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**Science, the Economy and Public Distrust – Challenges to
UK Scientific Governance**

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Acknowledgement and Preface

A case study, on GM crops, was selected as the paradigm, anchoring, case of an issue of technology governance in the UK in which public participation played a part, at least rhetorically, at the time of the STAGE network, and which reflected many of the issues raised by the catastrophes of scientific and technological governance that had arisen in the UK over the previous 15 years. It is bolstered by three short ancillary cases: this one on the challenges to scientific governance and one specifically on guidelines for the framing and use of scientific advice in government, which tried to encapsulate and diffuse some of the lessons drawn from the earlier failures.

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Contents

1. Introduction	4
2. Challenges to scientific governance, and changes in policy and practice	5
Notes and references	16

Figures

Figure 1 - Challenges to scientific governance: Scientific Advice and Policymaking, Guidelines 2000	5
Figure 2 - Challenges to scientific governance: House of Lords Select Committee Report on Science and Society, February 2000	7
Figure 3 - Challenges to scientific governance: Key conclusions of the Phillips Inquiry Report into BSE, October 2000	10
Figure 4 - Challenges to scientific governance: The Food Standards Agency Code of Conduct on Openness, 2000	12
Figure 5 - Challenges to scientific governance: Government Response to The BSE Inquiry, September 2001	14

1. Introduction

As with everything in contemporary scientific governance in the UK, the GM debate was framed in part by the crisis in public trust in scientific governance occasioned in the UK by the BSE crisis, pursued exhaustively forensically by the Phillips enquiry into BSE, and analysed as part of a wider enquiry into issues of *Science in Society* by the House of Lords Select Committee on Science and Technology. The Agriculture and Environment Biotechnology Commission (AEBC), the Food Standards Agency (FSA) and indeed the Department of the Environment, Food and Rural Affairs (DEFRA) itself were created as part of the response to BSE. It is this wider context which gives the GM debate its significance and resonance as the anchoring case study of contemporary UK scientific governance. The context is, in itself, a wider set of challenges on UK scientific governance within which the smaller debate, as an example of innovative practice, takes place. The intensity of scrutiny and change at the peak of that period is indicated by the fact that between November 1999 and September 2001, a period of just 23 months, the government either received, published or responded to 12 major official reports or pieces of legislation concerned with the governance of science and technology. The period is dealt with in more detail below in this ancillary, scene-setting, case study. The Guidelines on Scientific Advice in Policymaking, key to shaping the governance changes, are the subject of a separate ancillary case study.

Challenges to scientific governance, and changes in policy and practice

As noted above, the BSE crisis frames every contemporary issue of scientific governance in the UK. Much of this context setting ancillary case study links to it directly and in detail.

The **Guidelines on Scientific Advice and Policymaking**¹, first produced by the then Chief Scientific Adviser, Lord (Robert) May, in March 1997, were themselves strongly influenced by the BSE episode and constitute the first response to it in terms of broad governance practice. They are summarised in their 2000 edition in *Figure 1*.

The importance of the Guidelines is that they act as a reference point in the diffusion of a particular kind of ‘best practice’ - one seemingly based implicitly on the notion of deliberative governance - across government and the assessment of the effectiveness of that process. Because of this, they are one of our ancillary cases for the UK, although it might be that they would be more valuable as a basis for comparative analysis. The particular importance of the 2000 edition was that

Figure 1. Challenges to scientific governance - Guidelines 2000: Scientific advice and policy making – July 2000 (PH summary of OST Source)

- **Scope:**
 - Covering all research from all sources
 - Particularly important where issues sensitive, for example where there is significant uncertainty, a range of opinion, or implications for public policy;
- **Identification of issues needing advice:**
 - Information on issues likely to be important from a variety of sources
 - These include non-departmental sources, including international bodies (‘eg the European Commission’) and issues identified by ‘the interests directly concerned (eg individuals, companies, scientists or lobby groups) or by reports in the media’
 - Speedy identification of the unexpected, and appropriate linkages across government in response
- **Balance of scientific disciplines:**
 - Consult all relevant disciplines
 - At minimum, check with experts consulted if they believe they cover the ground
- **Bringing together the right people:**
 - Experts, advisory committees, learned societies or consultants; also professional bodies, public sector research establishments, lay members of advisory or consumer groups & other stakeholder bodies
 - Bring in others from eg other disciplines, not necessarily scientific ‘to ensure that the evidence is subjected to a sufficiently questioning review from a wide-ranging set of viewpoints’ (para 12)
 - Consider experts from outside UK
 - Require declarations of interest, consider whether conflicts of interest likely to undermine the credibility or independence of the advice, make declarations available to all those acting on the advice, and consider making them public
- **Ensuring right questions asked:**
 - Frame questions which experts can address – consult them in doing so
 - On sensitive issues, ensure that questions cover concerns of all relevant stakeholder groups. Consult on questions if necessary
- **Give experts clear guidance:**
 - Indicate roles clearly
 - Allow for uncertainty and indicate how critical it is to the analysis
 - Alongside scientific input, determine scope of inputs on social, political, economic, moral or ethical concerns
 - Respect the line between responsibility of experts to give advice and departments to make policy
- **Open and transparent procedure:**
 - Publish data, analysis, judgements, data omissions, etc. Test claims for privacy rigorously
 - Especially when not subject to peer review, make available for external checking
- **Issues with European or wider dimensions:**
 - Ensure sound scientific basis for Community decision-making
- **Handling of advice by departments:**
 - Presumption of openness beyond ‘minimum obligations’
 - Plan presentation, avoiding uncertain or conflicting conclusions
 - Distinguish scientific advice from ministerial action based on it
 - Communicate results early to key interest groups

