, fuel and fibres.

Organisation for Economic Co-operation and Development. 2004. **Challenges and Risks of Genetically Modified Organisms**. Paris: OECD.

available online in the British Library via *Source OECD*.

The aim of this book is to examine what sorts of risk analysis are appropriate when dealing with genetically modified organisms. Chapters discuss both the opportunities and risks associated with their use, and include perspectives from farmers, the food processing industry and consumers.

Paarlberg, R. 2010. **Food politics: what everyone needs to know**. Oxford: Oxford University Press.

available in the British Library Social Sciences Reading Room at: SPIS 338.19 PAA

This book provides a series of short chapters, structured as questions and answers on a range of topics covering global food markets, intensive farming, GM food, and organic, local and slow-food movements.

Pretty, J. ed. 2005. **The Earthscan Reader in Sustainable Agriculture**. London: Earthscan

available in the British Library STM Reading Room at: (B) 631.58

Essays introducing concepts and applications of ecological and holistic approaches to farming, using examples from around the world.

Ronald, P. 2011. 'Plant Genetics, Sustainable Agriculture and Global Food Security'.

Genetics. number 188, pp 11- 20.

available online at: <http://www.genetics.org/content/188/1/11.full.pdf+html>

A review and discussion, suggesting how use of GM crops could be integrated into existing sustainable agriculture practices.

Ronald, P. C. & Adamchak, R. W. 2008. **Tomorrow's Table: Organic Farming, Genetics and the Future of Food**. Oxford: Oxford University Press.

available from the British Library at: YK.2009.a.23374

Written as a memoir of a year in the life of a geneticist and an organic farmer. This book examines aims and approaches of genetic modification and organic farming, and considers how they may be aligned.

Schurman, R. & Munro, W. A. 2010. **Fighting for the Future of Food: Activists versus agribusiness in the struggle over biotechnology**. Minneapolis: University of Minnesota Press.

available in the British Library Social Sciences Reading Room at: SPIS 338.17 SCH

An analysis of the anti-biotech movement and success in its campaigns against the use of Genetically Modified Organisms. The book examines how discussion of GM technology broadened from scientific and technical considerations to a wider public and social movement.

Tzotzos, G. T., Head, G. P., & Hull, R. 2009. **Genetically modified plants: assessing safety and managing risk**. Burlington: Academic Press.
available in the British Library STM Reading Room at: (B) 631.5233
A review of GM technology, its applications, and public attitudes to the technology. The book mainly focuses on current approaches to assessing and managing risk.

Wu, F. & Butz, W. P. 2004. **The Future of Genetically Modified Crops: Lessons from the Green Revolution**. Santa Monica: RAND Corporation
available in the British Library STM Reading Room at: (B) 631.5233
also available online at: <http://www.rand.org/pubs/monographs/MG161.html>
This 2004 report uses an analysis of the 'Green Revolution' in the use of agricultural technology during the mid-20th century to analyse the prospects for the use of GM technologies.

NEWS AND CURRENT DEBATE

Jason Clay. 'Freeze the footprint of food: Jason Clay identifies eight steps that, taken together, could enable farming to feed 10 billion people and keep Earth habitable.' **Nature**. 21 July 2011.
available in the British Library STM reading room at: (P) BX 80 – E(3)

Jessica Twentyman. 'Global food debate presents opportunity to reap a profit'. **Financial Times**. 27 June 2011.

Jonathan Jones. 'Why genetically modified crops?' **Philosophical Transactions of the Royal Society: series A**. vol 369, pp. 1807- 1816. 13 May 2011.
available in the British Library STM reading room at: (P) JA 00 –E(11)

Sir David Baulcombe. 'Opinion: Professor Sir David Baulcombe FRS argues that we should accept the best of organic and biotech approaches to help meet our future food production needs'. **Food Science and Technology**. March 2011.

Louise Gray. 'Shoppers kept in dark over GM ingredients'. **The Daily Telegraph**. 21 March 2011.
Report that animal products on sale in UK may have come from animals that had been fed GM soy.

