Public Participation and Controversy involving Science:
an Irish perspective

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I hereby certify that this material, which I now submit for assessment on the programme of study leading to the award of Doctor of Philosophy is entirely my own work and has not been taken from the work of others save and to the extent that such work has been cited and acknowledged within the text of my work.

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Table of Contents

ACKNOWLEDGMENTS III

TABLE OF CONTENTS IV

ABSTRACT VII

LIST OF TABLES VIII

LIST OF FIGURES IX

LIST OF ABBREVIATIONS X

INTRODUCTION 1

PURPOSE OF STUDY 3
SIGNIFICANCE OF STUDY 4
PERSONAL EXPERIENCE 6
RESEARCH FRAMEWORK 7
THESIS OUTLINE 8
GENERAL DEFINITIONS 9

PART A—THEORY 11

CHAPTER 1—SCIENCE AND THE PUBLIC 12

WHAT IS SCIENCE COMMUNICATION? 13
PUBLIC AWARENESS RESEARCH METHODS 18
REASONS FOR SCIENCE COMMUNICATION 18
DEFINING SCIENCE AND THE PUBLIC 21
WHAT IS SCIENCE? 23
WHO IS 'THE PUBLIC'? 28
DISCUSSION 31

CHAPTER 2—COMMUNICATING CONTROVERSY 33

HOW AN ISSUE BECOMES CONTROVERSIAL 35
FRAMING CONTROVERSY AS SCIENCE 39
COMMUNICATING THE CONTROVERSY 43
MASS MEDIA 48
DISCUSSION 60

PART B—STRATEGIES FOR DEMOCRACY 62

CHAPTER 3—MAKING DECISIONS 63

POLICY-MAKING IN IRELAND 64
IRISH POLITICAL CULTURE 64
WHAT IS PUBLIC POLICY? 66
MAKING PUBLIC POLICY 66
INFLUENCING PUBLIC POLICY 68
WHO ARE THE POLICY MAKERS? 70
DEMOCRATISATION OF SCIENCE AND TECHNOLOGY 72
IN PURSUIT OF DEMOCRACY 72
TECHNOLOGY 76
SCIENCE 79
EXPERT KNOWLEDGE 81
PRECAUTIONARY PRINCIPLE 86
DISCUSSION 88

CHAPTER 4—PUBLIC PARTICIPATION PROGRAMMES 90

WHAT IS PUBLIC PARTICIPATION? 91
INTEREST IN PUBLIC PARTICIPATION 93
ORIGINS OF PUBLIC PARTICIPATION 95
REASONS FOR PUBLIC PARTICIPATION 97
THE DEMOCRATIC PROCESS 98
LAY KNOWLEDGE 98
MAKING BETTER DECISIONS 100
REDUCING CONFLICT AND INCREASING LEVELS OF TRUST 100
LIMITATIONS OF PUBLIC PARTICIPATION 101
EXAMPLES OF PUBLIC PARTICIPATION METHODS 103
EVALUATION OF PUBLIC PARTICIPATION 110
EVALUATION FRAMEWORKS 111
EVALUATION OUTCOMES 116
ORIGINAL EVALUATION FRAMEWORK 117
DISCUSSION 123

PART C—TWO ORIGINAL CASE STUDIES 126

CHAPTER 5—BACKGROUND & METHODOLOGY 127

GENETICALLY MODIFIED ORGANISMS 129
BACKGROUND 129
METHODS 133
WATER FLUORIDATION 153
BACKGROUND 153
METHODS 157
COMPARISON OF THE TWO CASE STUDIES 158
PUBLIC PARTICIPATION EVALUATION 160

CHAPTER 6—COMMUNICATING CONTROVERSY IN IRELAND **162**

GENETICALLY MODIFIED ORGANISMS **163**
WHO IS INTERESTED AND WHY? 164
WHAT ARE THE PUBLIC ISSUES? 169
COMMUNICATION OF CONTROVERSIES IN THE PUBLIC SPHERE 184
ANALYSIS OF COMBINED MEDIA SAMPLE I 194
WATER FLUORIDATION **201**
WHO IS INTERESTED? 201
WHAT ARE THE PUBLIC ISSUES? 202
COMMUNICATION OF CONTROVERSY IN THE PUBLIC SPHERE 203
SUMMARY 208
DISCUSSION **209**

