A Critical Discourse Analysis of the 'GM Nation?' public debate

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Abstract

The increasing application of science and technology, while having reduced uncertainties and threats to mankind (like impacts of natural disasters), has also created new uncertainties in terms of risks and ethics. Environmental risks from new technological innovations and ethical questions raised by developments in genetics are the defining uncertainties associated with technology in our *risk society*. Also the current socio-economic order is a knowledge-driven one. This 'knowledge-based' society also implies that it is a discourse-driven order, with language playing a more critical role in contemporary socio-economic changes than it has in the past. Policy makers around the world, in response to these new challenges to technological innovations thrown up by this *risk society*, have started moving away from expert-based governance of science and technology and towards governance based on transparency, public dialogue and democratic engagement. It is within this context that this research analyses, using a Critical Discourse Analysis (CDA) perspective, the largest ever public engagement exercise conducted in the UK – the 2003 'GM Nation?' public debate on the possible commercialisation of genetically modified crops in the UK. The primary aim of conducting this piece of research is to have a better and deeper understanding of the process of engaging the public in policy-making on technological issues. This includes analysing the aspiration to normative democratic ideals of public-engagement exercises and the role of the public in technological transition. The aspect of relations of power and domination between participants in public engagement exercises has been largely neglected in the empirical literature and this research aims at exploring these aspects in detail through the use of CDA as a research method. The findings of this research point to the ideological influence of the discourse of the market or, more generally, the neo-liberal discourse in the contemporary socio-economic environment in the UK. This research concludes that the agriculture regime in the UK continues to operate under the selection pressure of the economic discourse despite the emergence of niche counter discourses of sustainability in recent years.

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Chapter 1 – Introduction

1.1 Introduction

We are at this moment in time, by most accounts, going through possibly the worst global economic crisis in modern history since the 1930s. What started off as a mortgage crisis in the USA soon snowballed into global 'credit crunch' leading to an economic recession in much of the developed world and slowing growth in many fast-developing countries. This recession is being seen as a game-changer as it threatens to alter the politico-economic balance of power in the world.

The recession was preceded by dramatic increases in world food prices in 2007-2008 causing a global crisis resulting in social and political unrest in many parts of the world. There has been considerable speculation and debate on causes for this rise in food prices. The Food and Agriculture Organisation of the United Nations (FAO) identified a number of reasons for the sudden surge in food prices. These included low level of cereal stocks in the world, crop failures in major exporting countries, rising oil prices and rapidly growing demand for agricultural commodities to be used in biofuels (Clarke, 2009). In response to this increase in prices of food commodities there have been increasing demands in the UK to resume the debate on GM foods as a possible solution to the current problems. After the 2003 'GM Nation?' public debate on the possible commercialisation of GM crops in the UK there had been a moratorium in place, with some select varieties having been permitted for farm-scale testing. Since then the issue of GM foods had been largely off the headlines until the food crisis of 2007-2008. And then in October 2009 the Royal Society in a report recommended the growing of GM crops in the UK to prevent a catastrophic food crisis by 2050, thus bringing GM foods back on the national agenda (Mendick and Sawer, 2009).

Current Public Dialogue on GM

In November 2009, the Food Standards Agency (FSA) set up an independent steering group to shape and manage a fresh public dialogue on food and the use of genetic modification. The aim of this public dialogue is "*to help ensure that future government and non-governmental policy towards the availability and production of food which involves the use of genetic modification is informed by a thorough understanding of the public's principal concerns and priorities in respect of such food*" (FSA, 2009).

However, recently this programme of public dialogue has been mired in controversy with the resignation of Dr. Helen Wallace and Prof. Brian Wynne from the steering group in quick succession. The reasons given by Prof. Wynne for his decision to quit the steering group are instructive in the context of this current research. One such point he has raised is about how, according to him, the public dialogue programme as it stands contradicts the principles in the Government's own *Sciencewise* guidelines. The *Sciencewise* document is a set of guiding principles for public dialogue on science and technology related issues. These guidelines have been developed by the Government in collaboration with policy makers, practitioners, academics, and representatives of the scientific and business communities working in the areas of science policy and public engagement. The purpose, the document sets out, is "*to enable more informed policy in science and technology and so build confidence in decision-making related to the undertaking, development and overall governance of science and technology; to build on the public's generally positive views on science – and to both maximise the opportunities offered by new areas of science and technology and minimise potential downsides*" (ERC, 2009).

The guiding principles for public dialogue in science and technology set out in the document are:

- The conditions leading to the dialogue process should be conducive to the best outcomes (context)
- The range of issues and policy opinions covered in the dialogue should reflect the participants' interests (scope)
- The dialogue process itself should represent best practice in design and execution (delivery)
- The outputs of dialogue should deliver the desired outcomes (impact)
- The process should be shown to be robust and contributes to learning (evaluation)

In his explanation of the reasons for his resignation from the steering group, Prof. Wynne has raised issue with the statement made by Mr. Jeff Rooker, the Chair of the FSA that "*the public is anti-science*". This is clearly contradictory to the position set out in the Guiding Principles document. According to Wynne, this has implications for the scope and framing of the public debate. From the "public is anti-science" attitude, it follows that the GM issue is viewed as a "scientific issue". However, this would mean that those perspectives on GM which approach the issue from a wider framework and even claim that the 'sound science'

perspective cannot "*accommodate, understand and assess some of the key issues over global food and its food chains, and their resilience, sustainability and justice*" (Wynne, 2010). Prof. Wynne has also taken exception to Mr. Rooker's assertion that the dialogue is about GM. Wynne counters that this position contradicts the Guiding Principles related to framing of public debate, in particular this statement: "*Where appropriate we will work with participants to agree framings that focus on broad questions and a range of alternatives to encourage more in-depth discussion. For example, we might start by asking, 'How do we provide for our energy needs in the future?' rather than starting by asking, 'Should we build new nuclear power stations?'*" (FSA, 2009).

It is evident from the above discussion that the use of language and the discourse is a key element in controversies surrounding science and technology. It is in this context that this research work seeks to re-examine the last public debate on GM foods in the UK, the 2003 'GM Nation?' debate, looking at the discourse of Genetic Modification of foods with emphasis on the issue of the democratisation of policy decision-making on controversial technologies. In doing so, it aims also to inform the conduct of future public debates on other controversial technologies such as nuclear power and nanotechnology and also give valuable insights into science-society relations in general.

This chapter gives a brief introduction to the research work. A brief background to the various disciplines which inform this work is laid, including a background to the literature on STS, a brief history of the development of biotechnology, public engagement and critical discourse analysis. The aims of the research are detailed out and also a description of how the research was carried out is given.

1.2   A History of Biotechnology

The term 'biotechnology' was coined by Hungarian engineer Karl Ereky in 1919. Biotechnology is the application of scientific and engineering principles to the processing of materials by biological agents to provide goods and services (Bud, 1993). It refers, generally, to the application of a wide range of scientific techniques to the modification and improvement of plants, animals, and microorganisms that are of economic importance

(Persley and Siedow, 2002). There are many different ways to define the term, and Chawla (2002) identifies three appropriate definitions: (i) The application of science and engineering in the direct and indirect use of living organisms, or parts or products of living organisms, in their natural or modified form. (ii) Biotechnology means any technological application that uses biological system, living organism or derivatives thereof to make or modify products or processes for specific use (Convention on Biodiversity). (iii) The controlled use of biological agents such as microorganisms or cellular components for beneficial use (US National Science Foundation).

Mankind, since the beginning, has sought to maximise the quantity and quality of its crops and at the same time minimise the labour needed to produce them. For example, the merits of crop rotation have always been known to man. But it was not until the time of the industrial revolution at the beginning of the second half of the 18th century that scientific principles of breeding and crop management began to be practiced. The initial application of biotechnology in agriculture involved selective breeding to bring about an exchange of genetic material between two parent plants to produce offspring having desired traits such as increased yields, disease resistance, and enhanced product quality. At the turn of the 20th century, genetics – the science of heredity – was born as the principles of Gregor Mendel were rediscovered. A priest and a scientist, Gregor Mendel had studied the inheritance of certain traits in pea plants, and showed how the inheritance of these traits followed particular laws. Later, Thomas Hunt Morgan and his associates at Columbia University in New York City developed the so-called classical theory of the gene, locating the units of heredity on the chromosomes in the cells of all organisms. However, the real major breakthrough in the field of genetics came in 1953 when James Watson and Francis Crick discovered the double helical structure DNA (Deoxyribonucleic acid). This led to the development of the field of molecular biology. Agricultural biotechnology, apart from a brief moratorium in the early 70s in response to risks posed by recombinant bacteria, has seen rapid and exponential growth.

1.3   Public Engagement in Science and Technology

The contemporary discourse of the governance of science and technology is unstable and contradictory, combining as it does the 'new' discourse of public engagement and openness along with the 'old' language of science-led innovation and sound science (Irwin, 2006). The idea of public dialogue and engagement has been in vogue over the past decade

internationally, and particularly in Europe, as a result of an apparent legitimation crisis in the governance of science and technology. The assumption is that increased public participation in decisions over science and technological development will help eliminate, or at least reduce, any subsequent opposition to technological change by achieving broad consensus; i.e. resulting in 'socially robust' technologies. This change in the discourse from an expert-based governance of science and technology to a governance based on public dialogue, transparency and democratic engagement has partially been influenced by sustained criticism of the 'deficit theory' (for example (Irwin and Wynne, 1996)). The following excerpt is an illustration of how this new discourse has entered policy circles:

"We recommend.... that 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" (House of Lords Select Committee on Science and Technology, 2000: 43).

However, as Irwin (2006) argues, the current proliferation of public engagement exercises has, generally, not been accompanied by a simultaneous change in the attitude of policy makers towards the status of expert knowledge. Rather, these democratic forms of influence over science and technology policy seem to be undermined by the 'dominant culture' which reinvents itself in the face of sustained critique and public mistrust (Wynne, 2002). Thus the limitations of these new public engagement initiatives are more a matter of the rigidity of cultural and epistemological assumptions about science-led progress rather than the mechanisms of the way these public engagement exercises are organised (Irwin, 2006). As a consequence, the current environment of science and technology governance is marked by a competitive struggle between the 'old' discourse of public deficit and the 'new' discourse of democracy and public engagement. These struggles are played out in debates on controversial technologies such as nuclear power and GM Foods.

1.4   Critical Discourse Analysis

Discourse is a very difficult concept to pin down mainly because it has so many conflicting and overlapping definitions from a range of theoretical and disciplinary standpoints. In linguistics, the term 'discourse' is used to refer to extended samples of either spoken or written language. 'Discourse' is also used for different types of language used in different

sorts of social situation such as a 'newspaper discourse' or a 'classroom discourse'. For the purpose of this research, the concept of discourse as applied to social theory and analysis is relevant. The work of Michael Foucault has been one of the most influential in this area.[1] 'Discourse' here refers to the different ways of structuring areas of knowledge and social practice. Thus, for example, in health care the discourse of 'medical science' is the dominant one and is constantly in a struggle with other 'alternative' and contrasting ways of understanding the practice of health care, like the discourses of homeopathy and acupuncture.

The current socio-economic order is knowledge-driven and is more commonly referred to as the knowledge-based society. Being knowledge-driven implies that it is also discourse driven with language playing a more central role in contemporary socio-economic changes than it has done in the past. Hence, a discourse based study of the current dynamics of science-society relations is important and justified.

Critical Discourse Analysis (CDA) aims to study the discursive reproduction of power abuse. CDA is interested in the critical study of social issues, problems, social inequality and domination. A CDA scholar is not 'neutral' but rather favours dominated groups in society. A discourse analysis can be defined as 'critical' if they satisfy one or more of the following criteria:

- Relations of domination are studied primarily from the perspective of and in the interest of the oppressed/dominated social group;
- The experiences of the members of the oppressed/dominated groups are also used as evidence to evaluate dominant discourse;
- It can be shown that the discursive actions of the dominant group are illegitimate;
- Viable alternatives to the dominant discourses can be formulated that are consistent with the interests of the dominated groups (Dijk, 2008).

The primary concern of this piece of research work is the investigation of issues of power exercised by dominant groups in public debates on controversial technologies in general, and GM foods in particular. Hence, this work is placed under the domain of critical studies and CDA has been found to be the most appropriate theory/method to inform and facilitate the research.

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[1] Michael Foucault's work has been reviewed in the Literature Review chapter.

1.5　　Aims of the research

This research set out to conduct a Critical Discourse Analysis of the 2003 nation-wide public debate held in the UK on the possible commercialisation of GM crops in the country. The debate was called 'GM Nation?' public debate and ran for six weeks from June 3rd to July 18th 2003. Through this analysis this research aimed to achieve the following:

1) To have a better understanding of the process of engaging the public in decision-making on issues relating to science and technology.

2) To contribute to the general debate on science-society relations through the particular analysis of relationships of power and dominance amongst the participants in the 'GM Nation?' public debate.

3) To make a theoretical contribution to the literature on public engagement, technological transformation and, Critical Discourse Analysis.

1.6　　The Research Process

The research started with the general aim of analysing the GM foods debate in the UK in the context of science-society relations and to understand how the current state of our knowledge of the innovation processes and technological transformation could give insights into the debate. After an initial review of the literature on public engagement exercises and public understanding of science in general and the literature, it was decided that incorporating critical discourse analysis into the research could help explore issues of power and domination in public debates on controversial technologies, something which had been largely ignored in previous studies. After the initial theoretical framework was in place, a detailed review of the literature in the following three broad areas was conducted: innovation systems and technological transformation, public engagement exercises and public understanding of science, and critical discourse analysis. Based on this review of the literature, the research aims were further refined to incorporate the gaps identified in the literature. The data collection stage ran simultaneously with the literature review and was sourced mainly from the official 'GM Nation?' website.[2] Two sets of data were obtained; the first set consisted of emails/comments posted on the website as part of the general

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[2] The website is now defunct and no longer exists.

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debate and the second set was made up of the transcripts of the six Tier-1 public meetings which were organised in various cities throughout the country during the period of the debate. Analysis of the textual data was then done using the methods suggested by Norman Fairclough for CDA (2003). All the analysis was done manually by going through every word of the textual data, although a minimal use of the software NVivo was made for some help in locating themes. Once the analysis was complete, the results were interpreted and discussed in the context of the aims of the research.

This thesis is divided into seven chapters. Chapter 2 reviews the current state of literature in the areas of innovation systems and technological transformation, public engagement and critical discourse analysis. The chapter also places the research work at the confluence of these three disparate disciplines. Chapter 3 details the methodology used and outlines the epistemological underpinnings of the research work. Chapter 4 is devoted to the description of the case-study: the 2003 'GM Nation?' public debate in the UK on the possible commercialisation of GM crops. This is followed by the critical discourse analysis of the data in Chapter 5. The data includes emails and comments posted on the official 'GM Nation?' website and the transcripts of 6 Tier-1 public meetings that took place in various cities around the country. The results of the analysis are interpreted in Chapter 6 and I have concluding remarks in Chapter 7.

1.7   Conclusion

This chapter introduced the research topic and its general aims and objectives. This research derives its theoretical basis from the broader discipline of Science and Technology Studies (STS) or Social Construction of Technology (SCOT). Consequently, this chapter was devoted substantially to describing the history and development of technological understanding, ranging from technological determinism to interpretive flexibility. This chapter has also given a brief history of plant biotechnology and initial, basic introductions to public engagement and critical discourse analysis. In the following chapter, a complete and detailed review of the literature on these varied disciplines is provided.

Chapter 2 Literature Review

2.1 Introduction

As was outlined in the previous chapter, the broad objective of this research is to study and analyse, using a critical discourse analytical perspective, the role of public participation in technological innovation, with particular reference to plant biotechnology (GM crops). This objective covers issues relating to democratic theory, the agential aspects of technology, issues of power and hegemony and the role of language in constructing our social reality. As such, the literature on the topic has a grounding in a range of disparate disciplines and 'grand' theories including Science and Technology Studies (STS) and Public Understanding of Science (PUS). Researchers have only recently started showing interest in the capability of discourse theories to enhance our understanding on the issue of democratisation of technological innovation (Henderson and Weaver, 2003, Rogers-Hayden and Hindmarsh, 2002).

This chapter gives a detailed review of the two theoretical threads involved with this research: public engagement in science and technology, and discourse theory. The review of these largely disparate subject areas has a focus both on the theoretical as well as empirical literature. In the final sections of this chapter, the literature involving the various combinations between the three threads is reviewed and the gap in the literature, which this particular intends to fill, is identified.

2.1.1 Literature Search

The initial search for the relevant literature was conducted using the following process:

A search for the relevant literature was done using a combination of keywords including *'innovation', 'technolog*', 'engagement', 'governance'* and *'democr*'*.

The database used was the Social Sciences Citation Index for the years 1970- present.

The following combinations of keywords were used:

Set 1. innovation AND engagement

Set 2. innovation AND governance

Set 3. innovation AND democr*

Set 4. technolog* AND engagement

Set 5. technolog* AND governance

Set 6. technolog* AND democr*

The table below gives the results of the search using these keyword combinations

Keyword Combination	Total No of records
innovation AND engagement	120
innovation AND governance	559
innovation AND democr*	245
technolog* AND engagement	443
technolog* AND governance	959
technolog* AND democr*	1005

Table 2. 1 - Keyword Combination

After accounting for duplication a total of **2,857** articles were obtained from the SSCI database.

An initial screening of these articles revealed that many of these articles were not related to the subject matter of this review and hence in order to keep the data to manageable levels and to obtain the most relevant articles, it was decided to limit the search to the following journals which were found to be the most relevant for the subject topic of the literature review:

1. Technological Forecasting and Social Change

2. Risk Analysis

3. Minerva

4. Public Understanding of Science

5. Science Technology & Human Values

6. Social Studies of Science

7. Technology Analysis & Strategic Management

8. New Genetics and Society

9. Technology in Society

10. Science Communication

11. Research Policy.

The search was repeated using the same combination of keywords for articles in the above journals. The table below gives the results of this search

Keyword Combination	Total Number of records
innovation AND engagement	9
innovation AND governance	41
innovation AND democr*	8
technolog* AND engagement	42
technolog* AND governance	67
technolog* AND democr*	89

Table 2. 2 Keyword Combination

After accounting for duplication, a total of **192** unique articles were obtained.

The distribution of the articles across the different journals was as follows:

Name of the Journal	Total number of records
Research Policy	40
Science Technology & Human Values	39
Technological Forecasting and Social Change	24
Social Studies of Science	18
Technology Analysis & Strategic Management	18
Technology in Society	15
Public Understanding of Science	14
Minerva	8
New Genetics & Society	7
Science Communication	7
Risk Analysis	2

Table 2. 3 Distribution of articles across journals

These 192 articles were used as the initial base for analysing the literature on the democratisation of technological innovation. However, not all articles formed part of the review. Also many articles which weren't part of this initial base also formed part of the review. These articles were largely sourced from references made in the articles from the initial base.

2.2   Public Engagement

2.2.1   *The theoretical literature on technological citizenship, democracy and governance*

The literature in this category consists mainly of works from American authors like Philip Frankenfeld, Frank Laird, Andrew Zimmerman and Jesse Tatum. Frankenfeld (1992)

introduces the concept of technological citizenship as a status for individuals consisting of rights and obligations within the realm of impact of the technology and enforced by the state. These rights and obligations of technological citizenship compose a *'a new social contract of complexity'*. Wording his article something like a manifesto, Frankenfeld envisages his model of technological citizenship as "single, concise, normatively explicit model of how we should govern complex hazards and why" (p459). Technological citizenship questions the validity of the acceptance of experts' statements and actions by laypersons. He distinguishes between *valid* public acceptance which is deep and informed, subjective, voluntary, rigorous and rich, and *invalid* public acceptance which involves thoughtless deference and blind trust. He defines technological citizenship as

"equal membership, participation, and standing or status of persons as agents and subjects within a realm of common impact to at least one 'technology'…under a definable state that governs this technology and its impacts. Such status is defined by a set of binding, equal rights and obligations that are intended to reconcile technology's unlimited potentials for human benefit and ennoblement with its unlimited potentials for human injury, tyrannisation, and degradation. Such status, rights, and obligations are thus intended to reconcile democracy for lay subjects of technology's impacts with the right of innovators to innovate" (p462).

The overarching goals of technological citizenship are 1) *autonomy* 2) *dignity* and 3) and *assimilation* of the people as opposed to *alienation* from their fellow subjects and built environments despite complexity. Frankenfeld then enumerates the rights and obligations involved with technological citizenship. The rights include 1) the right of the people within the technological sphere of impact to simplified, understandable information about the technologies surrounding them; 2) the right of the people within the technological sphere of impact to participate in decision-making on those technologies including the approval and vetoing of the introduction, management, detection and remedy of complex hazards; 3) the right to safeguards of *informed consent* which entails the approval of any new technology should be based on the extent to which the workings of the technology are understood or comprehended by a specified percentage of the relevant scientific community or lay public. Thus any technology deemed incomprehensible would not be introduced; and 4) the right to absolute limits on levels of endangerment which is respect for the laypersons' safety and thus for their dignity. This could be concretised through a cap on the absolute number of

people who could be injured or killed in a worst-case accident of any given harmful technology, irrespective of the probability of the accident occurring.

The obligations include 1) the obligation to learn and use knowledge so as to form opinions about the complex hazards autonomously and thus to vote and make decisions on them autonomously; 2) the obligation to participate in any technology-governing process that the state provides; and 3) the obligation to exercise technological civic literacy, civic virtue and judgement which involves thinking about the consequences of one's actions, the interdependence of people, the potency of consequences that technology brings, and the implications of this interdependence for moral responsibility to avoid harm (Frankenfeld, 1992).

Frank Laird (1993) develops normative democratic criteria for evaluating public participatory mechanisms on technological issues through a discussion of two different traditions of democratic theory, *direct participation* and *pluralism*. Both these theories view democracy as much more than just voting for officials and leaving the rest to elite politics and the administrative state. According to both these theories, public participation is meaningful only when it enables citizens to better understand their interests and how they might influence decisions that have an impact on their interests and when it enables citizens to have some sort of substantive influence over actual policy outcomes. However, there are some deep differences between these theories which arise out of the way they view people and the effects of political activity on them. The *pluralists* are concerned with the actions of groups whereas *direct participationists* are concerned with individuals. For *pluralists*, collective actions by groups are more effective in promoting individual interests shared by the group than individual actions. *Direct participationists* on the other hand insist on empowering the individual. Thus it is not enough to join an organisation. People must participate directly as individuals. Also *pluralism* focuses on the outcomes of participation, whereas *direct participation* is concerned both with outcomes and the effects that the participatory activity has on individuals in terms of their increased sensitivity to the linkages between their interests and the others and the development of a sense of justice arising out of the act of participation. Thus, democracy enables people to become fully developed citizens. *Pluralism* on the other hand insists on outcomes of the participation activity undertaken by interest groups on behalf of individuals as well as group learning. This might mean that contesting groups can hire experts and lawyers to increase the quality of participation to ensure that the group's interests are an important factor in policy outcomes. For

direct participation the act of quality participation is an end in itself, because of the opportunity for positive educational and psychological effects on individuals.

Based on the commonalities of these two theories Laird puts forward his suggestion for an effective mechanism of participation in science and technological policy issues, which he calls *participatory analysis*. *Participatory analysis* is a broad category of participatory mechanisms that emphasise the learning criterion of the democratic theories along with the other criteria. At a practical level, this can be implemented through groups or people engaged in participation understanding the different interpretations that one can draw from the facts and trying to think of ways to choose among those interpretations. More importantly, analysing a problem means being able to challenge the formulation of the problem itself, that is, for people to decide for themselves what the most important questions are. As policy decisions on technological issues often involve specialised, esoteric knowledge, the dependence on experts should be balanced by the participants retaining for themselves the analytical prerogative of determining which questions to ask and how to ask them. *Participatory analysis* provides a mechanism for linking the two goals of rational policy-making and democratic understanding (Laird, 1993).

Andrew Zimmerman argues that simply increasing the opportunities for public participation in technological decision-making won't produce durable democratic governance (Zimmerman, 1995). There are no guarantees that citizens participating in governance do so as autonomous individuals. Apart from the constraints imposed by the socio-political structures and the socio-technical order which prevent individuals from attaining *personal* autonomy, the underlying values and principles according to which individuals make choices - the *moral* autonomy, also affects the democratic*ness* of governance. Zimmerman suggests macro and micro level concurrent strategies to create situations for authentic opportunities for technological citizenship. At the macro-level this include 1) *articulating a more democratic vision of technology* which involves the development of an ethic of technological governance which conceives of technology as subordinate to and in the service of human interests; 2) *designating meta-technologies as public trusts*. Meta-technologies are those systems which are essential to the functioning of the prevailing socio-technical order. Donald A. Schon (1971) has characterised these meta-technologies as having the power to *"facilitate the processes of technological innovation and diffusion, and thereby to increase society's leverage on technological change itself"* (Schon, 1971).

These are generally infrastructure technologies like energy systems, transportation systems and telecommunications systems. These meta-technologies should be formally recognised as critical to the public interest and well-being by conferring upon them *public trust* status. The advantage of this is that the institutions empowered to control and manage such assets are publicly accountable for the social consequences of their decisions and actions; and 3) *the reconstruction of technological systems* in a way that technological systems which are deemed as antithetical to democratic principles and practices could be held in violation of the public trust and dismantled and reconstructed. The mechanisms could include various forms of public participatory exercises.

At the micro-level, Zimmerman suggests strategies for *civic education* to stimulate the moral development of people so that they can participate in technological governance as *morally autonomous* individuals. This could be implemented through encouraging participatory role-playing amongst adults. Borrowing from Kohlberg (1980), Zimmerman advocates that by forcing one to step outside one's usual roles, role playing leads to a better appreciation of one's own reality and of the manner in which it can impede one's capacity to develop autonomy. The aim of *civic education* according to Kohlberg is

"…the development of a person with the structures of understanding and motivation to participate in society in the direction of making it better or more just society. This aim requires experience of active social participation as well as the learning of analytic understandings, of government, and the moral discussion of legal and political issues…. My own theory argues…that if sociomoral development is the aim of social education, the central means of social education is the creation of opportunities and experiences for social role-taking and participation" (Kohlberg, 1980).

2.2.2 *The literature on public engagement exercises*

A number of procedures through which the public could be engaged in consultation on technological issues, have been identified in the literature. Gene Rowe and Lynn Frewer, for example, describe eight such procedures, including Referenda, Public hearings/inquiries, Public opinion surveys, Negotiated rule making, Consensus conference, Citizens' jury panel, Citizen/public advisory committee and focus groups (Rowe and Frewer, 2000). Renn et al. (1995) distinguish between three broad classes of citizen partici-

pation: genuine *deliberative* methods that allow for fair and competent debate and discussion between all parties such as consensus conferences, citizen juries, and planning cells; traditional *consultation methods*, including public meetings, surveys, focus groups, and mediation, where there is little or no extended debate; and finally *referenda* in which people do have democratic power, but that are not generally deliberative in nature (Renn et al., 1995). Which of these, one might ask, is the most effective method of public engagement? A corollary to this would be what does one mean by *effectiveness*? What are the criteria that need to be applied for measuring the *effectiveness* of any particular method or procedure of public participation? Rowe and Frewer, on their part, develop a set of criteria based on *public acceptance* of a procedure and on the *effective* construction and implementation of a procedure. These criteria are:

Acceptance criteria

i) *Representativeness:* The public participants should comprise a broadly representative sample of the population of the affected public.

ii) *Independence:* The participation process should be conducted in an independent, unbiased way.

iii) *Early involvement:* The public should be involved as early as possible in the process.

iv) *Influence on policy:* The output of the procedure should have a genuine impact on policy.

v) *Transparency:* The process should be transparent so that the public can see what is going on and how the decisions are being made.

Process criteria

vi) *Resource accessibility:* Public participants should have access to the appropriate resources to enable them to successfully participate in the exercise.

vii) *Task definition:* The nature and scope of the participation task should be clearly defined.

viii)   *Structured decision making:* The participation exercise should use appropriate mechanisms for structuring and displaying the decision-making process.

ix)   *Cost effectiveness:* The procedure should be cost-effective (Rowe and Frewer, 2000)

As is clear from the above, the five acceptance criteria are related to the *'democraticness'* of the procedure. These criteria can be supplemented by the ones advocated by the *'deliberative democracy'* theorists. The shift in technology policy-making from the *'deficit-model'* to more democratic approaches has found a theoretical ally in the deliberative models of democracy originating from the works of Jurgen Habermas and John Rawls (Elam and Bertilsson, 2003). Magnan (2006), for example, has subjected the Canadian biotechnology debate to the test of the Habermasian public sphere and found it wanting (Magnan, 2006). As Durant (1999) outlines, *"The ideals of equality between scientists and non-scientists and of informed public debate as the preconditions for forging socially sustainable public policies need to be translated into new processes of deliberative democracy"* (p317). (Benhabib, 1966)describes the features of the Habermasian model in the following way:

1. Participation in such deliberation is governed by the norms of equality and symmetry; all have the same chance to initiate speech acts, to question, interrogate, and to open debate;

2. All have the right to question the assigned topics of conversation;

3. All have the right to initiate reflexive arguments about the rules of the discourse procedure and the way in which they are applied or carried out. There are no prima facie rules limiting the agenda or the conversation, nor the identity of the participants, as long as each excluded person or group can justifiably show they are relevantly affected by the proposed norm under question (p70).

The literature on Constructive Technology Assessment (CTA) also provides with more or less similar criteria for the *democraticness* of any public engagement exercise. These are *representativeness; the balancing of a variety of interests; early involvement at an early*

stage; the influence of outcomes on policy; legitimacy of the process; openness to and capacity for criticism of values; accountability and responsibility for decisions made and their consequences; ease of access to resources; control over framing of agenda and over the definition of objectives; and the cost-effectiveness of participatory methods used (Genus, 2006)

The following section reviews the literature on the *democraticness* of some of the public engagement exercises.

On the *representativeness* of the public engagement exercise

In terms of the representativeness of a public engagement exercise, Pidgeon et al. (2005) analysed the findings of the open questionnaire data on participants' attitudes towards risk and benefit of GM Food/Crops from the 'GM Nation?' debate in the UK. They conclude that the self-selecting sample of the 'GM Nation?' open questionnaire was not representative of the general UK population. It was clear that the self-selecting participants were engaged individuals with strong views on the issue, what Gaskell and Bauer (2001) term as *'issue publics'*. But in terms of participatory democracy, the engaged public has a legitimate right to contribute in any public policy debate (Pidgeon et al., 2005). Similarly, Irwin (2006) expresses concern over the *representativeness* of the 'GM Nation?' debate as it was felt by many, especially those with favourable attitudes towards GM Food, that the debate had been *'captured'* by special interest groups or those with fixed opinions.' This, despite the special measures taken by the debate organisers to avoid the debate being dominated by familiar stakeholders (Irwin, 2006).

Einsiedel and Eastlick (2000) too are aware of the need to meet the representativeness criteria to realise the conditions for ideal deliberation, when they evaluate the first Canadian consensus conference on food biotechnology (Einsiedel and Eastlick, 2000).

Goven (2003) in comparing the New Zealand consensus conference in 1996 and 1999 on biotechnology with the Danish template, identifies shortcomings in terms of the various issues being represented in the expert panel convened for those consensus conferences. In the attempt to constitute a well-represented expert panel, the organisers enlisted an Anglican priest to represent the ethical viewpoint. However, Goven argues, the involvement of

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the priest, a former director of plant research at the Department of Science and Industrial Research, hindered rather than facilitated the organisation of a well-represented consensus conference (Goven, 2003)

On the framing of the issues

One of the key points of contestation in biotechnology debates has been the framing of the engagement exercise itself. How have the public debates fared in enabling participants to question the assumptions about science, technology and society around which the particular engagement exercise was carried out? Tee Rogers-Hayden and Richard Hindmarsh view New Zealand's Royal Commission on Genetic Modification or RCGM as having been working within a hegemonic social context based on modernist knowledge/power systems and forms of reasoning. This modernist context helped to serve as a frame of reference for the various value positions in the debate. This seemed to favour the genetic engineering interests at the expense of the anti-GM environmental groups whose worldviews based on more holistic approaches differed from that of the RCGM's organisers. Thus, the environmental groups found it difficult to put forth their views and then have them considered within the narrowly defined frame (Rogers-Hayden and Hindmarsh, 2002).

When the Canadian Biotechnology Advisory Committee (CBAC) drafted a 'Consultation Document' identifying the key areas of concern in the regulation of GM Food in order to frame the public debate, it resulted in the refusal of more than 50 NGOs from participating in subsequent 'stakeholder consultations'. The document was criticised for adopting the *regulation* of GM Food as the central issue, neglecting the possible framing of whether GM foods should be commercially grown at all. Thus those who questioned the desirability of growing GM foods couldn't be accommodated within such a framing (Magnan, 2006). Les Levidow talks of how the problem definition itself then provides the key to the solution. Defining the problems of intensive monoculture in terms of genetic defects forecloses any other possible remedies apart from those in terms of molecular biology. The various participatory exercises, says Levidow, thus have a double edged role. At one level, they provide a wider audience for public debate, but on another level they set the terms of the debate within a neo-liberal risk-benefit framework. *"'Harm' is defined as any effect that might jeopardise the agrochemical control of weeds. ...such an undesirable effect is deemed acceptable if it can be mitigated through the benefits of further technological progress. Thus, safety decisions internalise the genetic-pesticide treadmill"* (p224). Alternative definitions of the problem are neglected (Levidow, 1998).

Across Europe, in most science and technology public deliberations, the framing of the issues is typically decided by a small coterie of officials, organisations and 'experts' (Hagendijk and Irwin, 2006). The dilemma policy-makers face is that the more open-ended a debate is (i.e. where the policy-makers have less influence on the framing or at arm's-length), the more likely that the debate will be out of tune with official agendas. If less open-ended, there may be charges of manipulation and narrow definition of the debate (Hagendijk, 2004). *"In both cases, participants may become more familiar with science, but the public may become more alienated from politics"* (p47). However, as can be seen from the above review, the public consultation exercises tend to be far less open-ended, foreclosing possible alternative framings of the issues, thereby becoming *'highly sophisticated exercise(s) in social research'* (Irwin, 2001) or *'manipulated publicity'* (Magnan, 2006). The ghost of the Enlightenment looms large in these public consultations as *"the modernist belief in science-led progress is not being rejected…, but is being augmented with an assertion of the essential compatibility of…science and democracy"* (Irwin, 2006).

Influence on policy

Another issue, briefly touched in the previous section, is the impact of the public deliberation exercise on actual policy. One of the categories along which Einsiedel et al. (2001) measure the social and political impact of consensus conferences is their influence on policy decisions. In Denmark, consensus conferences are part of the policy-making apparatus of the parliament and lay panel findings have provided an important base for policy directions (Einsiedel et al., 2001). The timings of these conferences are also synchronised with the parliamentary affairs schedule so as to extract the maximum possible political impact. The same cannot be said, however, for consensus conferences held in other national contexts, even though Einsedel at al. (2001) are of the opinion that the consensus conference model 'travels well'. Joanna Goven, for example, points to the ad-hoc nature of consensus conferences in most countries other than Denmark (Goven, 2003). Due to their un-institutionalised nature, the public debates are unlikely to have any major policy implications. Alan Irwin in his analysis of the 'GM Nation?' debate observes that the 'arm's length' nature of the relationship between the government and the organisers of the debate, though giving the debate a semblance of independence, also gave rise to doubts about the status of the eventual conclusions of the debate. The fact that the UK Government offered no guarantee during the exercise that it would act upon the report, raised questions about

the practical value of such exercises from the public perspective (Irwin, 2006). Also, some have indicated that the rise in public deliberation exercises might have more to do with international competitiveness than a desire to shape policy based on the results of such exercises. The assumption here is that engaging the public will assist or at least smooth the process (Hagendijk and Irwin, 2006).

2.2.3   *Beneath the make-up*

The shift in the governance of science and technology towards more democratic processes has been necessitated due to a growing lack of trust among the public towards governments, particularly when dealing with scientific uncertainty. In the UK context, the BSE crisis in the 1990s accentuated this growing rift between public trust and scientific governance. There was growing recognition among policy makers on the need for transparency and a more inclusive approach for public dialogue on technological issues. But, asks (Irwin, 2001), does this new found enthusiasm for public dialogue *"...imply that public knowledges are given the same status as scientific understandings – or instead that familiar deficit notions of an uninformed public are recycled?"* (p3). The overwhelming reply from the empirical literature on the topic suggests that the *deficit-model* still looms large over governments' attempts at *democratising* scientific governance. Non-science based concerns are disqualified through trivialisation of their substance (Rogers-Hayden and Hindmarsh, 2002); the deficit model is reincarnated from science based to trust based (Goven, 2006); the organisers of the consensus conferences in New Zealand were working under the rationale of the deficit model (Goven, 2003); despite the expectations to the contrary, the GM Nation? debate indicated that talk of the deficit-theory's demise was decidedly premature (Irwin, 2006).