‘greater emphasis is placed on key issues such as the need to involve consumer groups and other stakeholder bodies in the development of *scientific evidence-based policy*. The need to be open about the degree of uncertainty attached to a piece of advice is also highlighted.’² [my emphasis].

The context in which the guidelines were born was one in which some dilution of discretionary governance may have seemed uniquely attractive given the scale of the erosion of public trust as a result of BSE. At the same time, the guidelines when introduced constituted a considerable formal challenge to established government practice and, moreover, were introduced by a temporary, albeit senior, public servant whose origins and future career lay in the wider scientific community. Given this, the guidelines are a remarkably consistent statement of the principles of deliberative governance, but it is not surprising that on one matter a more discretionary or educational model of the public breaks through the prevailing style. This one area of inconsistency shows itself in relation to public presentation of the results:

‘It is important that sufficient early thought is given to presenting the issues, uncertainties and policy options to the public so that departments are perceived as open, well prepared and consistent with one another and with the scientific advice. *The difficulties associated with presenting uncertain or conflicting conclusions should not be underestimated.*’³ [my emphasis].

Following the 1997 guidelines, the two most influential reference points in the early development of UK scientific governance post-BSE were the Royal Commission on Environmental Pollution’s Report, *Setting Environmental Standards*⁴, published in October 1998, and the February 2000 Report of the House of Lords Select Committee on Science and Society, chaired by Lord Jenkin, *Science and Society*.

In the context of scientific governance, *Setting Environmental Standards*, is notable for three things. The first is the way in which it picks up the leitmotifs of the 1997 guidelines, arguing for transparency of process, and a willingness to confront uncertainty and the limits of scientific knowledge. The second is the recognition that public values, knowledge and understanding, should be taken into account together with technical and scientific considerations. All of these become part of the canon of new scientific governance as later reflected in the GM debate case. The third is something that is stated more directly here than in some later sources – that this work, the effort to articulate and public opinion, is the responsibility of government, and not that of parliament:

‘Parliaments are able to express public attitudes and values to some extent. Nevertheless, governments should use more direct methods to ensure that people’s values, along with knowledge and understanding, are articulated and taken into account...’⁵

The government took until July 2000 to reply to the RCEP report – a performance that they were considerably to improve on as the debate on scientific governance gathered pace – and although broadly positive towards the recommendations showed a considered, if not reluctant, response to some of the messages being pressed on it. For example, in contrast to the apparent deliberative assumptions of the *Guidelines*, here is the careful, almost academic, response to processes of deliberative governance:

‘The government accepts that they have a valuable contribution to make to policy-making. They can, however, have their own disadvantages. For example, they can be time-consuming and resource intensive, and do not necessarily eliminate conflict. They can also be unrepresentative, and subject to capture by particular stakeholder groups. They can be dominated by the articulate with the loudest voices. So they should not be seen as a substitute for other methods, but a complement.’⁶

The Jenkin report *Science and Society*⁷ had been prompted by the BSE crisis, but reported in February 2000, before the BSE Inquiry, and this may have contributed to the attention it received at the time. *Figure 2* summarises its main recommendations on governance.

Figure 2.. Challenges to scientific governance - House of Lords Select Committee Report on Science and Society– February 2000 (PH selection from the report's recommendations)