CHAPTER 7—A SEARCH FOR IRISH DIALOGUE **211**

GENETICALLY MODIFIED ORGANISMS **212**
THE DOELG'S NATIONAL PUBLIC CONSULTATION 212
BIODIVULGA 244
WATER FLUORIDATION **253**
FORUM ON FLUORIDATION 253
CONCLUSION 261
DISCUSSION **262**

CONCLUSIONS **266**

BIBLIOGRAPHY **274**

APPENDICES **I**

APPENDIX A—*THE IRISH TIMES* BY DATE AND HEADLINE I
APPENDIX B—*THE IRISH TIMES* LETTERS BY DATE AND HEADLINE IX
APPENDIX C—ORIGINAL RESEARCH QUESTIONNAIRE XI
APPENDIX D—FLUORIDATION COMMUNICATION STRATEGY XII
APPENDIX E—FLUORIDATION COMMUNICATION PROTOCOL XIV
APPENDIX F—FOCUS GROUP DISCUSSION OUTLINE – DENTAL HEALTH FOUNDATION XVII
APPENDIX G—FOOD DRINK & TOBACCO FEDERATION, IBEC GM FOOD PAMPHLET XVIII
APPENDIX H—GENETIC CONCERN PAMPHLET XX
APPENDIX I—LIST OF SPECIALIST JOURNALISTS THAT REPORTED ON GMOS. XXII
APPENDIX J—*THE IRISH TIMES* THEMES AND SUB-THEMES XXIII
APPENDIX K—TIMELINE OF GOVERNMENT SCIENCE POLICY XXVIII
APPENDIX L—DOELG CONSULTATION PAPER SUBMISSIONS: THEMES AND DEFINITIONS XXIX
APPENDIX M—AGENDA FOR BIODIVULGA WORKSHOP XXX
APPENDIX N—FORUM ON FLUORIDATION QUESTIONNAIRE XXXIII

Abstract

In the past few years public participation programmes, such as consensus conferences and citizen juries, have become popular in many countries that want to explore ways to increase the involvement of their citizens in policy making involving controversial science. Such initiatives aim to bring social and moral issues to policy discussions that are often dominated by scientific and technical information. This is not to undermine the importance of scientific expertise, but to broaden the discussion of issues involving science that are increasingly of interest to members of the general public and interest groups. However, for these public participation initiatives to be legitimate they must have clear connections to the policy-making process.

The two Irish case studies that I have used to illustrate the current level of public involvement in policy making and the willingness of the Irish political culture to incorporate social and moral issues into the policy-making process were genetically modified (GM) foods and water fluoridation.

This thesis analyses three Irish consultation processes: the Department of Environment and Local Government's National Public Consultation on genetically modified organisms and the environment; BioResearch Ireland's BioDivulga Stakeholder Workshop; and the Department of Health and Children's Forum on Fluoridation. In the past it has been difficult to compare public participation programmes because of the different goals and cultures of different countries. To overcome this comparative difficulty I developed a framework to take these differences into account. My research found that there are a range of Irish citizens and interest groups who have social and moral concerns surrounding GM foods and water fluoridation but the consultation procedures adopted by the relevant government departments were not adequate to explore these concerns. However there are indications that the Irish government is willing to explore new public participation initiatives. What remains to be seen is how such initiatives will be incorporated into Ireland's current political culture, which views science as the dominant authority.