Irwin (2006) suggests that at one level it seems little really has changed. The same old technocratic model of governance is in circulation with the public constructed as an obstruction to progress. Despite the stated intentions of allowing the public to frame the issues, there is little evidence that the construction of the *scientific citizen* has brought about any wider cultural or institutional transformation. In cases where engaging the public has become institutionalised as in Denmark, there is even talk of *'dialogue fatigue'* as these exercises come to be viewed as bureaucratic and ritualistic, with little practical relevance (Irwin, 2006).

2.2.4 *Why consensus and an alternative to deliberative democracy*

The key aim of deliberative engagement exercises like the consensus conferences and citizen juries is the creation of consensus among diverging points of view. Although this is a noteworthy aim in itself, the focus on consensus, coupled with the concern with *representativeness* which privileges the *'innocent'* citizen, (one who is open-minded or doesn't have any pre-existing views on the issue) over the *'activist'* or the engaged citizen, is a significant departure from UK political culture where the treatment of controversial technologies has either been adversarial in character or else focussed on a narrower consensus among experts (Irwin, 2006). Some have even questioned whether consensus is achievable or even desirable (Irwin and Michael, 2003). Deliberative exercises designed by policy-makers are likely to feature strategic or unreasonable behaviour; for instance, when the participants are not inclined or oriented towards reaching consensus, or when there is an attempt to 'strategically' influence the worldviews of others (Genus and Coles, 2005). Also, what this model of consensus does not take into consideration are the structural factors which may prevent the achievement of the democratic criteria referred to earlier. Thus Jasanoff (2002) refers to the structural constraints placed through the insistence on objectivity and predictability of science; (Goven, 2003, Goven, 2006) calls for analysing the hegemonic values of the neo-liberal political-economic context around which deliberation on technology occurs. There are parallels in this respect in the STS literature with Winner's critique of the SCOT programme (Winner, 1993), especially in terms of *relevant social groups*. (Also, (Klein and Kleinman, 2002)).

Chantal Mouffe's (1999) critique of the Habermasian model of deliberative democracy centres on its apolitical character and its insistence that political questions are of a moral nature and hence susceptible to being decided rationally. Advocates of deliberative democracy make a distinction between 'mere agreement' and 'rational consensus', suggesting that the key to consensus is the ideal of the democratic procedure; the criteria of impartiality and equality, openness, lack of coercion, and unanimity. In response to the criticism that in practice these ideals are not achievable, the advocates of the Habermasian model of deliberative democracy accept that these obstacles should be conceived of as empirical ones and the ideal speech situation should be seen rather as a regulative idea. Mouffe takes objection to this insistence on procedures, and through a reading of Wittgenstein (1958) and Slavoy Zizek (1992), uproots the grounding of the Habermasian model. Bringing a conversation to

an end or *closure* in STS terms is always a personal choice, rather than a result of the application of the procedures of deliberative democracy. Mouffe insists that it is not possible to abstract ourselves from our human form of life and hence the impracticality of the ideal of the deliberative democracy procedure. Without the impediments to the ideal speech situation, no communication, no deliberation can take place since discourse itself in its fundamental structure is authoritarian. It is only through the intervention of a master signifier in a field of signifiers that a consistent field of meaning – a discourse - can emerge. Mouffe argues that the failure to acknowledge the dimension of power and antagonism and their ineradicable character is the cause for the growing disaffection with democratic institutions. The insistence on consensus abstracts the 'political' out of politics. (Mouffe, 1999). There is resonance hear to the Foucaultian conception of discourse where he draws attention to the power relations and struggles implicit in arguments, agreements and actions (Genus, 2006).

Mouffe's alternative to deliberative democracy is a radical, pluralist form of democracy. The question, according to her is not how to eliminate power from democratic deliberations (an impossibility), but how to constitute and channelize forms of power that are compatible with democratic values. "*The prime task of democratic politics is not to eliminate passions nor to relegate them to the private sphere in order to render rational consensus possible, but to mobilise those passions towards the promotion of democratic designs*" (p756). Once we accept that any consensus is always temporary and is a result of a hegemonic intervention, it becomes possible to conceive of the deliberative democratic model as forced consensus.

Chantal Mouffe's conception of a radical, pluralist democratic theory is in a position to fill up the void that exists, both in terms of the literature as well as (and more importantly) in terms of policy implications. The disappointment expressed with the GM Nation? debate, the stubborn longevity of the *deficit-model* in public engagement exercises, along with the continued lack of trust in government institutions and the *dialogue-fatigue* in places where such exercises have been institutionalised, mainly due to their perceived lack of practical significance, all point to the feeling that the present models of deliberation and democracy are not working. As Irwin points out, these models have a tendency to operate within a homogenous model of the social structure and a restricted definition of the underlying

issues (Irwin, 2006). A radical, pluralist model of democracy that values differences over consensus could help answering those concerns.

Andy Stirling makes a similar case in his discussion of the 'opening up' and 'closing down' of social appraisal (Stirling, 2008). If the appraisal process is about the closing down the process of technological commitments, then this implies that aim of the appraisal process is to justify technological commitments more suited to incumbent actors' interests. "…*the output of this kind of closing down in appraisal takes the form of what might be called 'unitary and prescriptive' policy advice. This involves highlighting a single course or a very small subset of possible courses of action (or technology commitments), which appear as preferable under the particular framing conditions privileged in appraisal*" (p. 279). If on the other hand the appraisal process is about the opening up of technological commitments, then the focus is on making explicit and examining the influence of assumptions and framing conditions on the results obtained in the appraisal. The opening-up approach, "…*involves systematically revealing how alternative reasonable courses of action appear preferable under different framing conditions and showing how these dependencies relate to the real world of divergent contexts, public values, disciplinary perspectives, and stakeholder interest*" (p. 280). The opening-up process, though may be ambiguous in terms of a unique policy decision-making, will likely to result in outcomes which are more robust.

2.2.5   *Empirical literature on public engagement*

I now review the literature related to instances of deliberative exercises. This body of work investigates these exercises in the context of democratic participation and deliberation and includes the various consensus conferences around the world, the 'GM Nation?' debate in the UK and New Zealand's Royal Commission on Genetic Modification.

Rob Hagendijk and Alan Irwin (2006) examine the technology governance structures in eight European countries. Drawing upon twenty-six case studies developed during the STAGE ('Science, Technology and Governance in Europe') project and eight workshops and conferences conducted in the eight countries, they identify six basic forms of governance.

1. *Discretionary governance*: Policies in this category are made without explicit interaction with 'the public'. Portugal and Greece exemplify this mode in which governance is presented primarily as a matter for government, which in turn is portrayed as serving universal goals.

2. *Corporatist governance*: This involves an explicit formal recognition of differences of interest as an input to negotiation. As negotiation takes place within a closed or highly regulated space, the decisive feature of this mode is the admission of stakeholders. Generally, the Scandinavian countries exemplify this approach. Norway and Denmark have shaped an inclusive corporatist mode, in which conflicting voices are included in negotiations. In Sweden, the future of a 'knowledge society' is defined as a shared objective, towards which all citizens are expected to contribute.

3. *Educational governance*: This assumes that policies for science and technology have foundered on the shoals of public ignorance. Hence it is necessary to create an informed citizenry. A notable example is Portugal, which has established a national agency to promote science education

4. *Market governance*: Science and technology are best regulated by demand and supply. The value of science comes from the surplus value created through its commercialisation and contribution to the generation of wealth. The public participates as customers and consumers. Public consultation may be used as a marketing device. Traditionally, European countries have been less market-oriented than the USA. However, economic liberalisation and deregulation along US lines are fashionable. Finland is a prime example.

5. *Agonistic governance*: This form of governance occurs in a context of confrontation and adversity. The democracies of Europe are not dominated by agonistic forms of governance, but discretionary and corporatist forms of decision-making occasionally lead to agonistic relations. The storage of nuclear waste in the UK is a case where policy seems to have stalled in the face of public opposition: opposition to GM foods has also taken agonistic form.

6. *Deliberative governance:* This rests on the assumption that open debate and engagement

can create a satisfactory foundation for decision-making. In this mode, the public are not consumers of science, but rather 'scientific citizens'. The consensus conferences organised by the Danish Board of Technology are iconic examples (Hagendijk and Irwin, 2006)

Although, individual countries showed closer affinities with one mode of governance over another, the pattern was rather complex and the governance of science and technology could be best described as a mixture of these modes. The trajectories of governance in these countries are a reflection of their individual political cultures. Ten general features were identified that characterise the governance of science and technology in Europe.

1) There was a tendency across Europe to view broad public deliberation as a one-off hurdle to be cleared at a time judged appropriate by the government, and often quite late in the process of decision-making.

2) There was still considerable gap between actual engagement exercises and main-stream policy. Current processes are focussed more on international competitive-ness than on a desire to be responsive to citizens. The assumption on the part of government is that consultation will assist (or at least smooth) the process, but not obstruct it.

3) The framing of the debate in Europe is typically decided by a small coterie of offi-cials, organisations and 'experts'.

4) In countries that have taken up deliberative governance, engagement often involves protracted disputes over timing, organisation and 'bias'. The broad language of de-liberation can dramatically run up against social, political and administrative reali-ties.

5) In most European countries, deliberation and public engagement are presented as a democratic route to consensus formation. To some degree, this assumption takes its inspiration from the old deficit model: once the public understands the real issues, then it will trust institutions, a 'reasonable' consensus will arise, and policy-making can proceed. This emphasis on consensus can lead to a sense of exclusion amongst the groups that disagree with the framing of the debate.

6) European experience suggests that deliberative governance poses challenges not only for governments, but also for non-governmental organisations (NGOs). NGOs

often claim to speak in the public interest. However, there is always the risk that 'public opinion' will not support them. Deliberations outside their control pose for NGOs a serious dilemma: whether to work within the process and risk co-option or stand outside it and risk marginalisation?

7) Rhetoric is running well ahead of practice. Broad, nationwide debates are still quite exceptional. More frequent are focus groups and consensus conferences, but these are normally organised on an *ad hoc* basis and are not a structural feature. High-profile but atypical initiatives remain marginal in comparison with the infrastructures dedicated to scientific and technological policy, which remain largely immune to public appraisal.

8) In many countries there is still a tendency to polarise 'science' and 'the public' or, more precisely, to limit public engagement to matters of ethics and values, rather than to expose experts to scrutiny. In many cases, the 'scientific' and 'public' aspects of an issue are carefully separated. Despite decades of scholarship in science and technology studies, there remains a prevailing assumption that 'technical' and 'social' aspects of science and technology can be kept apart.

9) In most countries, and in most cases, engagement initiatives are kept at arm's length from formal decision-making. Understandably, governments will not guarantee in advance their response to deliberative recommendations. Indeed, one may argue that representative democracy requires such distance to avoid the accusation that the debate has been manipulated. However, a refusal to take outcomes seriously risks undermining public trust.

10) Public engagement raises questions of political autonomy. Against the suggestion that citizens can alter the direction of policy-making, there is the simple fact that, with respect to technological change, single nations are greatly limited by international agreements and networks of dependency.

It is highly indicative of the comprehensiveness of Hagendijk and Irwin's work that these ten general findings are corroborated by other researches done on public engagement exercises, not just in Europe, but in Western democracies in general. Joanna Goven (2003) for example, found that the consensus conferences in New Zealand on biotechnology, due to their *ad hoc* nature and not being a part of a wider technology assessment programme as

is the case in Denmark, resulted in them reinforcing *'an already dominant expertise and the existing restrictive framing of the debate'* (Goven, 2003) (p.437). Goven also raises the issue of problematising the political –economic context. There is an ambivalent relationship between participatory technology assessment and expertise. On the one hand, participatory technology assessment is seen as a way for citizens to break the monopoly of expertise in decision-making on techno-scientific issues. However, one of the most important matter of concern for citizens relates to the commercialisation of science, more so in the context of biotechnology. This requires that participatory technology assessment mechanisms facilitate the problematisation of technology's political economy. And this may require more, not less expertise: the expertise of those who analyse technology's relations to power. The need is to acknowledge such expertise as professional expertise, rather than to reject them as 'activism' or 'advocacy' (Goven, 2003)

E.F. Einsiedel et al (2001) compare three consensus conferences on biotechnology in Denmark, Canada and Australia held in March 1999 and find that the consensus conference model 'travels well' as the areas of concern raised in all the three countries were strikingly similar. These included questions over food safety, the increasing dominance of a few players in the economic control of the food industry and ethical and environmental concerns. Although many issues around food tend to be local in nature, the focus of industrial countries on biotechnology as a national strategic priority and the global nature of food trade ensure that food biotechnology is simultaneously a local and an international concern. All three lay panels (of the three consensus conferences) insisted on framing the issue of food biotechnology beyond the '*narrower technical tropes of scientific risk discourse'* (Einsiedel et al., 2001). They discussed risk in broader terms, encompassing social, political and economic contexts. The authors conclude that the consensus conference model can be seen as an attempt to bridge the incommensurability of public participation and technical expertise. As lay publics bring in their ways of defining issues, their experience and their values to these deliberative approaches, such processes 'de-monopolise expertise' and recognise that ordinary people are intrinsically part of the technological project.

Edna Einsiedel and Deborah Eastlick (2000) in their evaluation of the Canadian consensus conference on food biotechnology focus on the learning process of the lay and expert panellists involved. At the end of the conference the lay panellists seemed to have an enhanced understanding of the issues involved and also a more positive view of their role as citizens in the context of the policy process. The expert panellists too seemed to have been impressed by the lay panellists' observations during the conference and thus this

engagement exercise introduced the lay citizens as important actors and stakeholders in the biotechnology policy process, presenting views and interests that may have been over-looked in expert-only processes. The Canadian conference is also discussed by Einsiedel and Eastlick in the context of deliberative democracy. They observe that there is a micro-level issue of how to realise the conditions for ideal deliberation and the macro-level issue of the constraints and opportunities posed by the larger structural conditions. At the micro-level there are practical problems such as time and resource constraints, gaining access to the widest range of possible viewpoints, and ensuring equality in the deliberative process and maintaining transparency and trust. At the macro-level, the deliberative exercise is embedded in the particular socio-political environment. As such, these institutional struc-tures may encourage or discourage deliberative mechanisms. The policy question then becomes *'how to make mechanisms available that provide genuine opportunities for obtaining public input occasioned by deliberation and learning'* (Einsiedel and Eastlick, 2000) (p. 339).

Alan Irwin (2001) explores the configuration of scientific citizenship and the construction of the 'scientific citizen' with reference to a major exercise in the UK, the Public Consulta-tion on Developments in the Biosciences (PCDB). He stresses the importance of the *institutional framing* for any exercise. The PCDB had a requirement both to inform mem-bers of the public about developments in the biosciences and to gather views, suggesting a deficit theory element within the exercise. Also there was a focus on quantitative data rather than qualitative responses alone as it was perceived that quantitative data would enhance the credibility of the exercise. Linked to this was the importance attached to statistical representativeness. This institutional framing of the exercise resulted in the participants appearing essentially as *reactive* members of the public rather than as citizens in a more active sense of the term. This framing led to the consultation taking shape as a highly sophisticated exercise in *social research* rather than a direct discussion between government and citizens. Irwin observes that there are at least two frameworks for the relationship between science and citizenship which are at play in any discussion on such exercises. The first is the *social research* framing of the science-citizen relationship charac-terised by the highly-professional and customer-responsive mode, the insistence on quanti-tative data and representativeness. This framing ties in closely with current institutional agenda and policy practices. The second framework is the *deliberative democracy* model characterised by direct discussion and engagement where the agenda is set by the citizens themselves. This model of the science-citizen relationship grants a more active role to the

members of the public. Irwin terms these two frameworks as competing 'technologies of communities' (Irwin, 2001).

Peter Taylor-Gooby (2006) analyses the increasing scepticism of and decreasing trust in government institutions and experts. An outcome of this has been a greater emphasis on public consultations on issues of high profile new technology. Using the GM Nation? debate as a case-study and the related 2002 UEA-MORI risk survey and 2003 UEA-MORI study of GM Food, Taylor-Gooby suggests that it would be too naïve to conclude that the shift towards greater independence and confidence among the citizens to take on the responsibility of engaging in decision-making is setting the stage for an engaged 'dialogic democracy'. The studies show that while some groups, like those belonging to more privileged backgrounds and better educated, may readily engage in consultations and take on the role of active citizens, other groups may have a more resigned view of the engagement process since they may perceive that they lack voice. Thus there is a danger that these consultation exercises like the GM Nation? debate may empower particular groups while ignoring others (Taylor-Gooby, 2006).

2.3   Discourse

Discourse is one of the most widely used terms in social research and also one of the least defined (Mills, 2004). Mills does a fine work of trying to pin down the general sense in which the term is used. Depending upon the field of enquiry or discipline, the meaning of the term varies. Hence linguists tend to define discourse in terms of speech or written texts or statements whereas those involved with cultural theory and critical theory see discourse as the general domain of the production and circulation of rule-governed statements, although there may be exceptions to this generalisation. The more linguistic-oriented definitions of discourse tend to contrast it with terms like text and sentence. Others, like Roger Fowler contrast discourse with ideology:

'Discourse' is speech and writing seen from the point of view of the beliefs, values and categories which it embodies; these beliefs etc. constitute a way of looking at the world, an organization or representation of experience – 'ideology' in the neutral non-pejorative sense.

(cited in Mills, 2004)

As usual, it is left to Foucault to eloquently sum up this variation in the meaning of the term:

Instead of gradually reducing the rather fluctuating meaning of the word 'discourse', I believe I have in fact added to its meanings: treating it sometimes as the general domain of all statements, sometimes as individualisable group of statements, and sometimes as a regulated practice that accounts for a number of statements.

(Foucault cited by Mills, 2004)

It is discourse in terms of '*a regulated practice that accounts for a number of statements*' that is of most interest to and it is in this sense discourse analysis has been adopted for this particular research.

Coming to discourse analysis itself, Slembrouck (2004) gives an extensive overview of the different approaches to and lender disciplines of discourse analysis. Upfront, he quotes Stubbs (1983):

*The term discourse analysis is very ambiguous. I……refer mainly to the linguistic analysis of **naturally occurring connected speech or written discourse**. Roughly speaking, it refers to attempts to study the organization of language above the sentence or above the clause, and therefore to study **larger linguistic units**, such as conversational exchanges or written texts. It follows that discourse analysis is also concerned with **language use in social contexts**, and in particular with **interaction** or dialogue between speakers. (emphasis by Slembrouck).*

The above definition is typical of how approaches based in linguistics would view discourse analysis as. Having been developed in linguistics as a reaction against grammar and semantics based enquiries, discourse analysis has other approaches which have moved away from the analysis of just the text towards the analysis of the social or the materiality of the discursive. As Slembrouck says, "*In this version, discourse analysis foregrounds language use as social action, language use as situated performance, language use as tied*

to social relations and identities, power, inequality and social struggle, language use as essentially a matter of "practices" rather than just "structures", etc."

Elsewhere, this has been termed as the linguistic turn in social research.

Slembrouck then lists out the various approaches to discourse analysis, including, analytical philosophy (Speech act theory), linguistics, linguistic anthropology, post-structuralist theory (M.M. Bakhtin), social theory (Bourdieu, Foucault, Habermas) etc.

Off these, post-structuralist theory and the work of Foucault are important in terms of discourse analysis based on social constructionism.

2.3.1 *Post-structuralist theory*

In broad terms, post-structuralism implies a conception of all social entities and the material world as discursive in nature. Taken to its extreme, this smacks of idealism where nothing exists outside the text. However, most theorists take up positions which are much more moderate. As Laclau and Mouffe (1985) illustrate effectively:

The fact that every object is constituted as an object of discourse has nothing to do with whether there is a world external to thought, or with the realism/idealism opposition. An earthquake or the falling of a brick is an event that certainly exists, in the sense that it occurs here and now, independent of my will. But whether their specificity as objects is constructed in terms of 'natural phenomena' or 'expressions of the wrath of God' depends upon the structuring of a discursive field. What is denied is not that such objects exist externally to thought, but the rather different assertion that they could constitute themselves as objects outside any discursive conditions of emergence (cited in Jorgensen and Phillips, 2002).

Post-structuralism often is used as a complementary term to post-modernism, which in itself is very resistant to a definition but can generally be understood to mean an approach to society and/or knowledge that stresses the uncertainty of knowledge and organization. It hints towards the existence of multiple truths and disintegration of the subject. Post-

modernism can be viewed as different intellectual and philosophical orientation to the project of modernity (Marston, 2002). Post-modernism rejects the closure inherent in modernity. It does not recognize meta-narratives (Cameron, 2002). It rejects the notion that the laws which rule the 'natural' world can be applied to the social world as well (Cameron, 2002), and hence is anti-positivist (Marston, 2002). Due to its rather rigid epistemological stance, post-modernism has had problems in being applicable in social research for, if everything is valid and nobody's opinion can be opposed, there is no epistemological ground to base your research on (Cameron, 2002). The main challenge is to reconcile the need to be explicit about a methodology and at the same time maintain a non-essentialist and non-positivist stand on the production of knowledge (Slembrouck, 2004). Here Cameron recommends a form of post-structuralism which dilutes some of the rigidity of post-modernist epistemology and thus can be better equipped as an epistemological basis for social research. Post-structuralism allows for agency to be exercised within structures that are more transparent than can be envisaged in post-modernism. Thus, Laclau and Mouffe talk about 'partial fixing of meaning' which implies that objects and social subjects and the relations between them may emerge in partially stable configurations which may last for longer or shorter periods of time, all along maintaining the rejection of any permanent closure (Slembrouck, 2004). Derrida's deconstruction of the conditions of possibility of dominant problematisations in specific socio-political contexts is a useful methodological tool that can incorporate post-structuralist epistemology.

Another criticism of post-modernism in social research has been that it depoliticises the agenda (Marston, 2002). Social research has always mostly been about addressing the inequalities in society and politicising disadvantage. Post-modernism with its focus on the uncertainty of knowledge and multiplicity of truths, contributes to diluting this agenda.

Postmodernism ignores the significance of market liberalism and associated trends to inequality, retrenchment and the regulation of the poorest groups. From this perspective, postmodernism functions as an ideological smoke screen, preventing us from recognising some of the most important trends in modern social policy.

(Taylor-Gooby (1994) quoted in Marston, 2002)

Marston, in response to this criticism, proposes a form of 'critical post-modernism' which would take on board the insights offered to social research by post-modernist and post-structuralist epistemology, without diluting the political agenda. He finds Critical Discourse Analysis (CDA) to be a perfectly suitable methodology where this form of critical post-modernism can be made operational. CDA which is mostly associated with the work of Norman Fairclough, offers an adequate theory and method of discourse analysis that recognizes both material and discursive practices (Marston, 2002). CDA will be described in more detail in the subsequent sections.

2.3.2 *Foucault*

The name of Foucault looms large over the literature on discourse analysis based on social constructionism. Foucault ties together the concepts of knowledge, discourse and power into a tight knot. Below an attempt is made to summarise his theorising of discourse through a reading of his article 'The Order of discourse', (1981) mainly quoting from the work of Mills (2004), Hook (2001) and Sharp and Richardson (2001).

By Order of discourse, Foucault conceptualises a discrete realm of discursive practices which are bound and constituted by rules, systems and procedures. This order of discourse is the basis of all that we say and do and all the knowledge we have. In other words, it is impossible to think and act outside of these rules and systems and procedures. Here, Foucault links discourse to the concept of power. Discourse itself is constituted by and also constitutes the social system, through forms of selection, exclusion and domination (Hook, 2001). For Foucault, power is not something one possesses; it is not repressive, instead power is a productive force.

Power must be analysed as something which circulates, or rather as something which only functions in the form of a chain. It is never localized here and there, never in anybody's hands, never appropriated as a commodity or piece of wealth. Power is employed and exercised through a net-like organization. And not only do individuals circulate between its threads; they are always in the position of simultaneously undergoing and exercising this power. (Foucault, 1980 quoted in Slembrouck, 2004).

External Systems of Exclusion

Discourse limits and also enables what can be said and written and what constitutes as knowledge. He describes the processes of exclusion that limit what can be said and what can be considered as knowledge. The first of these exclusionary mechanisms are the social procedures of prohibition or taboos. There are certain topics that are considered as 'taboo' in a given society at a given time. Foucault illustrates these prohibitions in the regions of politics and sexuality (Hook, 2001). There is nothing intrinsic to these topics which make them difficult to be talked about. It is simply a discursive effect which becomes institution-alised at a certain period of time in a given culture (Mills, 2004).

The second prohibition consists of the opposition between madness and reason. Foucault argues that in different times the speech of the mad person has either been considered divine or totally meaningless (Mills, 2004). What Foucault is referring to is that 'whole network of institutions' that allows a doctor to discern from the speech of the mad, what is truthful and what is meaningless (Hook, 2001).

The third exclusion deals with the opposition between true and false, the division between knowledge which is considered as true and that which is considered as false. Foucault refers to the Greek poets for whom, the content of the statement was no guarantee of its being true; more important was the context in which the statement was pronounced (Mills, 2004). But, as he explains , a day came when truth '*was displaced from the ritualised, efficacious and just act of enunciation, towards the utterance itself, its meaning, its form, its object, its relation to its reference*' (Foucault, 1981 quoted in Mills, 2004). Foucault termed this transition as our movement towards 'the will to truth'. The 'will to truth' has its own history which varies according to the range of objects to be known, the functions and positions of the knowing subject, and the material, technical and instrumental investments of knowledge (Hook, 2001).

Internal Systems of Exclusion

Apart from the external systems of exclusion, Foucault also talks about internal systems of exclusion, predominant among these being the commentary, the author and the discipline.

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By commentary Foucault refers to comments (secondary texts) made on the major (primary) texts which are circulating in society at any given point in time. These texts could be major religious works, judicial texts or scientific texts. By commenting on these texts, these major texts get repeated and grow in importance and influence. Paradoxically, commentary is something which has not been said before but at the same time has to be the same thing as the primary text. This limits the discourse, what Foucault calls the 'finitude of discourse' (Hook, 2001).

The second internal system of exclusion is the 'author'. Here, by author Foucault means in the sense of a principle, a grouping of discourse, a coherent discourse, a unity and origin of meaning (Hook, 2001). Theoretically, a person can say whatever he wishes, but people tend to be fairly restricted in their utterances due to societal and personal norms, in terms of their choice of topics and the words they use. There is a boundary, a set of parameters which the author is bound to follow. So eventually, our authorship is fairly predictable and limited in originality (Mills, 2004).

The third internal principle of discursive limitation is the discipline. Statements made within a particular discipline, to be considered as valid, must fulfil some conditions. They must be compatible with, agree with, and follow the theories, methods, propositions, rules, definitions, techniques and instruments that constitute that particular discipline (Hook, 2001). Foucault argues that the structures of discipline exclude more propositions than they enable. A work of research, however insightful or accurate, would fail to be considered as an academic work if it hasn't followed the norms and procedures prevalent in that particular discipline (Mills, 2004).

To conclude this section on Foucault, given below is a summary of the characteristics that any Foucauldian approach to discourse analysis will possess:

- Social change is constituted by and constitutes changes in communication

- Social change is constituted by and constitutes changes in practices.

- A 'good' social change cannot be pre-specified by theory.

- Social change is shaped by power, conceptualised as competition between differing systems of meaning or 'discourses'.

- Discourse is a specific ensemble of ideas, concepts and categorisations that are produced, reproduced and transformed in a particular set of practices, through which meaning is given to physical and social realities.

- Discursive struggle is shaped by power relations.

(Sharp and Richardson, 2001).

2.3.3 *Social Constructionist Approaches to Discourse Analysis*

Discourse analysis is the most commonly used method in the social sciences amongst several social constructionist approaches. Though social constructionism is an umbrella term for a range of theories, Burr (1995) lists four premises shared by all social constructionist approaches.

1. Our knowledge of the world is not objective truth. Rather, knowledge is created through discourse; i.e. what we know is not a reflection of an objective world 'out there', but is a product of the way in which we choose to categorise the world.

2. Our view of the world is historically and culturally contingent. Our worldviews and our identities could have been different had we been in a different historical and cultural context.

3. Knowledge is contingent. Knowledge is created through social interaction in which we construct common truths.

4. Different knowledge regimes or social understanding of the world lead to different social actions in which some forms of action become natural and others unthinkable.

Postmodernism shares the foundations of social constructionist epistemology in the sense that it is based on the ontology that acknowledges multiple meanings within any given

discursive context. For social constructionism meaning resides in individual interpretations within specific contexts (Spivey, 1997).

The plurality of language and the impossibility of fixing meaning once and for all are basic principles of poststructuralism, informed by a social constructionist epistemology (Weedon, 1997). A social constructionist epistemology does not question the existence of the object, but rather the assumption about the universality of knowledge which is embedded in these accounts

After having identified the similarities shared by all social constructionist approaches, Phillips and Jorgensen (2002) then set out to delineate some of the factors that distinguish each approach. They focus on the concepts of ideology and subject, the role of discourse in the constitution of the world and the analytical focus of each approach.

Ideology and Subject

The approaches differ in the degree of the subject's agency. All discourse analysis perspectives, in accordance with Foucault, acknowledge that subjects are created in discourse. But are the subjects, just passive creations of the discourse or do they themselves take part in reproducing and changing the discourse?

Althusser defines ideology as a system of representations that masks our true relations to one another in society by constructing imaginary relations between people and between them and the social formation (Althusser 1971). Accordingly, subjects have no chance of resisting the subject positions allocated to them by ideology. The majority of discourse analytical approaches reject this totalising concept and give some degree of agency to the subject, including Fairclough's Critical Discourse Analysis and Discursive Psychology, while Laclau and Mouffe's discourse theory seems to more or less follow Althusser.

Another implication of the concept of ideology is that if one is able to overthrow the ideological distortions that mask real social relations, truth can be attained. This idea is completely rejected by Foucaultian discourse analytical perspectives. For them, truth,

subjects and social relations are created in discourse and there is no way to get to a 'truer' truth. They give limited agency to the subject. On the other hand, Fairclough insists that the very aim of discourse analysis is to unmask the truths hidden behind the ideological constructions.

The Role of Discourse in the Constitution of the World

The perspectives also differ in the role they provide to discourse in the constitution of the social. While some approaches like Laclau and Mouffe's discourse theory do not distinguish between discursive and non-discursive elements of the social and thus view social practices to be completely constituted in the discourse, others like Fairclough reserve the concept of discourse for text, talk and other semiological systems and distinguish it from other dimensions of the social. Fairclough's Critical Discourse Analysis gives a dialectical relationship between the discursive and the non-discursive elements of the social. Thus, discourse not only constitutes the social but is also partly itself constituted in the social practices. Fairclough suggests that non-discursive elements of the social have their own separate logic and hence they should be studied using tools different from those of discourse analysis. Here a cross-disciplinary approach to discourse analysis is put forward.

Analytical Focus

Some approaches have an understanding that discourses are created and changed in the day-to-day discursive practices and thus the focus is the empirical analysis of people's talk and written language. Other approaches focus on the general, over-arching patterns and aim at a more abstract mapping of the discourses that circulate in a society at a particular moment in time or within a specific social domain.

2.3.4   *Laclau and Mouffe's Discourse Theory*

Laclau and Mouffe have developed their theory of discourse through the deconstruction of other bodies of theories. Through this deconstruction, they expose the ideological content

of these theories and expose internal contradictions. Laclau and Mouffe have constructed their discourse theory by borrowing from two theoretical traditions: Marxism and structuralism. These two fields are fused together into a single post-structuralist theory where the whole social field is viewed as a web of processes in which meaning is created. According to Laclau and Mouffe, the creation of meaning as a social process is about the fixation of meaning. We constantly try to fix the meanings of signs by placing them in a certain relationship with other signs. However, this is ultimately impossible as every concrete fixation of the signs' meaning is contingent; it is possible but not necessary. For Laclau and Mouffe, the aim of discourse analysis is to study the struggle of ways in which the meaning of the sign is to be fixed, and the processes by which some fixations of meaning become so conventionalised that we think of them as natural. A discourse is formed by the partial fixation of meaning around certain nodal points. A nodal point is a privileged sign around which other signs are ordered; the other signs acquire their meaning through their relationship with this nodal point. For example, in medical discourse, 'the body' is a nodal point which gives meanings to a whole load of concepts in the field. Similarly, in political discourse 'democracy' is a nodal point. A discourse is established by the exclusion of all other possible ways in which the signs could have been structured in relation to each other. All these other possibilities which the discourse excludes is called the field of discursivity. However, as the discourse is always constituted in relation to an outside, it is always in danger of being undermined by it, that is, its unity of meaning is always liable to be disrupted by other ways of fixing the meanings of signs. Laclau and Mouffe call those signs as elements whose meanings have not yet been fixed. Elements are signs which have multiple, potential meanings. Thus, in Laclau and Mouffe's conception, a discourse attempts to transform elements into moments by reducing their polysemy or multiplicity of meanings to a fully fixed meaning. However, as mentioned earlier, in this conception a discourse can never be so completely fixed that it cannot be changed and undermined by the multiplicity of meaning in the field of discursivity. Elements which are particularly open to different ascriptions of meaning are called floating signifiers. Floating signifiers are the signs that different discourses struggle to invest with meaning in their own particular way. Although, nodal points are floating signifiers, the term 'nodal point' refers to a point of crystallization within a specific discourse, whereas the term 'floating signifier' belongs to ongoing struggle between different discourses to fix the meaning of important signs. Thus in Laclau and Mouffe's conception of discourse, discourse aims to remove ambiguities by turning the elements into moments through closure. However, this aim can never be completely fulfilled as the multiplicity of meanings which the discourse displaces to the field of

discursivity always threaten to destabilize the fixity of meaning. Discourse is thus a temporary closure: it fixes meaning in a particular way, but it does not do it permanently. There's always room for struggles over what the structure should look like, what discourses should prevail, and how meaning should be ascribed to the individual signs (Jorgensen & Phillips, 2002).

2.3.5 *Critical Discourse Analysis*

The roots of Critical Discourse Analysis (CDA) lie in classical Rhetoric, Textlinguistics and Sociolinguistics. CDA takes a particular interest in the relations between language and power. CDA is a heterogeneous school and it has never been one specific or single theory. It is fundamentally interested in not only analyzing opaque but also transparent structural relations of dominance, discrimination, power and control as manifested in language use. One of the defining features of CDA is its concern with power as a central concern in social life. It takes an interest in the ways in which linguistic forms are used in various expressions and manipulations of power. CDA should not be seen as a particular theory but as a contributor to a field of critical research on late modernity (Chouliaraki and Fairclough, 1999).

The contemporary field of CDA is quite diverse (Jorgensen and Phillips, 2002). For the purpose of this research, this researcher will focus on the version of CDA developed by Norman Fairclough. For Fairclough, the coherent accounts of the relationship between abstract social structures and particular social events depend upon mediating categories, what he calls 'social practices'. Social practices are more or less durable forms of social activity, which are articulated together to constitute social fields, institutions and organisations. Each of these levels, i.e. social structures, social practices and social events, has a semiotic dimension. Languages are a particular type of social structure. For the semiotic dimension of articulated networks of social practices, Fairclough employs the term 'orders of discourse' which is quite distinct from Foucault's use of the same term. Text is the semiotic dimension of social events. Text here could be written documents or verbal conversations.

With the use of the term 'discourse', Fairclough considers language use as a form of social practice. This implies that discourse is a mode of action, one form in which people may act upon the world and especially upon each other, as well as a mode of representation. Also, since there is a dialectic relationship between social practice and social structure, it implies that there is a dialectic relationship between discourse and social structure; the latter is both a condition for, and effect of, the former. Discourse is shaped and constrained by social structure, but at the same time discourse is socially constitutive. Discourse contributes to the constitution of all those dimensions of social structure which directly or indirectly shape and constrain it.

Social practice has various orientations – economic, political, cultural, ideological – and discourse may be implicated in all of these without any of them being reducible to discourse. For example, discourse figures in variable proportions as a constituent of economic practice. In some types of economic practice such as bridge building or producing washing machines it plays a minor role. In others such as the stock market and journalism, discourse forms a major part.

A discursive event is an instance of social practice. A discursive event is also a text, where text refers to spoken as well as written language. However, these two dimensions of text and social practice are mediated by a third dimension which focuses on discourse as a specifically discursive practice. Discursive practice is a particular form of social practice. In some discursive events, the social practice may be wholly constituted by the discursive practice, while in others it may involve a mixture of discursive and non-discursive practice. Analysis of a particular discourse as a piece of discursive practice focuses upon the processes of text production, distribution and consumption (Fairclough, 2002).