- b) Research Councils and universities should strongly encourage communication training for scientists and, in particular, training in dealing with the media. (paragraph 3.22)
- c) the communication training offered to research students should be broadened to include an awareness of the social context of their research and its applications; and that strenuous efforts be made by universities to see that as many students as possible take full advantage of this opportunity. (paragraph 3.23)
- d) grant-giving bodies should give researchers every encouragement to share their research with the public, and should support and reward those who do so; and that universities should see this as a shared responsibility. (paragraph 3.26)
- e) the Higher Education Funding Councils should reward the work of those who have successfully brought the results of their research to a wider audience. (paragraph 3.32)
- g) the OST should establish liaison linking the science museums and science centres with the Research Councils and the Foresight team, so that each can help the other to identify and respond to emerging issues in science. (paragraph 3.46)
- l) direct dialogue with the public should move from being an optional add-on to science-based policy-making and to the activities of research organisations and learned institutions, and should become a normal and integral part of the process. (paragraph 5.48)
- m) for OST within Government and for COPUS giving a lead in the scientific community, dialogue with the public in one form or another should become a major strand of their activities. (paragraph 5.52)
- n) government departments should collate experience of new techniques of public dialogue, and draw up a code of practice designed both to maximise their effectiveness and preserve their integrity. ... The code should have the same status as the Chief Scientific Adviser's guidelines on scientific advice, and might even form part of them. (paragraph 5.53)
- o) any public dialogue should be conducted in good faith, and that its aims and in particular its role in the policy process should be clear from the start. Those organising public dialogue should see to it that single-issue groups do not monopolise proceedings. The organisers of such events should make every effort to encourage the media to cover the event and to report the outcomes. (paragraphs 5.51, 54-55)
- p) Government should give a lead at EU and international level in fostering public dialogue on issues involving science. (paragraphs 5.56, 60) and press for guidelines on science advice at EU level (4.9)
- q) advisory and decision-making bodies in areas involving science should adopt a presumption of openness. This presumption should apply, in particular, to the reasons on which regulatory decisions are made, including all scientific information and advice. The presumption should be overridden only where this can clearly be justified in terms of, for example, genuine commercial confidentiality. (paragraph 5.70)
- r) such bodies should open as many of their proceedings as possible to the public. (paragraph 5.71)
- s) the new Food Standards Agency should cultivate a culture of direct, open and timely dialogue with the public. (paragraph 5.73)
- t) the scientific merit of particular research grant proposals should continue to be assessed by peer review; but that the Research Councils should do more to involve stakeholders and the public in the wider task of setting the priorities against which particular grants are made, and should seek greater publicity for the process. We suggest that they might seek the considered involvement of members of Parliament and local authorities, and of other people active in their communities; and that they might hold occasional open forum meetings in different locations. (paragraph 5.78)

The main thrusts of the Jenkin report on governance can be considered in relation to the government's response to *Science and Society*, published in October 2000.

- Jenkin's recommendation that an **adoption of public dialogue** – two way communication – should be a presumption of public policy towards science, and as the responsibility of individual scientists, is broadly accepted as widely applicable:

‘As more experience is gained throughout the UK's decision-making institutions – and further good practice is identified – the benefits of a more open dialogue should start to be evident. The Government hopes that this will establish a virtuous cycle, which gradually makes public dialogue a normal and integral part of the many processes.’

The government sees this as part of wider priority crossing policy domains, citing the policy that quangosⁱ should aim to consult their users widely.⁸

- The recommendation that there be a similar presumption of **openness** in scientific governance, especially in relation to regulation, is accepted unreservedly⁹; although an accompanying recommendation that such bodies should hold open meetings as far as possible is effectively ignored
- in line with these principles, the need for new scientists, as research students, to learn about the **social context of their research and its applications**. This recommendation seems to be accepted as well in principle although the evidence for progress as to its achievement cited in the response are limited both in extent and depth;
- the UK to press for **guidelines on scientific advice at EU level**, similar to the UK guidelines. This recommendation is again accepted in broad terms
- similarly, the need for **research councils** to do more to respond to these principles by **involving stakeholders and the public in the setting of broad priorities**, which themselves frame the more detailed assessment of individual research proposals by the means of peer review. Whilst the broad need for stakeholder response is accepted by the government, there is a sense that the evolution of existing arrangements will be enough. Certainly, there is no sense that this will be a priority for the government centrally.

The importance of the Jenkin Report was that it was, in advocating public dialogue as part of a more open, transparent and accountable process of scientific governance, willing to go well beyond the educational and market research models which had previously dominated approaches to scientific governance, and in particular, unidirectional, top-down approaches to science communication. In doing so, Jenkin also marked a new impact of the social sciences on public policy, especially in terms of one of the Committee's expert adviser, Brian Wynne, described informally by Lord Jenkin later as ‘the true hero of the report’.

Jenkin was also important in causing a rash of activity amongst scientific and research organisations to take up the Science and Society theme. For example, the Economic and Social Research Council (ESRC) which already had a research programme under consideration with the title ‘Science, Governance and Social Change’, renamed it ‘Science and Society’,ⁱⁱ the Royal Society started a Science in Society programme with funds from a private benefaction, and the Parliamentary Office of Science and Technology (POST) took on a role of monitoring for Parliament developments in public engagement in science and

ⁱ The term quango – for quasi-autonomous non-governmental organisations – was introduced by Douglas Hague in the late 1970s (although, many such bodies are governmental in character and the official term in use is Non Departmental Public Bodies -NDPBs). The numbers of quangos and their perceived lack of accountability has been a reoccurring issue in UK governance ever since and one that has been popular with the media.