List of Tables

Table 1.1: Research questions and methods related to objectives of research................5

Table 3.1: Advantages and disadvantages of interest group involvement in policy making. Adapted from Andrew Heywood's balance sheet (Heywood 1997, p 259) 70

Table 3.2: Wynne's breakdown of uncertainty in expert knowledge (Wynne 1992; Yearley 2000)..........85

Table 4.1: Summary of a number of public participatory methods (Rowe and Frewer 2000; UK House of Lords 2000)..........109

Table 5.1: Research methods and samples used in each case study to achieve the three key objectives of the research 128

Table 5.2: The themes and definitions of articles found in *The Irish Times*...............138

Table 5.3: The themes and definitions of the Letters to the Editor of *The Irish Times*139

Table 5.4: Categories of social actors developed in the initial stages of the research . 143

Table 5.5: Descriptions and codes of the interviewees 147

Table 6.1: Frequency of themes in *The Irish Times* articles between November 1996 and April 1998. 169

Table 6.2: Percentages of the Social and Moral sub-themes reported in articles of *The Irish Times* between November 1996 and April 1998. 171

Table 6.3: The public issues raised in interviews 175

Table 6.4: The frequency and percentage of themes in *The Irish Times* articles from November 1996 to November 2000..........195

Table 6.5: The definition and frequency of the Social and Moral sub-themes in *The Irish Times* articles from November 1996 to November 2000. 196

Table 6.6: The frequency and percentage of themes in *The Irish Times* letters from November 1996 to November 2000..........199

Table 7.1: A comparison of the issues raised at each stage of the National Public Consultation, in the Interviews conducted before the commencement of this process and from the analysis of the combined media sample. 235

Table 7.2: Summary of the evaluation of the three public consultation initiatives.......264

List of Figures

Figure 2.1: The Shannon and Weaver model of communication (Fiske 1998) 44

Figure 3.1: The public sphere does not intervene in the relationship between scientific expertise and policy making (Edwards 1999, p 164) 83

Figure 3.2: The public sphere as an intermediary structure between scientific expertise and policy making (Edwards 1999, p 164) 83

Figure 4.1: The original evaluation framework for the evaluation of public participation initiatives 118

Figure 6.1: Timetable of GM events covered in *The Irish Times* 198

Figure 7.1: Percentages of categories of respondents to the *GMOs and Environment Consultation Paper* 221

Figure 7.2: Themes raised by each category of participant in their responses to the *GMOs and Environment Consultation Paper*. 224

List of Abbreviations

DHF	Dental Health Foundation
DoELG	Department of Environment and Local Government
DoHC	Department of Health and Children
EPA	Environmental Protection Agency
FFW	Fluoride-Free Water
FSAI	Food Safety Authority of Ireland
GM	Genetically Modified
GMOs	Genetically Modified Organisms
IBA	Irish Bioindustry Association
IBEC	Irish Business and Employers Confederation
ICSTI	Irish Council for Science, Technology and Innovation
IDGMB	Inter-Departmental Group on Modern Biotechnology
IFA	Irish Farmers' Association
NGO	Non-Governmental Organisation
PTA	Participatory Technology Assessment
STIAP	Science, Technology and Innovation Awareness Programme
TA	Technology Assessment
VOICE	Voice of Irish Concern for the Environment

Introduction

Over the past few years 'dialogue' has become the new word used to describe the type of communication that needs to occur among scientists, lay citizens, interest groups and policy makers. Policy institutions are attempting new initiatives to include citizens in decision-making processes that involve science. Countries that do not have a history of citizen involvement in policy making are exploring public participation initiatives, such as consensus conferences and citizen juries. In the past Ireland has mainly relied on evidence from scientists to advise on public policy but now non-scientists—lay citizens, representatives of non-governmental organisations (NGOs) and local communities—are beginning to have an opportunity to advise policy makers on issues that involve science.

The science communication community has also become increasingly interested in public participation initiatives. There has been an increase in dialogue-type events, conferences on 'dialogue' and academic research on public participation. However, since the release of The Royal Society's report entitled *The Public Understanding of Science* in 1985, which started the official 'public understanding of science' movement in the UK, there has been little change in the strategies used to communicate science with the public. Perhaps the science communication community is now ready to enter a new age of 'public understanding of science'.

Sociologists and political theorists have been exploring avenues to increase the democratisation of science for a longer period of time than the two groups mentioned above. But what is the reason for this recent interest in public participation?

In recent years there have been rapid developments in science that have become increasingly controversial. These controversies often involve scientific uncertainty and it is often this uncertainty that is most visible in the public domain. The uncertainty can be a divergence of opinions between experts or a disagreement about the actual amount, or lack, of scientific knowledge.

