

PLANT BIOTECHNOLOGY - A CONSENSUS?

- *The first UK Consensus Conference determined the informed public's view of plant biotechnology*

Parliamentarians are interested in public opinion. But as life in general, and science and technology in particular, have become more complicated, it becomes more difficult for such 'opinion' to be adequately informed. Some legislatures make use of 'Consensus Conferences' to find out what their publics really think of complex issues when fully informed. The outcome offers both a measure of informed opinion and also helps in identifying policies which reflect fundamental public concerns.

The first Consensus Conference in the UK was recently completed (on plant biotechnology), and this note examines its outcome.

THE CONSENSUS CONFERENCE 'IDEA'

The idea of the lay consensus conference emerged during the late 1970s in Denmark from a parliamentary committee's review of ways of encouraging local and regional debate on promoting Danish economic life, and its adjustment to using high technology. This crystallised in 1984 into specific proposals to Parliament to encourage dialogue between the 'man in the street', politicians and others on the implications of new technologies, their applications and consequences. Subsequently, the Danish Board of Technology (DBT) was formed in 1986, charged with the twin responsibilities of encouraging public debate on the consequences of technology, and in assessing the impact of technologies (technology assessment). The DBT reports to a committee under the Danish Parliament and is therefore essentially equivalent to POST under the UK Parliament, though very different in its work.

The Danish model has provided something of a benchmark for other countries interested in this area. In broad terms, a consensus conference is a forum in which a group of lay people put questions about a science and technology subject of controversial political or social interest to experts, listen to their answers, and then reach a consensus about the subject and report that to a press conference. Its rationale and methodology are described in Box 1.

THE UK PROTOTYPE CONFERENCE

In 1993, the Biotechnology and Biological Sciences Research Council (BBSRC) commissioned the Science Museum to apply the Danish model of consensus conferences to the UK in order to address public views



POST note

56
January
1995

POSTnotes are intended to give Members an overview of issues arising from science and technology. Members can obtain further details from the PARLIAMENTARY OFFICE OF SCIENCE AND TECHNOLOGY (extension 2840).

Box 1 WHAT A CONSENSUS CONFERENCE IS/ DOES

The rationale is based on the perception that society is undergoing rapid technological development and that the decision-making structures (e.g. expert groups) which society has in place have only limited scope for the ordinary citizen to participate in the process. The consensus conference is thus intended to involve ordinary citizens, with their different backgrounds, in assessing the technology and how it meshes with the moral, ethical and personal perspectives of the non-expert member of the public. The consensus conferences not only stimulate public debate on modern technology, but also give valuable feedback to politicians on peoples' attitudes towards new technologies and the unresolved issues associated with them.

The sequence of events in a consensus conference can be summarised in the following diagram :-

- ▶▶▶ **'Lay' panel selected** from volunteers from the general public.
- ▶▶▶ **First briefing weekend.** Lay panel is briefed by the necessary experts on the essentials of the issue, and its technical basis. Identifies priorities for further briefing.
- ▶▶▶ **Second briefing weekend.** Lay panel is briefed further on the areas where members feel they need additional technical and policy briefing. Identifies key questions for the Conference.
- ▶▶▶ **Consensus Conference Proper.** Lay panel interrogates in a formal public setting, experts (from all viewpoints) on what the panel sees as the key aspects of the technology (1.5 days). The panel negotiates its consensus, writes its report and releases it to the press on the third day.

The first two briefing weekends are restricted to the lay panel and the relevant experts. The third session, the consensus conference itself, is open to the public up to the point where the panel retires, unaided, to write its report. The announcement of the report and its discussion are then also public, with press and public interest groups present.

Danish experience has been that the costs of the conferences range between £40-70,000 and take at least 6 months to organise

on developments in plant biotechnology¹. The Science Museum, with the aid of a Steering Committee, followed the Danish (and Dutch) experience quite closely as described in Box 1.

Thus in June 1994, adverts were placed in a number of regional newspapers, inviting anyone with an interest in the process to volunteer for membership of the lay panel. From the publicity, 370 applications were received, of which 16 were selected according to a desire to achieve a cross-section of age, sex, educational level, occupation, life-cycle and regional location (Table 1).