CDA tries to unite and determine the relationship between three levels of analysis: the actual text, the discursive practices and the larger social context that bears upon the text and the discursive practice. A critical approach to discourse analysis seeks to link the text (micro-level) with the underlying power structures in society (macro-level) through discursive practices upon which the text was drawn (meso-level). CDA focuses on how social relations, identity, knowledge, and power are constructed through discourse.

Social structures are abstract, highly stable entities which define a set of possibilities. Social events occur within these set of possibilities. However, there is no simple causal relation between social events and structures. Their relationship is mediated by a network of social practices. These social practices can be thought of as ways of controlling the

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selection of certain structural possibilities and the exclusion of others. Thus for example, within educational institutions, the practices of teaching determine the way the event of a classroom activity occurs.

As Fairclough distinguishes between the discursive and the non-discursive, discourse (in the sense of semiotics and language) is an element of the social at all the three levels of social structures, social practice and social events. Thus language/semiotics corresponds to the social structures, the orders of discourse correspond to the social practices and texts correspond to the social event.

An order of discourse is a network of social practices in its language aspects. The elements of orders of discourse are genres, discourses and styles. These elements select certain possibilities within the set of possibilities provided by the language, and exclude others. In other words, orders of discourse "can be seen as the social organization and control of linguistic variation".

Although, Fairclough insists on distinguishing the discursive and the non-discursive, he concedes that as one proceeds from the more abstract level of structures to concrete events, it becomes increasingly difficult to separate language from other social elements. Borrowing from Althusser, language can be said to be 'overdetermined' by other social elements. Thus at the level of social practice, the elements of the orders of discourse (genres, discourses, styles) are not purely linguistic, but "categories which cut across the division between language and 'non-language', the discoursal and the non-discoursal".

As mentioned earlier, the elements of the orders of discourse, the discursive aspect of social practice, are genres, discourses and styles. Genres are different ways of interacting discursively. Examples are interviewing, blogging, etc. Discourses are different ways of representing the material world, other social practices etc. There can be different discourses which may represent the same area of the social and material world from different perspectives or points of reference or groundings. Thus, for example, there is the discourse of neo-liberalism and the discourse of the welfare-state in the field of political economics. Finally,

styles are particular ways of being, constituting social or personal identity in particular ways. For example, the way a manager would use language to constitute his identity or the way social movement organizations would use language to constitute their identity.

Every text has 3 types of meaning: Action, representation and identification. These meaning correspond to the three elements at the level of order of discourse: genres, discourses and styles respectively. Analysing of specific texts as part of specific events thus involves:

"a) looking at them (texts) in terms of the three aspects of meaning, Action, Representation and Identification, and how these are realized in the various features of the texts (their vocabulary, their grammar, and so forth);

b) making a connection between a concrete social event and more abstract social practices by asking, which genres, discourses and styles are drawn upon here, and how are the different genres, discourses and styles articulated in the text?

2.5   Empirical literature on the discourse analysis of public engagement exercises

Discourse analysis techniques have rarely been used in analysing public engagement exercises. Techniques like frame analysis have been used in analysing general debates around controversial technologies like the media coverage of the nuclear power debate in the USA (Gamson and Modigliani, 1989) and the GM cotton debate in India (Yamaguchi and Harris, 2004) and so has been CDA (Cook et al., 2006). CDA has also been used in analysing public understandings of genetic modification and also industry perspectives on genetic modification (Henderson and Weaver, 2003, Henderson et al., 2007). However, discourse analysis of actual instances of public engagement exercises is very rare. Two notable works in this regard are Tracey Skillington's discourse analysis of the Irish National Recycling Conference in 1993 (Skillington, 1997), held in order to assist the Irish Department of Environment in preparing the Waste Bill and in developing a national recycling strategy, and Tee Rogers-Hayden and Richard Hindmarsh's discourse analysis of

New Zealand's Royal Commission on Genetic Modification (Rogers-Hayden and Hindmarsh, 2002).

Although the Irish National Recycling Conference was not strictly a public engagement exercise, as only interested groups including state and economic interest group representatives and Earthwatch representatives were invited to debate the major issues around recycling, it is useful to review Skillington's design of the discourse analysis of the text emanating from the debate. Skillington presents three levels of analysis of the representations made by the actors in the Conference. At the first level, the themes and framing strategies involved in the debate were revealed. The theme of economic growth was prominent in the actors' presentations, particularly the economic actors who seemed to frame the issue of recycling with an emphasis on materialist, utilitarian approach. The presentations from policy actors reflected the dual nature of the state's political role in acting as an environmental regulatory mechanism and also as an initiator of economic development. In order to avoid conflicting discourse resulting from these somewhat contradictory goals, the policy actors made use of aggregate frames where the targets are not actors but rather abstract themes or meta-narratives (e.g. 'the Industrial Revolution', 'the third age', 'post-modern society' etc.).

The second level of analysis focused on the transformation of existing orders of discourse. Actors involved in the Conference combined existing discursive conventions and elements in creative ways to reorganise the discourse on recycling. The boundaries between elements of the discourse of sustainable development and discourse of environmental responsibility were redrawn. The third level of analysis focussed on the wider socio-political and institutional context of the discursive exchanges involved in the actors representations.

The three levels in Skillington's analysis are similar to Fairclough's multi-dimensional analytical framework. These three concurrent elements of the social context, the discursive field and the text have been explicitly mapped into the analysis of the Royal Commission on Genetic Modification (RCGM) by Rogers-Hayden and Hindmarsh (2002). The social context for the RCGM was taken to be the hegemony of the ideals of modernity in contemporary society. Within this social context, the RCGM gathered and analysed the submission made by the various participants – the discursive field. The third element of Fairclough's model – the text, was mapped onto the findings of the RCGM. The analysis by Rogers-Hayden and Hindmarsh concludes that the RCGM was embedded within hegemonic

modernist knowledge/power forms of reasoning. This was reflected in the design of the submission template through which representations to the Commission were made by the participants. The design of the template was based on a reductionist philosophical and methodological approach which favoured the genetic engineering submissions and put at a disadvantage, deep or radical environmentalists who weren't able to express their views within the holistic worldview they favoured. The overall effect was that the RCGM disempowered and disenfranchised the deep/radical environmentalists and this was reflected in the findings of the RCGM which was largely in favour of the genetic engineering interests.

2.6   Constructive Technology Assessment

The formulation of Constructive Technology Assessment (CTA) can be seen as an application of theories of public engagement on science and technology to theories of technological change. CTA originated in the Netherlands and is largely associated with the work of J.W. Schot and A. Rip (for e.g. Schot, 2001, Schot, 1992, Schot and Rip, 1997). CTA was developed in response to the failure of traditional TA methods in improving the integration of technology and society. The basic premise of CTA is that broadening the technological development process by including a variety of societal actors in addition to technical experts will produce better technology in terms of wider societal acceptability of the technology and fewer adverse effects than previously (Schot, 2001). Schot classifies the actors involved in a typical CTA into three or four categories: technology actors, societal actors which include users of the technology, citizens, etc., regulating actors who develop the rules and a fourth type of actor- 'meta-actor', responsible for coordinating and facilitating the interaction among the other type of actors (p. 41).

Schot proposes three criteria for measuring the quality of CTA practices. These are (i) *anticipation*, - when societal actors including users, citizens and social groups are involved in the design process, they are more likely to anticipate and identify any social issues involved with the design at a much earlier stage in the process. This is in contrast with more *ad hoc* processes of consumer research where designers first design the technology and then react to market signals and social effects (p.43);

 (ii) *reflexivity* – CTA encourages actors to recognise the perspective of other actors as well as their own and to acknowledge that every design option simultaneously creates both

desirable and undesirable social effects. Reflexivity is the ability of actors to consider social design and technological design as one integrated process

(iii) *Social Learning* – New technologies are developed through a mutual learning process. User preferences, technological options and necessary institutional changes are not given *ex-ante* but are expressed and modified along the development process. This allows producers to incorporate these options in their designs rather than having the technology optimised first and then search for fit with user preferences and regulations. Schot identifies two levels of learning. At the first level, the learning refers to the ability to incorporate user preferences and regulatory demands into the design features. The second level of learning refers to the questioning of these existing preferences and requirements in order to pave the way for more radical innovations (p. 44-45).

Another important thesis in this category is Van de Poel's elaboration on the role of outsiders in technological transformation (van de Poel, 2000). Van de Poel (2000) makes use of the concept of technological regimes to analyse and explain technical change and technical trajectories. Outsiders are people who do not share the technological regime of a particular technology. Van de Poel defines 'outsiders' as those who are 1) outside the system of interaction or network in which technical development takes place and 2) do not share some of the relevant rules with respect to technical development.

In order to play a role in technical development, outsiders may have at their disposal two important resources that can be used. The first resource is engineering and scientific know-how that is potentially relevant for the technological regime and the second resource is financial and managerial capability that is required to develop, produce and market alternative artefacts. Van de Poel differentiates three categories of outsiders: outsider firms who possess both the resources to variable degree, outsider professional scientists and engineers who possess the relevant know-how but lack financial and managerial resources, and societal pressure groups who possess neither of the two resources but have the potential of mobilising public opinion or users, consumers or politicians for or against features of a technology. By mobilising public opinion for or against certain features of technologies, societal pressure groups help maintain a certain issue on the agenda and influence technical change. They may also mobilise insiders in their attempts to shape technical development.

The two types of insiders who are most susceptible to be influenced by the societal pressure groups are users and the government. As relative insiders, users and the government can usually influence technical development more directly than societal pressure groups. If a significant group of users stops buying the existing technology, it can profoundly influence the development of that technology. Governments can influence technical development by forbidding certain technologies, subsidising alternative technologies or enforcing technical standards. Societal pressure groups mobilise these insiders through what Van de Poel calls a 'delegitimation detour'. This happens through a rhetorical labelling of particular effects of a technology as morally objectionable. If this rhetorical labelling is successful, the insiders may be mobilised.

2.7 Combining the theories public engagement in science and technology and theories of discourse

I have already reviewed the two main threads of public engagement in science and technology and discourse theory. I have also reviewed the literature which makes use of a combination of public engagement and discourse theory (Sec. 2.5) and constructive technology assessment (Sec 2.6). This section will now review the literature on the combination of theories of technological transformation, public engagement in science and technology and discourse.

As we have seen in the previous section, CTA represents a promising approach to managing technological change through widening the assessment process by more upstream engagement and involvement of diverse participants. A potentially important revision of CTA, however, has been suggested by Genus and Coles (2005) in terms of approaching CTA as a 'discursive activity'. Current approaches to CTA disregard the possible strategic behaviour by actors involved in deliberative exercises, as in the case where the participants are not inclined towards subordinating their own interests in pursuing a consensus. Also actors differ in terms of their discursive capacity to contribute meaningfully in an interactive process. As a result, deliberative exercises may fall short of the democratic criteria set out in the literature (e.g. Rowe and Frewer, 2000). In such a scenario, approaching CTA as discourse would bring into focus issues of interpretation and subjectivity. A discourse

analysis of deliberative exercises could help understand the inequalities of access to debate and decision-making.

As has been mentioned earlier in this chapter, CDA has been used to analyse New Zealand's Royal Commission on Genetic Modification (Rogers-Hayden and Hindmarsh, 2002). However, in this case the focus has largely been on the public engagement strand of the three threads reviewed in this chapter. There exists a need to involve the technological transformation strand more explicitly in the analysis, and as has been identified by Genus and Coles (2005), approaching CTA as discourse, with its focus on identifying the subjectivity and power relations involved with deliberative processes of technological change, can contribute towards completing the picture.

The next chapter will describe the case-study which forms the focus of analysis for this research. The case-study selected is the public engagement exercise - 'GM Nation?' public debate – which took place in 2003 as part of the UK governments consultation programme on the commercialisation of Genetically Modified (GM) crops.

2.8   Conclusion

This chapter has done an extensive review of the literature in the areas of public engagement and discourse analysis. It explained the process of how the literature was sourced from online databases and journals and the key words used for the purpose. In the section on public engagement, this chapter reviewed the literature on technological citizenship, democracy and governance. In the European context, the work done by Gene Rowe and Lynn Frewer on the various forms of public engagement is very important and has been described in detail. Works of other influential researchers like Irwin, Wynne, Jasanoff, Goven, Pidgeon, Poortinga etc has also been included in the review. There is an ever growing body of empirical literature on public engagement exercises and this chapter has covered this extensively especially with regards to biotechnology issues. Chantal Mouffe provides an interesting critique of the Habermasian model of deliberative democracy and its focus on achieving 'rational consensus'. Her alternative model of radical, pluralist democracy has also been described here. In the section on discourse analysis, the main

focus has been on the work of Foucault. Foucault's work has been highly influential in the field of discourse analysis. I also take a look at post-structuralist theories of discourse, namely the work of Laclau and Mouffe and provide a general overview of the various theories of discourse analysis which come under the umbrella of social constructionist approaches. I finally provide a detailed description of Critical Discourse Analysis, largely focusing on Fairclough's three-dimensional model.

The empirical literature on the discourse analysis of public engagement exercises is sparse. The literature on Constructive Technology Assessment (CTA) involves insights from theories of technological transformation and public engagement. The work of Van de Poel with regards to the role of regime outsiders in regime change has been described. This research work places itself at the confluence of these two disciplines reviewed in this chapter. The research work aims to build on Genus and Coles (2005)'s suggestion of approaching CTA as a 'discursive activity'. In the next chapter, I describe the background to the issue of governance of GM crops/foods in the UK in the period leading up to the 2003 public debate.

Chapter 3 The Governance of GM

3.1 Introduction

The literature on the research on the public debate on Genetically Modified/Engineered Food/Crops is part of a larger, general family of literature on public debates around risky and/or controversial technologies, particularly those concerned with the production and use of nuclear power, environmental sustainability and genetics in general. As Thompson states: *"...virtually all of the issues that have been tied to agricultural biotechnology in the last twenty five years could have also been raised with respect to other technologies, both within agriculture and for society at large"* (Thompson, 2002). After having reviewed the literature on public engagement and public understanding of science in detail in the previous chapter, this chapter gives a detailed review of the works that have been done on the governance of GM crops, emphasising the various methods that have been undertaken in various countries and the suggestions that have been made by researchers and experts in the area. This literature provides the background to the controversy on GM crops in the UK resulting in the 'GM Nation?' public debate.

3.2 The context

The debate on GM Food is not a simple monolithic debate. It involves a whole gamut of issues; some of which are specific to the GM Food debate and others which have a more general character. These include food safety, environment, ethics, trust, expert-lay dichotomy, world hunger, patents, labelling, oligopolistic corporations, the State Versus private enterprise debate, public consultation etc. The research on the topic, accordingly, has extensively covered these issues. However, certain strands of the debate have received more attention in the literature than others. There is a rich body of research concerning risk (e.g. (Lomax, 2000), (Herrick, 2005), (Daele, 2002)), trust (e.g. (Taylor-Gooby, 2006), (Poortinga and Pidgeon, 2004)), ethics (e.g. (Streiffer and Hedemann, 2005), (Thompson, 2002), (Saner, 2002), (Comstock, 2002). Recently there has been a growing interest in the analysis of the public discourse on GM Foods (e.g. (Yamaguchi and Harris, 2004), (Henderson and Weaver, 2003), (Cook et al., 2004)), partly as a result of research findings that have indicated that the conflict over GM Foods is essentially a struggle for a more democ-

ratic control over technology (Daele, 2002). Trust in government institutions is an important element of this struggle and in this respect Taylor-Gooby's (2006) research on the '*GM Nation?*' debate is highly indicative. As he describes, *"...trust is generally valuable as one way of managing communication and the co-ordination of social activities under conditions of uncertainty..."* (p82), as plant biotechnology used to produce GM Food is an instance of. He suggests that trust among the public in government institutions has declined and has been replaced by a more sceptical approach. It is in response to such general scepticism, that there has been a greater emphasis by policy makers on more democratic public consultation exercises like the *GM Nation?* (p91). In their research done to test whether public attitudes towards GM Foods was driven by the trust people had in the institutions promoting and regulating GM Foods, (Frewer et al., 2003) found that trust was not the driving force behind people's attitudes towards information provided about GM Foods; rather people's attitudes were influential in the degree to which they trusted the sources providing the information. Similarly, (Poortinga and Pidgeon, 2004) claim that people with clear positive or negative beliefs about GM Foods interpreted events or information according to their existing attitudes. However, for people with intermediate beliefs or who were yet undecided, negative events had a greater impact than positive events. Their research also revealed that consulting the public on regulation of GM Food was one of the most critical factors in terms of maintaining trust in regulatory institutions.

Another element of the struggle over democratic control is the expert-lay dichotomy. The sharp distinction between 'scientists' and 'the public', in fact, has been one of the defining characteristics of the GM Food debate (Cook et al., 2002). (Borch and Rasmussen, 2005) suggest that dialogue and public participation would be one of the key factors which would need to be considered if commercial development of GM crops is to be successful. However, this contrasts with the 'deficit model' approach of many natural scientists who would want the public to be more educated in science and technology, failing which decision making authority should rest with the scientific experts (p550).

Cook et al.'s (2002) work on experts' perceptions of the public suggests that scientists tend to group participants in the GM debate into three discrete categories: the GM scientists, the public and the opponents of GM. The scientists have a strong 'siege mentality' in the sense that they perceive their science to have been unfairly targeted by the hostile public reac-

tions to GM, suggesting of strong group affinity. Their methods of scientific enquiry are unfamiliar to the general public (which is anyone outside the scientific community) and thus they need to be educated. There is little appreciation of the possibility that the debate on GM can be held outside the purview of the natural sciences (for e.g. in the political, ethical or legal sphere) (p9). The public is perceived as a homogenous group with no allowance made for any scientific expertise outside the scientific community. The public is viewed as an emotional entity as opposed to rational, and are thus vulnerable to manipulation by the media and government and groups opposed to GM. Thus there is a strong subscription to the 'deficit model' where the public is not in a position to form opinions autonomously but is dictated by the media and the government. For the scientists, communicating with the non-experts means a one-way flow of information to 'educate' the public (p10). The opponents of GM are perceived to be consisting of the campaigning NGOs and the media, along with the supermarkets and the politicians to a lesser degree. The NGOs are regarded as working with an ulterior motive of harnessing support in order to maintain the funding of their organisations and journalists are said to be interested only in a 'good story'.

Borch and Rasmussen (2005)'s focus-group study comprising of participants who were experts in various fields and had an interest in plant biotechnology concluded that a broad perspective on risk was crucial for successful future public debates on GM Foods. It was necessary to avoid the traditional narrow perspective associated with the natural sciences and to incorporate other dimensions of risk which the public valued. These would include the societal and ethical concerns, normally not part of any risk assessment exercise in the scientific perspective. Borch and Rasmussen call it 'postnormal science'. The focus group also deliberated on the use of Consensus Conference and its failure to live up to the Habermasian ideal.

3.3   The public sphere

Much recent literature has focussed on public participation in the regulation of GM Foods.

Gaskell and Bauer (2001) make an important distinction between the public sphere model and the traditional diffusion model of social scientific research on technologies. The diffusion model of research is based on the assumption that technological progress has a pre-determined teleology, and the role of social science is to speed up this process through public acceptance. This model views the purpose of social research as follows: a) to distinguish the 'early adopters' – those among the public who accept the technology very early, and the 'laggards' – those who for some reason resist the technological innovation. b) to speed up the diffusion process; c) to suggest communication strategies for the diffusion process; and d) to absolve the technological innovation itself from any sort of critique. The 'deficit model' of the public, mentioned earlier, is an illustration of this diffusion approach to social science research on technologies.

Gaskell and Bauer distinguish this model from their conception of the trajectory of a technology as a social process. They term the controversy over biotechnology as the 'biotechnology movement', where proponents and critics represent the technology from their standpoint, and in the process indulge in activities to mobilise public support for the same. This is not a singular top-down moment, as is assumed in the diffusion model, but the technology movement is held together by various strands. The interaction between these various strands may come to influence the trajectory of the technology.

Gaskell and Bauer's public sphere is a three-dimensional construct employing the politico-regulative dimension, the mass mediation dimension and public perception dimension. Each of these elements of the public sphere interact with each other and influence and are influenced by the other two. Figure 1 below depicts this model of the public sphere. The ellipse in the centre of the triangle represents the biotechnology movement which is observed by as well as observes the public sphere. The bottom of the triangle represents regulation. The political regulatory process is the framework through which the negotiations between the various strands of the biotechnology movement find their ultimate grounding.

Public opinion

(informal)   (formal)

Public   Mass

Perception   Mediation

The Biotech-
nology Move-
ment

Regulation

Politics
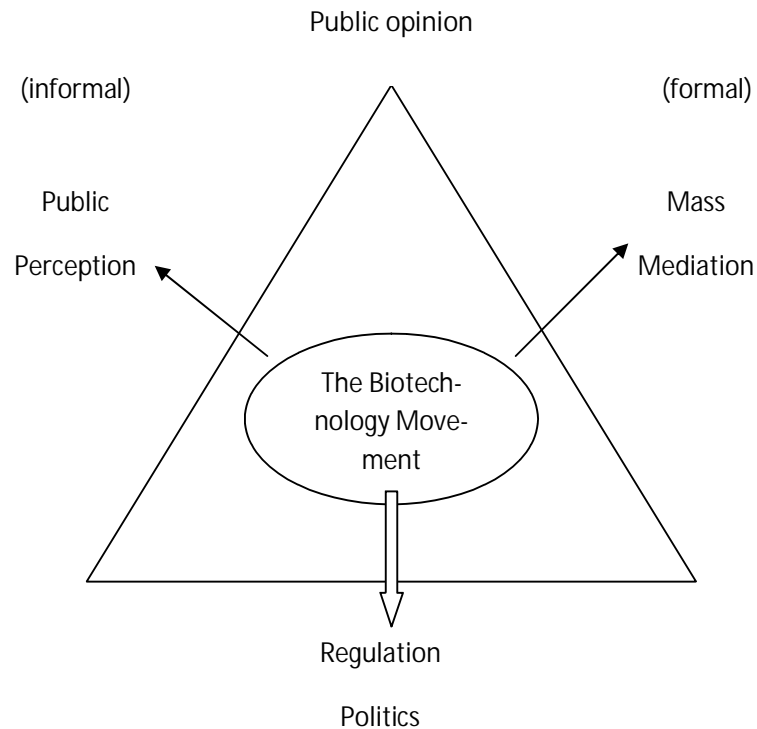
The biotechnology movement and the public sphere (Gaskell and Bauer, 2001)

The other two dimensions of the public sphere represent the public opinion. Public opinion is conceived as a process as well as an outcome which can be informal as in the case of public perception or formal as in the case of the mass media.

Analysis of the public sphere of GM Foods has been done using various methodologies and theoretical underpinnings. These range from surveys and focus-group studies to gauge public perceptions (e.g., (Beckwith et al., 2003), (Gaskell et al., 2001)) to frames and content analysis (e.g., (Kohring and Gorke, 2000), (Yamaguchi and Harris, 2004), (Bauer et al., 2001)) to Habermasian conception of ideal-typical public sphere (e.g., (Magnan, 2006)) to more social constructionist approaches emanating mostly from the work of Foucault (e.g., (Henderson and Weaver, 2003)).

Les Levidow has been one of the most prolific researchers in the area of biotechnology governance (e.g. (Tait and Levidow, 1992, Levidow et al., 1997, Levidow, 1998, Carr and

Levidow, 2000, Levidow, 2001, Levidow et al., 2007). The regulation of GMOs in the European context has been a complex and controversial area. The early regulatory approaches in the EU reflected this complexity. The precautionary approach in the EU created a trans-atlantic controversy in 1999 with regards to trade in GMOs. In the US, the regulation of GMOs was based on a definition of risk in straightforwardly biophysical terms. In most cases regulators concluded that GM crops posed no risks substantially different from non-GM crops and hence there was no need for special restrictions on their marketing. Levidow, Carr and Wield suggested the EU's precautionary approach to be viewed, not as unscientific obscurantism, but as a framework for learning in an uncertain environment (Jasanoff). In the UK, the Environmental Protection Act, 1990, had provided for a precautionary approach to GMO regulation.

Levidow (1999) introduces what he calls 'reflexive scientization' in the UK's biotechnology controversy whereby pecialists dispute and investigate various cause-effect models of risk, thus considering wider uncertainties. Through a reflexive expertization, moreover, would-be experts contend for authority to provide credible policy advice. Expert claims are scrutinized for their framing of the risk problem, accounts of uncertainties, trustworthiness, possible biases and commercial pressures. Proponents have understood biotechnology as a clean, precise tool that is essential for several imperatives, e.g.

• for making agriculture more efficient, enhancing economic competitiveness and thus accommodating market pressures;

• for reducing harm from agrochemicals via a genetic level control;

• for increasing food production, "feeding the world", and thus avoiding the risk of more famine; and,

• for anticipating any environmental risks of GM crops themselves.

This framing emphasizes the risk of failing to gain the benefits.

Critics have understood biotechnology as a contaminant, in several senses,

e.g.

• as a business that redesigns life for commercial purposes;

• as an industrialized agro-food chain that restricts consumer choice, controls the food supply, promotes intensive-agricultural models, perpetuates agrochemical dependence, and sterilizes wildlife habitats; and

• as regulatory procedures that downplay uncertainties, exclude important issues and involve a pro-industry bias.

This framing emphasizes the risk of biotechnology precluding beneficial alternatives.

Levidow and Carr (2007) have analysed the contending discourses that have framed the agri-biotechnological risks. They categorise the conflict over agri-biotech in Europe as three contending frames: 1) eco-efficiency, 2) managerialist and 3) apocalyptic. From its eco-efficiency frame, the agri-biotech industry has promoted GM crops as modest, benign extensions of selective breeding. It has diagnosed the societal problem as inefficient agricultural inputs, which can be remedied by more efficiently reaping nature's cornucopian potential through agri-biotech. In the apocalyptic frame, by contrast, GM crops pose risks which lie beyond credible management. According to an apocalyptic discourse, agri-biotech also undermines benign alternatives, in particular, less-intensive agricultural methods and high-quality products. The metaphors: superweeds, sterilisation and GM pollution have helped mobilise activists and to intensify public suspicion towards agribio-tech. A third frame, the managerialist frame has sought to legitimise EU regulatory proce-dures through links between scientific evidence and extra-scientific issues.

Three contending risk-frames for GM crops (Levidow and Carr, 2007)

	Eco-efficiency/cornucopian agri-biotech business, e.g., Europabio, some farmers	Managerialist DG-Environment & national regulatory agencies	Apocalyptic environmental NGOs, Coordination Paysanne, Green MEPs
Agricultural problem	Inefficient farm inputs, uncompetitive outputs	Uncertain biophysical effects of a new technology	Intensive monoculture, farmer dependence on MNCs, pesticide treadmill
Nature seen as	Cornucopian potential to be reaped	Resources to be managed and protected	Fragile resources under threat from uncontrollable, irreversible risks
GM crops seen as	Safe eco-efficient tools to gain economic and environmental benefits	Potential hazards to be evaluated and managed	Pollutants threatening the environment, democracy and societal values
Solution	Apply routine management measures	Design research and controls to manage uncertainty	Block or deter GM products
(1) Herbicide-tolerant weeds	Manage this agronomic problem through product stewardship, e.g., standard Good Agricultural Practices (GAP)	Evaluate control measures and their feasibility for this agro-environmental problem (which could affect herbicide usage)	Prevent 'genetic treadmill' and 'superweeds' which would perpetuate agro-chemical dependence
(2) Harm to farmland biodiversity	Use herbicides more efficiently and so reduce environmental harm Bayer: plan moral	Test relative harm of broad-spectrum and selective herbi-cides—effects contingent upon	Prevent herbicides from sterilising the countryside into green concrete

	Eco-efficiency/cornucopian agri-biotech business, e.g., Europabio, some farmers	Managerialist DG-Environment & national regulatory agencies	Apocalyptic environmental NGOs, Coordination Paysanne, Green MEPs
from 'total' herbicides	teaching for farmers.	farmer practices	
(3) Mixture of GM and non-GM crops	Protect non-GM crops through standard isolation distances (for each crop)	Limit adventitious presence through national measures for segregation and co-existence	Prevent 'genetic contamination'—but impossible or difficult

On the view that value-driven ethical questions on the use of biotechnology lie beyond the remit of regulatory procedures and authority, Carr and Levidow (2000) suggest that at least two criticisms can be levelled against such a view. The first of these criticisms is that science-based judgements are not value free themselves. For example, value judgements are involved in deciding what impacts to include and leave out of the risk assessment, and what counts as environmental harm. The second criticism is that the subjectivity of the decisions is compounded when the issue is not risk but uncertainty. While it may be difficult to take such uncertainties into account in the regulatory procedure, downplaying them by using the language of calculable risk undermines public trust in the regulators' precautionary efforts (Carr and Levidow, 2000).

Carr and Levidow (2000) also make some observations about the ad-hoc nature of national ethical committees in the UK. First, the link between the regulatory procedure and ethical advisors on the committee is weak as their opinions are not binding on the regulatory authorities. Second, the opinions of the professional bioethicists seem to be based on traditional anthropocentric and utilitarian ethical theory. The emerging ecocentric theories of environmental ethics are not considered, even though there are clear signs of shifting public values towards the environment, especially among environmentalists. Third, they tend to look at issues in terms of what they can get the public to find acceptable, rather than what ought to be acceptable; they encourage policy makers to think 'we've referred it to them, the ethics is now sorted, now we can just get on with the business' (Harris, quoted in (Vines, 1994)). Fourth, the value assumptions and normative judgements underlying the risk assessment decisions are not questioned. Fifth, many of the concerns being raised are not readily separable into scientific and ethical components but are integrally linked.

Carr and Levidow (2000) argue that instead of viewing risk as if it can be assessed pre-dominantly on the basis of scientific evidence, with relatively little uncertainty involved,

and treating ethical judgements as a separate issue, risk should be represented as a more integrated issue which would view uncertainty as a larger component of the risk assessment, and ethics as integrally involved in judgements about science, risk, and uncertainty.
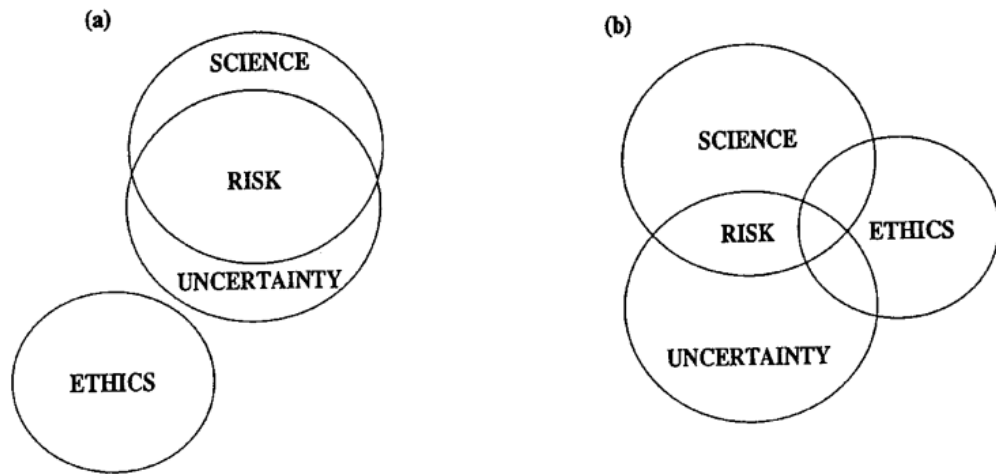
Conceptual maps of the link between science, risk, uncertainty and ethics (Carr and Levidow, 2000).

Comparing the regulation and the controversy of GMO maize with other controversial issues like BSE, Marchi and Ravetz (1999) suggest that the risk of GM maize is 'postmodern' in that there is no palpable or even demonstrable injury. It is not merely a question of different ways of conceiving a danger; some participants say that there is no danger at all. "*The uncertainties of the problem, necessarily viewed more or less subjectively, are more critical in the arguments than many of the facts of the case. The debate is as much at the methodological level as the scientific: how seriously should we weight possible future hazards; how much is the credibility of an applicant damaged by faulty procedures; how far is it legitimate for policy and commercial concerns to affect the evaluations of risks?*"

3.4   Conclusion

GM crops has been a contentious issue particularly in Europe and over the last two decades intense public and media interest has provided the frame of reference for viewing the debate on GM and also provided the grammar for the discourse. This chapter has given a review of the literature of the context in which the 'GM Nation?' public debate happened.

The participants in the 2003 'GM Nation?' public debate would have been contextually indebted to these earlier debates and media reports on the basis of which they formed their own views on the issue.

In the previous chapter I had reviewed the literature on public engagement and discourse analysis. This chapter focused on the specific background to the 2003 'GM Nation?' public debate. As mentioned in the previous chapter, there exists a gap in the literature in terms of bringing a critical discourse analytical perspective to public engagement exercises on risky technologies. Issues of power in such public deliberations haven't been adequately dealt with. This research aims to contribute towards having these issues highlighted and understood in public engagement exercises by analysing the 2003 'GM Nation?' public debate. The next chapter details the methodological underpinnings of this research work and the methods employed for the analysis.

Chapter 4 - METHODOLOGY

4.1   Introduction

The preceding chapter reviewed the literature on public engagement in science and technology, discourse theory and technological transformation. Empirical studies which can be seen as been underpinned by one or more of these disparate disciplines were also reviewed. Towards the end of the chapter, a gap in the literature was identified, namely the lack of empirical studies incorporating all the three disciplines and detailed discourse analysis of public engagement exercises. In this chapter, the methodological issues pertaining to this research are discussed and also the particular method used here for textual analysis as part of Critical Discourse Analysis are explained in detail.

4.2   The relationship of theories, models and hypothesis

Before I go on to the methodology, it will be useful to briefly describe the process of how and why one comes to select a particular methodological perspective. For this purpose, I make use of the flowchart described by David Silverman (Silverman, 2006).
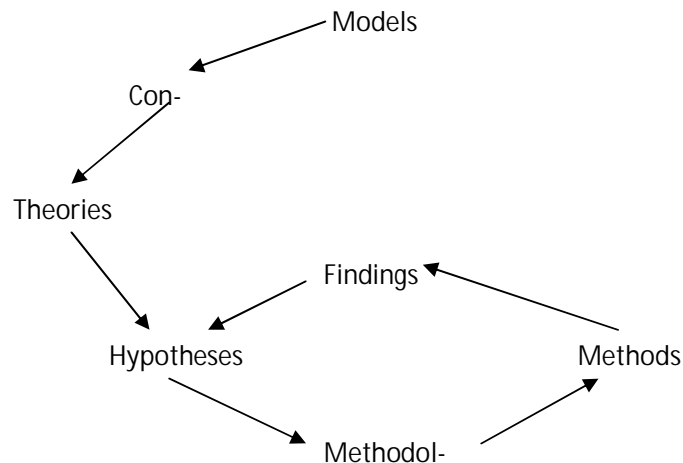
Figure 4. 1 Levels of Analysis (Silverman 2006)

These terms are explained in the following table

Term	Meaning	Examples
Model	An overall framework for looking at reality	Ethnomethodology, feminism
Concept	An idea deriving from a given model	Social practices, oppression
Theory	A set of concepts used to define and/or explain some phenomenon	Ethnic identification devices, social construction
Hypothesis	A testable proposition	"Tribes invoke ethnic identification devices more frequently when threatened by external enemies"
Methodology	A general approach to studying research topics	Quantitative, Qualitative
Method	A specific research technique	Social survey, conversation analysis

Table 4. 1 Basic terms in research (Silverman, 2006)

I-The Model

Models provide an overall framework for how we look at reality. They tell us what reality is like and basic elements it contains. My particular research project is a form of critical social policy research, informed by post-structuralist theories. A theory is critical to the extent that it seeks human emancipation, "to liberate human beings from the circumstances that enslave them" (Horkheimer, 1982). Critical theory as developed by the original Frankfurt School has its roots in Marxism and Hegelian philosophy, and is principally concerned

with libratory social transformation via political struggle to overcome oppressive structures (Healy, 2000). Critical approaches examine social conditions in order to uncover hidden structures. Critical theory maintains that understanding the ways one is oppressed enables one to take action to change oppressive forces. It has evolved from Marx's notion of 'false consciousness'. In methodological terms, critical theory challenges positivism as a theory of scientific investigation. It looks at positivism as the dominant form of ideology in late capitalism, in the sense that people everywhere are taught to accept the world "as it is", thus unthinkingly perpetuating it (Agger, 1991).