Issues such as climate change and genetically modified food present today's society with uncertainties affecting our own and future generations in all countries. Such issues not only involve science but a variety of other public concerns with social, moral, judicial and ethical dimensions. Supporters for increasing the involvement of members of the public in the policy-making process are not arguing that science should no longer have a role in policy making but that it should play more of an integrated role with other public dimensions. It is these public dimensions, with which science is becoming more intertwined, that are often excluded from public discussion and the policy-making process.

There are a plethora of interest groups—NGOs, local pressure groups and private organisations—that are all trying to influence public decision making through campaigning and lobbying. These interest groups are operating outside the general election process and the traditional methods of policy making have become inadequate to deal with the increasing number of challenges to social institutions of authority.

Growing alongside the increasing number of controversial issues involving science is the decline of public trust in science and the institutions that regulate science. Science presents itself as separate from society: that is, an independent knowledge-forming community that is above politics. However the science community, like any other interest group, is immersed in society and protects its own interests.

One of the responses to the assumption of the lack of authority of science is the recent movement of science communication which is attempting to increase the public awareness and understanding of science in the hope that this greater understanding will increase public support for science. Ironically this attempt could have further alienated the public from science. By presenting science with its traditional attributes of certainty and objectivity, the public awareness movement has added to the erosion of public trust in the authority of science.

The mere implementation of public participation programmes will not therefore increase the levels of public trust. However, what will have a role in determining the level of public trust is how its opinions and values are, if at all, incorporated in the policy-making process. In the past interest groups have informally provided their opinions on issues involving science, for example using media campaigns or direct action. However, these views have not readily been taken into consideration by the scientific community or policy institutions. What guarantee is there that public opinions and values, determined through dialogue initiatives, will actually influence the policy-making process?

It is this last question that is the focus of this thesis.

Purpose of Study

At the beginning of this project I was interested in how different values and opinions were included in policy making and whose opinions policy makers deemed more relevant. I was particularly concerned with how public issues, such as social, moral and ethical dimensions, were included in the regulation of genetically modified (GM) foods. The GM food issue was being debated as a scientific issue and the public dimensions were not being included in the public debates that were occurring at the time. The initial aim of this PhD was to identify a public participation programme suitable for Ireland

that would allow a range of social actors and members of the general public to have greater involvement in policy making in issues involving science.
The study evolved to have three objectives:

i. To determine which members of the public contribute to public discussion on issues that arise from the application of science, and the issues that they raise;
ii. To establish an evaluation framework suitable to analyse public participation initiatives; and
iii. To apply the evaluation framework to the three Irish participation initiatives under investigation to determine the level of public participation.

To achieve these three objectives I formulated nine research questions, which are listed in Table 1.1. As indicated in Table 1.1 suitable research methods were adopted to answer these questions.

Significance of Study

'Dialogue', the new word in the area of science communication and policy making, is the focus of activities that facilitate discussion and conversation among scientists, policy makers, lay citizens and interest groups. Public participation programmes have been conducted in a number of countries and have adopted, or modified, methods used in areas with a history of involving lay citizens in policy-making processes. Although the different attempts have been successful as events, there is little evidence to suggest their outcomes have influenced policy-making. The implementation of public participation programmes is not enough to address the decline in the authority of science and its regulation system. This thesis attempts to explore the limitations of public participation and investigate how to optimise the benefits of such an approach by providing a new evaluation framework with which to analyse public participation initiatives. The outcomes of my research will have implications for three groups: policy makers, science communication practitioners, and academic researchers interested in public participation.