1. This was under the Council's general remit, reinforced by the 1993 science and technology White Paper, to promote the public understanding of the science supported by the Council.

Table 1 PROFILE OF THE PANEL SELECTED

	18-34	35-54	55+
MALES	A-level student, Antrim Programmer, W. Midlands Civil Servant, Surrey	Road-sweeper/ driver, Manchester Operating Manager, Bristol Airline Captain, Ayrshire	Retired Engineer, Leeds Consultant (self-employed) London
FEMALES	Factory Worker, Birmingham Engineering Student, Stockport Nurse, Newcastle under Lyme	Nurse Tutor, Hornchurch Caterer, London	Teacher (retired), Paisley Housewife, Somerset Marketing Consultant, Caterham

*NB Overall characteristics: Education: 8: O'levels or none; 8: A'levels/degree; Location: 8 urban; 8 country
16 selected out of 370 volunteers (60% males, 40% females).*

experts from the scientific community, government departments, regulatory bodies, industry, environmental groups, consumer groups, and other experts.

The lay panel faces a considerable challenge. It must work effectively through two preparatory weekends, and a final consensus conference. It must come to grips with ideas and issues most of which will be completely unfamiliar at the outset (those with a professional interest in/knowledge of the subject are deliberately excluded from the panel). Apart from putting relevant questions to experts during the preparatory weekends, the lay panel must also acquire the skills of working as a team, of interrogating experts, and of developing a report independently of any external advice, representing their genuine views on the subject selected. Throughout, the lay panel must be continually reminded that it is their view that counts, and that it is up to them to identify the key issues and the line of questioning.

The first briefing weekend is designed to teach the lay panel basic relevant science and inform them about the current state of play in the field. This covers not only the science but also the regulatory, ethical, moral and legal implications of the technology. In this particular case the briefing covered:-

- What is plant biotechnology?
- How does traditional biotechnology differ from modern techniques of genetic modification?
- What are the basic scientific principles and techniques involved?
- Main areas of application in plant biotechnology.
- Main moral, environmental, legal, social, political issues of public interest.
- The key players - policy-makers, regulators, interest groups, etc.

This initial briefing allows the panel to focus on what it sees as aspects that need 'fleshing out' during the second preparatory weekend. These are covered from different angles by the groups involved (e.g. industry, environmental groups, consumer groups), and the lay panel has more time to ask the experts questions, and understand and challenge the different viewpoints presented. After this additional briefing, the lay panel then has to develop the 5 to 10 'key' questions on which the consensus conference proper will be based. The panel decided that these should be seven, as listed in Box 2.

On each of the questions, the lay panel also selected four experts to cover the different perspectives on each topic or issue. These were taken from a candidate list of

Box 2 KEY QUESTIONS SELECTED BY THE LAY PANEL ON PLANT BIOTECHNOLOGY

- 1 What in your opinion are the key benefits and/or risks of modern plant biotechnology?
- 2 What possible impact could plant biotechnology have on the consumer?
- 3 What possible impact could plant biotechnology have on the environment?
- 4 In your view what moral problems are raised by plant biotechnology?
- 5 Why are patenting and intellectual property rights such a feature of plant biotechnology?
- 6 How can we ensure that plant biotechnology benefits rather than harms the developing world now and in the future?
- 7 What are the prospects for effective regulation of plant biotechnology?

The consensus conference proper was well publicised and open to all who wished to attend, and was structured as follows:-

Day One. Formal question and answer sessions between the experts and the lay panel.

Day Two.

Morning: discussion continues with the participation of the audience.

Afternoon: the lay panel retires to consider their report, completing it overnight (unaided and uninfluenced by experts, steering committee members etc.).

Day Three. The lay panel presents their report to the audience and press followed by comments from parliamentarians and others and an open discussion.

WHAT THE PANEL SAID

On the first question, the panel concluded² that :- "Plant biotechnology has a role to play in helping to provide the world with quality food, and non-food products from sustainable sources. While this may have benefits, there are also risks involved.