In broad terms, **_post-structuralism_** implies a conception of all social entities and the material world as discursive in nature. I have done a detailed introduction on post-structuralism in the literature review chapter (Chapter II) and have also explained the 'critical post-modernism' of Marston (2002). This is the model on which this research is based.

II-The Concepts

Concepts are clearly specified ideas deriving from a particular model. Concepts offer ways of looking at the world which are essential in defining a research problem.

The concept of _social constructionism_ is closely related to the _post-structuralist_ model and feeds my research epistemology.

Social Constructionism

Though _social constructionism_ is an umbrella term for a range of theories, Burr (1995) lists four premises shared by all social constructionist approaches.

1   Our knowledge of the world is not objective truth. Rather, knowledge is created through discourse; i.e. what we know is not a reflection of an objective world 'out there', but is a product of the way in which we choose to categorise the world.

2   Our view of the world is historically and culturally contingent. Our worldviews and our identities could have been different had we been in a different historical and cultural context.

3   Knowledge is contingent. Knowledge is created through social interaction in which we construct common truths.

4   Different knowledge regimes or social understanding of the world lead to different social actions in which some forms of action become natural and others unthinkable. (cited in (Jorgensen and Phillips, 2002)).

III-Theories

Theories arrange sets of concepts to define and explain some phenomenon. Without a theory these phenomena cannot be understood. My research is a multi-disciplinary project and looking from a post-structuralist model and a social-constructionist epistemology, the theories on which I base my research questions are:

.

1) *Theories of Citizenship and Democracy* – Dryzek, Habermas, Mouffe, Irwin, Goven, Jasanoff

2) *Theories of Discourse* – Foucault, Laclau and Mouffe, Fairclough, Wodak, Potter

IV Research questions

A review of the literature on the theories mentioned in the previous section led to the formulation of following research questions.

1.   How do outsiders influence technological transformation?

2.   What discursive strategies are adopted by participants of public debates on technologies? Do they strive to achieve consensus on such issues or are they are polemic in nature?

3.   How does the discursive capacity of different groups affect their ability for influence in debates on technological issues?

4.   How do issues of power and dominance between groups have an influence on effective public engagement?

It is clear that all the research questions are a direct result of the **model** I selected, which led to the **concepts** and eventually to the literature of the specific **theories** from which my research questions are deduced.

V-Methodology

One way of approaching research methodology is to consider research in terms of qualitative or quantitative approaches on one hand, and inductive vs. deductive relation to theory on the other (Bergadaa and Nyeck, 1992).

	Inductive	**Deductive**
Quantitative	To observe specific relations between a large number of objects and describe them in a model	To determine if numerous objects that are representative of the problem at hand dispose of the properties and relationships anticipated by a theoretical model.
Qualitative	To define the behaviour of an object and to understand the conceptual framework to which it belongs. Develop theories, models etc. from observations.	To explain the characteristics and behaviour of existing objects following a set of predetermined relationships in a model.

Table 4. 2 Quantitative, Qualitative, Inductive, Deductive

Relation to theory

The *deductive* and *inductive* are two basic approaches that describe the research's relation to theory. In the *deductive* approach, the researcher, on the basis of what is known about in a particular domain and of theoretical considerations in relation to that domain, deduces a hypothesis (or hypotheses) that must then be subjected to empirical scrutiny. In the *inductive* approach, theory is the *outcome* of the research; i.e., a theory is developed based on the observations (Bryman, 2004).

Deductive approach

```
                    ┌─────────────────────┐
                    │       Theory        │
                    └─────────────────────┘
                               │
                               ▼
          ┌──────────────────────────────────────┐
          │        Observations/Findings         │
          └──────────────────────────────────────┘
```

Inductive approach

```
          ┌──────────────────────────────────────┐
          │        Observations/Findings         │
          └──────────────────────────────────────┘
                               │
                               ▼
                    ┌─────────────────────┐
                    │       Theory        │
                    └─────────────────────┘
```
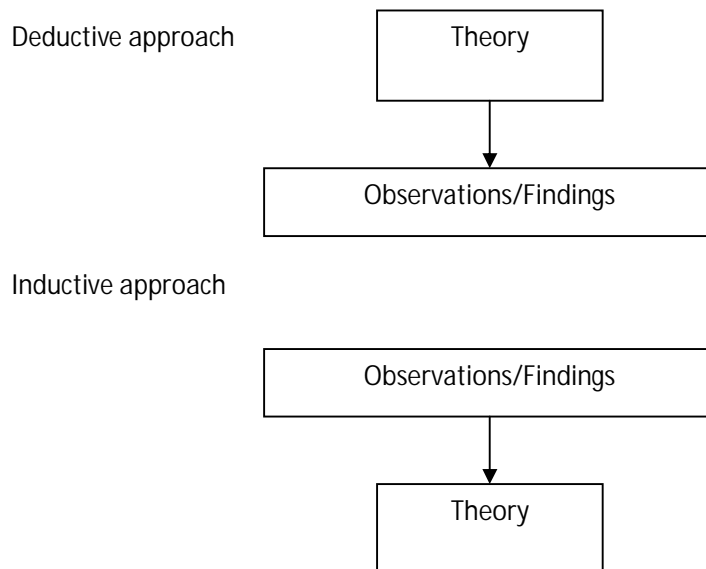
Figure 4. 2 Deductive and Inductive approaches to relationship between theory and research

Bryman (2004), though, argues that either approach will contain elements of the other. For example, in the *deductive* approach, as the hypotheses are confirmed or rejected, the results are fed back to the stock of theory that prompted the whole exercise which may result in the revision of the theories. And the *inductive* process is likely to entail a modicum of deduction. Once the phase of theoretical reflection on a set of data has been carried out, the

researcher may want to collect further data in order to establish the conditions in which a theory will and will not hold.

In the case of my research project, it is largely *inductive* but also has a *deductive* aspect as well; *deductive* in the sense that my research questions have a grounding in the theories of *Social Construction of Technology, Discourse, Citizenship* and *innovation*. However, as has been clear from the literature review, the application of *discourse theory* to technological debates has not been dealt with adequately in the literature and my research aims at contributing towards a development of a more robust theory of *technological discourse*. This is the *inductive* aspect of this research.

Choice of qualitative or quantitative approach

The decision of whether to choose the qualitative or quantitative approach ultimately depends upon the aim of the research, and as a direct consequence, on the type of research questions asked; whether the researcher is looking for *meaning* and *explanation* (qualitative approach) or for *frequencies* and *fundamental laws* (quantitative approach) (Van Maanen, 1983).

Yin (2003) distinguishes five forms of research questions: 'who', 'what', 'where', 'how' and 'why'. As argued above, the research questions strongly influence whether one should look for qualitative or quantitative data. Yin (2003) specifies this in the following way:

- 'What' questions in the sense 'how much' or 'how many' refer to numbers, i.e., quantitative data, and the most appropriate research strategies are surveys or archival analysis.
- 'How' questions, 'why' questions and 'what' questions of the exploratory kind, are, on the other hand concerned with coming to terms with the meaning, not the frequency, of a certain phenomena; i.e., qualitative data and qualitative approaches (Yin, 2003).

Though highly simplified, Bryman (2004) differentiates the quantitative and qualitative approaches as follows:

Quantitative research

- Entails a deductive approach in which the focus is on the testing of theories
- Incorporates the practices and norms of the natural scientific model and of *positivism* in particular; and
- Embodies a view of social reality as an external, objective reality.

Qualitative research

- Emphasis an inductive approach in which the focus is placed on generation of theories;
- Rejects the practices and norms of the natural scientific model and of *positivism* in particular and embraces the understanding of the ways in which individuals interpret their social world;
- Embodies a view of social reality as a constantly shifting emergent property of individuals' creation.

	Quantitative	**Qualitative**
Relation to theory	Deductive; testing of theory	Inductive; generation of theory
Epistemological orientation	Positivism	Interpretivism
Ontological orientation	Objectivism	Constructionism

Table 4. 3 Fundamental differences between quantitative and qualitative research strategies (Bryman, 2004)

As is quite clear from the above discussion, the *qualitative* approach is most suitable for my own research project. The **model**, **concepts**, and the **theories** on which my research ques-

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tions are based have an *interpretivist* and *constructionist* orientation. Also, the approach is largely *inductive* and finally, my research questions are 'how' based which according to Yin (2003) entails a qualitative approach.

VI-Methods

Methods are specific research techniques or strategies. According to Yin (2003), any strategy can be used for the purpose of exploratory, descriptive or explanatory research. For example, there could be exploratory case studies, descriptive case studies or explanatory case studies. There could also be exploratory experiments, descriptive experiments and explanatory experiments. Yin (2003) identifies the relevant situations for the five different research strategies based on the form of research questions asked, the extent of control on the event/s being investigated and whether or not the focus is on contemporary events.

Strategy	Form of Research Question	Requires Control of Behavioural Events?	Focuses on Contemporary Events?
Experiment	How, Why?	Yes	Yes
Survey	Who, What, Where, How many, How much?	No	Yes
Archival Analysis	Who, What, Where, How many, How much?	No	Yes/No
History	How, Why?	No	No
Case Study	How, Why?	No	Yes

Table 4. 4 **Relevant situations for Different Research Strategies (Yin, 2003)**

Thus depending on the whether the research question is 'how', 'why', 'who', 'what' or 'where', and whether the behavioural event can be controlled and whether the research focuses on contemporary events, one or more of the five research strategies can be used.

Since my research questions are of the 'how' type, using the criteria in the first column of table 4, either an experiment, or an historical analysis or a case-study would be suitable. Further using the criteria of 'control over behavioural events', since this research project is based on the public engagement exercises over risky technologies, an experiment strategy cannot be used. The differentiating factor between history and case study is the extent of focus on contemporary events. Public engagement over technological issues is one of the most topical concerns in social research. Although histories can be used to analyse this research issue, the project may be affected by many problems:

- Difficulty in accessing relevant data from the past.
- The amount of data required for conducting a historical analysis may be difficult to manage due to time and logistical constraints
- The analysis may sacrifice the depth of analysis in favour of the breadth.

Hence, a case-study is the most suitable strategy for this particular research project.

4.3   Choice of case

In selecting the case for the research, the following criteria were used:

- Relevance of the event in the UK context.
- Contemporariness of the event.
- Relevance of the event in terms of science-society relations.
- Accessibility of relevant data for analysis.

The 'GM Nation?' public debate which took place in the UK in June 2003 was selected as the case study for the research. 'GM Nation?' was the most extensive public engagement exercise ever carried out in the UK. The commercialisation of Genetically Modified (GM) crops has been a very controversial issue in Europe, more so in the UK and is an ongoing issue. The relevance of the event in terms of science-society relations cannot be emphasised enough. The recommendation for the debate came from the report '*Crops on Trial*' published by the Agriculture and Environment Biotechnology Commission (AEBC) in September 2001. Stressing the importance of encouraging a broader national engagement, the report said:

"It will be crucial for the public to be involved in the important decisions which need to be taken. We have to find a way to foster informed public discussion of the development and application of new technologies."

(http://www.gmnation.co.uk/ut_09/ut_9_1.htm)

4.4   Data Collection

The data consisted of the following datasets.

1.   Transcripts of the six launch meetings;
2.   Comments posted by the general public on the official website.

The six launch meetings

The 'GM Nation?' public debate was launched with a series of six Tier 1 meetings in various parts of the UK, including Birmingham, Swansea, Taunton, Belfast, Glasgow and Harrogate. The transcripts of these meetings were sourced from the official website of the debate: www.gmnation.co.uk. Much of these meetings were organised around small round-table discussions between participants. The feedback from these discussions around each table was delivered by a volunteer from each table. These meetings were audio-taped by the

organisers and the transcripts made available of the official debate website. However, the transcripts consisted only of the feedback from each table and did not include the discussions around each table. This was the case for all the six meetings.

Apart from these six Tier 1 meetings, there were about 42 Tier 2 regional and county-level meetings and 629 local Tier 3 meetings. The transcripts for these meetings were not available and hence they didn't form part of the data set for the research.

Comments/Emails posted on the debate website

The organisers had provided for participants to post their comments and emails on the GM issue on the debate website. Over 1200 email/comments were received during the debate period, nearly all from individual members of the public. The data set for this research included 166 of the emails and comments posted.

All the data was analysed manually by repeated reading of the transcripts of the public meetings and the 166 comments/emails. A minimum use of the NVivo software was made for the purposes of locating quotes pertaining to the themes identified.

4.5   Data Analysis

The method used for analysis is informed by Fairclough's three-dimensional model of Critical Discourse Analysis. The model has been described in detail in the review of the literature (Chapter II). Fairclough has also suggested a number of specific methods for analysing of texts. This section describes in detail the particular methods used to analyse the textual data in this research.

4.5.1 *Dialogicality and hegemony*

Intertextuality is the presence of actual elements of other texts within a text. This could range from taking the form of direct reporting of other text within quotation marks (direct speech) to summarizing or rewording of what was actually said or written (indirect speech) with or without attributing it to an agent.

As with intertextuality, *assumptions* connect one text to other texts. But assumptions differ from intertextuality in that the former are not attributed or attributable to other specific texts, but left vague.

"Both intertextuality and assumptions can be seen in terms of claims on the part of the 'author' – the claim that what is reported was actually said, that what is assumed has indeed been said or written elsewhere, that one's interlocutors have indeed heard it or read it elsewhere. Such claims may or may not be substantiated" (p.40).

The defining contrast between intertextuality and assumption, however, is that whereas the former explicitly "*opens up difference by bringing in other 'voices' into the text*"; the latter "*reduces the difference by assuming common ground.*" In other words intertextuality, accentuates the *dialogicality* of the text and the latter diminishes it. Here Fairclough borrows from Bakhtin's 'dialogical' theory of language according to which *"a word, discourse, language or culture undergoes 'dialogization' when it becomes relativized, de-privileged, aware of competing definitions for the same things. Undialogized language is authoritative or absolute"* (Holquist 1981 p.427 in Fairclough, 2003, p. 42).

Depending on the text's orientation to difference or the degree of 'dialogicality', Fairclough lists five possible scenarios:

a) an openness to, acceptance of, recognition of difference; an exploration of difference, as in 'dialogue' in the richest sense of the term;

b) an accentuation of difference, conflict, polemic, a struggle over meaning, norms, power;

c) an attempt to resolve or overcome difference;

d) a bracketing of difference, a focus of commonality, solidarity;

e) consensus, a normalization and acceptance of differences of power which brackets or suppresses differences of meaning and norms.

As we have seen in our discussion on Laclau and Mouffe's discourse theory in the previous chapter, *hegemony* is a central concept in post-structuralist discourse theory which emphasise the importance of ideology in sustaining relations of power. Hegemony is a particular conception of attaining power through consent and acquiescence instead of just resorting to force. The hegemonic struggle between two contenders can be seen as partly a contention over the claims of their particular visions and representations of the world to having a universal status. Thus *hegemony* is the *universalizing* of certain *particular* claims.

As mentioned earlier, intertextuality opens up difference and assumptions reduce difference. Thus the most 'dialogic' text would be one which directly quotes other texts or attributes other sources in the text; i.e., one which gives 'voice' to other sources (type 'a' and 'b' above), and this degree of 'dialogicality' will reduce as we from texts with explicit references to other texts to those which make modalised assertions. Even less dialogical option is the text which makes non-modalised assertions, leaving no room for other possibilities (type 'd' above). And the least dialogic would be 'assumptions' which suppresses any possibility of difference, taking particular assertions for granted. Thus lesser the 'dialogicality' of the text, greater is its 'hegemonising' capability.

Most dialogical	Attribute, quote
	Modalised assertion
	Non-modalised assertion
Least dialogical	Assumption

4.5.2 *Legitimation Strategies*

According to Weber, "Every system of authority attempts to establish and to cultivate the beliefs in its legitimacy"(Weber (1964) in Fairclough, 2003). And according to Berger and Luckmann, "legitimation provides the 'explanations' and justifications of the salient elements of the institutional tradition". People are constantly concerned in social life, and in what they say or write, with claiming or questioning the legitimacy of actions which are taken, procedures which exist in organizations, and so forth. This means that textual analysis is a significant resource for researching legitimation.

Four main strategies of legitimation are distinguished:

- **Authorisation** Legitimation by reference to the authority, custom, law, and of persons in whom some kind of institutional authority is vested.
- **Rationalisation** Legitimisation by reference to the utility of institutionalised action, and to knowledges society has constructed to endow them with cognitive validity.
- **Moral Evaluation** Legitimation by reference to value systems.
- **Mythopoesis** Legitimation conveyed through narrative.

4.5.3 *Logic of Equivalence and Logic of Difference*

Laclau and Mouffe (1985) identify a 'logic of difference' and a 'logic of equivalence'. These are respectively tendencies towards creating and proliferating differences between objects, entities, groups of people, etc. and collapsing or 'subverting' differences by representing objects, entities, groups of people, etc. as equivalent to each other. This is an aspect of the continuous social process of classification. Classification has crucial effects such as whether political processes and relations are predominantly represented, understood and acted upon in terms of division between 'left' and 'right', or how diverse economic and social phenomena and changes are subsumed under 'globalisation' as equivalent instances or aspects of it. Thus classification and categorisation shape how people think and act as social agents. Equivalence and difference are in part textual relations and these categorisa-

tions and classifications are partly realised through textual strategies. These textual strategies relate to semantic and grammatical relations between clauses and sentences. Thus, logics of difference are realised through the use of contrastive relations (with words like, 'but', 'instead of' and 'however') and logics of equivalence are realised through the use of additive and elaborative relations, for example making entities equivalent by including them in lists.

4.6   Validity, Reliability and Reflexivity

For researchers working within the positivist paradigm, 'validity' and 'reliability' are the cornerstones of legitimate research. Reliability is the requirement that research findings are repeatable and not a result of fleeting, localised events; Validity is the requirement that the researcher's description of the world reflects what is really out there, independent of our ideas and talks about it. Social constructionist research, however, is not about finding objective facts about the world or making truth claims. For social constructionist researchers all knowledge is provisional and contestable and historically and culturally specific. Thus the concepts of validity and reliability are therefore inappropriate for judging the quality of social constructionist work like this current one (Burr, 1995).

For social constructionist research, the concept of reflexivity has been adopted to judge the quality of the work. Reflexivity involves the recognition of the problematic nature of research, the dubious position of the researcher, the constructive nature of language, and that there is no 'one best way' of conducting either theoretical or empirical work (Alvesson et al., 2004). Accordingly, this researcher acknowledges that in using a Critical Discourse Analysis approach the research has taken an explicit political stance, in that it seeks to uncover and make visible the relations of power and domination that exist in the debate on GM crops in the UK. In keeping with the social constructionist approach, this research does not make claim to the absoluteness and finality and objectiveness of the findings of the research and acknowledges that the researcher brings his own world views and biases to the research and cannot completely distance himself from them. The quality of this research can be assessed in the robustness of the methods used and the thoroughness of the analysis.

4.7   Conclusion

The research project is based on a critical *post-structuralist* model. *Post-structuralism* implies a conception of all social entities and the material world as discursive in nature. The concept closely related to this is *social constructionism* which has a historically and culturally contingent view of knowledge and the world. This is a multi-disciplinary research based on theories of innovation, citizenship and democracy, discourse theory and social construction of technology. Based on a review of the literature on these theories, research questions were framed, which dictated a *qualitative* and *inductive* methodology. The case study selected for research was the 'GM Nation' public debate held in the UK in June, 2003. Transcripts of the public meetings were sourced from the official website of 'GM Nation?' and analysed using Fairclough's three-dimensional model of CDA. The following chapter will describe in detail 'GM Nation?' debate, covering its contextual background and the actual exercise itself.

Chapter 5 – Description of the Case Study

5.1   Introduction

In the previous chapter I discussed the methodological issues related with this research and also outlined the methods to be used for data analysis. This chapter describes in detail the case-study that has been selected for this research, namely the 2003 'GM Nation?' public debate organised in the UK to debate the issue of the possible commercialisation of GM crops. This public participation exercise was described by the steering board as 'an un-precedented event – a special public debate before a potentially far reaching change in public policy'. I start by giving a background to the debate, the immediate history of the general biotechnology debate in the UK and the developments which led to the 'GM Nation?'. I then look at how the 'GM Nation?' was constituted and planned, its aims and objectives, its remit and its status in the policy making process and governance of GM foods and crops in the UK. This description of the case-study prepares us for the discourse analysis of the textual data from the debate in the following chapter (Chapter V).

5.2   Background to the debate

The governance of biotechnology, especially those areas of biotechnology relating to food, in has been the subject to much controversy in the UK over the recent decades. The years 1996 to 1999 were agricultural biotechnology's 'watershed years' in the UK (Gaskell et al., 2003). It all began with a particular shipment of soya from the US in 1996 which was eventually revealed to be genetically modified soya developed by Monsanto, and with it the prospect of GM soya entering the food chain without labelling. In the background of the BSE/CJD crisis, the publics, by and large, had little appetite for genetic modification of food products, particularly in the absence of any visible benefits to them. A series of Eurobarometer surveys that charted the publics' views on biotechnology had revealed that

people had become increasingly sceptical about the benefits of biotechnology through the 1990s and support for GM food and GM crops had declined. The BSE crisis in 1996 had shaken the publics' trust in scientific governance and showed the limitations of scientific expertise, which in turn had an influence on the general opinion on agricultural biotechnology. The issue reached a crescendo in 1999 with the controversy surrounding the work of Arpad Pusztai on genetically-modified potato. In the experiments done by his team, rats fed on GM potato showed intestine damage and harm to their immune systems.

With the public trust in the voices of science, politicians and regulators at its lowest ebb and with the recognition that technological innovation could no longer ignore public opinion, public consultation was advocated nationally and internationally as a possible solution to the crisis. The House of Lords Science and Technology Committee recommended public consultation as a remedy to the unaccountable nature of the traditional policy-making process which relied on expert opinions. The Labour Government, in 1999, ushered in a new era of open governance with the establishment of the Human Genetics Commission (HGC), the Agriculture and Biotechnology Commission (AEBC) and, in 2000, the Food Standards Agency (FSA). The 'GM Nation?' debate was coordinated by the AEBC.

5.3   Purpose of the debate

The stated aims of the 'GM Nation?' public debate were twofold (2003):

1. Promote an innovative, effective and deliberative programme of debate on GM issues, framed by the public, against the background of the possible commercial production of GM crops in the UK and the options for possibly proceeding with this
2. Through the debate provide meaningful information to Government about the nature and spectrum of the public views, particularly at grass roots level, on the issue to inform decision-making.

To meet these aims, the public debate sought to:

1. Allow the public to frame the issues for the debate so that the debate focused on what the public thought were important issues;

2. Focus on getting people at the grass-roots level whose voice had not yet been heard to participate in the programme;

3. Create new and effective opportunities for deliberative debate about the issues;

4. Enable (through dialogue with experts and other activities) access to the evidence and other balanced and substantiated information the public may want and need to debate the issues;

5. Create widespread awareness among the UK population of the programme of the debate, and give widespread opportunities to register views;

6. Provide occasions within the programme of debate for interactions between members of the public in debate, and mutual learning between the public and experts;

7. To complement and inform the economic and science strands and in turn, as appropriate utilise their outputs;

8. Calibrate the views of organisations who had already made their views known by contrasting their views with other participants in the debate;

9. Provide intelligent, qualitative information about public views emerging from the debate in a report to the Government (GM Nation? The findings of the public debate)

5.4   Structure of the debate

The debate comprised a number of distinct stages including, a process of desk research, a preliminary series of workshops, designed to allow a range of lay perspectives to frame the terms of the process, the production of stimulus materials to support the debate process, an open engagement phase, comprising public meetings, availability of information materials, a website, and the opportunity to comment on the issues or complete a questionnaire, and a series of focus groups that were conceived as providing some degree of 'control' over possible bias arising from the public engagement perhaps only attracting participation by those with pre-existing and fixed views.

The process started with an initial desk research conducted on strategic considerations for designing the programme of the debate, and on existing public views on genetic modification. In order to elicit lay framings of GM-related issues, a series of discussion groups, known as Foundation Discussion workshops, were organised with the objective of investigating how a cross-section of the lay public tries to make sense of these issues. There were nine such discussion groups conducted. Eight of these groups were made up of individuals who were not already engaged with the issue of genetic modification, and a single workshop was composed of those who were actively involved and interested in GM issues. These workshops took the form of focus groups and used a wide range of moderation techniques, some of which were novel. These included the use of a number of games that made possible the representation of contrasting participant views in graphic and amusing terms, storytelling, and the presence of a professional cartoonist to provide stimulus material. The interactions of the participants within these workshops were highly mediated by two facilitators. Audio recordings were done of all the workshops by the facilitators and they also retained a variety of flipcharts which were used during the various games and procedures in the workshops. They also retained the work of the cartoonist who was present at each of the workshops.

The analysis of the group discussions identified six frames that the participants used when discussing, and trying to make sense of, GM issues (Wilbourn, 2003):

- Food
- Choice
- Information needs
- Uncertainty and trust
- Targets and intended trajectory
- Ethics.

November 2002

Foundation Discussion Workshops

Total of 9 large 'focus groups'. 8 with ordinary citizens pre-selected to represent a spread of socio-demographic characteristics. 1 further meeting held with GM stakeholders.

Exploratory 'framing' of issues in preparation for the main debate process the following summer.

Open Meetings

Tier 1
Major 'national' meetings organised by Steering Board executive (n = 6)

Tier 2
Meetings organised by local councils or national organisations and supported by Steering Board executive (n = 40 estimated)

Tier 3
Local meetings organised by community groups, educational centres etc. (n = 629 estimated)

**MAIN DEBATE
June-July 2003**

Debate Website

Including information on GM, and the opportunity to register views in qualitative and quantitative form.

Closed 'Narrow-but-Deep' Groups

10 re-convened focus groups held with 77 ordinary citizens pre-selected to represent a spread of socio-demographic characteristics.

Each group met twice to deliberate on GM issues, with a period in between to gather information.

Transcripts and Rapporteurs' Reports

Questionnaire Responses

Emails/ Letters

Qualitative Analysis of Participants' Discourse

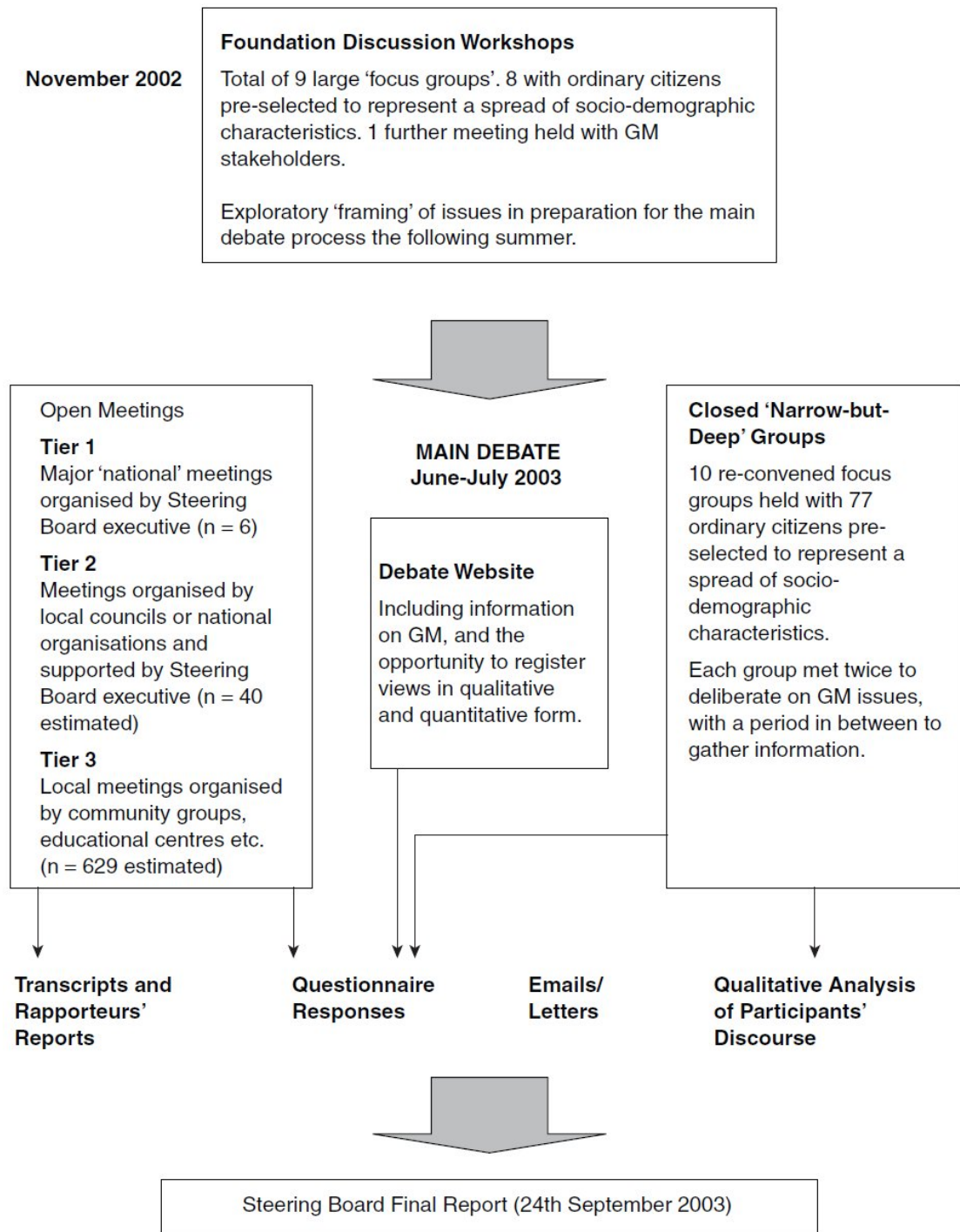Steering Board Final Report (24th September 2003)

Figure 5. 1 The 'GM Nation?' debate process - Source: (Pidgeon et al., 2005)

The information obtained from the initial desk research and the nine Foundation Discussion workshops was used to develop a range of stimulus materials to ensure participants in the

debate were informed adequately about the nature of the arguments on GM. As a first stage, background research was commissioned which included a review of the literature about public attitudes in the UK to GM issues, focusing on GM crop commercialisation and a review of the other public engagement exercises conducted in the UK and elsewhere.

The work of preparing the stimulus material was not straightforward as it was required to strike a balance between the relative status of quite well-established scientific findings and wider value-based issues like political and ethical considerations. The sub-contractors appointed to carry out this work were advised that whilst the brief was concerned with creating "objective" information, there was a case to include "opposing views" because "this is often how people encounter information in real life".

The stimulus materials thus produced were in the form of a video, a workbook and a CD-ROM. The video used the device of using conversations between three small groups of people – members of the lay public, scientists and farmers – to articulate the different kinds of argument typically used in debates about GM. The workbook, which was a glossy 48 page pamphlet and the CD-ROM contained the information on GM and took the form of a series of questions about GM, its regulation, possible impacts and so on. The material was presented in the form of a paragraph or two of "views for" and "views against".

5.5   The Public Meetings and the Website

The public meetings were organised in 3 Tiers. In Tier 1 there were six national and regional public meetings, three in England and one each in Northern Ireland, Scotland and Wales, directly organised by the organisers of 'GM Nation?'. In the Tier 1 meetings, the plenary sessions were professionally introduced and facilitated. Most of these meetings were organised around small round-table discussions between participants. The feedback from each table to a final plenary was delivered by volunteer. The Tier 1 plenary sessions were audio taped and subsequently transcripts were made available on the debate website. The Tier 2 and Tier 3 meetings took on a diversity of forms. Tier 2 events were county-level meetings organised in partnership with county councils and other public organisations and Tier 3 meetings were local events organised independently by interested groups and organisations and they were provided with the stimulus material. These meetings did not necessarily follow a uniform format like the Tier 1 meetings. For each meeting, in every

Tier, the organisers issued feedback forms, posing the questions generated by the Foundation Discussion Workshops and allowing participants to express further views.

The debate was launched on 3 June 2003 with a press briefing in London and the first of the Tier 1 meetings in Birmingham. The other Tier 1 events took place in Swansea, Harrogate, Taunton, Glasgow and Belfast. These meetings were attended by over a 1000 people. It was estimated that there were a total of around 40 Tier 2 regional and county-level meetings and 629 local Tier 3 meetings.

The 'GM Nation?' public debate also had a website and was actively utilised to gather views from the public. From 1 June 2003 to 16 July 2003 the website received over 2.9 million hits and 24,609 unique visitors, of whom 5,110 visited more than once. Each visitor's session lasted on average 11 minutes 5 seconds, and over 60 per cent of visitors submitted feedback forms: these figures compare very favourably to typical response rates on commercial websites. Starting from when it was first announced in 2002, the debate received over 1200 letters or emails, nearly all from individual members of the public.

5.6   Debate Feedback

During the six weeks of the '*GM Nation?*' debate, about 70,000 feedback forms were sent out in response to requests from members of the public and interested organisations. In total 36,557 feedback forms were completed. Of the 36,557 responses 18,771 (51 per cent) were submitted in hard copy and 17,786 (49 per cent) on the website. More than half the respondents, 54 per cent, were women (compared to 51 per cent in the UK population) and 44 per cent were men (compared to 49 per cent). The remaining 2 per cent did not identify their gender. The feedback forms invited people to complete the questions inspired by the Foundation Discussion Workshops.

5.7   The "Narrow-but Deep" process

The debate organisers were aware that findings from the debate drawn from a self-selected sample of the lay public could be criticised for their possible bias. To test the possibility of whether there was a silent majority who chose not to participate in these public events, the 'narrow-but-deep' component of the debate was organised. This comprised of ten further group discussion exercises amongst the general public. The sample was constructed to give

broad coverage across the general public population. Thus, four broad life stage and two broad socioeconomic groupings were adopted, while the locations gave broad geographic coverage of the United Kingdom, including Scotland, Wales and Northern Ireland. A total of 77 people took part. All the groups specifically excluded people who were employed, or did research in biotechnology and/or GM or who did any active campaigning for or against GM.

Specific objectives of the Narrow-but-Deep process included the following requirements:

- To use the frames identified by the public to facilitate debate and deliberation which focuses on what the public sees as the relevant issues surrounding GM.
- To enable access to the evidence and other balanced and substantiated information the public may want and need to debate the issues.
- Through deliberation and access to evidence, allow people to come to a considered view on the issue of GM, the possible commercialisation of GM crops in the UK, and the options for proceeding with this commercialisation.

Each group met twice during June or July 2003 with a facilitator, using a very similar approach to the Foundation Discussion Workshops. In their first session, the participants were introduced to the issue of GM and the debate, and provided with the '*GM Nation?'* booklet and CD-Rom. They were invited to devise ways for them to continue to engage in issues about GM, and think and talk about it before meeting again in about two weeks' time. They were given a daily diary to use as they pleased to collect their findings and record their thoughts. Participants used the time between sessions in different ways, collecting information from a variety of sources. At their second session, they reported the results of their activities on GM and discussed and debated the issues they thought most important. At the beginning of each session, before any discussion, each group was asked to complete the thirteen "closed" questions of the debate feedback questionnaire. Their replies, and their discussions in each session, give broad "before and after" pictures of their views on GM and suggest whether and how the general public might change their responses to GM issues in the light of greater engagement. The facilitators audio recorded each of the Narrow-but Deep sessions. The diaries kept by participants during the two weeks between group meetings were collected at the end of the second meeting. Standard 'GM Nation?' feedback questionnaires were issued to the participants for completion on the spot at the start of both the first and second meeting of each group.

5.8   Conclusion

This chapter described in detail the case-study involved in this research, the 'GM Nation?' public debate. The debate was a result of a long period of controversy in the UK over applications of biotechnology, in particular plant biotechnology. The changing status of science-society relations and the increasing use and acceptance of exercises all over the world aimed at involving the publics in the governance of science and technology was also instrumental in the decision to organise the debate.

The debate was the largest such public engagement exercise ever organised in the UK and had number of components to it including public meetings, questionnaire feedbacks, an interactive website where people could post their comments and much narrower group discussions. This chapter gave a detailed description of each of these elements of the debate.

The thesis now proceeds to the analysis part of the research and the next chapter has the critical discourse analysis of the textual data obtained from the case-study, comprising of the transcripts of the six Tier 1 meetings and the comments and emails posted on the 'GM Nation?' website.

Chapter 6 Analysis of the 'GM Nation?' data

6.1   Introduction

This chapter analyses the data from the 'GM Nation?' debate. In the first section, I analyze some extracts from the comments posted on the official website of the debate using Fairclough's textual analysis method and in the second section I analyse the transcripts of the six Tier-1 public meetings which took place as part of the debate.