Table 1.1: Research questions and methods related to objectives of research

Objective	Research Question	Method
1. To determine which members of the public contribute to public discussion on issues that involve science, and the concerns that they raise.	i. Who are the members of the public interested in issues involving science?	a. Analysis of Media b. Questionnaires c. Interviews
	ii. What are their concerns and interests in issues involving science?	a. Analysis of Media b. Questionnaires c. Interviews d. Document Analysis
	iii. Why are members of the public interested in particular issues involving science?	Interviews
	iv. How do members of the public contribute to the public discussion on issues involving science?	a. Interviews b. Review of information materials c. Focus Groups
2. To establish an evaluation framework suitable to analyse public participation initiatives.	i. What examples have been used in other countries?	Literature Review
	ii. How have these programmes influenced the policy-making process?	Literature Review
	iii. How have these initiatives been evaluated?	Literature Review
3. To apply the evaluation framework to the three Irish participation initiatives under investigation to determine the level of public participation.	i. What role have members of the public had in the formal policy-making process?	a. Interviews b. Document Analysis
	ii. To what level have the public influenced the shaping of public policy?	a. Document Analysis b. Interviews c. Analysis of Media

My research is relevant to the Irish government which is currently exploring ways to increase 'national conversation' on issues involving science. For example, the recent report of the Irish Inter-Departmental Group on Modern Biotechnology has called for Forfás[1] to investigate measures designed to increase public consultation and involvement. It is hoped that the results from this thesis will promote the use of public participation procedures and assist in the selection of suitable methods to ensure maximum inclusion of social actors and lay citizens in the policy-making process. Furthermore this thesis provides a greater understanding of the types of issues that social actors and lay citizens have raised and emphasises the need for methods that will ensure the consideration of all issues, and not just scientific or technical issues.

The second group identified was practitioners of science communication who are using public participation initiatives to extend their current practices of communicating with the public. The evaluation framework will provide a mechanism for science communicators to select suitable methods to increase the relevance and success of their programmes.

Academic researchers comprise the third group for which my research has implications as it adds to the currently limited research on the potential outcomes of public participation initiatives in countries that do not have a history of public participation.

More generally, this thesis provides an opportunity to help reduce the gap between practitioners of science communication and researchers of the philosophy, sociology and history of science.

Personal Experience

I had been questioning the reasons for my involvement in science communication for nearly six months before undertaking this research. Prior to starting this PhD research I was involved in a programme—the *Shell Questacon Science Circus*—which aims among other things to change public perceptions and attitudes toward science. This aim is shared by many of Questacon's programmes. My experience with the *Shell*

[1] Forfás is Ireland's National Policy and Advisory Board for Enterprise, Trade, Science, Technology and Innovation.

Questacon Science Circus indicated the limitations of such programmes in communicating contemporary and controversial science. It was this awareness that prompted me to explore alternative means of communicating controversial science with members of the public.

Research Framework

There are many methods available to social science researchers and each method reveals slightly different facets of the same situation. By combining several of these methods I obtained a better, more substantive picture of reality. This use of multiple methods is referred to as triangulation. To increase the depth of understanding in the investigation's data I included multiple theoretical perspectives, multiple data collection procedures and multiple analysis techniques.

Theoretical Perspectives

Theoretical approaches to science communication have highlighted the complexity of the task of practitioners involved in science communication. Science communication is not a single academic discipline but rather a field consisting of interdisciplinary approaches. This thesis has used a number of theoretical perspectives to explore public participation involving science including the sociology, history and philosophy of science, political theory, and media and communication studies.

The sociology, philosophy and history of science have provided a framework in which to understand science and its relationship with society. Together with sociology, political theory was used to explore the role of the citizen in the policy-making process. The works of Andrew Feenberg, Steve Fuller, David Held, Alan Irwin, Richard Sclove and Brian Wynne are drawn on to explore citizenship, lay expertise, democratic processes and new strategies for making policy involving science.

The concepts of uncertainty, trust and risk were used to explore the decline in the authority of science and my work drew on Ulrich Beck's notion of risk society and the early work of Dorothy Nelkin involving controversy. The continuing representation of science as authoritative and non-political is addressed, as are the effects this image has on the communication of controversy among scientists, policy makers and lay citizens.

Data Collection Procedures

A variety of data collection techniques were used including questionnaires, in-depth interviews and focus groups. A complete list of data collection procedures used in this thesis is provided in Table 1.1. With the exception of the focus groups, which were conducted by a professional research company, I primarily conducted the collection of the data presented. I was also involved in the development of the focus group discussion outline.

Analysis Techniques

Data collection and analysis were undertaken concurrently, as far was possible, rather than in isolation.. Qualitative and quantitative analysis techniques were used and are detailed in Chapter Five.