'The 9 billion-people question: a special report on feeding the world.' **The Economist**. 26 February 2011.
available in the British Library Social Sciences reading room

Frederick Kaufman. 'The second green revolution'. **Popular Science**. February 2011.
available in the British Library Science reading room at: (P) BW 50 – E(162)

Vanessa Schipani. 'Alternative agriculture: the debate over genetically engineered crops rages on, but other technologies offer new hope for sustainable farming'. **The Scientist**. February 2011.
available in the British Library STM reading room at: (P) BW 50 – E(206)

G. Padmanaban. 'GM technology in India – is it a quiet burial?' **Current Science**. 25 January 2011.

available in the British Library STM reading room at: (P) BX 80 – E (86)

available online at: <http://www.ias.ac.in/currsci/25jan2011/157.pdf>

Louise Gray. 'Britons must swallow fear of GM crops to feed world'. **The Daily Telegraph**. 24 January 2011.

Robin McKie. 'GM crops key to human survival, says top scientist: Government expert warns of "perfect storm" of crises leading to world shortages and riots'. **The Observer**. 23 January 2011.

Michael Skapinker. 'Patient science is GM food's best hope'. **Financial Times**. 11 January 2011.

Report on public attitudes towards food and commercial scientific enterprise.

Debashis Banerji. '*Bt* brinjal and GM crops: towards a reasonable policy ahead'. **Current Science**. 25 November 2010.

available in the British Library STM reading room at: (P) BX 80 – E(86)

available online at: <http://www.ias.ac.in/currsci/25nov2010/1319.pdf>

RESOURCES ON THE WEB

Biofortified

<http://www.biofortified.org/>

A blog and related resources written and maintained by graduate students and academics. Most posts and resources are related to plant genetics and genetic engineering.

Eldis – Food security

<http://www.eldis.org/go/topics/resource-guides/food-security>

Current research and opinion on food security in developing countries. Eldis provides a database of research, commentary and other services for people working in or researching issues relating to development around the world.

EUROPA: Food Safety – From the Farm to the Fork

http://ec.europa.eu/food/food/biotechnology/index_en.htm

EUROPA is the website of the European Commission. These pages give details of regulation of GM food in the EU, including authorisation, labelling and traceability. There is a database of Genetically Modified Organisms authorised in the EU, and 'GMOs in a nutshell', a guide on the use and regulation of Genetically Modified Organisms in the EU.

EuropaBio: The European Association for Bioindustries

<http://www.europabio.org/>

Organisation representing bioindustries at EU level. The website contains introductory information, press releases and position papers in support of the use of biotechnology in agriculture and healthcare. There is an introductory-level factsheet promoting the benefits of GM technology at: <http://www.europabio.org/gm-benefits-factsheet>

Food and Agriculture Organisation of the United Nations

http://www.fao.org/index_en.htm

The FAO is concerned with ensuring better nutrition, improving agricultural productivity and contributing to the growth of the world economy. The FAO website provides information and news on all aspects of food production and supply around the world. The topic pages include details on biotechnology, safety and food security.

Food Security Portal

<http://www.foodsecurityportal.org/>

Website facilitated by the International Food Policy Research Institute, with details on global rice, wheat and maize prices, data for countries around the world, and news on food shortages and food policy.

The Food Standards Agency – GM and Novel Foods

<http://www.food.gov.uk/gmfoods/>

Information about the regulation of use and labelling of novel foods within the European Union. Novel foods are defined as a food or food ingredient that does not have a significant history of consumption in the EU before 15 May 1997. This web page links to news and information on public consultations. There are also teaching tools on the history of GM food and an explanation of how plants are genetically modified.

GM Organisms – The New Scientist

<http://www.newscientist.com/topic/gm-food>

Topic guide, news, comment and previews of related articles from New Scientist magazine.

Genetically-modified food – The National Centre for Biotechnology Education

<http://www.ncbe.reading.ac.uk/NCBE/GMFOOD/menu.html>

This website was produced by the NCBE, University of Reading, in 2006 to describe controversies around GM food in Britain during the 10 years from 1996. The website includes links to government reports and transcripts from media reports.