PART 1 – Analysis of emails/comments

6.1.1   Analysis of some extracts

This analysis focuses on the various discourses which people made use of while claiming their case in the GM debate, the intertextuality and assumptions involved in their claims, their legitimation strategies and the classifications they make of social processes through the logic of equivalence and the logic of difference. Here selected extracts from the views expressed by people on the debate website have been analysed. The extracts were selected on the basis of the richness of content for the purposes of analysis and to cover the broadest range of views expressed by the participants on the debate website.

Number of comments posted on the 'GM Nation?' website month-wise.

Month	No. of comments
August 2002	1
October 2002	1
January 2003	12
February 2003	35
March 2003	55
April 2003	55
May 1-May 3 2003	7

Table 6. 1 No of comments posted on the 'GM Nation?' website posted month-wise

6.1.2 *Discourses/Themes*

In this section I identify the most common themes and discourses found in the letters and comments posted on the 'GM Nation?' website. The themes are illustrated by quoting the relevant text from the letters and comments. These themes were identified after a close reading of the material and this was largely an inductive process, although the possibility of previously identified themes influencing the coding process to some extent can't be ruled out.

Economics

Identity as 'consumer'

Generally, the participants on the 'GM Nation?' website seemed to look upon themselves as consumers. In the debate, their role as consumers seemed to overrule any other identity they may have, for example their role as citizens, as parents, as male/female, as farmers, as students, as housewives, as protestors etc.

Some explicitly identified themselves as 'consumers'.

I should like to comment as a consumer (layperson) and share some personal experience on how close we are (as a European collective) to realising short term financial gains if GM crops are introduced in Europe. – R F

As a mere consumer, previously exposed to the horrible risk of VCJD despite repeated reassurances from the government of the day, I am somewhat cynical about this consultation process. – D B

As a consumer who increasingly opts for the organic option I am concerned that the introduction of GM crops will limit, by contamination, my freedom to exercise the choice to buy organic food. – Ms. V M

Economic benefits of GM / being GM-free

While discussing the benefits of going GM or GM-free, the economic argument was quite prominent in the submissions of the participants on the website.

Some seemed to frame the debate in pure economic terms:

studies in India and other developing world countries have shown that adoption of high input/high yield methods of agriculture associated with GMO's are not economically viable to the typical subsistent/cash crop farmer. – H

Opposing GM crops is both irrational and financial lunacy………
Unfortunately the people opposed to GM crops know little about the science and want to make Britain a scientific and commercial backwater.
If people want to grow food uneconomically and produce less healthy products, then they certainly have the right to do so. However such people should not try to impose their views on the rest of us.
– R L

There were also concerns raised about the effect of GM on the market for organic foods, economically impacting organic farmers and producers.

The organic farmer in question was fighting for a right to protect his livelihood, as millions of farmers globally are doing. The release of GMOs, "accidentally", into the environment is a reality. If these farmers cannot guarantee their produce to be 100% organic, their entire market is destroyed overnight. – S E

Organic agriculture is facing a serious threat with the possibility of GM crop licences being issued by the government this autumn. In the USA, there have been several cases of cross-pollination

between GM and non-GM crops that has even led to some growers of non-GM crops being success-fully sued by GM seed companies for growing patented GM seeds without permission. In a small country like ours, cross-pollination would occur frequently due to wind borne and insect borne pollen. This could spell the end of organic agriculture in Britain. – D G

My last concern about GM food is the effect on the organic food industry. I am already aware of a company which makes organic soya products and no longer sources soya from Canada due to fears of cross-contamination from GM crops in the US. Considering the size of Canada it would seem that organic farms in the north of the UK could justifiably complain about GM crops growing anywhere in Northern Europe, let alone within a few miles in the same country. The organic food industry is growing and flourishing, even the Prince of Wales is a strong advocate. It would seem crazy to me with the rich soil and plentiful water we have in the UK to risk the integrity of our future crops by growing experimental seed tampered with by greedy corporations. – S W

There are approximately 70 Organic farmers in Dorset whose livlihood would be threatened as GM contamination is not permitted in Organic produce.
Honey producers are particularly vulnerable as bees can travel over 3 miles collecting pollen – MF

I am totally opposed to GM products imported or grown here, and am especially horrified by the plans to railroad through the gm licenses.
I believe it is up to the government to PROVE to us BEYOND DOUBT that no harm is possible and this can only be done over many tens of years due to the very nature of gene transfer and the toxicology results of tissues fed on gm products over a significant proportion of a lifetime.
I am involved with an organically run smallholding surrounded by commercial agricultural land - people like me will find it impossible to start up in the future. – J B

Many argued that permitting GM crops will only result in economic benefits to the big biotechnology multinationals.

The only people this benefits are greedy farmers and Monsanto - which not only has monopoly on selling the GM seed but also the weedkiller needed to benefit from the GM properties. – S W

…. the main purposes seem to be that multi national seed producers (like Monsanto) obtain an unfair advantage because their seeds become dominant through gene drift and pollution of indigenous crops. – A M

As I understand, the new genes themselves are copyright the GM conglomerates and they could claim revenue from these farmers (and countries) who have been unwittingly contaminated, in effect the world could be held to ransom.
No matter what the protestations of the GM companies are at this moment, in the future, with perhaps new senior management, whatever financial boost which can be obtained will be. – G H

In this case, the uncertain science on which the GM trials are based is being dictated by large corporations with huge financial interests. – S F

In the USA, according to the Soil Association report, in spite of claims by GM seed companies, virtually every benefit claimed for GM crops has not occurred. Instead, farmers are reporting lower yields, continuing dependency on herbicides and pesticides, lack of demand for GM crops, particularly in Europe and, critically, reduced profitability leaving food production even more vulnerable to the interests of the biotechnology companies. – D G

Some argued that going GM-free will give UK a competitive advantage over other regions of the world.

Farmers here would be well advised to stick to more 'natural' crops to be sold at a premium to the rest of the world when the GM product loses its flavour, metaphorically speaking. – GH

As a relatively small agricultural economy compared to USA, Canada etc and as an island we are in a very good position to market our produce at the quality end of the market by investing in

organic and IPM solutions rather than trying (and inevitably failing) to compete on price through pursuing high input/high yield methods via conventional non-organic and GM solutions. – H

Runaway

The 'runaway' theme has been adapted from Gamson and Modigliani (1989), where in our case it refers to a fatalistic position on GM crops and denotes apocalyptic, uncontrollable consequences of permitting the commercialization of GM crops .

The 'runaway' discourse was frequently invoked by the contributors to the website.

Some raised concerns that when the dangers of growing GM crops are realised it would be too late by then.

We have seen with so many new technologies that the hidden dangers only reveal themselves after a significant number of years, by which time it is too late to reverse the damage caused. – M H

Don't open Pandoras box, as there will be no going back. WHY TAKE THE RISK? – S

If, by scientific speculations unforeseeable adverse effects appear later, after having opened doors to GM, there will be no way back It is a one way process. – Dr. E. K-P

...my concerns about GM agriculture stem from the potential risk that dominant genes, once let loose would be very difficult to stop spreading. Remember, it may take just one slip by one farmer to release GM pollen which would promulgate exponentionally. – G H

Quite often the same metaphor of the genie was used to describe the situation of uncontrollability of the consequences of commercializing GM crops.

In brief the potential upside of GMOs, even if the GM companies are correct (and that is very dubious - see the Soil Association report Seeds of Doubt), is strictly limited while the downside is quite terrifying. This Genie cannot be put back in the bottle. – Mr. R N

Those who say introduced GM genes will not spread are living in cloud-cuckoo-land.
Once out of the bottle, the genie will not be able to be caught when things (go) wrong- as they will do, going by past human efforts of tinkering with the environment. – H W

As a scientist I accept that some GM products will be safe
and beneficial, but we only need one mistake, and the genie is out of the bottle for
ever. History is littered with examples of man doing something without appreciating the consequences of his actions. We must stops this madness before it is too late. – Mr. T H

They'll never get the genie back in the bottle if you go ahead with this.
How will our grandchildren think of this decision? – Mrs. M B

The trouble with the current trials is that they involve the release of GM material into the environment. The genie is already partly out the bottle. I do not want it fully released. Following the wider use of GM crops it would be impossible to guarantee that conventional crops were not contaminated. – B G

Trust

Trust was another major discourse frequently raised in the emails. There was large scale distrust towards the motives of the multinational biotechnology firms.

First of all, I think the public do have a genuine worry as regards the motives of the biotech companies. Multi-billion dollar corporations do not become such through philanthropy and altruism. They are businesses and, this being understood, they are concerned with making money – S E

In this case, the uncertain science on which the GM trials are based is being dictated by large corporations with huge financial interests. They are risking our health, future choice of food and the fragile environmental balance that sustains us. If the GM crop trials were being grown undercover there would not be the degree of concern there is now. – S F

The choice of wind pollinated crops seems to me a deliberate attempt by the industry giants to corrupt non GM and organic genetic material with their technology so destroying the oppositions ability to claim GM free status. – H

It is therefore not surprising that the Environment Minister himself went on the record recently to express his concern at the manner in which the GM research effort is "controlled" by the GM industry itself, with hardly any fully independent research into GM health and safety funded by the Government. He realises full well that the industry may well be in possession of a wide range of of research results which could lead to the demise of their entire industry; and naturally enough, since the health and safety of the public does not come at the top of their list of priorities, they will ensure that this material never sees the light of day. – Dr. B J

There was distrust towards the government as well.

I cannot protest strongly enough regarding the Government's cavalier support for GMO's (with the honorable exception of Michael Meacher). Anyone might assume they were in the pocket of the agro-chemical industry! – S C

Ultimately in an increasingly unstable world where even democratic governments ignore the opinions of the masses in favour of the multinational corporations and their profits, such as has happened with the war in Iraq, this kind of forum for discussion will become irrelevant compared with the horrors that will be brought upon us! – M J

Unfortunately the secrecy which prevailed at the outset means that trials have been conducted in dispersed sites, rather than in strictly controlled locations, and as with Foot and Mouth disease, it is only after the event that consideration of the concerns has been given any respect. Unfortunately MAFF's high-handed conduct and secrecy brought discredit on all assurances of safety from such a government-funded source, so the change of name to DEFRA, far from reassuring, adds to suspicions of a cover-up. Likewise the government desire to control has led to the Food Standards

Agency being seen as a government agency and not a trustworthy independent body, at the very time when the endorsement by such an independent body could have carried weight.

At a time when the highest standards of transparency are required, if people are to put trust in the changes introduced by such bodies, sadly the way they have been set up removes that trust. It is therefore all the more important that the environmental concerns are met by open and reasoned presentation of evidence, with opportunities for opponents to put their case and have it weighed by an impartial body, not a political officer or body. – G.J. S

I'm not sure, given recent history if the Government will even listen to the views of the public on this issue, or any other. – C W

And also towards scientists and their science.

As science can only judge on the knowledge from past experiences by mere extrapolation, scientific results cannot be relied upon as the only basis for decision in cases of such enormous long term consequences. – Dr. E. K-P

Now the Biologists are making patents and releasing modified genetic material into the environment. They have no idea of the potential dangers in that. They just have not done anything like sufficient research to discover them. And they lie. Their wages are dependent on the success of their employers, and they are appointed to Committees that should be making proper regulations to see that no modified gene can find out for itself what mischief it can get up to if free in the environment. – IT

science has not had the time or opportunity to test the possible effects of GMOs and much of the research that has been done is by bodies with a vested interest. – D G

Many participants saw the government, the biotechnology industry and the scientists as co-involved together in a sort-of conspiracy to push through the commercialization of GM crops in the UK, whatever the opinion of the public. The term 'establishment' was also used a few times.

The establishment from the beginning of the GM affair has tended to the view that the science is not as dangerous as the tabloids like to say and that we have been eating GM maize for years without mishap, further, life-science research depends heavily on the big international companies and without these funds our biotechnical industry would fall behind. This general view has sanctioned the placing of scientists involved in the the biotechnical industry in regulatory bodies here and

especially in America and there is no doubt that our government has been strongly influenced to favour GM promotion. – M D

What is going on here? Why does the scientific establishment feel so threatened by one relatively small research project that it has to continue, more than three years after the publication of the paper in question, with its campaign of vilification and refutation? The answer may be that the results thrown up in the study were so inconvenient to the establishment's ruling hypothesis (ie that GM foods are perfectly safe) that they are still in a state of denial. It goes without saying that this state of denial suits the biotechnology multinationals — and their research teams — extremely well. – Dr. B J

It is my strong belief that this Government is being manipulated (ie having its monetary strings pulled) by those companies and scientists involved in the trials and production of GM food. – CB

Consumer Choice

One of the most frequently discussed topics in the emails was the issue of consumer choice being affected by the commercial growing of GM crops.

In addition to this, it seems to be the case that the phrase "consumer choice" is bandied about everywhere in an extremely selective manner. Consumer choice brings us any number of different companies selling the same product in different packaging. I would like to see someone trying to safeguard my right as a consumer to choose GMO-free over the self-conferred "right" of the biotech companies to safeguard their profit margins by ensuring that my capacity for choice is taken away. – S E

The loss in the choice to eat non-GM food due to the contamination of non-GM crops by GM crops through cross-pollination was raised by many contributors.

GM crops will contaminate surrounding crops and consequently, in time, consumers will not have the ability to choose not to eat GM products because they will have infiltrated almost everthing that we wish to eat. This is not acceptable. – M H

I believe we have a right to choose organic. It has already been proven that cross pollenation can contaminate organic crops, thereby losing their organic status. – S

If GM has spread out all over the farmland by cross pollination soon there will be not enough GM free food available. So, by making concessions to the almighty GM industry the government will deprive their citizens from the Right for their Freedom of Choice. – Dr. E. K-P

In recent years farmers have been encouraged to diversify. Those that have taken the time and effort to convert to organic farming are now under threat of having their land contaminated. If this happens, their steadily increasing number of customers will have lost their right to choose the source of their food. – S F

If GM is grown commercially in this country all crops will eventually become contaminated thus removing consumer choice. – M F

Quite simply the consumer has clearly stated that they want to retain 'Choice' and the granting of GM commercial licences would, in due course, contaminate Organic and non GM crops grown here thereby considerably reducing choice.
Those of us who prefer to eat organic food would be driven to importing it from those Countries which declare themselves GM free & even they, in due course, would be contaminated through wind blown GM pollen. – D G

Uncertainty/ignorance

There was widespread concern amongst the contributors about the uncertainty which existed as to the knowledge on the possible consequences of growing GM crops.

To let GMO's loose in our wonderful countryside - and indeed in our amazing world - is absolutely criminal. They can have no possible knowledge of where it will lead and the unalterable damage which will be spread throughout. – S C

We do not yet know the TRUE implication of what meddling with nature can do. – S

The extent of the unknown risks of introducing GMOs into the environment is too great to even start to comprehend. We must recognize that our knowledge of the processes that regulate gene incorporation and expression are in their infancy and that our capacity to manipulate the plant genome is crude. Given this lack of understanding the current regulatory safeguards are inadequate and cannot offer sufficient protection against inadvertent creation of health and ecological problems. – Dr. J A D S

The truth is ACRE does not know what the risks are. When and how have the long-term risks to human health ever been assessed?

In the report of monitoring studies of field scale releases of GM oil seed rape in England from 1994 -2000 by NAIB, it is clearly stated, "Further investigations are needed to determine the extent of spontaneous hybridisation between oilseed rape and certain wild crucifers and the production of backcrossed and introgressed populations". So we also do not know what the risks to the environment are, and that is just from oilseed rape alone. What about all the other varieties of GM crops that will be grown here if the government and the biotech industry get their way? – D B

Being such a small island means that the comparative density of vegetation there can be no sure way of knowing what the seeping' effect of cross pollination will be. – E S W

Now the Biologists are making patents and releasing modified genetic material into the environment. They have no idea of the potential dangers in that. They just have not done anything like sufficient research to discover them. - I T

Genetic modification involves the insertion of an alien gene into the genetic material of any organism, raising the 'possibity' of many unforeseeable consequences. Little is known about how genetically modified organisms (GMOs) will interact with the environment or with one another; science has not had the time or opportunity to test the possible effects of GMOs and much of the research that has been done is by bodies with a vested interest.

The British Medical Association has said the potential adverse effects have not been sufficiently investigated, and they strongly recommend caution. – D G

I wish to register my opposition to the introduction of GMOs into the UK (or to take the wider view, into Europe) on the grounds that (a) we do not know what the long term effects of consumption of GMOs are; (b) we do not know what the effect of growing such crops would have on other crops, particularly those grown Organically - from evidence we have so far, it appears that no effective distance has been established which would ensure that no cross-contamination occurred; (c) I believe we do not know enough about the effects on our ecosystem of "tampering with Nature'. – J W

I am extremely concerned at the possibility of GM crops being commercially planted in the UK whilst the "jury is still out" on the potential damage which this action could cause. ……… Furthermore, the potential damage to the environment and wildlife has not been fully explored and conclusions reached. It does seem sheer folly to proceed to full scale GM crop planting without understanding the

possible dangers. – T M

Developing Countries

The discourse of developing countries was also prominent in the emails sent to the website. Most of the comments on this theme were a rejection of the idea that GM crops/food would be beneficial to consumers and farmers living in less-developed or developing countries and help in solving world hunger problems.

Many of the commentators on this page have pointed out the lie to the idea that GMOs will mean we can solve the world's food problems. There are countries in Africa right now suffering from starvation, countries with rich natural resources, fertile land and a perfect climate. They are not starving because they cannot grow food there. They are starving for myriad other reasons, one of which has more to do with the international arms business than it does with the agricultural environment. – S E

It certainly won't feed the world, it will give greater control over natural resources to multinational companies. This will only make the situation worse for people in developing countries. As such, GM crops have already been burnt in protest by farmers in India who feel completely duped by the GM industry, which seems to be entirely motivated by profit. – S C

There is already enough food in the world to feed everyone, what is missing is a lack of will in Western world to provide this food to less fortunate countries at a price that does not incur horrendous debt. – C M

African countries have made a strong stand against accepting GM. Once the farmers there understand that they will have to buy seeds from the patent companies and will not be able to save, store and re-use their own seeds, they soon realize the risks involved. Each year they will have to buy new seed from the company. Small farmers will need loans to buy them. Oxfam, Christian Aid, Save the Children, Cafod and Action Aid have warned that GM crops could further intensify poverty and malnutrition in the developing world. – S F

I would also like to comment on one of the myths put about by the pro GM lobby that GM technology can solve the problem of famine in third world countries. It will NOT. The problem is not lack of food but a combination of corrupt governments and ruthless exploitation by western business and financial organisations. The introduction of GM into third world countries will only make matters worse by making their farmers dependant on the Biotech companies. – M F

We are told that this technology will solve the world's food shortage - there isn't one. More than enough food is grown to feed the world's population, it just isn't being distributed to those who need it. – C W

Although, there was some support for the idea that GM crops will benefit the developing world.

Unlike almost all GM protesters, I have actually spent time in the developing world— including 12 years in Papua New Guinea helping set up farmers cooperatives to grow coffee and chrysanthemums (to produce organic-approved pyrethrum insecticides). These farmers are desperate for crops that will resist deadly diseses and insects and will reduce their workload.
Unlike British "organic farmers" they don't have the luxury of hand-weeding and "homeopathic fertilisers." – Dr. R J

Public debate

The contributors also commented on the public debate process as well. Most of these comments were critical of the debate process.

Some expressed doubts over the intentions of the organisers of the public debate

This public debate may be a good thing but I fear it will be simple window dressing on the part of government to try and quell the present overwhelming opinion of the public against the technology, but ultimately big business will win out and GM will be thrust upon us largely without our knowledge as there are no plans to make producers label GM products. – M J

This is not a debate. There is no opportunity on this website for consumers to get involved in or influence a public debate, beyond a very basic 'post your views here'. There is no promise that the views of people who do follow this line will be recorded, or analysed, or taken into account in any

way - it looks to me as if these emails have no more impact than a radio phone-in show. This site is misleading and this pretence of public debate is clearly a farce. -

I don't see how we can have a proper public debate without access to the proper information. – Dr. A.W. W

There was dissatisfaction expressed with the timing of the debate, wanting the debate to have taken place before the field trials had commenced.

As a mere consumer, previously exposed to the horrible risk of VCJD despite repeated reassurances from the government of the day, I am somewhat cynical about this consultation process. We have unwittingly been eating GM Soya for several years now and UK field trials have already genetically contaminated the environment and organic crops. Wouldn't it have made much better sense to have had some form of democratic consultation prior to this fait accompli? - D B

Some were not happy with the publicity, or the lack of it, for the debate.

I find it interesting that you are certainly keeping this Public Debate really very quiet- it took quite a lot of chasing to discover this address after fortuitously hearing Farming Today at that popular hour of five thirty am-nice to know the Government really wants to hear public opinion. – C G

6.1.3 *Intertextuality*

Intertextuality, in general, is the direct or indirect presence of elements of other texts within a text. As was described in the methodology chapter, the analysis of intertextuality of a text can be based on nature of the 'orientation to difference' of the text. Fairclough identifies five scenarios of 'orientation to difference' for a text:

a) an openness to, acceptance of, recognition of difference; an exploration of differ-
   ence, as in 'dialogue' in the richest sense of the term;

b) an accentuation of difference, conflict, polemic, a struggle over meaning, norms,
   power;

c) an attempt to resolve or overcome difference;

d) a bracketing of difference, a focus on commonality, solidarity;

e) consensus, a normalisation and acceptance of difference of power which brackets or
   suppresses differences of meaning and norms (Fairclough, 2003)

In this section I give extracts from the emails sent to the 'GM Nation?' website as instances
of intertextuality for each scenario described above.

a) **an openness to, acceptance of, recognition of difference; an exploration of dif-
   ference, as in 'dialogue' in the richest sense of the term**

*I am willing to believe that weeds are a major threat to soya crops, and indeed that reducing this
threat makes soya farming more efficient but bearing in mind the current trend towards avoiding
food treated with pesticides, herbicides and hormones I cannot see the benefit to the British buying
public of a product designed to have more chemicals sprayed on it during the growing process. – S
W*

Here the external voice is implied in the form of those who believe that weeds are a major
threat to soya crops. It is a form of unattributed indirect reporting. The writer is showing a
willingness to agree with this external voice on this matter but as a whole is opposed to use
of pesticides. Hence there is an exploration of difference in this text indicating a dialogue
and an openness to other voices.

No matter what the protestations of the GM companies are at this moment, in the
future, with perhaps new senior management, whatever financial boost which can be obtained will
be. – G H

Here the writer shows a degree of openness to the '*protestations of the GM companies*' and recognises the differences between them and his own opinions.

I know that there are risks to be acknowledged, and a regulated system is required and in place for
our safety, but I have read many untrue opinions which have only scared people unfairly. – K A

The tone of the writer here is definitely one of acceptance and recognition of differences as the writer acknowledges that there are some risks to GM but thinks that there many false stories floating around as well.

While I can understand the argument that, since all crops have been modified by plant breeders
down the centuries, we should not stop the process now, I am deeply concerned that not enough
conditions have been put in place, nor been the subject of open public discussion, before open air
trials have been launched. – G J S

The writer shows some degree of openness to differences in positions regarding GM when s/he mentions that s/he understands the argument about crops having been modified by plant breeders for centuries.

b) **an accentuation of difference, conflict, polemic, a struggle over meaning, norms, power**

A lame "We're sorry, we didn't realize" will hardly do the trick to cure the widespread destruction
they will have engineered.- S C

Here the writer involves an external voice in the form of what it might say in the future. This voice is not attributed or vaguely attributed to those who support the growing of GM crops and creates an accentuation of difference between this and writer's own voice.

When Dr Trevor Watts points out that "It was very noticeable to me that the leader of a group of GM protesters, unaccountably acquitted on a charge of criminal damage for tearing up GM crops, actually owned an "organic" farm, and therefore had strong vested interests in promoting it", he is conveniently ignoring the fact that the bodies who stand to gain the most, internationally, from the marketing of GMOs are the multi-billion dollar biotech companies. Now there really is a vested interest. – S E

Here the effect of the quote directly attributed to Dr. Trevor Watts is to accentuate the difference and the conflict and is polemic. The writer of the email also contests the term 'vested interests' used by the quoted voice and thus there is a struggle over meaning in this text.

In addition to this, it seems to be the case that the phrase "consumer choice" is bandied about everywhere in an extremely selective manner. Consumer choice brings us any number of different companies selling the same product in different packaging. I would like to see someone trying to safeguard my right as a consumer to choose GMO-free over the self-conferred "right" of the biotech companies to safeguard their profit margins by ensuring that my capacity for choice is taken away. – S E

Here the writer contests the meaning of the term 'consumer choice' which the writer thinks is being used in an 'extremely selective manner'. The writer contents that the way the term is being generally used it may bring the consumers the choice of different companies selling essentially the same product; however the writer wants the consumer to be given the choice of eating GM-free food.

Those who say introduced GM genes will not spread are living in cloud-cuckoo-land. – HW

This is an unattributed indirect reporting where the writer's own voice conflicts and is in polemic with the reported voice as he doesn't agree with the assessment that introduced GM genes will not spread.

My main concerns over GM foods stem not from the unproven concerns about
possible health risks from the actual genetic modification process but from the reasons behind each
modification and the consequences – S W

As I understand it Monsanto developed GM soya, not to allow it to grow in areas with limited water
supply, or to improve crop size in poor soil but to allow it to withstand heavy applications of the
Monsanto weedkiller commercially known as "Roundup" – S W

The above two extracts are examples of non-attributed intertextuality. In the first extract the writer implies that there have been concerns raised about possible health risks ('unproven') due to GM by some, although the writer doesn't attribute it to anyone. Similarly in the second extract, the writer implies that claims have been made regarding GM that it allows crops to be grown in areas with limited water supply and improves crop size in poor soil. Again these claims are not attributed to anyone. In both the cases the writer opposes these claims made and thus there is a conflicting or polemic relationship between the voices.

In a letter from Mr Meacher my local MP was informed that 'it is alert to the fact that GM crops
may have an impact on allergies, but to date it is not aware of any GM plant release leading to an
adverse effect on human health'. If the government leaves its blinkers on and plays puppy to
America it will not find any evidence in any direction against GM crops. – JB

Here the external voice is in the form of a direct quote from Mr. Meacher. The writer is critical of Mr. Meacher's quoted text and thus the external voice serves to accentuate the difference between the writer's own position and what is according to the writer, the government's position.

We can help the third world with the vast overproduction we already have. – S

Here the writer refers to claims made by proponents of GM that it will help feed the third world. The writer does this implicitly without reporting these claims. One implication of this is that the claim made by GM proponents is so well-known so as to have achieved hegemonic proportions and the writer's text is an attempt to dislodge that hegemony, a struggle over meaning.

The current generation of GMOs provide little real benefit except in corporate profit, while assumptions have been made that a GM variety is no different to a non-GM variety without rigorously testing this hypothesis. - Dr J A D S

There is an unattributed indirect reporting of the assumptions being made that GM varieties are not different from non-GM ones.

It certainly won't feed the world, it will give greater control over natural resources to multinational companies. – S C

The writer makes an implicit reference to the claims made by proponents of GM that it will help feed the world. The text here serves to accentuate the difference in position between this and the writer's own.

Dr Pascal Drake says "pollen spread between GM and non-GM species can be minimised by physical spread". What distance does he recommend, given that in Mexico, GM-contaminated crops were found 60 miles from the nearest official plantings? – Ms. M B

This is a direct quote from Dr. Pascal Drake which the writer gives an impression of having a dialogue with and exploring differences with, but is in effect, creating a polemic and accentuating differences with Dr. Pascal Drake.

ACRE, in its assessment of the risks from GM oilseed rape stated, "ACRE's risk assessment of GM oil seed rape has always assumed some gene-flow will occur and that this does not in itself constitute a risk to human health or the environment." Echoes of the bland cajolery delivered to us during BSE debacle? The truth is ACRE does not know what the risks are. When and how have the long-term risks to human health ever been assessed? - DB

Here again is a direct quote from an organisation called ACRE. The writer responds to this quote by reminding the readers about the BSE debacle. Clearly, the orientation to difference in this text is polemic and accentuates the difference.

There is no need for them in England - nor probably elsewhere, in spite of unsubstantiated claims that only they can feed the world. – M D

There is an unattributed indirect reporting in the form of 'unsubstantiated claims' about feeding the world. The orientation to difference is polemic.

The people of the developing world who know the truth about GM crops want them desperately — only those few who believed propaganda about GM causing cancer in children (a scandalous lie spread by white representatives of "environmental" groups) are sceptical, and most of them are converting. – Dr. R J

The text contains an instance of implicit intertextuality in the form of '*a scandalous lie*' attributed to '*white representatives of "environmental" groups*'. The writers tone is in polemic to the implicit outside voice.

If GM is an attempt to corner the market in seeds, it's a pretty poor one. – Mrs. U J

Here the writer makes reference to accusations made by opponents of GM about GM companies allegedly wanting to create their monopoly in the seeds business. Here the writer refutes this allegation.

I would also like to comment on one of the myths put about by the pro GM lobby that GM technology can solve the problem of famine in third world countries. It will NOT. The problem is not lack of food but a combination of corrupt governments and ruthless exploitation by western business and financial organisations. – M F

The outside voice here is in the form of '*myths*' attributed to the pro GM lobby. The writer categorically refuses to accept that '*GM technology can solve the problem of famine in third world countries*'.

GM agriculture has been heralded as a breakthrough for the world, claiming higher yields, fewer herbicides and pesticides. Thus it is claimed to be kinder to the environment, a solution to world hunger and an economic miracle for farmers. The experiences of American and Canadian farmers, (See the authoritative Soil Association report "Seeds of Doubt" published last September & now on their website), indicates that these claimed benefits have not materialised, and many problems and detrimental side effects have occurred. – D G

This text serves to accentuate the differences between the various voices presented here, i.e. the pro-GM voices which are not attributed and the anti-GM voices which are attributed to American and Canadian farmers.

We are told that this technology will solve the world's food shortage - there isn't one. More than enough food is grown to feed the world's population, it just isn't being distributed to those who need it. – C W

This is a case where an unattributed voice is included in the text when the writer refers to the claims made that this technology will solve the world's food shortage. The writer vehemently denies that there is any problem of food shortage in the world. Thus there is a struggle over meaning visible in the text and is polemic.

No amount of Government assurances that there is 'no evidence' that GM food is unsafe will convince me that it is safe. Nobody knows that, so don't insult our intelligence. – CW

Here the writer includes the voice of the Government in the form of its assurances about there being no evidence that GM food is unsafe. The writer rejects these assurances outright creating a polemic between the voices.

The Government has stated that it is committed to increasing organic yields within the UK and yet, judging by the North American and Canadian farmers experience (see the Soil Association's Seeds of Doubt Report), this will be impossible due to contamination by GM crops. – T M

Here the writer includes two voices, one of the Government and the other of the North American and Canadian farmers. The writer claims that the Government's promise to a commitment to increasing organic yields within the UK cannot be fulfilled due to contamination by GM crops as has been experienced by North American and Canadian farmers.

c) **an attempt to resolve or overcome difference**

I am perplexed by both the extreme pros and antis regarding GM crops. It seems to me that each case is different and needs to be analysed as such. It seems that as a member of the public I am supposed to be either against or for without having proper access to the data for each proposed crop. I very much resent this attitude by those who wish to push through their new GM varieties and those who unthinkly reject every proposal out of hand. Dr. A. W. W

Here the writer refers to the attitudes of those who want to push through their new GM varieties and those who tend to reject every proposal without due consideration. The writer distances himself from both these extreme voices and suggests that each case is different and should be analysed as such. This can be seen as an attempt to resolve the differences between the two extreme voices.

It is very unfortunate that the arguments for and against GM technology have become polarised with dogmatic and unsupportable arguments being used by both sides. – AW.E & L S. E

Here the writers lament the polarisation of the GM debate with '*dogmatic and unsupportable arguments*', taking a neutral position. This can be seen as an attempt, although in a not entirely convincing manner, to resolve this polarization by taking the middle path.

d) **a bracketing of difference, a focus on commonality, solidarity**

This is a precedent surely no-one wants to set. As Mr Robert Nock rightly points out, "this Genie cannot be put back in the bottle" – S E

This is an example of a direct quote where the writer quotes an external voice to support his/her own position. Thus, there is a focus on commonality and a bracketing of any other difference that may exist between the quoted voice and the writer's own.

Since the trials started I have suffered from severe hayfever during the flowering of these crops. This has required medical treatment. I am not the only resident to suffer an extreme reaction. – J B

The writer brings in an outside voice in the form of statement of fact "*I am not the only resident to suffer an extreme reaction*". This implies that other residents have either told him/her personally or have reported this to someone orally or in writing that they have suffered extreme reactions as well. This form of indirect reporting tends to conceal any differences (for example, the kind of 'extreme reaction') and focuses on commonality.

We have seen with so many new technologies that the hidden dangers only reveal themselves after a significant number of years, by which time it is too late to reverse the damage caused. – M H

This is an instance of indirect reporting where the writer refers to other examples of new technologies going wrong. Here the writer points to the commonality between these technologies and GM in terms of their 'hidden dangers', and brackets any differences that may exist.

1   *It has already been proven that cross pollenation can contaminate organic*

2   *crops, thereby losing their organic status. We do not yet know the TRUE*

3   *implication of what meddling with nature can do. In the US people have reported*

4   *allergic reactions resulting in recall costing billions. Processing of our food*

5   *supplies have already had terrible results and do get into the food chain - ie*

6   *adding of antibiotics as a matter of course to animals due for slaughter causes*

7   *resistance in humans. – S*

The extract is highly dialogic as it has many instances of intertextuality, although either in the form of indirect reporting or through implying what would have been said or written without actually reporting them. In Lines 3-4 the writer brings in the voice of the people in the US who have reported allergic reactions, through a form of indirect reporting. There are at least 2 other instances where the writer brings in other voices without actually reporting them but by implying what they would have said or written. For example, she writes on

lines 1-2, "*It has already been proven that cross pollenation can contaminate organic crops…*". This implies that somebody would have written down in a research article to prove that cross pollination can contaminate organic crops, although the writer doesn't report it as such. Similarly in lines 4-5, the writer implies that it has been reported elsewhere that processing of foods has resulted in harm. All these examples of intertextuality tend to report the common elements amongst the different voices and ignore any differences that might have existed.

As such, GM crops have already been burnt in protest by farmers in India who feel completely duped by the GM industry, which seems to be entirely motivated by profit.- SC

Here the imagined voice of the farmers in India is brought into the text '*who feel completely duped by the GM industry*'. This voice finds solidarity with the writers own views.

In the report of monitoring studies of field scale releases of GM oil seed rape in England from 1994 -2000 by NAIB, it is clearly stated, "Further investigations are needed to determine the extent of spontaneous hybridisation between oilseed rape and certain wild crucifers and the production of backcrossed and introgressed populations". So we also do not know what the risks to the environment are, and that is just from oilseed rape alone. – D B

The text contains a direct quotation from a report by NAIB. The writer uses to quote to support his own position and thus the orientation to difference in this text is that of solidarity and a focus on commonality.

There is no need for field trials to demonstrate that organic food is preferable; ask any serious chef or just eat it. There is evidence on the other hand that pesticides eaten on food are harmful. – M D

Oxfam, Christian Aid, Save the Children, Cafod and Action Aid have warned that GM crops could further intensify poverty and malnutrition in the developing world. The US government now admits that GM crops do not increase yields. – S F

In the above text there are a couple of instances of implicit intertextuality where there is implication that things have been said or written without actually reporting them. Here, in the above example what is represented is a generalized attitudes like 'warned' and 'admits' which abstract away from specific statements or evaluations. These abstractions, of what could be quite diverse things that have actually been said or written, serve the function of reducing difference and focus on the commonality between the voices.

*In a week where Tony Blair has (applaudably) pledged commitment to reducing our reliance on fossil fuels…*H

Here the writer includes the voice of Tony Blair in the form of indirect reporting of his pledge to commit to reducing reliance on fossil fuels. And since he applauds this commitment, the orientation to difference in the text serves to focus on the commonality between the voices.

I do not believe this wonderful planet - of which the UK has much to contribute - was made with such vast symbiotic variety of both animals and plant only for man to mix them all up so that none can 'depend' because it will be all too much of the same. Please, please do not let this happen. As Sir David Attenborough said at the close of his series on The Life of Mammals "Perhaps the time has come, when we should put our aspirations into reverse. Perhaps, now, instead of controlling the environment for the benefit of our populations, we should find ways of controlling our population to ensure the survival of our gravely threatened environment". – E S W

Here the writer gives a direct quote from Sir David Attenborough which provides solidarity with the writer's own voice.