ⁱⁱ Later funded as *Science in Society*

technology¹⁰. Of course the enthusiastic response covered a range of motives and beliefs, including that in some institutions that the new dialogue ingredient in science communication would rebuild public trust so as to restore the status quo ante of scientific discretion. Institutional competition for position in the new landscape also helped fragment resources: COPUSⁱⁱⁱ – a science communication alliance of the Royal Society, the British Association and the Royal Institution of Great Britain, which had been formed in the light of the Bodmer report 15 years earlier, looked for a new role but eventually gave up in October 2002.

The Jenkin Report also undoubtedly had an effect on two government publications in July 2000 – the revised Guidelines on Science Advice, already referred to, and a new **Science and Innovation White Paper** published by the DTI – *Excellence and opportunity*.¹¹ This was the first White paper covering this territory since the 1993 White Paper *Realising our potential* had required the research councils to take on responsibility for public understanding of the science they funded. *Excellence and opportunity* could have taken the parallel step of formally incorporating the new governance processes advocated by Jenkin into government department and research council practice. The White Paper introduces the issue in terms which Jenkins would recognise, and which suggest a recognition of a sustained social challenge to discretionary/educational/enlightenment forms of science-society relations:

‘competition is just one side of the story for consumers. Consumers will support investment in science if it helps to deliver products they value. But, in addition, public confidence in the whole notion of science must be strong and well founded. People must feel that science is serving society and that it is properly regulated, open and accountable. *The BSE crisis and the controversy over GM foods have raised questions about the value of scientific progress in society.* These are questions we should ask. It is in the public interest, in the interests of scientists and in the interests of companies seeking to exploit science commercially that they are addressed. We need a more systematic and independent approach to satisfy public concerns about the risks created by scientific innovation.’¹² [my emphasis]

At another point, the paper adds a much quoted passage:

‘*science is too important to be left only to scientists.* Their knowledge, and their assessment of risks, is only one dimension of the challenge for society. When science raises profound ethical and social issues, the whole of society needs to take part in the debate.’¹³ [my emphasis]

However, prescription is less radical than diagnosis and seems to be framed by concerns to regulate risks within a consumer model of scientific governance (the section of the paper is titled ‘Confident Consumers’):

‘When science delivers innovations that improve people's lives with minimal risk that they understand, they support it wholeheartedly. Science and innovation need a stable and transparent framework of public support within which they can develop.’¹⁴

The new approach is acknowledged but is also restricted to certain institutions (although a Medical Research Council Consumer Liaison Group is favourably cited) and is very much on probation:

‘The Government is establishing new strategic bodies to help facilitate dialogue. The Food Standards Agency has this as an important part of its role, integrated with its regulatory responsibilities. Two new biotechnology commissions, the Human Genetics Commission and the Agriculture and Environment Biotechnology

ⁱⁱⁱ formerly known as the Committee on the Public Understanding of Science. After effectively ending its proactive life, COPUS still formally remains in existence as a channel for some government science communication grant schemes.

Commission established alongside the Food Standards Agency, have representatives from all interested groups, and a remit to facilitate public debate. They report to Ministers in the devolved administrations as well as UK Ministers.

These Commissions face a challenging task, bringing together widely different views on very difficult issues and working under public view. If they are successful, they will provide models for the future. The Government will watch their work closely to see what lessons can be translated into other areas.¹⁵

The Inquiry on BSE¹⁶ (the Phillips Report) was published in October 2000, having been commissioned nearly three years earlier. Although widely and immediately attacked for being a whitewash on the issue of individual political and managerial responsibility for what had been described as the UK's greatest peacetime crisis^{iv}, it was stronger in distilling principles for more open and accountable governance of science. Strongly influential on the terms of this was Sir Robert May, (now Lord May) then Chief Scientific Adviser, to the government, whose evidence included

'You can see the temptation on occasion to wish to hold the facts close so that you can have internal discussion and the formation of a consensus so that a simple message can be taken out into the market place. My view is strongly that that temptation must be resisted, and that the full messy process whereby scientific understanding is arrived at with all its problems has to be spilled out into the open.' (Phillips, paragraph 1297)

Phillips quoted this approvingly, along with NGO views that institutions build credibility through openness. The report continues

'Everyone agreed that the Government had a problem with credibility. A number of Government Ministers told us that they had lost credibility with the public, so that it was necessary to get independent experts to lend credibility to public pronouncements about risk. Mrs Bottomley spoke of the need for the public to receive information free of 'political overtones'. She told us that she did all that she could to promote the Chief Medical Officer as an independent expert who could be trusted by the nation.' (Phillips, para 1300)

and concludes

'Our experience over this lengthy Inquiry has led us to the firm conclusion that a policy of openness is the correct approach. When responding to public or media demand for advice, the Government must resist the temptation of attempting to appear to have all the answers in a situation of uncertainty. We believe that food scares and

Figure 3. Challenges to scientific governance: key conclusions of the Phillips Inquiry Report into BSE – October 2000. PH summary.