The Grocer

<http://www.thegrocer.co.uk/>

News, analysis and opinion relating to the UK food retail trade.

International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD)

<http://www.agassessment.org/>

The IAASTD was an international review of knowledge, research, policy and practice in agriculture, and aimed to provide options to alleviate poverty and hunger and protect livelihoods worldwide. This website provides the global, synthesis and sub-global reports, plus the executive summaries.

International Food Policy Research Institute: publications

<http://www.ifpri.org/publications>

IFPRI conducts research and provides policy advice on many aspects of food production and supply, with a particular emphasis on issues relating to development. Their publications may be searched and downloaded online, and include many studies on the use of genetically modified organisms, and the impact of attitudes towards GM foods on farmers.

ISAAA: International Service for the Acquisition of Agri-Biotech Applications

<http://www.isaaa.org>

ISAAA promotes the use crop biotechnology, with a particular focus on small-scale farmers in developing countries. The organisation provides information for policy makers, impact assessments and support on regulation. As part of its series of *ISAAA Briefs* (copies held at the British Library), it provides an annual review on the 'global status of commercialized biotech'. A summary of findings from the review of 2010 is available online at: <http://www.isaaa.org/resources/publications/briefs/42/default.asp>

National Farmers Union online

<http://www.nfuonline.com/>

'The Voice of British Farming', the NFU website provides news, policy and campaigns related to all aspects of farming, including on organic farming and GM crops.

PG Economics

<http://www.pgeconomics.co.uk>

A UK-based consultancy, specialising in plant biotechnology, and agricultural markets and policy. The website provides links to many of their reports, including reviews of the global impact of GM crops.

Plant Breeding: the business and science of crop improvement

<http://www.bspb.co.uk/BSPB%20Handbook.pdf>

A guide, produced by the British Society of Plant Breeding, to explain the methods and benefits of plant breeding. The guide includes information on genetic modification and other enhanced breeding methods.

SCIMAC: supply chain initiative on modified agricultural crops

<http://www.scimac.org.uk/index.html>

SCIMAC was established in 1998 to argue for a managed introduction of GM crops in the UK. Its membership includes the Agricultural Industries Confederation, National Farmers Union, British Society of Plant Breeding, and Crop Protection Association. The website contains details of their proposals, responses to EU and national government, and other information in support of the use of GM technology.

Soil Association: healthy soil, healthy people, healthy planet

<http://www.soilassociation.org/>

The Soil Association was founded in 1946, and supports, promotes and regulates organic farming. It campaigns on related issues, with news and reports related to its campaign against Genetically Modified crops available at:

<http://www.soilassociation.org/gm>

HOW THE LIBRARY CAN HELP YOU TO FIND OUT MORE ABOUT THIS TOPIC

The British Library holds reports, books and journals from all over the world, covering many issues of importance to the way we live our lives. Much of this is recorded in our Library Catalogue at <http://explore.bl.uk>. We also provide current awareness services and subscribe to databases that you can use to keep up to date with current research. Some of these services that are relevant to debates on GM Food are listed below:

AGRIS: An international database recording research in agricultural sciences.

Food Science and Technology Abstracts: details of journal articles, books, conference proceedings, theses and legislation relating to all aspects of food production, processing and nutrition.

Source OECD: reports and data on the global food trade and the development of agricultural industry.

Use our guide to online sources on the **European Union** to find out about regulation, research and public attitudes to the use of GM technologies.

<http://www.bl.uk/reshelp/findhelprestype/offpubs/eudoc/onlineinfo/eudoclinks.html>

Use the British Library's journals collections to find out about current debate and developments in the technology of Genetically Modified Organisms, their regulation and public opinion. Alongside our collections of scientific and academic journals, we also have large collections of trade press, such as *The Grocer* and *Agri Trade News*. Use our Business and Intellectual Property Centre (BIPC) and Science Technology and Medicine Reading Rooms to read current and past issues.

How to get a reader's pass

You will need a reader's pass to visit our Reading Rooms. Details on how to do this, and what information you will need to bring with you, can be found at:

<http://www.bl.uk/reshelp/inrooms/stp/register/stpreregister.html>