But I am concerned about GM crops, and the contamination of certain wild plants by such modified varieties. For example, some time ago a particular scientific study found that ladybirds were affected when they fed on the aphids which themselves fed on crops genetically modified to resist them. The ladybirds became unable to reproduce in sufficient numbers to provide a healthy population. The Government chief science officer pointed out that it was probably because the diminished number of aphids simply didn't provide adequate nutrition for the ladybirds, and their reproductive systems were, of course, dependent upon sufficient nourishment. – Ms. D P

There are two instances of intertextuality in this text. In the first instance, the writer makes reference to a scientific study done on ladybirds and in the second instance the writer includes the voice of the '*Government chief science officer*'. Both these external voices serve to provide support to the writer's position by focusing on the commonality between them.

e) **consensus, a normalisation and acceptance of difference of power which brackets or suppresses differences of meaning and norms**

Prof Blanchfield suggests we do not ban, but "solve the problems" - and this could possibly be done in vast greenhouses whence GM pollen could not escape. – Ms. M B

This public debate may be a good thing but I fear it will be simple window dressing on the part of government to try and quell the present overwhelming opinion of the public against the technology,... - M J

In this text there is an implied voice vaguely attributed in the form of overwhelming public opinion against biotechnology (Lines 5-6). This in an instance of scenario (e) with the writer assuming a consensus on the issue of GM amongst the public and any difference of opinion is bracketed or suppressed.

Part 2 – Analysis of the transcripts of the public meetings

This section details the analysis of the transcripts of the 6 Tier-1 meetings which took place in Birmingham, Swansea, Harrogate, Taunton, Glasgow and Belfast. The focus here will be on the themes involved in the discussions at the meetings and on intertextuality analysis.

6.2.1   *The Themes*

Most of the issues raised by the participants in the six Tier -1 meetings were common across all the meetings. Explained below are these common themes with directly quoted extracts from the meetings to illustrate the theme. These themes have been identified through a close reading of the text and also from the findings of the analysis of the emails and letters.

The Debate Process

One of the favourite topics of discussion for the participants at the meetings was the debate process itself.

Publicity:

Concerns were raised that there was not enough publicity for the event.

"The second question is, why was this event so badly publicised and arranged for such an inconvenient time?..."

"I think this debate is very welcome and in prefacing that there were some concerns about the publicity of the event, which was maybe not as good as it should have been, …"

-Belfast

"We did however agree that the debate process we felt was flawed, that we were here really to be used and to give respectability to the debate, and that really the whole thing should have been advertised more, and the use of television would have reached far more people."

- Swansea

"First of all, we wish to express our general concern about the poor publicity given to the whole of the debate process, which has been mentioned earlier. The second comment we would like to make is to express our regret that not all the data that we think we should have had available to us, was available to us, for example the results of the field trials, and the results of the two other component parts of this national debate."

- Taunton

"I spent about an hour getting lost. And I asked about 30 people in Taunton, because I was trying to find the place, did they know there was a debate, and none of them knew at all anything about it. One was interested because they had heard about it on telly elsewhere, but had no idea that there was a debate here today."

- Taunton

These concerns over publicity caused the participants to raise doubts over how representative of the public the opinions expressed in the debate were.

"In effect the questions we raised led to one final question, which was how do we get the involvement of ordinary people in this. And we made the point that this room does not contain ordinary people, this contains people who are motivated to come here. And we were concerned about how this debate had been publicised. We were concerned and raised questions about what additional fora there would be available and what the government was planning. I am probably not alone in the room by saying that I don't know what that is."

- Birmingham

TABLE NINETEEN

"This is supposed to be a public consultation, how many public who are not members of organisations, be it biotech industry or NGOs or whatever, real public. And I work for the Church of Scotland and we are trying to work with finding out how do you get actual real people rather than the usual suspects. I would be very interested to know, I have a train to catch quite soon, how many real public have we got here?"

CHAIRMAN

"I can ask for anyone who is what he describes as the real public, could you put your hand up. What would you say, about 50%."

TABLE TWENTY

"… and when I contacted this morning the Today Programme, they couldn't find out … Your publicity quite frankly stinks."

Birmingham

Some participants even questioned the intentions of the government:

"Is this just window dressing? Does it really matter? Because if the government really wanted people's views, it would have been advertised, it would have been publicised and everyone in Britain would have known about it."

- Swansea

Information material:

Some of the participants also were not happy with the information material provided at the debate venues.

"And in our GM Nation, the public debate book, there are quite a lot of blanket claims about there is no evidence that there are adverse health effects, but if nobody has looked for it, of course there isn't any evidence."

- Taunton

"We had grave reservations about the overall independence of the steering group, and the materials, some of which we found to be misleading, in a pro-GM direction." (Applause)

CHAIRMAN

"Before you move on, do you have a couple of specific examples, because I am interested in all this feedback."

TABLE FOUR

"An example would be that the benefits are described in a way that implies they are certain, whereas the impacts are described as risks, and therefore uncertain."

- Glasgow

"We were not convinced by any of the so-called benefits that were presented in front of us, and in fact we had a general concern about the evidence that was presented to us…"

-Glasgow

"The presentation of this guide itself seemed to be somewhat biased because the primary beneficiaries did not include, on paper, the biotech companies, which was one thing we felt were the primary beneficiaries."

- Swansea

There was also a feeling that the documentation was not scientific enough

"With the documentation that we have all looked through, you get the pro and the anti arguments, but it doesn't really take you any further forward. It would be nice to actually see some of the scientific basis on what these are decided on"

- Harrogate

"Can we first of all mention this booklet that you have produced, which was supposed to help us. We found that whenever we looked at it, we actually found that because it has no references from when it makes a scientific statement, that we don't know what the scientific basis of that is. We couldn't find it very useful at all. Several times we wanted to say who said that, and in fact it doesn't have any references at all throughout."

- Swansea

And some wished that they had been provided the information in advance of arriving for the meeting.

"I think one of the more critical things was that we could have benefited from having the information in advance of being here particularly…"

- Belfast

The organisation of the meetings

Participants also were not satisfied with the way the meetings were conducted. The concerns included the time allotted for debating the issues, the schedule of the debate, and the location of the meeting venue.

"I don't think many people are particularly satisfied by the state of this debate this afternoon, and I think you will find that is a common theme."

Birmingham

"We weren't able to answer all of the questions that were here, we didn't really feel that we had enough time, and so much for public debate that is 25 minutes over a subject this complicated."

- Birmingham

"We were quite upset over how this debate has been organised, advertised and the inappropriate timing of when it has actually happened, which also further adds to our sense of distrust, as you can well imagine."

- Belfast

"maybe this debate should have been going on 3 years earlier, or when the first material was fetched into the country."

 - Harrogate

"We thought the timing of the debate was wrong, as other people have said,…"

- Swansea

"There was no way enough time to discuss all of the issues. In fact I can't think that anyone has discussed all of the issues. And that there was very poor publicity, to echo what our friend on this table said. It was also raised that maybe this is an information gathering session that will take our sceptical thoughts and find a way of soothing them so that the government can go ahead with what it wants to do."

- Taunton

"And secondly, it was very hard to cycle here from the train station. I nearly got run over twice by big lorries. It was a very difficult place to find on a bicycle. The map which was supplied didn't even have the train station marked. I spent about an hour getting lost."

- Taunton

There were also concerns over insufficient funding

"Just as a starter point, this entire operation I believe is being funded to the tune of about half a million pounds, and according to Dr Dave Carmichael, that was only after the insistence of him and others that it was taken up from about a quarter of a million. It doesn't seem very much money for what is a very important operation. To just put it in perspective. That is about half the price of one cruise missile in Iraq, so it is a fairly low priority it would seem."

- Taunton

Many participants also objected to the timing of the public debate in relation to the field trials

"we were fairly concerned about the potential ecological effect, and we were a bit disappointed that the results of the farmscale trials haven't been published before this debate

took place, so we found it very difficult to make a good judgment of what the impact would be in the UK situation when those results haven't been published before this debate took place."

- Harrogate

"What we all unanimously agreed on is that this debate is too late, and also paradoxically it is also too early because the results of the trials haven't come through yet, and we are caught between the two."

- Swansea

"Also somebody mentioned, we were wondering why these debates were taking place before the results of the trials had even been published."

- Taunton

"First of all, we wish to express our general concern about the poor publicity given to the whole of the debate process, which has been mentioned earlier. The second comment we would like to make is to express our regret that not all the data that we think we should have had available to us, was available to us, for example the results of the field trials, and the results of the two other component parts of this national debate."

- Taunton

And there were some who were of the opinion that the public debate was more of a workshop session than a proper debate

"We also feel that this is really a workshop session and we would have preferred a debating situation where we had experts on the stage in front of us and we could ask them relevant questions and get answers on the so-called independent science from independent scientists."

- Birmingham

"First of all I would like to say that I think this is a bit of a misnomer, public debate, because the … of debating you need somebody to argue for, and somebody to argue against, and everybody seems to be singing the same song."

- Glasgow

Not everyone, however, was dissatisfied with the debate

"There was a fascinating debate, and I hope we learnt from each other. I certainly did. We felt that more people should benefit from these discussions in the country."

- Glasgow

To summarise, generally, the participants in the six meetings showed a great degree of dissatisfaction with the organisation of the debate and even doubted the intentions of the government in organising the debate. The objections included the lack of publicity about the debate, concerns over how representative of the general public the opinions expressed at the meetings were, the information material provided at the meetings for the participants, the time allotted for discussions, the organisation of the meetings, and the relation of the public debate to the field trials.

Economy

An interesting aspect of the meetings was that largely the participants' focus was on benefits and risks to 'consumers'. Most of them identified themselves as consumers. This implies that the debate overall was enveloped within a discourse of *economics* with the

identity of the people as consumers of goods in the forefront as opposed to, say, their identity as citizens in a democracy.

Consumers

"We don't see that the benefits are coming from consumers, consumers aren't demanding what GM has to offer, but we would certainly pay the price if it was to go horribly wrong."

- Birmingham

"But there is also the consumer who goes into the shop and the supermarket who only asks one question, and that is how much?"

 - Birmingham

"I guess there might be some cheaper food for those consumers who wanted to consume it."

- Taunton

"But a primary beneficiary would be the reduction of consumer trust in government. In fact we felt when we did agree on this that one of the areas that could be most harmed was consumer confidence in the government's capacity to protect, inform and consult."

- Swansea

"Our table was made up of producers and consumers, organic farmers and the rest of us called ourselves concerned consumers."

- Swansea

"We as consumers are at risk…"

- Swansea

"Our table would mostly be described as consumers."

- Harrogate

"In terms of who we felt would benefit most from it, again the two areas we looked at were consumers primarily through lower cost possibly of food,…"

- Belfast

"There were no particular benefits now for UK consumers,…"

- Glasgow

Economic risks of GM

There was overwhelming consensus that commercialising of GM would have negative economic consequence. The main argument seemed to be that allowing GM would put the survival of the organic industry in danger.

"so there was a risk to the agricultural industry, and in particular sectors within the industry, perhaps primarily the organic sector, the potential loss of their accreditation due to cross-pollination from another farmer, that is something which has to be given serious consideration we felt."

- Belfast

"And really picking up on one of the previous points about liability, which I think is a major issue in terms of potential risk to adjoining farmers, particularly organic farmers who may well lose their organic status and the prospect of securing premium payments for crops, from the perceived or otherwise actual risk of cross-pollination."

- Birmingham

"We also mentioned that businesses could possibly suffer because consumers are now very conscious of GM foods, and certainly in Britain, and like America, and I think Thank God we live in Britain and we have some sanity here, we are actually asking for our food to be labelled and businesses are finding that most consumers would prefer not to have GM food, because there is a gut instinct that people just feel that it isn't good for them."

- Swansea

Competitive Advantage by going GM-free

Many participants expressed the view that going GM-free could give UK a competitive advantage

"...it would give us a market advantage not to have GM. We can't compete with the US on volume of production anyhow, we could compete another way."

- Belfast

"The point was also made that it is potentially a positive selling point for ourselves, as Northern Ireland, or as the UK, in that if we are producing a product which is GM free, perhaps that may give us marketing advantages. That has to be put into the context of the world trade negotiations and how world trade is going to free up most likely over the next

number of years, and how we don't want to disadvantage ourselves any more than we already are."

- Belfast

"...we thought that GM crops shouldn't be grown here, and we thought the UK could actually benefit commercially by declaring itself a GM-free country"

- Harrogate

"We could only see one benefit to GM crops, and that was if the UK stay GM-free we would have added value to our agricultural exports which would give the agricultural industry a great boost."

- Swansea

"And finally, we summed up, we felt this gives the UK, with its island status, an opportunity to achieve a GM-free niche market when everyone else is producing GM food."

- Taunton

"We have got a really good chance to have the market for ourselves as a non-GM market to the rest of the world."

- Taunton

Some expressed the opinion that a GM –free status would help the tourism industry

"...if we make our country a natural seedbank – which we could – then that could well be good for tourism."

- Taunton

"There is the Scottish image, the Tourist Board perception, our country as a whole is one of a clean environment and producing healthy foods, and that in itself is under threat."

- Glasgow

Commercial Benefit to Biotechnology companies

The main benefit, the participants thought, of GM would be increased profits of biotechnology companies who were involved in GM

"...the only economic advantage is to the companies who sell GM."

- Belfast

"In terms of the benefits and what the benefits could potentially be, the main ones we came up with were wealth generation, both in terms I suppose of the production companies, in terms of the growers etc,..."

- Belfast

"But the main benefit again was perceived to be commercial benefits to biotech companies through a number of ways, through patenting, through tying producers into buying sterile seed and the associated chemicals needed to produce the crop."

- Glasgow

"The area that would benefit we could only see was business."

- Taunton

Facing competition with the help of GM

There was some support for GM with the argument that it would allow UK farmers to compete with farmers from other countries

"One member said it is important to start with a level playing field when we are looking worldwide. You may place your own country at a disadvantage by not allowing them to be a part of world competition."

- Belfast

"As a conventional farmer now I feel that I need to have the tools of modern technology, those technologies that are available to farmers in other countries, in order to compete. Because we are told repeatedly that as farmers we have got to stand on our own two feet, we have got to compete with the rest of the world in producing our food. But it is not possible to do that with your hands tied behind your back. We have got the CAP reforms and the world trade negotiations that will make it even more difficult for European and British farmers to compete than it is already."

- Birmingham

"And my question would be, if the people here don't think that we should have the opportunity to grow GM crops, are they prepared to support the British agriculture and British farmers in a way that will enable them, subsidise them if you like, to compete with the rest of the world producers?"

- Birmingham

"For example in competing with neighbours, or gaining access to certain markets. But most of the table was convinced that those benefits would be short term."

- Glasgow

"One member also felt that he would accept a ban on UK production of GM crops, provided the government banned the imports of these crops. However, if the government did not ban the imports of these crops, they wanted the farmers in the UK to have an even chance of competing in the world market."

- Swansea

In summary, the debate in the six meetings was largely centred around the discourse of economics, with the focus being on consumers and many of the participants identifying themselves as consumers as opposed to, say, citizens. The participants were largely of the view that allowing GM would put the UK farmers and industry, particularly organic, at a disadvantage. They felt that UK could benefit commercially by acquiring a competitive advantage through declaring itself GM-free. There was also an opinion that a GM-free status could benefit UK tourism industry, particularly this view was expressed with reference to Scotland in the Glasgow meeting. There was also an overwhelming opinion expressed that the biotechnology companies were set to benefit the most commercially if GM was allowed in the UK.

And finally, although outnumbered by the anti-GM opinions, there was some support for GM with the argument that it would enable UK farmers to compete in the world market with others.

Trust

The GM debate has been characterised by a lack of trust amongst the public towards the people responsible for decision-making on GM, including the Government, scientists and biotech companies. The analysis of the public meetings reveals the same mistrust. Many times, the participants seem to consider the government and the companies to be on the

same side of the debate on GM. They doubt the motives of the government in organising the debate; doubt the intentions of the companies

"Perhaps the decision has already been made, as has been reported in some circles. And I think we were fairly convinced that the government already know the public are against this, so how informative will the conclusions of this debate be?"

- Belfast

"*I suppose you could say that the general opinion of the table was very much characterised by a sense of distrust, distrust of the companies who have their own motives and reasons for wanting to promote GM products, distrust of the government who seem to be enthralled to the phenomenally loving power of these companies, and whether there is any freedom in government to act in our best interests or not, and also distrust that anything we say matters.***"**

- Belfast

"We were quite upset over how this debate has been organised, advertised and the inappropriate timing of when it has actually happened, which also further adds to our sense of distrust, as you can well imagine."

- Belfast

"This is not connected with what is on the agenda, but no mention has been made of the political side, and while we are here having an open discussion, we have a Prime Minister who is in favour of genetically modified crops, and those of us who protested against the Iraq war were totally ignored. What kind of assurances can be given, I would like to know, that the same thing won't happen when feedback is given from this conference."

- Birmingham

"And one final thing which I came up with, which one person in particular mentioned, was that an event like this could be seen as an abdication of responsibility by the government, in that they are asking the public to make decisions, with relatively little information, where it could be seen as the job of government to decide these things, and they will have account-ability where members of the public don't."

- Birmingham

"We had grave reservations about the overall independence of the steering group, and the materials, some of which we found to be misleading, in a pro-GM direction. (Applause)"

- Glasgow

"Points raised about who to trust, and it was certainly felt not the government. It was felt that some reports were not being publicised, and there was not enough research done. One of the points made later on, linking back to that, is that a lot of the science is being financed by agri-business, and it is done on the basis of affirmation of hypothesis, rather than trying to prove the negative. Affirmation of hypothesis always wins, and actually proves nothing."

- Glasgow

"We were not convinced by any of the so-called benefits that were presented in front of us, and in fact we had a general concern about the evidence that was presented to us, and the debate as a whole, the way it was organised, the way people found out about it, the fact that some people were told that the debate was full, and quite clearly the debate is not full this evening."

- Glasgow

"...there was a general lack of trust I think in that we have got to be careful where we are getting all the information from, from all different sides."

- Harrogate

"And we spent some time talking about why there was the difference in the UK, Great Britain, as opposed to the USA where there doesn't seem to have been any problem at all with it. So whether that was down to the fact that we have had the BSE problem and people just don't believe things any more."

- Harrogate

"We had concerns about trust. We discussed that products in the past that had been pushed forward to market without adequate testing, the tobacco companies might be an example there. Information being suppressed for someone's gain somewhere."

- Harrogate

"And the main feeling is that it isn't safe in the hands of big business, and that politicians and big business seek uncertainty rules and secrecy rules basically in the GM debate in Britain today."

- Swansea

"And also is it true or not that Lord Sainsbury I believe is overseeing the whole thing and he has interests other than in the large supermarket, ie shares in certain organisations that are promoting GM products?"

- Swansea

"Is this just window dressing? Does it really matter? Because if the government really wanted people's views, it would have been advertised, it would have been publicised and everyone in Britain would have known about it."

- Swansea

"And I also just wanted to point out that the Minister for Science and Technology is Lord Sainsbury, who has financial interests in biotechnology. He is also the biggest donor to the Labour Party, and so if that is not a conflict of interest going on in this government, I don't know what is."

- Taunton

"And we believe that the reason that the genetic technology is being proposed, instead of alternatives, is because of the financial interests. We believe that there should be a change in the way that funding is allocated, so that funding can be gained for independent research, rather than scientists having to seek funding from commercial bodies."

- Taunton

"We are concerned about the integrity of government and believe that trust in the democratic process would be lost if genetically modified crops were introduced."

- Taunton

To summarise, there was widespread distrust expressed with the government's intentions, the way the debate was conducted, the conflict of interests involved with those involved in the organisation of the debate, the independence of scientists involved in research on GM and the influence of the biotechnology companies on the Government.

Developing Countries

One of the arguments discussed in detail in all the meetings was the point about GM crops being beneficial to farmers and consumers in the poorer countries of the world and in solving problems of world hunger. These countries were variously referred to as 'developing countries' or 'third world'.

Some participants did express that developing world farmers would definitely benefit from GM.

"…and the idea of golden rice, which has more vitamins, could be an answer to third world starvation."

- Belfast

"it was felt that it would be safer for developing world farmers with lower pesticide use,…"

- Birmingham

"We felt that some of the benefits of this technology were trying to solve world hunger,…"

- Glasgow

"We identified some potential benefits. Feeding the hungry, for example. The creation of high protein varieties of normally low protein crops. I think somebody mentioned potatoes in India."

- Glasgow

"One person thought that people in developing countries might actually want GM crops…"

- Harrogate

"…there could possibly be enhanced nutrition for the third world, but not for the UK."

- Taunton

However, most of the participants rejected the claim about GM being beneficial to poorer countries and its role in eradication of world poverty.

"So we are concerned for example that if people continue to promote GM crop development on the basis that it is going to ease suffering or put an end to widespread hunger, we are not convinced. There are clearly political and economic questions to do with distribution that have to be addressed before we could commit ourselves to GM development to face that particular question."

- Belfast

"...we were suspicious of biotechnology companies' claims of feeding the world. We think it is unlikely this is the real problem and that the problem is really of food security, is to do with economic inequalities, not the quantity of production and the research money that is generally being poured into areas that are not going to provide obvious benefits to the world's poor, but there was some disagreement about that, I should add."

- Birmingham

"...we did reject arguments to feed the world and improve nutrition as, a lovely term from one of my colleagues here, a spurious travesty, because we thought that basically other factors than availability generate the problems of hunger and malnutrition."

- Glasgow

"Developing countries, as one of my colleagues said, have been used as a badge of moral respectability. The main issues of third world hunger are not being addressed, and GM is not going to fix this."

- Glasgow

"one of the selling points for GM crops has been that it will solve world poverty, but the view of the table was that poverty in certain parts of the world is not caused primarily by a lack of food, but was corrupt governments, etc, etc."

- Harrogate

"On the third world stage as well where developing countries spend most of their time growing cash crops on their better land for export, rather than using their land to feed themselves, we can't actually see how come by introducing GM crops that will grow better in these countries, they will suddenly start growing food to feed themselves, where it seems a little bit more likely that they will spend time growing more cash crops for export, so that won't actually help feed the people. The Chairman of the World Health Organisation says that we can already actually feed the world with the amount of food that we have got, it is just that the food isn't getting to the people that need it, (Applause) and that there is no humanitarian necessity for growing GM stuff."

- Swansea

"And then we actually said that we weren't quite sure why the third world was being made guinea pigs, and why the poor of this world were becoming guinea pigs for what in fact has been the lack of testing."

- Swansea

"The third world, Lucy was saying, produce enough food to feed themselves. GM is not going to feed them. Poverty is resulting from our free trade policies and dumping our subsidised goods out there."

- Taunton

There was a large opinion that introduction of GM would, in fact, be harmful to the interests of the developing countries.

"...the economic risk of GM proliferation could lead to some of the world's poorest farmers becoming poorer because corporations will gain monopolies, or near monopolies, in certain markets."

- Glasgow

"Third world farming was extremely interesting, because we felt that the monopolisation of patented seeds, controlled by a few large companies, was disastrous for the economies of third world countries, due to the intensive nature of farming brought in by this technology."

- Glasgow

"The biggest risk that was perceived by the table was the globalisation, the global impact on developing countries."

- Harrogate

"We think the long term effects politically will be eventually to polarise wealth and that money will go from Africa to American corporations, and it will do nothing to alleviate world hunger, which is mainly caused by poverty."

- Harrogate

"We believe there is a risk to developing countries of us pushing GM cropping systems on to developing countries, and we believe that the lessons of the green revolution, or the so-called green revolution in the '50s and '60s, have been entirely forgotten, and that when we

tried to impose chemical, and fertiliser and new seed systems on to the third world countries, it didn't work other than in the very short term"

- Taunton

"There was our concern about the exploitation of the third world, the monocrops that they would be growing which would be destroying their indigenous husbandry which we felt was really a much more sustainable form of agriculture for them than growing these genetically modified new crops which had no definite prognosis about them."

- Taunton

To summarise, there were a few instances where participants were of the opinion that GM would be beneficial to farmers in poorer countries with the use of less pesticide and would help in eradicating hunger and increase nutrition in the food through crops like golden rice. However, most of the participants rejected the claim that GM could help solve world hunger, as according to them the problem of hunger was not due to lack of food but due to varied other reasons including distribution, economic inequalities, corrupt governments, and the fear that farmers in developing countries would be forced to grow cash crops rather than food crops.

Some participants thought that GM would, in fact, be harmful to the interests of the developing countries as the poor farmers were likely to become poorer due to big multi-nationals gaining monopoly in markets, and the destruction of their indigenous farming methods.

Health and Safety

On the question of health and safety, the participants were of the opinion that there was not enough information on the effects of GM and thus on the precautionary principle, they expressed their opposition to GM.

"Health could be harmed potentially, though not all were agreed about that. Antibiotic resistance may be gained from eating the crop – that was a health risk which some people saw."

- Belfast

"Is altering genetic make-up safe? And I think the key point we all felt was that we just simply don't know, it is still out to question and only time will tell what the effects on human health, wildlife and the general environment will be."

- Birmingham

"There were concerns that there have been no health tests done, no human health tests on GM, so therefore we do not know what are the health risks of GM."

- Swansea

"we are not convinced that we have seen sufficient evidence of the safety of this process, both in terms of human health and its impact on the environment, as evidenced by for example by the refusal of the insurance companies to cover farmers against potential risks, and the refusal of biotech companies to accept liability for any future damage they might cause;"

- Taunton

Many others pointed to the evidence which suggested than GM was not safe and hence should be avoided

"There are already known problems with health, there are already documented evidence of side effects from using GM. If we are not going to label it, we are not going to be able to know the side effects. Surely that is the situation in America now, nobody knows why there is a tremendous increase in problems with the digestive system in Americans. We can all

speculate, but nobody knows because the product has never been labelled, so there has never been any way of checking it.”

- Birmingham

“We identified wide ranging health concerns, including risks of chronic diseases, resulting from poor nutrition, auto-immune diseases, developmental effects, allergies, antibiotic resistance.”

- Glasgow

“Is GM food safe to eat well?   We have seen people dying from eating GM food with protogene, and others in America.”

- Glasgow

There were also some participants who felt that GM was safe, and indeed could be used to produce crops for medical purposes.

“…it was felt that it would be safer for developing world farmers with lower pesticide use, and because of the very stringent regulations on GM crops it was felt that there were unlikely to be adverse health risks.”

- Birmingham

“There is we felt no scientifically documented cases of human health problems, but monitoring over a period of several years is needed.”

- Birmingham

"There was a reasonable view expressed that certain types of GM technology can be used to save life, the production of pharmaceuticals and in other medical applications."

- Glasgow

To summarise, the opinion on the health and safety effects of GM seemed to be fairly divided. Some participants felt that there was insufficient information and hence on a precautionary principle opposed GM. Others thought there was enough evidence to prove that GM was not safe and hence were outright opposed. Still others expressed the view that GM was safe and indeed could be used to produce crops for medical purposes.

Choice

One of the points on which there was most opposition to GM crops was on the issue of choice. There was almost unanimous opinion expressed at the meetings that growing of GM crops would mean that the choice of consumers to eat non-GM food or Organic food is taken away from them. They will be forced to eat GM as the other non-GM crops will get contaminated by cross-pollination from GM crops.

"GM could actually force us into a situation where we would have lack of freedom of choice. It is apparently already in many of our foodstuffs, especially in processed foods, as you have mentioned earlier, and many of the people who buy organic want to buy organic because it offers the freedom from GM contamination. This might not be the case if GM is allowed loose into the wider environment and we might not be able to offer that any more."

- Belfast

"There is a very real feeling here, a very real fear, of the way in which we are eliminating choice here. You said it yourself. Monsanto has 80 – 90% of the seeds that are going out there. That means that we are using crops and the feeling here was that we were being

driven down to certain kinds of crops. But worse than that, obviously with the cross-contamination which might take place, and almost certainly will take place as a result of these field trials, we were reducing the choice further. In the end we all end up eating GM because everything has been infected, contaminated by GM."

- Birmingham

"We also talked about the choice and there is an issue with if you start commercially growing GM crops, how do you be assured that any of it is absolutely GM free, especially with things like soya imported from America. Again there are problems with organic and conventional farmers in this country, how can they be sure that what they are selling to consumers in this country is still organic or GM free? The possibility that they are going to lose GM certification because they won't be able to prove it. And it is people's human right to know exactly what they are eating and they should have a choice not to take the risk with GM if they so decide."

- Birmingham

"We felt that it could limit consumer choice. If people really don't want to have GM technology, then they might feel that they might have to have the technology as it spreads to organic food, for instance. We were concerned about labelling. How good would labelling be if we do have to have this technology? Can it really guarantee that some of our food would be GM-free, or not? How organic can our organic food be if we introduce GM technology? Some comparison was made between GM and mobile phones at our table, but others felt that this was not a proper comparison, in that we can choose to have a mobile phone, but we might not be able to choose to have GM food in the future. So choice is a big issue for us. People who don't want to have GM technology felt that they were going to have it foisted on them, whether they wanted it or not. We were very concerned about contamination issues. We were concerned about people with allergies, who for instance might suddenly have this technology foisted on them."

- Glasgow

"The containment, we thought in effect you would not be able to have any organic foods, so you were cutting down on choice for consumers to a great degree."

- Harrogate

"...it is a threat to humanity, that there is a threatened imbalance in ecosystems, that we contaminate our environment because these crops and their effects cannot be localised, we face the problems of monoculture and we lose the types of plants that have evolved for particular types of environment. All this diversity disappears. We lose our choice, we lose the choice of organic food."

- Swansea

"The first one we felt quite strongly about was no freedom of choice. We are taking decisions which will affect future generations, and we don't think that we have a right to do that. People may have a right to eat GM food, but we also have a right to eat organic food, and that will actually be taken away from us, we feel, if we go GM."

- Taunton

A lot of times the issue of choice was coupled with the contentious issue of labelling.

"Labelling came up a number of times because although the choice for the consumer was mentioned, if products are not properly labelled then in any ways the consumer will not actually have the choice that they want and they could be unwittingly and unwillingly consuming GM products."

- Belfast

"We certainly think that if we don't label we are going to limit consumer choice. We want to know whether we are being fed GM or not. And we reckon this is a political decision, it is nothing else…"

- Birmingham

"We were concerned about labelling. How good would labelling be if we do have to have this technology? Can it really guarantee that some of our food would be GM-free, or not? How organic can our organic food be if we introduce GM technology?"

- Glasgow

"...and indeed were this technology to progress, an absolutely essential basis that there is sophisticated labelling of food, so that people can express that choice."

- Harrogate

And a couple of times, the discussion on choice were extended to a discussion on implications for democracy.

"Also there is an issue about democracy. If it is introduced, we are going to have no choice, we will be forced to eat GM products because food labelling is an issue…"

- Belfast

"As someone else pointed out before, we will lose our choices, we will lose our choice for organic foods, and in fact the end result will be at the very end, the loss of democracy."

- Swansea

To summarise, the discussion on choice in these meetings was very elaborate and at times passionate, with most of the arguments referring to cross-contamination of other crops including organic with GM. Labelling was an important issue as participants thought that in order for consumers to have a choice of eating non-GM food, labelling was needed. And

some participants extended the discussion to imply that lack of choice with GM crops was against the democratic fundamentals of society.

Environment and Ecology

A great deal of the discussion in the meetings dealt with environmental and ecological issues. Some opinion was expressed that GM could be beneficial to the environment.

"...we felt that there were certain environmental benefits arising from reduced use of fossil fuels from reduced cultivations and reduced use of pesticides."

- Birmingham

"...there is potential for reduced CO2 emissions if fewer cultivations are needed to produce GM crops"

- Birmingham

"The table thought in general that there was the potential to improve some agricultural practices and it would be a beneficial impact on the environment."

- Harrogate

However, there were others who expressed the view that there was insufficient information on the long-term effects of GM on the environment.

"When we look at the wider environment, certainly we feel that we had not been sufficiently informed as to whether GM was going to harm the environment or not, but our general feeling was that the potential for harm is quite huge and taking the precautionary principle, we have to say that it certainly worries us very much indeed."

- Belfast

"And I think the key point we all felt was that we just simply don't know, it is still out to question and only time will tell what the effects on human health, wildlife and the general environment will be."

- Birmingham

"…we are not convinced that we have seen sufficient evidence of the safety of this process, both in terms of human health and its impact on the environment,…"

- Taunton

There were counter-claims as to impact on bio-diversity. Some participants felt that GM would reduce pesticide and herbicide use and hence have a positive impact on biodiversity and wildlife while others claimed that it would negatively impact biodiversity.

"Another benefit was that grain could be produced cheaper because you would be using less herbicides and less pesticides and this may have a powerful impact on biodiversity."

- Belfast

"There could be claims to reduce the amount of chemical used, which might increase wildlife."

- Taunton

"We worried very much about the impact of GM on biodiversity, not just the wider biodiversity of insects and wildlife, but the very obvious biodiversity for farmers that if all the effort in breeding goes into GM crops, there will be little effort put into open pollinated and wider variety. So we will lose the biodiversity of our foodstuffs that we have had around for thousands of years."

- Belfast

"We were concerned about the terminator gene escaping into the wild and in its way destroying choice in that way, that wild plants, other plants would be destroyed in that way."

- Birmingham

"we were fairly concerned about the potential ecological effect, and we were a bit disappointed that the results of the farmscale trials haven't been published before this debate took place, so we found it very difficult to make a good judgment of what the impact would be in the UK situation when those results haven't been published before this debate took place."

- Harrogate

"...there was a great risk of escaped unstable genes into the environment. We might lose wild strains of plants which currently exist. The ecological impact was a concern for everyone here, geneflow from GM crops into the wild. And also the slippery slope analogy, that if we say yes to GM crops, then we will have GM forests, with GM trees, GM animals, GM fish. Who knows where it will end? That if we say yes now, there is no going back. We want to ensure diversity of nature, diversity of food, and not have precise uniformity."

- Taunton

American Influence

Another interesting aspect of the meetings was the inclusion of participants' perception of American power and influence on decision-making on GM in the UK. Many participants felt that American companies and the government were influencing the UK government into allowing the commercialisation of GM crops. Some also expressed the opinion that GM was going to beneficial to the American companies and the US Government.

"The American government itself is probably the biggest beneficiary, with Monsanto paying a few millions to Bush's campaign."

- Glasgow

"We saw potential financial benefits to dependent scientists and researchers, and political benefits to the USA in its quest for global hegemony."

- Glasgow

"And we were concerned in particular about the international aspects of this, and much of the drive towards GM technology is seen as coming from the United States. And in fact there was a wider concern about this, that the way in which GM is being promoted in fact is undemocratic, it is subverting the democratic process, and one or two members of the group weren't actually reassured by the process which is taking place here, the GM Nation process in this respect."

- Glasgow

"Also we are concerned about the power of the corporates over the decision making process. The lobby power, certainly in the United States, has a large effect on what goes on in government, and we are concerned that the corporate powers are having more impact than they necessarily should do into this debate."

- Harrogate

"A point was raised that we are quite afraid of the US using GM as a tool to become more globally powerful."

- Harrogate

"It also occurred to us that if the British government should be seen to support GM crops, this would be seen to be strengthening their alliance with America, and whether that is of

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benefit to a concerted drive to a move towards a better European constitution, given that Europe are not particularly keen on GM crops, is a moot point."

- Swansea

"And thirdly, to express our strong presumption that the UK government will simply give into the USA and go ahead anyway, whatever we say."

- Taunton

"...should GM crops be introduced into the UK or not? And the answer was no. And we reached that conclusion from a number of points raised, such as who do you believe are the primary beneficiaries of GM – the answer being the American biotech companies and the American government."

- Taunton

Representativeness

In all the meetings the participants identified who they were representing. There were representatives from the farming community, the industry, academia, environmental organisations and consumers among others.

"We had around our table representatives from the agricultural sector, both cereal and intensive, we had representatives from the Friends of the Earth, we had representatives from the food industry, and we had representatives from the general public."

- Belfast

"We had 8 people, and one of the people was a graduate in genetic science, another on part of a body for food safety in industry, others were more involved in environmental and farming jobs."

- Glasgow

"We had quite a mixed set of people on this table, mixed in terms of their backgrounds, we have some union representatives, we have some farmers, we have some supermarket representatives, and also a representative from a food production company."

- Harrogate

"We had quite a wide spectrum of people here, we have got students of genetics, zoology, environmental biology, we have got organic growers and conservation workers, so I think it is going to be no surprise when you find that we are pretty much against the introduction of GM crops here."

- Swansea

There were many concerns raised about the representativeness of the UK public at the meetings.

"We felt that we wanted a much more in-depth debate than we have been given so far, that a very small amount of us, 900 people across the UK is not representative enough,…"

- Glasgow

"Can you clarify this? Why are there so few, in fact I can't see any, black people, Muslim people? I come from Bradford and I am surrounded by Muslims. What do they think of the imposition of GM?"