- To establish credibility it is necessary to generate trust.
- Trust can only be generated by openness.
- Openness requires recognition of uncertainty, where it exists.
- The importance of precautionary measures should not be played down on the grounds that the risk is unproved.
- The public should be trusted to respond rationally to openness.
- Scientific investigation of risk should be open and transparent.
- The advice and the reasoning of advisory committees should be made public.
- The trust that the public has in Chief Medical Officers is precious and should not be put at risk.
- Any advice given by a CMO or advisory committee should be, and be seen to be, objective and independent of government.

ⁱ In terms of government expenditure. BSE cost 170,000 cattle and to date 120+ human lives in the UK from variant CJD. The Phillips Inquiry alone cost £26m to conduct.

vaccine scares thrive on a belief that the Government is withholding information. If doubts are openly expressed and publicly explored, the public are capable of responding rationally and are more likely to accept reassurance and advice if and when it comes.’ (Phillips, paragraph 1300)

The Report’s conclusions on lessons to be learned in dealing with uncertainty and the communication of risk are given in *Figure 3*.

Four out of seven chapters of the government’s **Interim Response to the BSE Inquiry**, published in February 2001, focused on aspects of scientific governance, with chapters on ‘Science and Government’, ‘Openness’, ‘Risk and Uncertainty’, and ‘Good Government’. This was a far larger part of the response than in the original report, and suggested that the government was eager to learn the lessons of BSE in terms of governance processes. The approach in the interim report was itself open and consultative. The government set out some of its current procedures and institutional innovations on some issues – including the Guidelines 2000 on Scientific Advice and Policymaking (*Figure 3*) and the introduction of a Food Standards Agency (FSA – *Figure 4*), Agriculture and Environment Biotechnology Commission (AEBC) and Human Genetics Commission (HGC), and the inclusion of lay members in memberships, and forthcoming provisions of the Freedom of Information Act. Notably, however, whilst setting out its preliminary thinking on other issues, it welcomed further input on:

- obtaining and using scientific advice;
- opening up government departmental research strategy and making research commissioning more subject to peer review and stakeholder scrutiny;
- extending processes of identifying potential new risks beyond ‘horizon scanning’;
- coordination of research across government, echoing one specific concern of Phillips regarding research on TSEs^v;
- whether openness as exemplified in the FSA processes was enough;
- how to implement the ‘Government’s commitment to trusting the public’¹⁷ in developing consultative and open processes for policy development;
- how to structure government responsibility for risk-based decisions, make it transparent, allow public contribution and comment, and communicate low risk, especially when allied to uncertainty;
- coordinating and sharing work across government and with the devolved administrations
- the role and independence of the Chief Medical Officers and Chief Veterinary Officers.

It is of interest that whilst the devolved administrations in Scotland and Wales (relatively new features of the UK governance landscape at the time) are of concern in the government’s analysis, developments at European level hardly feature, beyond a brief reference, as ‘international considerations’, to the EU Council Resolution on the Precautionary Principle of December 2000.

The three new institutions meant to embody principles of open and accountable governance - the **Food Standards Agency** (FSA), the Agriculture and Environment Biotechnology Commission (AEBC), and the Human Genetics Commission (HGC), - were all set up in the

^v TSEs: transmissible spongiform encephalopathies. The emphasis on TSEs, rather than BSE alone, reflected a concern to put food health issues in context, in this case learning from other related diseases such as scrapie (sheep) and kuru (humans).

period 1999-2000, the latter two as a result of a government review of its advisory and regulatory framework for biotechnology, the first through specific legislation, *The Food Standards Act, 1999*. The Act itself is largely permissive as regards issues like transparency, but it does require those appointing FSA members to balance the need for ‘a variety of skills and experience...among members of the [Food Standards] Agency (including experience in matters related to food safety or other interests of consumers in relation to food)’ against ‘financial or other interests which is likely to prejudice the exercise of his duties.’¹⁸ This requirement for a ‘variety of skills and experience’ emphasises one consistent approach to governance under uncertainty also reflected in the response to Phillips, and in the 1997 and 2000 Science Advice guidelines: to try to ensure that advice, evidence and policy positions are tested by a competitive process – whether of peer review, experimental testing, or debate between competing perspectives – in order to ensure more scientifically or socially robust outcomes.

The FSA itself claims that ‘from its inception [it] has set out to establish new levels of openness in the way it discharges its responsibilities for food safety and food standards in the United Kingdom.’¹⁹ The principles and procedures from its *Code of Practice on Openness*²⁰ and its *Publication of advice to Ministers* are summarised in *Figure 4*.

Figure 4. Challenges to scientific governance – The Food Standards Agency’s Code of Practice on Openness and statement on the Publication of advice to Ministers- 2000.
(PH summary of FSA sources).