Potential benefits may include: plant varieties with higher yields; food with improved taste and nutritional values; reduced use of fertilisers, pesticides and seed dressings; longer shelf life; provision of a sustainable source of oils for food and fuel and biodegradable plastics; hardier plants; better use of set-aside land; and valuable compounds for use in medicine, flavourings and food additives.

2. The full panel statement can be obtained by Parliamentarians from POST (E: 2840), or directly from the Science Museum (Prof. Durant). Also available via Internet.

The potential risks include: the transfer of genes into related crops; disruption of the food chain; the creation of new weeds; infringement of plant breeders' rights; increased monoculture; emergence of resistant pests; and undermining of traditional economies.

Biotechnology could change the world, but in order for it to be used effectively - maximising benefits and minimising risks - we also need to adapt social and economic structures to take account of the changes it might produce."

On the second question, the panel felt that biotechnology offered the consumer several potential benefits: improved taste, better nutritional values, longer keeping properties, variety and consistency of quality. However, it equally recognised that the use of genetic modification was contentious, sometimes also on moral and ethical grounds (question 4). For instance, some people might object to the use of plant material which contained genes which had originated from animals, and meaningful labelling is clearly essential to allow vegetarians and people with religious objections to avoid products offensive to them. At the more general level, the panel felt that the public could only freely exercise its right to choose if it knows that products concerned have been genetically engineered. Other concerns expressed by the panel included the need to be alert to 'side-effects' of genetic modification. For instance, if medicines and vaccines are derived from plants, plant allergens should not be present. Equally, genetic alterations to food should not reduce nutrients.

From the consumer's perspective, the panel felt that the products currently reaching the market were more the result of researchers and producers creating a market for their products, rather than the market expressing a need or desire for them.

On the environment (question 3), the panel noted that the impacts of plant biotechnology on the environment are extremely difficult to predict, and this was reflected by disagreement among the experts and groups consulted. The panel attempted to take a balanced view by recognising that there were some environmental benefits envisaged from genetic modification of plants; for instance, pesticide-resistant plants or crops could reduce the amount of pesticides used, crops requiring less fertiliser would reduce the danger of excess seeping into river systems. On the other hand, the possibility of novel genes transferring to other species exists, raising the prospective of herbicide-resistant 'superweeds'. The panel felt there was a need for regular and widespread monitoring of genetically engineered crops after licences for general use have been issued, and felt that the ability to engineer changes at a rate faster than would occur in nature meant that it was not possible to anticipate problems that might show up over the longer term. The panel also noted that "society must increase

its knowledge and appreciation of environmentally-sustainable agricultural practices. Gene technology can assist in the process of preserving and enhancing biodiversity and susceptibility, or further the trend toward monoculture that delivers short-term benefits at long-term risk".

On patenting and intellectual property rights, the panel recognised that patents are necessary to recover the costs of research and development and that there was dispute over how far patents could cover living matter - particularly whether genes should be patentable. On this, the panel saw patenting rules being adapted to the advantage of multinational companies, and felt that since over-turning a patent is an expensive procedure it is important to ensure that patents are not granted which are too broad in scope.

Patenting can also bring into 'corporate ownership' material that originated from genes of native species or farmed varieties in the developing world. This required a balancing of the legitimate concerns of research companies with those of peasant farmers who maintain and protect the many varieties of crops that are essential for the preservation of biodiversity. The panel also felt that there should be more thought and international support towards guiding new technological advances to meet the social and economic needs of developing countries, and to encourage the use of appropriate technology, rather than trying to push engineered hybrids onto unsuspecting communities. The panel supported more widespread international funding for the bodies set up to do research appropriate to developing countries.

Finally, on the regulations, the panel concluded that regulatory control in the UK is amongst the most stringent, but that there was still room for improvement. They felt that there should be a greater separation of the roles of the regulator and the regulated (e.g. by excluding anyone with a commercial interest from the relevant regulatory bodies). The panel also felt that some form of international bonding and registration scheme should be introduced to indemnify against unforeseen consequences of releases of genetically modified plants. The panel felt that there should be more "public good" research "to maximise benefits to all rather than leave it to the private sector, whose interests will lie with the profits".