- Harrogate

"Are these all Harrogate people? (Large number of people saying no) In which case it is not a cross-section of the population."

- Harrogate

Some participants also expressed their disappointment with the fact that most of the people attending these meetings were not ordinary people but those who had interests in GM.

"In effect the questions we raised led to one final question, which was how do we get the involvement of ordinary people in this. And we made the point that this room does not contain ordinary people, this contains people who are motivated to come here. And we were concerned about how this debate had been publicised."

- Birmingham

"This is supposed to be a public consultation, how many public who are not members of organisations, be it biotech industry or NGOs or whatever, real public. And I work for the Church of Scotland and we are trying to work with finding out how do you get actual real people rather than the usual suspects."

- Birmingham

"A lot of people at the table came with entrenched views"

- Belfast

6.2.2   *Intertextuality*

Due to the nature of the public meetings, intertextuality analysis is not as straightforward as it was in the case of the emails and letters. The public meetings were organised in such a way that in every individual meeting, participants were distributed around tables into separate groups. Each table was given time to discuss the risks and benefits of commer-

cialisation of GM crops and then feedback on the discussion was sought from each table. One person from each group was nominated to summarise the discussions that took place in that particular group.

As a result, the transcripts from the meetings have hardly any instances of direct quotes from other voices. This is in sharp contrast to the emails and letters where the participants made frequent use of direct quotes. Also, since one nominated person was supposed to sum up the discussions that took place on each table, the voice of the nominated speaker, in effect, contained the voices of the other participants at the table. Thus, the organisation of the public meetings promoted attempts to resolve or overcome differences between opinions on GM, to focus on commonality between the opinions and even a suppression of differences in opinions to produce consensus. These are scenarios (c), (d) and (e) in Fairclough's typology of orientation to difference.

Below is an example of such a summing up of opinions of the participants around the table.

"…Summary of the benefits, we thought that the main benefits were commercial benefits to agricultural and biotechnology companies, giving them control over the food chain and destroying their competitors – ie organic farming. We saw potential financial benefits to dependent scientists and researchers, and political benefits to the USA in its quest for global hegemony. We thought there might be long term benefits from the contained use of these technologies, so we weren't completely opposed, but we did reject arguments to feed the world and improve nutrition as, a lovely term from one of my colleagues here, a spurious travesty, because we thought that basically other factors than availability generate the problems of hunger and malnutrition……… Conclusions. Food crops – never, was our conclusion, they should never be introduced into the UK. (Applause) Non-food crops, we said definitely not now and we could not see the evidence for the rush towards commercialisation. Four reasons why: the fact that it would erode and remove choice; the fact that despite all the supposed benefits and alleged non-risks, the companies promoting this are not prepared to take liability for their products (Applause); thirdly, we feel that the onus has been put on the opponents of GM to prove that it is a problem, whereas we believe the onus should be on the proponents to prove that it is safe; and finally, probably most

sweepingly, there are better alternatives to meet the needs that the proponents of GM claim. (Loud Applause)".

- Glasgow

Most of the outside voices included in the participants' discussion (or summarisation by the nominated person) were used to justify their own position on the issue.

For example:

"And the first thing we looked at was a report ordered by the European Commission last year which found that co-existence between genetically modified, conventional and organic crops in the long term, if commercialisation takes place, will be impossible."

- Birmingham

"Now some people will come back with the answer that this won't happen in this country, and I would just like to draw your attention to a report in the Modern Law Review last year which was co-authored by a researcher at Kings College London, and the conclusion of this report is that a likely scenario in this country would be that the Schneizer case would be followed."

- Birmingham

The above two extracts are also examples of **legitimation** through the use of **Authorisation**. In the first example, the speaker makes reference to the authority of the European Commission and in the second example he/she makes use of the authority of an unnamed researcher from Kings College London to support his/her claim.

The majority of outside voices were not attributed or vaguely attributed, as can be expected in such a public meeting. For illustration, below are some examples from Belfast meeting.

"Some say that the mutation risk is low, but if we are always interfering with nature, would mutations increase?"

Here the orientation to difference seems to be of the scenario (a) where there is a sense of dialogue between the voice of the 'some' and the speaker's own.

"Perhaps the decision has already been made, as has been reported in some circles."

The above extract is an example of scenario (d) where the speaker finds agreement with what has been reported in 'some circles'

"It has been reported that in the USA food allergies have gone up by about 50% in the last years…"

Here the speaker gives evidence to support his claim. This is again an example of scenario (d) or even (e) since the speaker focuses only on those statistics which support his claim and ignores or suppresses others which may not suit him/her.

6.3   Conclusion

This chapter analysed the data from the 'GM Nation?' public debate. The data consisted of extracts from comments posted on the official website and transcripts of the six Tier-1 public meetings. The data from the website was analysed using Fairclough's textual analysis methods. The focus was on the various discourses involved in the debate, the analysis of intertextuality, the legitimation strategies used and the use of logics of equivalence and logics of difference. The data from the Tier-1 public meetings was analysed for the major

themes involved. The analysis reveals that the participants in the debate are very much opposed to the commercialisation of GM crops in the UK.

In summary, the debate was highly polemic in nature, with the arguments focussed towards accentuating differences between the positions on GM, although the majority of the participants in the debate expressed anti-GM attitudes. There was widespread distrust of the Government and the biotechnology companies. The participants were cynical about the intentions of the Government in organising the debate. The lack of choice to consumers was the main argument used against the commercialisation of GM crops in the UK. There was some support for GM as a tool for eradication of world hunger and for the benefit of farmers in the developing countries, but overall the participants rejected this claim. The debate was coloured within an overall discourse of economics with the participants focussing on the economic benefits and risks of GM and the participants identifying themselves as consumers as opposed to citizens. Also Rationalisation was the most common legitimation strategy used by participants who posted comments on the website. There was also a great deal of anti-American sentiment expressed in the public meetings. Based on these analyses the next chapter will put these results in context with the current state of the literature and discuss in detail the implications of these findings.

Chapter 7 – Discussion of the findings

7.1   Introduction

In the previous chapter I conducted an analysis of the texts produced in the 'GM Nation?' debate process: the emails sent to the debate website and transcripts of the six Tier-1 public meetings. The analysis was based on Fairclough's three-dimensional CDA framework, but whereas the previous chapter was concerned with the textual analysis of the data, in this chapter I discuss the findings of the analysis in the context of the other two dimensions of discursive practice and social practice. In this chapter I discuss the implications of the findings of the analysis in terms of the immediate context of the issue of genetic modified foods/crops, as well as in the general context of technological innovation, including the engagement of the 'publics' in policy decision-making on technologies. The chapter will place the findings in relation to the existing literature on innovation, science and technology studies, technology assessment, public understanding of science and discourse as set out in Chapter II (Review of the literature), making significant contributions to these immense bodies of knowledge.

7.2   The 'GM Nation?' debate as Social Practice and Discursive Practice

Fairclough views discourse as simultaneously being (i) a text, either written or spoken, (ii) discourse practice –the process of text production and text interpretation, and (iii) socio-cultural practice (Fairclough, 1995). In the previous chapter, I have analysed the *text*. Here I look at the other two aspects of discourse.

7.2.1   *Social Practice*

In this section I discuss the social context within which the 'GM Nation?' debate took place. The analysis of social practice looks at the structures, both discursive and non-

discursive, which partly determine or constrain the discourse. Discourse also has constitutive effects on the social practice and the dimensions of the social structure which determine or shape it. I have explained this dialectical relationship between discourse and social practice in detail in the chapter on Literature Review (Chapter II). In our case, I look at the structural conditions which influenced the discourse of the debate and also those aspects of the social practice which the participants in the debate contested and sought to influence in accordance with their own values. The agential aspect of this multi-dimensional discourse analysis model is analysed in the next section under discursive practice. I first give a brief review of the various meta-narratives of social context and then I discuss the specific social context within which the 'GM Nation?' debate took place.

Social practice has various orientations – economic, political, cultural, ideological, technological etc. Discourse may be implicated in all of these without any of them being reducible to discourse (Fairclough, 2002). This is in contrast with the position of post-structuralist discourse theories which seem to regard discourse as all-encompassing (cf. Laclau and Mouffe, 2001). Again, I have given a detailed review of these positions in the chapter on Literature Review (Chapter II). In this section, I focus on the non-discursive moments of these various orientations of social practice, focussing on the socio-political and technological structural conditions which provided the context for the 'GM Nation?' debate.

In terms of meta-narratives the current epoch has variously been termed as late-modernity (Chouliaraki and Fairclough, 1999), post-modernism (Lyotard, 1984), Risk Society (Beck, 1992), etc. In their account of late-modernity, Chouliaraki and Fairclough (1999) borrow from the works of Harvey, Giddens and Habermas in describing the economic, social and cultural changes of late-modernity. Economically, there has been a shift from 'Fordist' mass production and consumption of goods to 'flexibility' represented through more recent concepts like 'lean' and 'agile' manufacturing and 'Just In Time'. Also, the units of production are increasingly transnational, more commonly described as the process of 'globalisation'. Politically, 'neo-liberalism' has taken root at an international level. 'Postmodernism', according to theorists like Beck, Giddens, Harvey etc., is the cultural manifestation of these economic changes. Chouliaraki and Fairclough refer to this phase as 'late-modernity'. An important characteristic of late-modernity is that the changes associated with it exist as discourses as well as processes occurring outside discourse. And the processes occurring

outside discourse are substantially shaped by these discourses (Chouliaraki and Fairclough, 1999).

In terms of the technological moment of social practice, the increasing application of science and technology, while having reduced uncertainties and threats to mankind (like impacts of natural disasters), has also created new uncertainties in terms of risks and ethics (Hennen, 1999). Environmental risks from new technological innovations and ethical questions raised by developments in genetics are the defining uncertainties associated with technology in our times. Beck's 'risk society' provides a useful meta-narrative in contextualising the controversy around these technologies. Beck rejects the idea of the current milieu being a post-modern one (Beck and Lau, 2005). He asserts that *"...all Western societies are still modern societies: there has been no movement beyond the realm of the modern to its opposite, because there has been no clear break with the basic principles of modernity but rather a transformation of basic institutions of modernity (for example, the nation-state and the nuclear family). We would suggest, therefore, that what we are witnessing is a second modernity"* (p. 525-526). Beck's theory rests on two basic assumptions: the first that there is a break between first and second, or reflexive modernity. Here 'first modernity' encapsulates all that is associated with industrial societies, like the nation-state, the Fordist company, the nuclear family, unquestioned science, etc. The foundation of this 'first modernity' was a logic of order that drew strict boundaries between categories of human beings, things and modes of activities which enabled assigning responsibilities and areas of authority unambiguously. It is this very logic of order that is being threatened by the new 'reflexive modernity'. The second assumption is that it is the very process of modernisation itself which is undermining the foundations of the 'first modernity'.

While first modernity was characterised by the either/or logic of institutional structures and any ambiguity or plurality was deemed a deviation that had to be overcome and eliminated, the transition to second modernity is marked by the social recognition of plurality and ambiguity, especially when this recognition occurs in institutionalised form.

At the heart of first modernity, especially in the context of governance of science and technology, lies the distinction between science and society and therefore between facts and values and science and politics. These dichotomies and boundaries get blurred in second modernity. There is, though, not a complete rupture in the process of transition to second modernity as post-modernism suggests. While second modernity shares certain principles

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of first modernity (such as rational reason being the basis for decision-making), the institutional responses to the fundamental imperatives of these principles are associated with the particular phase of modernity. In other words, "*....the continuity of modernity will be guaranteed by the basic principles, while the transition to reflexive modernity will be brought about by the discontinuous transformation of basic institutions*" (p. 532).

The 'GM Nation?' debate took place in the context of this transition to Beck's 'second modernity'. The lack of trust in science and scientists, in governments to act in the best interest of people, which underlined the controversy around GM crops in the UK, is a manifestation of this crisis of modernity. The old rigid boundaries between nature-society distinctions are being eliminated and so is the difference between scientific and non-scientific knowledge. As these distinctions are eliminated and science itself becomes ambiguous and a source of uncertainty, what was once considered 'natural' and thus beyond anyone's responsibility is now forcing institutions to take responsibility for decisions and make them in a pragmatic way, using political procedures and normative criteria (Beck and Lau, 2005). The turn towards public engagement in decision-making on science and technology policy around the world is a response of 'reflexive modernity' to this crisis of modernity.

The anomalies and deviations from the norm of first modernity are in second modernity more mainstream. These anomalies and deviations do not have to be eliminated; rather they are accommodated as valid, even if not equal, alternatives to the norm. The proliferation of public engagement exercises from the last decade of the 20th century onwards was a result of policy makers being forced to respond to these new pluralities as existing institutional arrangements of first modernity were ill-equipped to meet this crisis. It is in this context of the meta-narrative of the transition to second modernity that the 'GM Nation?' public debate on the possible commercialisation of GM crops in the UK took place in 2003.

7.2.2   *The 'GM Nation?' public debate as discursive practice*

Discursive practice mediates the relationship between the text and the socio-cultural practice within which it is embedded. Processes of text production and interpretation are

constrained by the resources available for members involved in these processes. These resources are determined by the existing social structures, norms and conventions etc. They are also constrained by the specific nature of the social practice they are part of, which determines what elements within the members' resources that can be drawn upon (Fairclough, 1995).

The process through which the 'GM Nation?' debate was conducted corresponds to the discourse practice part of Fairclough's model (in its text production aspect), i.e. the methodology and the forums made available through which the participants could engage in the debate process. There were broadly four such forums (i) Letters and emails, (ii) Meetings and events, (iii) Debate feedback and (iii) Narrow-But-Deep discussions. Of these, I have analysed the texts from the Letters and emails and the six Tier 1 public meetings. Let's see how the orders of discourse associated with these discourse practices were reproduced or transformed during the debate.

There are a number of discursive practices associated with the social domain of public engagement exercises. These are, for example, focus groups, citizen juries, consensus conferences, etc. There are also other more specifically designed forms of public engagement exercises like New Zealand's Royal Commission on Genetic Modification which tend to be more extensive, both in terms of scope and scale. The 'GM Nation?' debate was also a specifically designed, extensive exercise which employed a number of genres including online website comments, public meetings, questionnaires and focus groups. The texts I have analysed emanated from the online website comments and public meetings. I have discussed the efficacy of these genres on how they influenced the nature of the text produced elsewhere in the chapter. Here I will focus on how these genres relate to other discursive practices.

One of the most interesting and unique aspect of the 'GM Nation?' debate was the use of Information Technology (IT). An official website for the debate was set up, which apart from providing all the information material pertaining to the debate, also provided a forum for participation in the debate allowing participants to post their views and comments on the issue. The use of IT provided an interactive forum for public engagement which was also inclusive as potentially anyone with access to the internet could participate on the website. Also, this genre allows participants to express their views uninhibited without the feeling of being intimidated by other participants as may be possible in other genres like

public meetings. Deliberative exercises must be free from any sort of coercion and must provide a high degree of protection to the independence and freedom of thought of the participants. Online forums are potentially capable of meeting these requirements (Coleman and Gotze, 2001).

Although, the 'GM Nation?' debate was not the first instance of using IT in a public consultation (Most western democracies have had some experience of this before 2003 – see (Coleman and Gotze, 2001)), it was certainly the most high-profile. And as we will see later in the chapter, the text produced through the website comments was qualitatively different from that produced at the public meetings. As the contributors on the website were not restricted by constraints of time or a fixed format, the comments were often very detailed and much richer in content. Although there were exceptions where the comments were nothing more than a sentence long and could be considered, in internet terminology, as trolling. Trolling is a common feature of online discussion forums, but the 'GM Nation?' website's comments section didn't suffer much from this.

In conclusion, the use of IT promises to revolutionise the process of public engagement as it provides a convenient way for people to get involved in policy-making. Despite the danger that online engagement processes may give rise to a form of "techno-populism" where the best resourced and the loudest and the most confident participants may seek to dominate and hijack the debate as is quite often the case in many unregulated online discussion forums today, these are outweighed by the huge potential benefits of this genre for empowering the voices and opinions of those who have been hitherto neglected.

7.3   Discussion of the analysis

7.3.1   *Discussion of the findings of the intertextuality analysis*

Emails

The analysis of the emails sent to the 'GM Nation?' website in terms of intertextuality reveals that the GM debate is highly polemic in nature. In terms of their orientation to

difference, a large majority of the emails analysed exhibit scenario (b) in Fairclough's five scenarios. In other words, these emails reveal an accentuation of difference between the different positions on the issue of GM crops. There exists a struggle over the meaning of GM crops, its benefits and risks, its ethics and its science. In an effective public debate, one might expect elements of scenarios (a) and (c) where there is an exploration of differences and attempts are made to resolve and overcome differences and move towards a consensus (Fairclough, 2003). However, this wasn't the case with the 'GM Nation?' public debate. This finding is not different from what has been observed in other public engagement exercises on biotechnology across the world (Goven, 2006, Levidow, 1998) and indeed by other works done on the 'GM Nation?' debate (Taylor-Gooby, 2006).

Although forming consensus was not an objective of the 'GM Nation?' debate – its major aim was to provide the Government with 'meaningful' information about the nature and spectrum of the public's views, which would then inform decision-making (Board et al., 2002) – the question remains, what does the 'GM Nation?' debate mean for the idea of the public sphere and for deliberative democracy?

The public sphere

The concept of the public sphere is usually associated with the work of Habermas as this is where it is more fully elaborated. In its strictly pure historical form, the public sphere is an arena of rational-critical debate comprising of private individuals coming together as a public. From the private realm the public sphere works as an institution scrutinising and checking the functioning of state apparatuses. It performs the political function of express-ing the needs of civil society to the state (Habermas, 1989).

For the public sphere to produce effective democratic dialogue, it has to meet certain conditions: there has to be mutual understanding among the actors; all actors would have equal opportunity for discussion, free from any form of domination or coercion, and rational argument will be the prime arbiter in the debate. The 'GM Nation?' debate failed to meet most of these conditions. As mentioned earlier, the debate at most times was polemic with the prevalence of scenario (b) in terms of orientation to difference in the text. There was huge distrust on either side of the divide. The analysis also revealed hegemonic claims

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in the debate characterised by assumptions made in the texts and the lack of dialogicality. Thus there was an element of an attempt to domination in the discussion. At one level, it seems the 'GM Nation?' debate seemed to have offered equal opportunity to participate in the debate, either through the writing of emails and comments on the website or through participating in the various public meetings. However, it is widely understood that people who actually participated in the debate were engaged individuals who had strong opinions on GM crops (mostly opposed) (Pidgeon et al., 2005). Also there were concerns raised that the debate programme wasn't publicised well enough and many people weren't aware about the 'GM Nation?' debate.

As for the rational argument being the arbiter of the debate, as has been mentioned earlier, the 'GM Nation?' debate wasn't looking for a consensus. The main purpose of the debate was to gather views from the public about possible commercialization of GM technology and convey that information to the government.

A related concept to the public sphere is that of deliberative democracy. Deliberative democracy is a form of political decision-making through a process of public discussion and debate in which citizens look beyond their narrow self-interest in favour of the larger good of the society (Bohman, 1996). Deliberative democracy is about a recovery of authentic democratic values and the expansion of a more elevated public sphere (Giddens, 1998). The focus here is on consensus achieved through rational argument rather than through 'mere agreement'. Advocates of deliberative democracy proclaim that if the proper procedures of public discussion are followed, which can be achieved through realising the conditions of ideal speech (mutual understanding amongst the actors, mutual recognition of the legitimacy of other actors to question the assigned topics of conversation, and equal opportunity for actors to engage in discussion without any coercion or domination), the consensus thus achieved would be legitimate and in the general interests of all the participants.

This notion of consensus and deliberative democracy has been criticised in various accounts. Stanley Cavell reckons that bringing a conversation to an end, or in other words achieving consensus, is always a personal choice and cannot be put down to having been achieved through the application of procedures (Cavell, 1990). For Chantal Mouffe, the conception of a public sphere where power and antagonism have been eliminated to realise a rational consensus, denies the central role the conflict dimension plays in democratic

politics. For her consensus is an act of hegemony and it is ultimately political and is bound to be achieved through exclusion (Mouffe, 1999).

"*Consensus in a liberal democratic society is – and always will be – the expression of a hegemony and the crystallisation of power relations. The frontier that it establishes between what is and what is not legitimate is a political one, and for that reason it should remain contestable. To deny the existence of such a moment of closure, or to present the frontier as a dictated by rationality or morality, is to naturalise what should be perceived as a contingent and temporary hegemonic articulation of 'the people' through a particular regime of inclusion-exclusion.*" (Mouffe, 2000).

Similar insights have also been raised in the field of constructive technology assessment (CTA). Audley Genus and Anne-Marie Coles critique the Habermasian public sphere with reference to cases where the argumentation process falls short of the ideal speech conditions, for example where the arguments are subject of coercion. In such cases the prospect of openness to criticism will be diminished. Also they raise the issue where participants in the debate are not interested in achieving a consensus in the first place (Genus and Coles, 2005). The 'GM Nation?' debate was just such a case. The analysis of the emails confirms the highly polemic nature of the debate. The participants came to the debate with deeply entrenched positions, showing little interest in working towards a consensus. And the fact that achieving consensus was not the aim of the debate, it can be said that, at least in principle, the debate avoided the exclusion of deviant voices and enabled a broader set of viewpoints to be heard.

Public meetings

In the case of the six Tier-1 public meetings, as has been mentioned in the analysis chapter, the transcripts weren't as amenable to intertextuality analysis as the emails were. This was perhaps because of the nature of the text production itself. The transcripts were summarised versions of the discussions that took place around each table. As this research was not privy to much of the rich data those individual discussions at each table would have produced, the intertextuality couldn't be properly assessed. As such, by the very nature of summaries, the transcripts of the meetings gave the impression of consensus. The organisation of the

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meetings in such a way seemed to have promoted attempts on the part of the participants to resolve differences of opinions on GM issues, focusing on commonality and suppression of differences in order to produce consensus. Although, it was not the aim of the 'GM Nation?' debate to produce consensus, there seemed to have been a feeling among the participants in some of the meetings that they were supposed to reach consensus during their deliberations.

Thus, the intertextuality analysis of the emails and transcripts of the public meetings produced somewhat opposing results. While on the one hand, the emails showed a rather polemic and conflicting nature of the debate, the public meetings, perhaps because of the way they were organised, seemed to have a consensual texture. Thus, when the 'GM Nation?' debate didn't aim to create consensus amongst the participants on the issue of GM, it succeeded, at least partially, as in the case of emails, in empowering voices which otherwise could have been weeded out, or excluded, in the hegemonic act of achieving consensus. Consensus would mean obtaining *closure* on the *interpretive flexibility* of plant biotechnology.

But if there is no consensus, and consensus is inherently hegemonic, what implications then do this have for decision-making? For if there is no consensus, wouldn't any decision taken be controversial? Technology assessment, according to Hennen (1999), is about policy consulting and participation in technology assessment should not be mistaken for direct decision-making. The goal of participation in technology assessment is not to settle, or achieving 'closure' on conflicts through bargaining or compensations for those whose interests have been violated, but to "*gain empirical and normative insights*" and introduce them into decision-making (Bechmann, 1997, pg. 154 cited in Hennen, 1999). On this count, the 'GM Nation?' public debate seemed to have been a partial success through the comments and emails and letters, but fell short when it came to the public meetings.

7.3.2   *Discussion of the findings of the legitimation strategies analysis*

The analysis of the legitimation strategies used by the participants to support their claims or make their claims legitimate reveals that all four strategies (Authorisation, Rationalisation, Moral Evaluation and Mythopoesis) were utilised to varying degrees. However, Rationalisation was by far the most common legitimation strategy used featuring in almost all the emails and the public meetings. While the proponents of GM crops legitimised their

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arguments based mostly on Rationalisation, the opponents apart from Rationalisation, also utilised Moral Evaluation basing their arguments on moral and ethical issues involved with GM technology. Authorisation and Mythopoesis were also used in some cases. The analysis reveals that participants in the debate felt the need to justify their case through recourse to rational argument more than others. There seems to have been an implicit constraint on the kind of arguments one could use for one to be taken seriously. Also, the discussion in the Tier 1 meetings, which although was framed by the public, given effect through nine discussion workshops prior to the launch of the debate, focussed on the narrow risk/benefit analysis of GM crops, which constrained the kind of legitimation strategies the participants could use. However, the participants in the emails to the website were free to post their views without any specific framings. In spite of this, the analysis of the emails reveals that participants somehow felt the need to justify their position through the use of rational argument. This suggests that participants in debates on technological issues might be constrained in their argumentation strategies. This may be seen as a sign of the hegemonic influence of the discourses of rationality, especially in issues relating to science and technology.

On one level, this finding reinforces earlier studies on the legitimation strategies used by other movements. Yearley (1992), for example, commented on the environmental movement's dependence on scientific rationality in order to make its case for, among other things, reducing the emission of greenhouse gases and not consuming detergents which are rich in phosphatic water softeners. However, this is in contrast with Hoban, Woodrum et al. (1992) where farmers and non-farmers in North Carolina were interviewed on the use of genetic engineering in agriculture and found that moral objection was the strongest predictor of opposition.

7.3.3   *Discussion of the findings of the analysis of the themes*

In the case of the 'GM Nation?' debate, the ideological investment of the discourse of the market, or in a more general sense the neo-liberal discourse is apparent from the prevalence of the economic argument in the emails and the public meetings from both proponents and opponents of GM. The focus for the proponents of GM was on how GM provided financial benefits, for example, to the farmers, and that in order for the UK to compete internationally it was necessary that GM crops were allowed to be grown in the UK. Even the opponents of GM utilised the economic argument to make the case for a GM-free UK. The idea

that focussing on organic foods can give the UK a competitive advantage in terms of quality was floated around frequently.

Also, there was a tendency for the participants to identify themselves as 'customers' or 'consumers'. The discussion on the risks and benefits of GM was seen from the point of view of consumers. Here again, it is evident that the ideological discourse of neo-liberalism was being reproduced in the debate. This finding agrees with Rayner (2003). Rayner argues that different actors have different motivations for encouraging public participation in assessment processes. These motivations are reflected in the way these actors give identities to the publics. For example, governments and natural scientists view the publics as citizens through the prism of the deficit model. Critics of the deficit model conceive the publics as citizens from the point of view of deliberative democracy and ideal free speech (Habermas, 1984). Industry, on the other hand, has a model of the citizen as consumer, which follows from its motivation in supporting public engagement as an information collection exercise to inform management and marketing decisions. Rayner emphasis that it is this model of citizen as consumer that would be most attractive to the publics in modern Western democracies, where they seem to be alienated from the electoral process as reflected in the decline in voter turnouts in elections. "*...our consumption patterns are likely to have a greater impact in shaping our lives than our ballots. Thus, popular choices about governance seem to be increasingly made in the marketplace rather than in legislature. In Sagoff's (1990) terms, the consumer is displacing the citizen in political importance*" (p.165). This was evident in the general debate around GM foods in the UK when the supermarkets removed GM products from the shelves citing consumer concerns. And as public engagement exercises such as the 'GM Nation?' debate are political arenas where the publics reaffirm their rights as citizens in a democracy, one would have expected the 'citizen' identity to prevail over the 'consumer' identity. The fact that the participants chose the 'consumer' identity over the 'citizen' identity points to the hegemonic influence of the neo-liberal discourse in the UK. Although, it is quite possible that the participants may have been using the 'consumer' label strategically since 'consumer' is more politically potent and influential a label than 'citizen' as pointed out by Sagoff (1990). Either way, this would point to the influence of the neo-liberal economic discourse.

This finding is particularly interesting when one considers the point that public engagement exercises involving decision-making on issues such as the commercialisation of GM crops, ideally, want to explore the different world-views that the publics might bring to the table. This was certainly the case with the RCGM debate in New Zealand where the organisation

of the debate was criticised by the environmentalist groups as they deemed that the design of the submission template was based on a reductionist philosophical and methodological approach which favoured the genetic engineering submissions and didn't allow the expression of holistic worldviews which the radical environmentalist seemed to espouse (Rogers-Hayden and Hindmarsh, 2002). On the face of it, the design of the 'GM Nation?' debate didn't suffer from such drawbacks as there were no submission templates. In spite of this, the fact that focus of the arguments in the debate, both through the emails and the meetings, was on the economics and the market, points to the hegemonic influence of the discourse of neo-liberalism in the UK.

It can be argued that since the 'GM Nation?' debate was specifically framed 'against the background of the possible commercial production of GM crops', the debate was fore-closed in favour of economic argumentation. Although the stated aims of the debate and the resultant framing surely did influence the debate, it would be too simplistic to view the prevalence of the neo-liberal economic discourse following as a direct result of this. Especially so in the case of the emails, as the participants were not asked to conform to any specific format or they need not have to watch or read the stimulus material which was prepared for the public meetings, which could have influenced them.

7.4   Discussion of Critical Discourse Analysis

This research has used Fairclough's 3-dimensional model of CDA. One of the main aims of CDA is to expose the ideological assumptions behind people's actions and words. These ideological representations come to be understood as 'common sense'. The critical approach to discourse analysis is based on the view of a relationship between micro events (such as the 'GM Nation?' debate) and macro 'structures which sees the latter as both the conditions for and the products of the former. Structures are not only presupposed by, and a necessary condition for, action, but are also products of action.

In an earlier section of this chapter I have looked at structures in the form of social practice which contextualised the 'GM Nation?' debate and action in the form of the public meetings and website comments that formed part of the 'GM Nation?' debate. The structural

aspect was identified in terms of the transition to Beck's 'second modernity'. The 'GM Nation?' public debate was caused by and a part of, the 'crisis of modernity'. The years leading up to the debate were characterised by decreasing level of trust in public institutions and scientists. Increasingly, science itself was being seen as value-laden and not as 'objective' as it claimed to be. Where, in first modernity, decisions relating to science and technology policy were made on the advice given by scientists and experts, in second modernity more of such policy decisions were being made through consulting a broader cross-section of society including environmentalists, users and lay people in general. Another structural aspect is the ideological discourse of neo-liberalism in the socio-political and economic sphere. We will see later in the section how these structures were instantiated in the text of 'GM Nation?' debate and also discuss whether the text itself reproduced or altered these structures.

A more specific context to the 'GM Nation?' debate was the struggle over the direction of agriculture policy in the UK. A significant part of this struggle was discursive in nature, with different groups competing to influence the general discourse of agriculture in the UK. In terms of the socio-technical regimes literature, the neo-liberal discourse in the wider political and economic landscape seems to exert a selection pressure on modern agricultural regime. This regime has evolved through a trajectory where the focus has been on increased factor productivity, through increased mechanisation, specialisation and use of inputs including chemicals which have favourably impacted the agricultural output per unit of labour (Smith et al., 2005). Thus the regime has stabilised around the discourse of economics. However, increasingly innovation systems have been coming under pressure from discourses of sustainability and the environment. This has resulted in the emergence of a niche in the form of organic crops. Another significant development in the wider landscape has been the progress made in the field of genetics in the past couple of decades. These scientific developments and subsequent research into their applications in the field of agriculture have led to the niche of GM crops. Both these niches have put increasing selection pressure on the incumbent agricultural regime. The 'GM Nation?' debate was a site where the different discourses, including the incumbent economic discourse and the niche discourses of sustainability and the environment could engage together in regime transformation.

So how were these structural issues reflected in the text of the debate? As was mentioned earlier, the textual analysis of the data, both, from the website comments as well as the public meetings, revealed that the focus of the discussions was on the economics of GM

crops. Even those who were in favour of more sustainable agriculture in the form of organic crops quite often tended to make their case based on economic benefits of organic crops and economic risks of GM. Also another revealing finding was that the participants came to the debate in their identity as 'consumers' or 'customers'. Very few participants chose to identify themselves as 'citizens'. This suggests the ideological discourse of neo-liberal economics at work. The exercise of power through consent, as opposed to coercion, is closely associated with the concept of ideology. According to the 'dominant ideology thesis', social order (and the incumbent socio-technical regime) is sustained largely through the effects of dominant ideologies winning the consent or acquiescence of the majority. The majority see this formation, which is essentially ideological, as 'common sense' or 'natural'. Discourse is the medium through which ideology operates and hence the importance of the power to control the discourse. From the analysis of the textual data it is clear that the ideological discourse of neo-liberal economics continues to control the overall discourse on agriculture. Although other discourses like the moral/ethical, health and sustainability were invoked, these struggled to displace the hegemony of economics. The socio-technical regime of agriculture has stabilised around economics and the niches of sustainability discourse have not yet managed to breakthrough. Although there was widespread opposition to GM crops and the Government acknowledged this opposition by declaring a moratorium on the commercial growing of GM crops in the UK, this cannot be viewed as the discourse of sustainability and health having dislodged the discourse of neo-liberal economics from its controlling status. The debate was fought to a large extent on the economic argument, based on the economic benefits of GM and organic crops, even if there appears to be a much greater constituency for the sustainability discourse than before.

As to the question of how did the event itself influence the structure, it can be inferred from the above discussion that the 'GM Nation?' debate reproduced and reinforced the structure which has stabilised around the neo-liberal economic discourse. However, this statement must be qualified by saying that the contesting discourses of sustainability and health have an increasing influence on the structure, even if not sufficient to alter the structure.

The above discussion also indicates that the agential capacities of the participants seem to have been restricted as they were unable to challenge successfully the structuration effects of the neo-liberal economic discourse. This was the case for both, the website comments as well as the public meetings. This could be partly due to pervasiveness and the stability of the neo-liberal discourse or/and due to deficiencies in the conduct and design of the debate process itself.

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7.4.1 *Positioning the research in the current literature on CDA*

Critical Discourse Analysis (CDA) is a relatively new academic field. A keyword search for the term "Critical Discourse Analysis" on the SSCI database produced 446 results with the first articles published in 1994. The empirical literature on CDA involving public engagement exercises is sparse. However, there are two significant studies which are comparable to this current research. The first one is the discourse analysis study of the 1993 Irish National Recycling Conference (Skillington, 1997) and the other is CDA of the Royal Commission on Genetic Modification in New Zealand (Rogers-Hayden and Hindmarsh, 2002).

Rogers-Hayden and Hindmarsh's work is a CDA of a public debate on a similar issue as the 'GM Nation?' debate. However, the focus of their research is much narrower than this present research as the key aim of their work was to investigate some of the constraints faced by the environmentalist groups in their submissions to the RCGM in New Zealand. Also, although they have used Fairclough's 3-dimensional model of CDA, their analysis of the textual data is limited. Apart from the fact that they have not analysed the individual submissions and just the final report of the RCGM, the methods employed to analyse the text are not as rigorous as the ones that have been used in this research. Hence I believe, this current application of CDA to a public engagement exercise is an improvement on Rogers-Hayden and Hindmarsh's work, both, in terms of the scope of the application as well as the rigorous nature of the methods employed for textual analysis.

Skillington's analysis of the Irish National Recycling Conference, on the other hand, had a much broader scope when it showed how relations of domination and traditional power asymmetries were being reasserted in newer participatory decision-making exercises. Skillington doesn't explicitly mention the methodology used as CDA, but the 3 dimensional model used for the discourse analysis is very similar to CDA. Here, again, as in the case of Rogers-Hayden and Hindmarsh's work the textual analysis is limited to just one method, namely, frame analysis, although the use of frames is quite extensive and detailed. The focus of Skillington's paper is similar to the current research in terms of the interest in the 'democraticness' of participatory exercises and issues of power and ideology. However, this research goes further in exploring how struggles over technology are, in part, struggles over the control of discourse of technology.

Hence, in terms of the current state of empirical literature on CDA, this research makes an important addition to this relatively new field. This is probably the first time such a detailed discourse analysis of textual data of this size, using a range of different methods, has been done. This research provides a base for further studies conducting CDA of public engagement exercises.