- **Policy on Openness:**
 - Disclosure of information the norm, with the aim to publish information or advice provided to others or in most other circumstances, on request
 - Make available records of decisions, to enable consumers and other stakeholders to check their basis and assess their quality
 - Make available general explanatory material or guidance used in dealing with consumers and other stakeholders, subject to ‘reasonable time and a measure of privacy’ to examine and debate options
 - Consult stakeholders ‘as early as is practicable’ in the policy-making process
 - Aim to publish any substantive advice to government
 - Peer reviewed publication of research the norm
 - Treat all requests for information on a fair or equal basis, and when unable to supply information requested, explain why
 - ‘Small number of well defined circumstances’ constituting exceptions: imminent publication, information incomplete or unsubstantiated, privacy, legal constraints, and personnel or financial or organisational issues within the Agency itself
- **Delivering the Policy:**
 - Decision-tracking: information on decision basis normally available
 - Consultation in policy-development and presumption that responses to consultation are published
 - Open FSA Board and other meetings
 - FSA Advisory Committees encouraged to be open at all stages of the risk assessment process

The UK **Freedom of Information Act**²¹ is the last example of changed governance practice cited in the government’s initial response to the BSE Inquiry. The Act, much of which does not come into force until 2005, gives a theoretical right of access to information to any person making a request for that information to a public authority. However, it has been widely criticised for the wide scope of exclusions and exceptions, and although it may come to be used it may be that in many cases the most effective route to UK government sources is through the equivalent US legislation.

Between the publication of the initial response to the BSE Inquiry, in February 2001, and the final response in September of that year, a test of the relationship between the theory and practice of the new scientific governance came in the form of the UK’s latest, and most serious, **outbreak of foot and mouth disease**, peaking in March 2001 with some 50 new

confirmed cases a day. June 2001 also saw a general election, with an almost identical outcome to that in 1997. In the restructuring of government after the election it was decided to break-up the old Ministry of Agriculture, at the heart of the BSE and foot and mouth crises, in principle as the final act in the separation of responsibility for the agricultural industry on the one hand, now to come under a new Ministry, DEFRA^{vi}, and food safety and standards on the other. However, DEFRA announced in August that a three-stranded enquiry into the foot and mouth outbreak would be conducted in private, although the reports would be published. Further the chair of one of the strands was Sir Don Curry, chair of the Meat and Livestock Commission at the time of BSE, when, according to the Phillips Inquiry, the Commission had been exaggerating the safety of British beef.

At the British Association Science Festival in Glasgow that September, Professor Malcolm Ferguson-Smith, one of the three members of the BSE Inquiry Committee, said that the response to foot and mouth showed that the government had not learned the lessons from the Phillips report – that ‘lack of openness leads to public mistrust of government’ – and that the Report was in danger of becoming ‘a £26m doorstop’. DEFRA, he concluded, was ‘the same gang under a different name’.²² However, he welcomed the foundation of the FSA.

The final Government **Response to the BSE Inquiry** in September 2001 drew on the results of a public consultation on the recommendations of the interim report, which had taken place over the preceding six months, and is largely organised to respond to those additional points. *Figure 4* summarises the main governance issues and the government’s response to each. The evidence is only presented in summary, consolidated form – there is therefore no attribution, nor even any real sense of the range of views presented on each issue.

Interestingly, the paper recognises that:

‘The Foot and Mouth epidemic tested in many ways the actions put in place in the interim response to the BSE Inquiry report. The Government Chief Scientific Adviser played an active role in bringing to bear as full a range of available scientific advice as possible to inform decision taking on the epidemic as events unfolded.’

In faint acknowledgement of the criticisms, it continues:

‘Whilst the Government response to the epidemic indicates that real progress is being made in implementing the principles underlying the BSE Inquiry’s recommendations, there will always be a need to continue to develop and improve on what we have put in place, and ensure that practices are maintained through best practice and effective monitoring.’²³

However, in total, the response also contains much detail of what it considers good practice in developing scientific governance in line with the Phillips report recommendations. Its language in the section on Risk, Uncertainty and Openness is particularly interesting:

‘The “traditional” linear model of risk assessment, risk management, and risk communication no longer holds as a general approach...one of the key lessons from the BSE Inquiry report is that communication should be continuous and integral. This is particularly important when dealing with uncertainty. The Inquiry rightly commented that the Government should trust the public with information and treat people like adults.’²⁴

‘Being open also means being honest about the possibility that advice to consumers may change as the evidence changes or as scientific understanding develops.’²⁵

^{vi} Department of Environment, Food and Rural Affairs

As an example of 'trusting the public' the FSA's work is cited:

'...the review of BSE controls; openness about the evolving position over the

Figure 5. Challenges to scientific governance – issues raised in the public consultation accompanying the Government's Response to the BSE Inquiry, and the government response to them. September 2001. (PH summary of DEFRA sources)