VIEWS ON THE PROCESS AND OUTCOME

In terms of the process, the experiment is generally seen as a success. Firstly, it proved possible to involve the necessary number of experts who were prepared to commit considerable time and effort to preparing briefing documents, and attending the briefing weekends and the consensus conference itself. Secondly, the sixteen panelists 'stayed the course', developed the

ability to work together as a team, and succeeded in agreeing a report in the very tight timescale allowed (on the afternoon, evening and night of the second day of the conference). Members of the panel reported that they had learnt a lot through the process; in some cases this had caused their views to change dramatically; in others it had merely reinforced already-held views.

The broader success of the conference, both in itself, and as a potential future model, depends on much wider considerations. As described above, the purpose of consensus conferences is two-fold - firstly, to encourage a wider debate within society on an issue; secondly, to provide better insight into 'informed public opinion'. The success of the first can be measured by press and media coverage; this was patchy and short-lived (and surprisingly sensational given the depth of the briefing) through newspapers and scientific magazines, with some interest from radio, but none from television. Because of the regional distribution of the lay panel, the national coverage of the conference itself was supplemented by local coverage of some of the individual panel members. The exercise has also been followed by more focused attempts to explore some of the issue raised - for instance, the Society for Chemical Industry is having a special meeting on the environmental and ethical aspects of agricultural biotechnology.

In terms of its relation to Parliament, the Danish model has some special characteristics. Denmark is a small country and relatively homogeneous culturally, and it is therefore more credible to see a consensus panel as broadly representative of the society as a whole. This, and the fact that the concept developed out of parliamentary interest in this form of technology assessment, means that there is a strong interest in the consensus conferences within the Parliament. As a result, parliamentary debates have followed consensus conference reports and sometimes pursued conference conclusions (one example being the objection by one panel to the use of genetic information in deciding insurance premiums; another being the outcome of a consensus conference on the future direction of Danish transport priorities).

The UK Parliament and its Select Committees have already addressed the issues raised in this conference on several occasions³. In addition, Ministers are advised by a number of expert bodies (e.g. the Advisory Committee on Releases to the Environment and the Advisory Committee on Genetic Modification). Few thus expect consensus conferences in the UK to have the close links to Parliament that they do in Denmark. Nevertheless, the exercise does give an insight into the kinds of concerns, fundamental principles and beliefs which are held by a very informed group of lay people.

As well as of potential interest to Parliamentarians, this may also be relevant to government regulators seeking to ensure that the structures they set up carry with them public credibility and support.

Views from the experts/ industry/ science community have been mixed. On the one hand, many have been impressed by the way in which the panel assimilated large amounts of detailed technical information. On the other hand some were disappointed that hypothetical 'disaster' scenarios which had been ruled out by objective scientific evidence, still featured in the panel's final document. There was also some surprise in some quarters that the panel remained sceptical about the benefits for the consumer likely to arise from plant biotechnology, and saw it more as an example of 'technology-push' rather than a response to genuine consumer benefits and needs. This may well be due to the perception that while many of the potential applications (e.g. crops for poor soils) were seen as important for society, practical applications so far (herbicide tolerance, fuller flavoured tomatoes) were seen as having little or no direct benefit to the consumer. Thus 14 of the 16 asked said they would eat a genetically modified tomato, but not necessarily buy one!

It is possible that a less rushed process, which gave the panel longer to explore the detail of issues, could have led to different judgements. On the other hand, the whole process is intended to identify those deeply held views which may or may not mesh with scientific 'objectivity'. It is by no means axiomatic that a better public understanding of science automatically translates to public support - a fact which companies and regulators alike need to take into account. Thus the scepticism emerging from the consensus process suggests that either dissemination of the appropriate information is flawed and not getting through, or perhaps that industry has not taken into account, as far as it could, the real needs of customers.

The consensus conference approach has thus been validated in the UK, although it can be costly (this 'prototype' cost £80,000 and, if all the time of contributors were included, much more). It does however provide a means of extending and furthering public debate on issues - for example, the approach could have a role to play in developing and focusing the public debate suggested by the Transport Secretary on the future direction of transport policy in the UK.

3. For example, the House of Lords Science and Technology Committee reviewed biotechnology regulation in 1993.