7.5   The discussion of the findings in the context of socio-technical systems

7.5.1   *Governance on the outside and Governance on the inside*

The 'GM Nation?' public debate can be considered as an instance of what Smith and Stirling (2007) call 'Governance on the outside'. Governance on the outside is characterised by identifying a unique, discrete socio-technical system with well-defined boundaries. Consequently, governance is conceived of as separate from, and acting from the outside on, the socio-technical system.
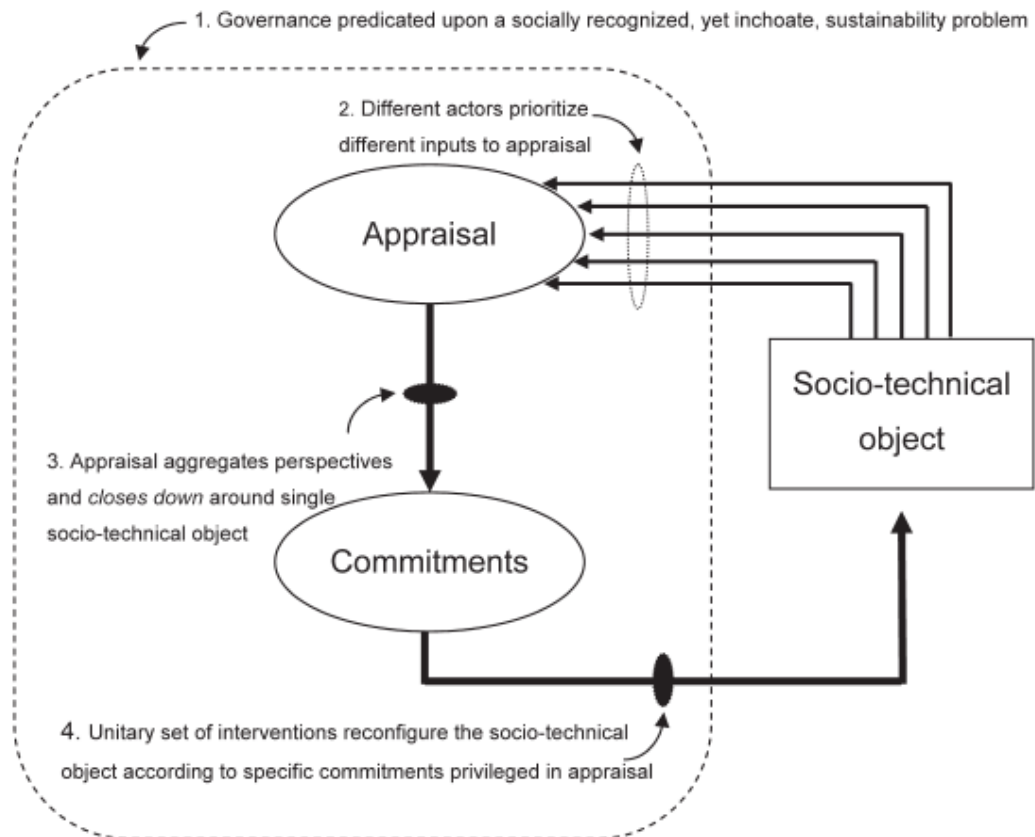

Figure 7. 1 Governance on the outside: **intervening in the socio-technical object**

The 'GM Nation?' debate was a one-off appraisal of GM Foods/crops (the socio-technical object) where inputs to the appraisal were from a wide-range of perspectives held by different actors. However, there were no clear-cut commitments emanating from the appraisal process as there was great ambiguity on whether the outputs of the debate would feed into policy-making on GM Foods/Crops. This was one drawback of the 'GM Nation?' debate process that has been frequently pointed out by analysts (e.g. Horlick-Jones et al., 2006).

This non-commitment on the part of the government could also mean that the appraisal process served in 'opening up' of the governance of GM (Stirling, 2008). Here, in the 'opening up' of governance, "*instead of focusing on unitary prescriptive recommendations, appraisal poses alternative questions, focuses on neglected issues, includes marginalised perspectives, triangulates contending knowledges, tests sensitivities to different methods, considers ignored uncertainties, examines different possibilities, and highlights new options*" (p. 280). A commitment on the part of the government would have meant a 'closing down' of technological choice, which would support the interests of incumbent policy-making actors. Committing to a particular trajectory for GM would have meant denying the political nature of technology in general and GM in particular. An opening-up approach would build a pluralistic discourse as opposed to consensual discourse. This is similar to Mouffe's views on consensus being an act of hegemony that have been detailed earlier in the chapter.

As Smith and Stirling (2007) acknowledge, any ideal governance process would have elements of both, 'Governance on the Outside' as well as 'Governance on the Inside'. As the 'GM Nation?' debate resulted in the "opening up" of the appraisal of GM, it served to sustain the uncertainties surrounding GM as any reduction in uncertainty under one framing merely result in more uncertainties under alternate framings. In this respect, with the allowance of different framings the 'GM Nation?' debate can be said to have partially been an example of 'Governance on the Inside'.
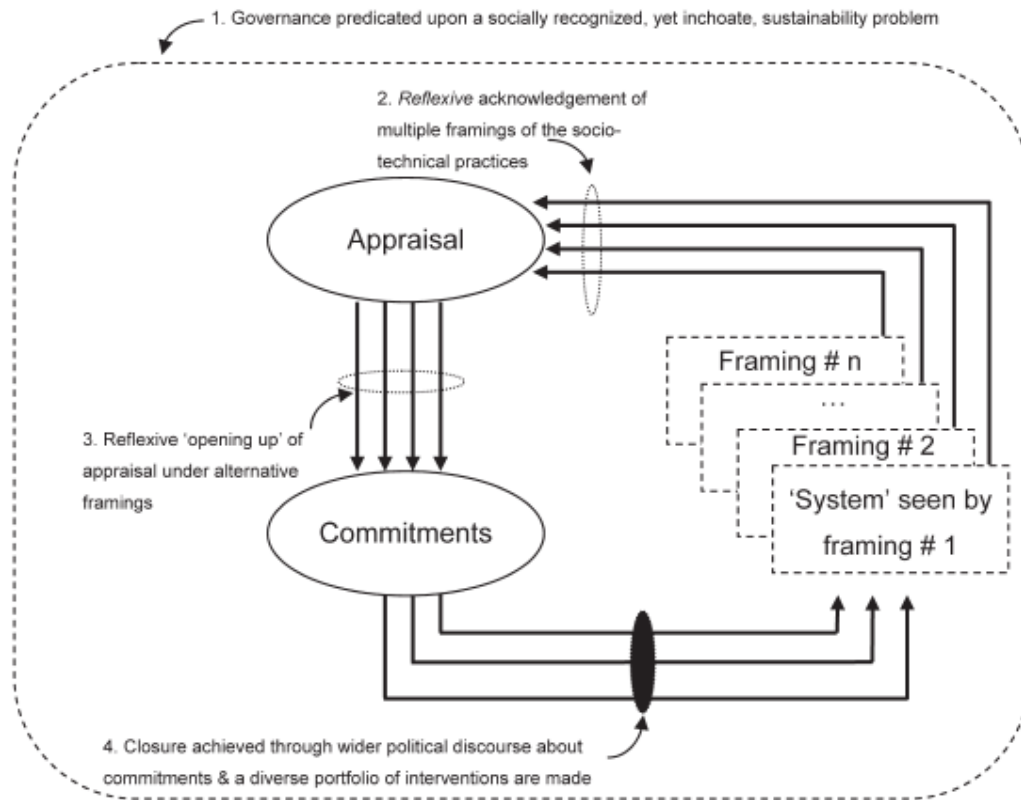
Figure 7. 2 **Governance on the Inside: co-constituting of governance and socio-technical subjects**

7.5.2   *The role of outsiders in technological change*

Transition management is often thought of as transformation of the socio-technical regime guided through negotiations between the various social actors who are essentially outsiders to the regime (Smith et al., 2005). Van de Poel (2000) makes use of the concept of techno-logical regimes to analyse and explain technical change and technical trajectories. An interaction system in which technical development takes place is governed by rules that guide the action of the actors involved. These rules pattern the trajectory of the develop-ment of technology. Some rules are implicit or tacit and are followed by the actors by way of routine or habit. Others are more explicit and are laid down as organisation rules or technical norms. *"The totality of the relevant rules makes up the rule-set or grammar – the technological regime – of a technology"*. Outsiders, here, are people who do not share the technological regime of a particular technology. Van de Poel defines 'outsiders' as those who are 1) outside the system of interaction or network in which technical development

takes place and 2) do not share some of the relevant rules with respect to technical development.

In order to play a role in technical development, outsiders may have at their disposal two important resources that can be used. The first resource is engineering and scientific know-how that is potentially relevant for the technological regime and the second resource is financial and managerial capability that is required to develop, produce and market alternative artefacts. Van de Poel differentiates three categories of outsiders: outsider firms who possess both the resources to variable degree, outsider professional scientists and engineers who possess the relevant know-how but lack financial and managerial resources, and societal pressure groups who possess neither of the two resources but have the potential of mobilising public opinion or users, consumers or politicians for or against features of a technology. By mobilising public opinion for or against certain features of technologies, societal pressure groups help maintain a certain issue on the agenda and influence technical change. They may also mobilise insiders in their attempts to shape technical development. The two types of insiders who are most susceptible to be influenced by the societal pressure groups are users and the government. As relative insiders, users and the government can usually influence technical development more directly than societal pressure groups (van de Poel, 2000).

Can the 'GM Nation?' debate be considered such an instant of users being given the opportunity to influence the development of the GM food technology? It is obvious that the debate was a result of widespread distrust in the government's willingness or ability to make decisions in the best interests of the public (a consequence of earlier crisis like the BSE). This distrust was fuelled through large scale mobilisation by societal pressure groups like Greenpeace and FoE.

But for users to really influence technical development directly, the engagement process should occur more 'upstream' than it did in the case of 'GM Nation?'. Here the debate was focussed on the possible commercialisation of an already developed technology. Such downstream engagement process have been criticised as, intentionally or unintentionally, serving only token purposes, especially when technological applications are 'locked in' through commercial or other constraints. Recently, nanotechnologies seem to offer such opportunities for more upstream engagement in technology development as these technolo-

gies are still in a nascent stage and lessons learnt from public engagement with earlier technologies can be put to use (Rogers-Hayden and Hindmarsh, 2002).

7.6 Reliability and Validity of Discourse Analysis

All researchers working under the social constructionist agenda have to own up to the fact that their research output is also a construction. Hence it is important for a researcher to be reflexive and make clear his position at the outset. Critical Discourse Analysis adopts an explicit socio-political or ideological stance towards data and analysis. This researcher too had a socio-political agenda in seeking to expose the power relations in the current neo-liberal political and economic environment in general which coloured the debate on GM foods in the UK. This researcher was of the position that not all voices were being heard in such public debates and certain sections of society had the power to control the discourse on science and technology in general, and GM Foods in particular, to suit their interests. This position of the researcher was formed on his own views on the current neo-liberal environment and was reinforced by the literature on public engagement exercises.

CDA does not make broad empirical generalisations. Universalisation is antithetical to the idea of discourse being constructed from specific interpretative resources and for particular contexts. Hence the conclusions of this particular research are not intended to be applicable to all or some of the other public engagement exercises, although this research does make some normative recommendations for conducting future engagement processes.

As CDA is an interpretation, it is possible that this researcher's interpretation may differ from other researchers for the same data set. The status and validity of this current research rests on the rigorousness of the analysis and the methodology. The close reading and analysis of the large amount of data from the website comments and the transcripts of the public meetings is unique in the empirical literature on public engagement exercises.

7.7   Conclusion

One of the major concerns for Critical Discourse Analysis has been the ideological effects of texts – the effects of texts in creating, sustaining and transforming ideologies. CDA sees ideology as contributing to establishing, maintaining and transforming relations of power, domination and exploitation. This research aimed to uncover these ideological effects of texts in the particular context of the debate around genetically modified foods in the UK. The ideological discourse of neo-liberal economics which was characteristic of the socio-political context in which the 'GM Nation?' debate happened was reproduced through the participants' comments on the website and the discussion in the public meetings.'

The previous chapter analysed the data from the 'GM Nation?' debate using a CDA perspective. This chapter discussed the findings of that analysis with reference to various issues that have been raised in the literature on public engagement with technology development. The 'GM Nation?' debate was initiated from a recommendation by the Agricultural and Environmental Biotechnology Commission (AEBC), the independent body which provides strategic advice to government on biotechnology issues and their impact on agriculture and development. This was an unprecedented exercise in terms of scale in the UK and was brought about by large-scale mistrust in the government on health and safety concerns with regards to new technologies.

The intertextuality analysis reveals that the debate was highly polemic in nature and it seemed the participants were not oriented towards reaching consensus. At one level, the fact that the debate objective was not to seek consensus may have helped in empowering voices which would have otherwise been excluded in the hegemonic act of achieving consensus. However, the use of Rationalisation as the legitimation strategy in the arguments made by the participants points to the issue of hegemonic influence of rationality in science and technology discourse. The publics are forced to use a rational argument, as opposed to say ethical and moral ones, in order for their voices to be considered legitimate.

The chapter also discussed the debate in the context of Smith and Stirling (2007)'s 'Governance on the outside' and 'Governance on the inside'. With regards to the literature on

innovation and technological transformation, the research identified the 'GM Nation?' debate as the site where the incumbent economic discourse engaged with the niche discourses of sustainability and environment in the struggle to influence the path of technological transformation of the agriculture regime. In terms of the publics influencing technology development, the 'GM Nation?' debate came quite late in the day. The debate was only concerned with issues surrounding the commercialisation of an already developed technology. For the publics to have an influence on technology development, the engagement process needs to occur more 'upstream'.

Chapter 8 – Conclusion

8.1   Introduction

The Theoretical Context

The present study explored the issue of public engagement in policy decision-making on 'risky' technologies. It did so by employing, as a case-study, the 2003 nation-wide public debate in the UK on the possible commercialisation of GM crops, called 'GM Nation?'. This study was underpinned by a range of disciplines and 'grand' theories, including Science and Technology Studies (STS), Public Understanding of Science (PUS), political theory and theories of discourse.

This study was unique in its application of critical discourse analysis to a public engagement exercise. Although discourse analysis has earlier been used by Skillington (1997) to analyse the statements made by participants at the Irish National Recycling Conference organised in 1993, the work is fundamentally different from the current one as the Conference was not a public engagement exercise in the strict sense as the participants were not members of the general public but representatives of various environmental organisations, industry and policy makers. The only other work that has specifically used discourse analysis in the context of a public engagement exercise is Tee Rogers-Hayden and Richard Hindmarsh's 2002 analysis of New Zealand's Royal Commission for Genetic Modification. However, while Rogers-Hayden and Hindmarsh (2002) focused on the immediate concern of the outcome of New Zealand's Royal Commission on Genetic Modification and the hegemony of the "social and cultural power of modernist ideals" on the debate around genetic engineering, this current study, in addition to this, looked beyond the 'GM Nation?' debate to understand the role of the publics in technological transition and innovation and how power relations are sustained, opposed and negotiated through discourse.

Accordingly, this research places itself at the meeting point of three broad disciplinary areas, namely, innovation and technological transformation, public engagement and theo-

ries of discourse. An extensive review of the literature on these broad subjects was conducted, with focus on those studies which have combined these broad disciplines. For example, the approach to managing technological change known as CTA (Constructive Technology Assessment) is based in the disciplines of innovation and public engagement. As has been mentioned in the chapter on the review of the literature, the motivation for this research comes from the proposed revision of CTA that has been suggested by Genus and Coles (2005) in terms of approaching CTA as a 'discursive activity'. Approaching CTA as discourse would bring into focus issues of interpretation and subjectivity. A discourse analysis of deliberative exercises could help understand the inequalities of access to debate and decision-making.

The Policy Context

This research employed the 2003 'GM Nation?' public debate on the possible commercialisation of GM crops in the UK as the case-study. The debate was a consequence of years of raging controversy in the UK, both on the academic stage and on the 'ground-level', over the pros and cons of growing GM crops. The debate was also a consequence of an increasing use of public engagement exercises by policy makers across the world on matters relating to controversial technologies such as nuclear power and GM crops. In fact, methods in engaging the public such as consensus conferences had long been 'institutionalised' in countries such as Denmark.

Many significant events in the context of GM foods took place through the 90s: Retailers voluntarily removed GM tomato paste from shelves, there was controversy over the shipment of unlabeled GM soya to Europe by Monsanto, and in 1998-99 marked the famous Pusztai affair which was a widely publicised disagreement amongst scientists about the safety of GM potatoes. During this period Eurobarometer surveys suggested that opposition to GM in the UK and other European countries was at its peak. The UK initiated a programme of country-wide farm-scale evaluations (FSE) in 1998 to evaluate the impact of selected GM herbicide-tolerant crops on farmland biodiversity. In the lead up to the debate the UK, there was a democratic deficit on decision-making on GM. There was also a trust deficit, particularly with respect to issues of health as a result of mistakes made by policy makers like in the case of Bovine Spongiform Encephalopathy (BSE). The BSE crisis marked a watershed in the way UK science policy was viewed. A number of reports focused on the need for scientists and policy-makers to have greater interactions and dialogue with the public on issues relating to science and technology.

It was in this context of controversy over GM foods and a 'crisis of trust' identified by the House of Lords Science and Technology Committee's report on *Science and Society*, the 'GM Nation?' public debate was recommended to the Government by the newly-formed Agriculture and Environment Biotechnology Commission (AEBC). The public debate was announced on 26th July 2002 by Margaret Beckett, Secretary of State for the Environment. (see Rowe et al., 2005).

Why Critical Discourse Analysis?

One of the main motivations for doing this research was to do a critical study of the society we live in. A critical goal to research means critiquing and changing society by aiming to expose and elucidate the background assumptions and 'naturalised' ideological representations (Fairclough, 1995).

The decision to use discourse analysis for the research was motivated by primarily two reasons: First, the idea that the current socio-economic order is a 'knowledge-driven' or 'knowledge-based' society also implies that it is a discourse-driven order, with language playing a more critical role in contemporary socio-economic changes than it has in the past. Hence analysing the discourse was seen as an appropriate way to achieve the critical goals of the research. Secondly, this research was analysing a public debate where language, obviously, was the primary tool people used, and hence a detailed analysis of the language used and its assumptions and 'taken for granted', 'naturalised' knowledge was essential.

Although there are various forms and methods of discourse analysis, having roots in different disciplines ranging from linguistics to critical theory, and with varying degrees of similarities to each other, the critical goals of this research meant that Critical Discourse Analysis as developed by Norman Fairclough was the most appropriate methodology to be used. Critical Discourse Analysis (CDA) has been defined "....as fundamentally concerned with analysing opaque as well as transparent structural relationships of dominance, discrimination, power and control as manifested in language" (Wodak and Meyer, 2001). Apart from its concerns in tackling issues of discrimination and power, CDA has a well-defined 'rule book' of methods to be applied for analysis. These methods have been developed over a period of time and are characterised by their ease of use and also in their relevancy to the larger issues which it aims to tackle. Also CDA has a reasonable acceptance amongst the academic community as a methodology and method of research and is a rapidly growing discipline in its own right.

8.2.1 *Aims and objectives of the research*

The primary aim of conducting this piece of research was to have a better and deeper understanding of the process of engaging the public in policy-making on technological issues. This included analysing the aspiration to normative democratic ideals of public-engagement exercises and the role of the public in technological transition. The aspect of relations of power and domination between participants in public engagement exercises has been largely neglected in the empirical literature and this research aimed at exploring these aspects in detail through the use of Critical Discourse Analysis (CDA) as a research method.

The objectives of the research were thus two-fold: 1) To make a theoretical contribution to the literature on public engagement, Social Construction of Technology (SCOT) and Critical Discourse Analysis, and 2) To make recommendations to policy-makers with regards to the better understanding and appreciation of relations of power and domination in the design of future public engagement exercises on technology.

Additionally, with the next public engagement exercise on GM foods set to take place in 2011 and with the controversy surrounding the resignation of two high profile members of the steering group set up to manage the public debate, this research aims to contribute to the policy-making process on GM technology by providing insights from Critical Discourse Analysis of the last such engagement exercise on GM.

8.2.2 *The Research Process*

The research process started with a draft proposal carrying a rough outline of the aims and objectives of the research and the proposed methodology and expected findings. An extensive review of the literature on the topics of public engagement, social construction of technology and Critical Discourse Analysis was then conducted. The purpose was to locate gaps in the current state of the literature in these fields and to specifically focus the research towards filling these gaps. The data for the research, which consisted of emails/comments posted on the 'GM Nation?' website and transcripts of the six Tier-1 public meetings, were downloaded from the website for analysing. The analysis was underpinned by Fairclough's three-dimensional model of CDA, and appropriately the textual analysis was conducted using some of the methods suggested by him in his book 'Analysing Discourse: Textual

Analysis for Social Research'. More specifically, analysis of intertextuality, discourses and legitimation strategies of the textual data was done as these were thought to be more suited than others to achieve the aims and objectives of the research. The N-Vivo software was used for the purpose of finding quotes pertaining to themes within the text. However, much of the analysis was done without the use of any software as it was qualitative in nature and required detailed and repeated readings of the text.

8.2.3 *Key Findings*

In this section I will summarise the key findings of the analysis. A detailed description has been given in Chapter 7.

1. The intertextuality analysis of the data from the comments on the website revealed that the debate was polemic with accentuated differences between the various positions on the issue. The participants were not keen on achieving consensus or to find common ground. They came to the debate with deep entrenched positions. This finding concurs with previous studies done on the 'GM Nation?' debate.

2. The aim of the 'GM Nation?' was not to achieve consensus. For some, consensus is a 'closing down' of options, a political act, a personal choice, an act of hegemony which can only be achieved by excluding deviant voices (Mouffe, 1999, Cavell, 1990). Hence by not insisting on achieving consensus, the 'GM Nation?' debate, at least in principle, encouraged a wider range of viewpoints and inclusiveness.

3. Due to the nature of the data from the transcripts of the six Tier1 public meetings, it was not possible to conduct an intertextuality analysis in this case. Much of the data from these public meetings were summaries of the discussions that took place around each table. Since this research was not privy to these individual discussions, much of this rich data was not accessible which was required for intertextuality analysis. Due to way these meetings were organised, the participants in these meetings seemed to be looking to achieve consensus on each table, although this was not required by the debate organisers.

   This finding for the public meetings contrasts with the findings for website comments, where the debate was polemic in nature. This may have occurred due to the fact that each table was asked to present a summary of the discussions that took place and in the process of summarising it seems quite plausible that minority views may have been omitted, although this is not possible for the researcher to verify as

he didn't have access to contents of the discussions on each table. This finding has implications for the way in which future public engagement exercises in the public meetings format may be designed.

4. The analysis of the legitimation strategies used by the participants at, both, the website comments and the public meetings revealed that the participants felt the need to justify their views through recourse to rational argument more than others (such as moral/ethical arguments, invoking an authority and arguing through using stories as examples). This suggests that there seems to have been an implicit constraint on the participants on the kind of arguments that could be used for them to be considered valid. It is quite possible that since the public meetings were focused on the narrow risk/benefit of GM crops, it may have tilted the discussion in favour of the use of rational arguments. However, there were no such constraints on the posters of the website comments and it would have been expected to find a fair mix of legitimation strategies, but even here the rational argument was by far the most frequently used. I conclude from this that, in general, participants in debates on science and technology issues are constrained in their choice of legitimation strategies for their arguments and this also points to the ideological power of 'rationality' in the current neo-liberal socio-political and economic environment.

5. There was a tendency amongst participants at both, the website comments and the public meetings to largely identify themselves as 'customers' or 'consumers' as opposed to, say, 'citizens'. Considering that the 'GM Nation?' debate was an important event in terms of direct participatory democracy in the UK, it would have been expected that participants would come to the debate in their identity as 'citizens' and performing their duties and claiming their right as expected of ideal citizens. Although, it is quite possible that the participants may have been using the 'consumer' label strategically since 'consumer' is more politically potent and influential a label than 'citizen' as pointed out by Sagoff (1990). Either way, the ideological influence of the discourse of the market or, more generally, the neo-liberal discourse on the participants is apparent.

6. Also, in terms of the themes (discourses) involved in the debate, the economic discourse was the most common theme the participants discussed. There were other themes involved as well, such as trust, the ecology and the environment, health issues etc. However, even these discourses were coloured with an economic argument. In her analysis of the 1993 National Recycling Conference in Ireland, Tracey Skillington (1997) found that the economic actors participating in the debate felt the

need to defend the principle of profit (and the case for an economic solution to the debate) through recourse to the environmental discourse as they "...*felt constrained by the cultural potency of new criteria of social development that involve ethics and environmental responsibility*" (p.499). Thus, the economic actors had to internalise the new, increasingly powerful environmental discourse in their arguments. In the present analysis of the 'GM Nation?' debate, this finding by Skillington has been turned on its head, in that the environmental actors in the debate seemed to have been constrained by the hegemonic influence of the discourse of economics.

It has been pointed out to this researcher that since the debate was 'framed against the background of the possible commercial production of GM crops', the debate was foreclosed in favour of economic argumentation and the economic theme was bound to be most prominently discussed. However, this researcher is not convinced that such a translation from the stated objective of the debate process would have occurred into the discussions of the participants; Although, this does raise the concern that the organisers of the debate sought to narrow down the debate to its commercial risk/benefits argument, thus attempting to exclude other viewpoints on the issue.

7. In terms of Smith and Stirling (2007)'s understanding of governance on the 'outside' and governance on the 'inside', this research concludes that the 'GM Nation?' debate was partially an instance of governance on the 'inside'. As the government did not make any commitments on whether and how the findings of the debate process will feed into a fixed decision on GM crops in the UK, the 'GM Nation?' appraisal process seemed to have served in the 'opening up' of the governance of GM crops. An 'opening up' process "*instead of focusing on unitary prescriptive recommendations, appraisal poses alternative questions, focuses on neglected issues, includes marginalised perspectives, triangulates contending knowledges, tests sensitivities to different methods, considers ignored uncertainties, examines different possibilities, and highlights new options*" (p. 280). Any commitment on part of the government would have meant a 'closing down' of appraisal with the possibility of the outcome favouring the incumbent regime. Hence, at least in favouring a pluralistic discourse as opposed to a consensual one, the 'GM Nation?' debate acknowledged the political nature of GM technology and served in 'opening up' of the appraisal.

8. The 'GM Nation?' public debate was a site where the incumbent socio-technical regime based on economic discourse could engage with other niche technologies

based on discourses of sustainability and the environment in maintaining or transforming the agriculture regime. However, it was observed in the debate that these niches struggled to displace the incumbent regime based on the neo-liberal economic discourse. Rather, the niche technologies seemed to be forced to adapt themselves to these incumbent ideological discourses. This research concludes that the agriculture regime in the UK continues to operate under the selection pressure of the economic discourse despite the emergence of niche counter discourses of sustainability in recent years.

9. The 'GM Nation?' debate happened quite late in the development trajectory of GM regime for regime outsiders to have great influence on its development. This research concludes that in order for outsiders to have influence in technical development they should be involved much earlier in the development cycle and such engagement exercises should take place much 'upstream' than happened with the 'GM Nation?'. There are implications here for future engagement on nascent technologies like nanotechnology and synthetic biology. If the publics are involved at an early stage in the case of these technologies, they would have a greater opportunity to influence their development trajectory and this would also result in much more 'socially robust' technology as whatever path the technology takes it would have been with the full knowledge and acceptance of the publics.

8.3   Contribution

The contribution of this research is threefold. Firstly, it makes a theoretical contribution in terms of making important additions to the existing body of literature in the fields of CDA and public engagement. It also makes a contribution in terms of the methodology used in analysing public engagement exercises by employing CDA to a high degree of detail. Finally, the findings of this research have been used as a basis for policy recommendations for engaging the public in decision-making on technological issues in the future.

8.3.1   *Theoretical Contribution*

It makes a theoretical contribution by adding to the existing body of literature in the individual disciplines. This research builds on the work done on the role of outsiders to the technological regime in technological transformation by van de Poel (2000). The publics as

relative outsiders to the regime of plant biotechnology were given an opportunity to influence the direction of this regime through participating in the 'GM Nation?' debate. Also, within this broad discipline of SCOT, this research builds on recent developments in CTA taking up the recommendation by Genus and Coles (2005) to consider CTA as a 'discursive activity'. The 'GM Nation?' debate was taken up as an instance of CTA and it was analysed as a discursive activity using Critical Discourse Analysis.

In the discipline of public engagement, apart from the addition to the literature on CTA discussed above, this research provides insights on the issues of power and hegemony with regards to public engagement exercises; issues which have been largely ignored in previous works on public engagement. Although recent empirical works like Rogers-Hayden and Hindmarsh's discourse analysis of the RCGM in New Zealand (Rogers-Hayden and Hindmarsh, 2002) have employed CDA, it doesn't delve into issues of power and hegemony in detail. This research has particularly focussed to filling this gap.

However, the most important contribution of this research is the unique combining of elements from these three distinct disciplines. This is probably the first instance of research work where insights from SCOT, public engagement and Critical Discourse Analysis have been incorporated in order to gain a better understanding of the process of engaging the public in technological innovation. This approach to innovation and public engagement has sharpened the insights gained into the issue of 'missing actors' in such public engagement processes.

8.3.2   Methodological Contribution

Although CDA has earlier been used to provide a critical understanding of engaging the public in decision-making on technological issues (Rogers-Hayden and Hindmarsh, 2002), this research has done an in-depth textual analysis of the data using some of the methods prescribed by Norman Fairclough, like analysis of intertextuality, analysis of legitimation strategies and analysis of discourses (Fairclough, 2003). Each of these methods serves specific research themes. For example, the intertextuality analysis fed into the themes of power and hegemony which this research was interested in, particularly the hegemony of

neo-liberal economic discourse. Similarly, the analysis of legitimation strategies served to illustrate the hegemony of rationality (instrumental, economic etc.) pervasive in techno-logical discourse.

A methodological contribution has thus been made by this research by applying these methods of textual analysis as part of CDA to data from a public engagement exercise. In doing so it has contributed to proving the validity and usefulness of these methods of textual analysis in research of this kind.

8.3.3 Contribution to Policy on Public Engagement

This analysis of the largest public engagement exercise ever to be organised in the UK has produced findings which have implications for the implementation of other public engage-ment exercises in the future. This research has identified a number of limitations in the manner in which the 'GM Nation?' public debate was organised and this section sets out the implications of this for future engagement exercises.

1. **Publicising the engagement exercise:** This research as well as other works on the 'GM Nation?' has found that many participants felt the public debate was not ade-quately advertised. Also it has been the assertion of many analysts that the debate largely attracted the already engaged public. Hence, in order that public debates are truly 'public', policy makers need to ensure that they are adequately advertised and adequate funding is obtained for the purposes.

2. **Design of the public meetings:** This research found that the design of the Tier 1 public meetings favoured the majority view around each table to be recorded. As each table's discussion was summarised and reported to the chair, this researcher feels that this doesn't do much justice to the rich disagreements and discussion that may have occurred at each table. Also summaries by its very nature promote a con-sensual discourse and hence these summaries would likely have missed out and ex-cluded minority opinions around the table. There are implications here for the de-sign of public meetings in future engagement exercises.

3. **Use of information technology:** This research found that the website comments part of the debate was the most open and provided an unconstrained environment for participants to express their views. This was reflected in the data used in the re-

search. As more and more people move to the internet it is necessary for policy makers to increasingly make use of the internet to engage the public on various issues. More people are likely to get involved in public debates through IT then by physically attending public meetings. This research has made a case for proper and extensive use of IT for future public engagement.

4. **Upstream engagement:** The 'GM Nation?' debate occurred quite late in the development trajectory of GM crops. By that time it was not possible in any meaningful way to alter the path of its development and this has resulted in much public controversy as it seems inevitable that the technology will find its way into the shops and people's plates eventually. Recently, in response to rising commodity prices there have been increasing calls to reopen the debate on GM crops. To avoid such controversies in the future and in order to develop more 'socially robust' technologies, where the publics would be satisfied with its development, such public engagement should take place at a much earlier stage in its development. The more upstream the engagement, better are the opportunities for the publics to influence its development, resulting in 'socially robust' technologies.

5. **Framing and scope:** The findings reveal that much of the debate was focused around the discourse of economics and economic benefits and risks of GM. To a large extent, this was a result of the way the debate was framed and the scope, where the objective of the public debate was to specifically investigate GM issues in the background of the possible ***commercialisation of GM crops in the UK.*** Also, in the public meetings the participants were specifically asked to debate on the risks and benefits of growing GM crops in the UK. Purportedly, the scope was decided based on the results of the Foundation Discussion groups which allowed the publics to define the scope of the debate.

This finding has particular importance in the context of the next public debate on GM which is due to happen in 2011. Prof. Wynne resigned from the steering group set up for the purpose of organising the debate process, citing concerns over the framing and scope of the public debate. The findings of this research should help policy makers appreciate the importance of language use and the way the debate is framed.

8.4   Limitations of the Research

No piece of work is perfect and neither is this research. This section enumerates and acknowledges the limitations the research suffers from and gives the reasons for the same.

1. **No primary data:** This research has not obtained and used primary data for the analysis. Due to the nature of the research, there was a complete emphasis on secondary data in the form of comments/emails on the website and transcripts of public meetings. Without doubt, primary data obtained from interviews with the organisers of the 'GM Nation?' debate as well as the participants in the debate would have given the findings of this research that much more strength in terms of validity and possibly signalled other insights that might have been missed out in the current research. However, considering the time and economic constraints and the visualised possible benefits from obtaining primary data and also the fact that considerable time had elapsed since the debate took place in the summer of 2003, it was decided to forfeit the collection of primary data for the current research.

2. **Summarised comments in the public meetings:** As was mentioned in the discussion chapter, the data obtained in the form of transcripts of the six public meetings was not as 'strong' as the data obtained from the comments/emails posted on the website. While the latter largely reflected the individual participants' own choice of words, the data from the public meetings were in the form of summarisations of discussions that happened on each table in the public meetings. Although these summarisations were done by a nominated person from each table, such summaries missed out on the rich data in the form of discussions that had taken place on each individual table. This drawback of the data is particularly significant in the context of the methodology of Critical Discourse Analysis employed for this research. In order to take advantage of the possibilities provided by CDA, there was a need for access to the words spoken by individual participants in the discussions around each table. However, as this researcher was not present at any of the public meetings and the data that was available didn't have the transcripts of these individual discussions, there was little that could have been done to overcome this limitation of the data.

8.5   Further Research

In this section I give possible avenues for further research emanating from and a continuation of and also as an improvement to this piece of work.

This research used as a case study the 'GM Nation?' public debate which took place in 2003. Since then it is quite possible that the discourse on GM may have changed. The world and particularly the UK at this moment are in a midst of a severe recession. Much of the world was also affected by rising commodity prices in 2009. So in many ways it's a different world to the one that existed in 2003. There have been renewed calls to reopen the GM issue for public scrutiny in the UK. The FSA is now in the process of organising another public debate on GM crops in 2011. Further research could use the same methods to analyse the discourse on GM crops in this forthcoming public debate and compare it with the findings of this research.

There have been other public engagement exercises since 2003 on the issue of commercialisation of GM crops in other parts of the world. More recently, India held a public debate on the commercialisation of a GM variety of aubergine called BtBrinjal. Further research could analyse this debate using similar methods as have employed in this research and compare the findings. This research could also give insights into the practice of participatory democracy in a fast-developing country and comparisons could be made with the GM debate in the UK where democratic institutions have had a longer tradition.

Apart from GM, there have been public engagement exercises on other technological issues such as nanotechnology and nuclear power. Further research using the same methodology could be done on these exercises. This would also act as verification for the methods employed here.

Although this study was a Critical Discourse Analysis, there are other discourse theories and methods, such as Laclau and Mouffe's Discourse Theory which can be very useful in tracking changes in discourse over time and analysing struggles over discourse. Further research could use this methodology for analysing the 2003 'GM Nation?' debate and changes in discourse since then. Also the findings of such research could be compared with this current study.

8.6   Conclusion

In conclusion, this research set out to explore the issue of public engagement in policy decision-making on 'risky' technologies, in particular GM Foods. The aim was to have a better and deeper understanding of the process of public engagement in technological policy-making. The aspect of relations of power and domination between participants in public engagement exercises has been largely neglected in the empirical literature and this research aimed at exploring these aspects in detail through the use of Critical Discourse Analysis (CDA) as a research method. This study had its theoretical basis in the disciplines of Science and Technology Studies, Public Understanding of Science, Political Theory and Critical Discourse Analysis. This studies unique contribution is its use of CDA for analysing a public engagement exercise. It differs from previous such studies in its extensive and elaborate use of the methods of CDA for analysis of a large amount of data. This research used the 2003 'GM Nation?' public debate on commercialisation of GM crops in the UK as a case-study.

This study has made theoretical contributions to all the three disciplines of Critical Discourse Analysis, Public Understanding of Science and Science and Technology Studies. Its methodological contributions lie in its application of CDA and the various methods of textual analysis such as intertextuality analysis, legitimation strategies and analysis of discourses. The findings have a number of contributions to make to policy-making as well, including in terms of the structure and design of the debate process.

Social research is a human endeavour, and like all human endeavours this research is by no means perfect. A significant limitation has been the kind of data available for this researcher for analysis. If this researcher had been privy to the individual table discussions in the public meetings, the analysis and, in turn, the findings would have been more robust. Finally, this researcher has made a number of recommendations for further research which could build upon this study.

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