- **Guidelines 2000 and proposed Code of Practice for Advisory Committees:**
 - Consultation revealed support for proposals but emphasis on the need for proper implementation. Points included operating openly, dealing 'sensibly' with conflicts of interest, using agreed risk assessment processes, and publishing advice and evidence promptly to facilitate review by the scientific community
 - The government's response looked back to the founding and first steps of the FSA, the AEBC and the HGC, and forward to the publication of the Code of Practice (see *Figure 5*). They cite lay members and more open working practices of most scientific advisory committees. It commits itself to strengthening the implementation of Guidelines 2000, ensuring that its scientific advisory committees follow the Code of Practice, and publishing a list of those doing so.
- **Handling of scientific advice:**
 - Consultation proposed more consistency in implementation & application of guidelines
 - The government's response was in terms of action by the Chief Scientific Adviser (CSA) and the HSE to develop a quality management system and procedures for implementing Guidelines 2000. The CSA's letters to departments will be published 'providing the wider public with the means to judge how well departments are measuring up to the latest benchmarks.'
- **Relationships with non-government scientists:**
 - Consultation suggested that 'while not giving undue credence to ill-supported theories, government...should be more proactive in seeking out non-mainstream views'.
 - The government's response was in term of the existing advice in the Guidelines, in the range of expertise used in combating foot and mouth, and in the work of the FSA. One new intention was for the greater involvement of expertise from outside the UK in the Advisory Committee system
- **Managing research programmes and setting science and innovation strategies:**
 - There was strong support in the consultation for departments to develop and publish science and innovation strategies, for the links between research priorities and government objectives to be evident, and for the involvement of key stakeholders in the development of the strategies
 - The government's response pointed up that all departments had prepared and would publish through their websites, science and innovation strategies
- **Horizon scanning to identify future risks:**
 - The consultation suggested that the government should do more on this, in closer partnership with expert committees, learned societies and professional bodies in the UK, and with an international dimension
 - The government points to the UK Foresight programme, to initiatives in DEFRA, FSA and HSE (the Health and Safety Executive) and to the intention that all government departments will publish their horizon scanning activities
- **Risk management, uncertainty and openness:**
 - Consultation supported the principles set out and commended the work of the FSA as 'best practice'. Concerns were expressed about whether the Freedom of Information Act contained enough safeguards on public health and whether it would constrain the FSA. In handling risk, the government should give greater recognition to uncertainty
 - The response outlines current best practice and comments: 'The "traditional" linear model of risk assessment, risk management, and risk communication no longer holds as a general approach...one of the key lessons from the BSE Inquiry report is that communication should be continuous and integral. This is particularly important when dealing with uncertainty.' The Stewart report on the possible use of mobile phones is cited as an example of the use of the precautionary principle.

theoretical risk of BSE in sheep; publicising the possible risk of dioxins in milk from cattle grazing near pyres used to dispose of carcasses culled as a result of action to control FMD [foot and mouth disease]. In each case the Agency successfully conveyed a complex message without ensuring unnecessary alarm.²⁶

As an example of the open and precautionary approach in practice the government refers to the issue of the possible health effects of mobile phone radiation:

‘...an independent expert committee led by Sir William Stewart concluded that it was not possible to say with certainty that radiation from mobile phones, even at levels below national guidelines^{vii}, was totally without adverse health effects. In view of the gaps in our knowledge, the Government adopted a precautionary approach. The UK Chief Medical Officers strongly advised that where children and young people do use mobile phones, they should be encouraged to use them for essential calls only and that the calls should be kept short. Leaflets containing this message were...made available at points of sale.’²⁷

The concluding claim is that these cases demonstrate that:

‘practical experience has shown that openness and trusting the public with information – as the BSE Inquiry recommended – has not led to unnecessary alarm. It has also shown that an open and consultative approach can lead to better decisions as well as helping to build public confidence. The Government is committed to furthering the recent trend towards greater transparency, openness and information about levels of uncertainty...[and] wants to have approaches in place for effective dialogue, which allow public concerns to feed into policy development and ensure that scientific information is presented in an accessible way.’²⁸

Conclusions

The period of this brief review of the background to the GM debate is, in the context of the evolution of governance, extremely short – about two years. It was, however, one of unparalleled intensity as government started to come to terms with the impact on the governance of science and technology of the – by now – socially shared conception of BSE as disaster and the unresolved conflicts over the distribution of potential costs and benefits of GM. We have looked at the participation in the governance debate of a limited range of actors, in government, in parliament, and in agencies and inquiries that the government has set up. Nevertheless, the debate – and especially the Jenkin report – has been very permeable to NGO, industry and academic influence and opinions, and these have been cited in support of conclusions and recommendations reached. Academically this has been arguably, the greatest period of social science influence over science and technology policy and one of the biggest impacts in any policy domain within the UK. There has been a social multiplier of this impact as scientific and governmental institutions have sought to apply the *Science and Society* analysis and approaches to the legitimisation of their work, and sometimes also to its aims, structures and processes.

In one sense this period can be seen as an extended period of crisis management, during a period when the increasing salience of science and technology to the economy has raised the stakes for stakeholders. It is probably a mistake to look for too much coherence in this period from actors who are to some extent using the crisis and the new repertoires of analysis and action accompanying it in jockeying for power and advantage. In particular government has been seen to be in support of a variety of forms of governance, perhaps shifting slightly more decisively to embracing educational/deliberative process as the period ends, but not buying into process in a manner which cedes discretion over outcomes.

In the further evolution of scientific governance a number of hybrids are possible: deliberative processes which simply inform discretionary governance, most often of a market character; deliberative processes which, being conducted by bodies which are ostensibly representative of major stakeholders, inform negotiated outcomes of a corporatist character; deliberative processes which have a clear linkage to government decisions; discretionary governance which, perhaps with public engagement inputs, is driven by the perceived political and economic costs of agonistic forms. These are explored in the GM debate case.

^{vii} these guidelines are general ones for human exposure to radiation issued by the National Radiological Protection Board (NRPB)

NOTES and REFERENCES

¹ *Guidelines 2000: Scientific Advice and Policymaking*. Office of Science and Technology, July 2000.

² Government Response to the Jenkin Report, *Science and Society*, October 2000, para 5.

³ *Ibid*, paragraph 27

⁴ Royal Commission on Environmental Pollution (1998), 21st Report, *Setting Environmental Standards*

⁵ *Ibid*, paragraph 9.75

⁶ Government Response to the RCEP report, *Setting Environmental Standards*, July 2000, paragraph 85

⁷ *Science and Society*. Third Report of the House of Lords Select Committee on Science and Technology, Session 1999-2000, 23 February 2000

⁸ Government Response to the Jenkin Report, *Science and Society*, October 2000, para 33. The report cited is *Quangos: Opening the Doors*, Cabinet Office, 1998

⁹ *Ibid*, para 54

¹⁰ Note particularly the valuable survey *Open Channels: public dialogue in science and technology* (March 2001) and the update *Public Dialogue on Science and Technology* (Postnote 189, November 2002). *Public Dialogue on Science and Technology* summarised two cases, GMOs and DEFRA's radioactive waste consultation, largely as a result of an independent consensus conference. As a result of the latter DEFRA – the Department which, as we will see, is the effective government customer for the AEBC GMO debate – agreed to set up an independent overseeing body to advise on nuclear waste options which it has said will “operate in an open, transparent and inclusive manner” and which “must engage with interested stakeholders and the public.” Significantly, in terms of subsequent assurances given to the AEBC in relation to the GM crops debate, the paper further quotes DEFRA's response to a House of Commons Select Committee in October 2002 on the uses of the outputs from public engagement:

[it] will need to remember one simple principle of public engagement: it is a waste of everyone's time unless the decision-maker is willing to listen to others' views and then do something which it would not have done otherwise.'

See the POST website: www.parliament.uk/post/home.htm

¹¹ *Excellence and opportunity: a science and innovation policy for the 21st century*. Cm 4814, 26 July, 2000. Available on the Office of Science and Technology website: www.ost.gov.uk/enterprise/excellence.htm

¹² *Ibid*, para 16

¹³ *Ibid*, para 27

¹⁴ *Ibid*, para 16

¹⁵ *Ibid*, paras 28 and 29

¹⁶ Report of the Inquiry into BSE and Variant CJD in the United Kingdom, October 2000. Available at the Inquiry website: www.bseinquiry.gov.uk

¹⁷ *The Interim Response to the Report of the BSE Inquiry* – HM Government in consultation with the Devolved Administrations, February 2001, para 5.18, p.24

¹⁸ *Food Standards Act*, 11 November 1999, 2 (3)

¹⁹ Introduction to *Publication of advice to Ministers*, FSA website (www.foodstandards.gov.uk) 17 December 2001

²⁰ *FSA Code of Practice on Openness*. Available on the FSA website.

²¹ Freedom of Information Act, 2000. 2000 Chapter 36. Available at www.hmso.gov.uk/acts/acts2000/20000036.htm

²² Professor Ferguson-Smith was quoted on the BBC News website, 4 September, 2001.

²³ *Response to the Report of the BSE Inquiry* – HM Government in consultation with the Devolved Administrations, September 2001, para 4.3, p.16

²⁴ *Ibid*, para 5.2, p. 41

²⁵ *Ibid*, para 5.10, p. 45

²⁶ *Ibid*, para 5.11, p. 45

²⁷ *Ibid*, para 5.12, p. 45

²⁸ *Ibid*, para 5.13, p. 46