Thesis Outline

This thesis is comprised of Parts A, B and C. Part A consists of the theoretical chapters, Part B reviews strategies for contemporary democratic societies, and Part C presents the two original case studies of this research.

Part A

Chapter One—Science and the Public—surveys the recent movement of science communication and the Science and Technology Studies (STS) approach to issues involving science and the public with the aim of determining how the two areas can learn from each other. Chapter Two—Communicating Controversy—explores what constitutes a controversy involving science and how controversies are communicated among interest groups, government and members of the general public.

Part B

Chapter Three—Making Decisions—reviews the policy-making process in Ireland and alternatives to the governance of science. In Chapter Four—Public Participation Programmes—initiatives that increase the level of public participation in policy making are explored and an evaluation framework is presented. This framework was then used to evaluate three Irish consultation initiatives.

Part C

Chapter Five—Background and Methodology—outlines the background of genetically modified foods and the issues surrounding their introduction to Ireland. The case study of water fluoridation which became controversial in Ireland in 1999 is also introduced. The second, more substantial, section of the chapter details the methodology used in my research.

Chapter Six—Communication of Controversy in Ireland—examines the first objective of my research, to determine which social actors have communicated with members of the general public and how this has occurred. The chapter also identifies the issues that social actors raised regarding to the two case studies.

Chapter Seven—A Search for Irish Dialogue—is the final chapter and evaluates three Irish consultation initiatives: the Department of Environment and Local Government's National Public Consultation on genetically modified organisms (GMOs) and the Environment, BioResearch Ireland's BioDivulga Stakeholder Workshop on biotechnology in food and agriculture, and the Department for Health and Children's Forum on Fluoridation that is reviewing the process of water fluoridation.

The thesis finishes with the Conclusions.

General Definitions

Science Communication

The term 'science communication' is used to describe both the research and practical activities involved in this area. Each approach is placed in context throughout the thesis to ensure clarity. There are two reasons for using the term 'science communication' as opposed to, for example, 'public understanding of science': firstly, it does not make assumptions about who members of the public are and what they do, or do not, understand, and secondly, it is a generic term that is not country specific. 'Science communicators' refer to practitioners involved in communicating science to the public. The researchers involved in this area are identified by their primary discipline, such as sociologist or mass communication researcher, unless they are new researchers to the field of science communication, in which case they are referred to as science communication researchers.

Science

The use of the word 'science' in this thesis includes areas that might be more properly defined as technology. For example, the title of this thesis is *Public Participation and Controversy involving Science*, even though one of the case studies—genetically modified foods—is an outcome of biotechnology. I am aware of the distinction between the two and when I only want to refer to science or technology it is made clear to the reader. The primary reason for this choice is that 'science' is a succinct way of describing 'science and technology'.

Ireland

'Ireland' and 'Irish' refer to the Republic of Ireland, its citizens and activities.

Part A

Theory

Chapter 1

Science and the Public

This chapter reviews the recent movement of science communication and academic research that has focused on science and the public, and the different interpretations of 'public' and 'science'. The title of this thesis, *Public Participation and Controversy involving Science*, contains two other key words—'controversy' and 'participation'—that are dealt with in Chapters Two and Four, respectively.

The aim of this chapter is to highlight the different approaches to science communication and demonstrate that each approach can learn and develop from the others. The following areas are discussed:

i. the different meanings of science communication;
ii. science—the message of science communication; and
iii. public—the audience of science communication.

What is Science Communication?

Anyone embarking anew on the science communication field could easily be overwhelmed by the number of phrases used to describe what we do. Science communication is open to a number of interpretations: the public understanding of science (PUS), the public awareness of science, the promotion of science, the public engagement of science and technology (PEST), the appreciation of science, the public communication of science and technology (PCST), the popularisation of science and the education of science. The meanings of each phrase may or may not be used interchangeably, depending on the user, and phrases may also be specific to certain countries. For example, the 'public understanding of science' is largely a British term, although it has propagated to other countries in recent years, whereas in Spain science communication is often referred to as '*divulgación cientifica*' or the popularisation of science. But each of these terms refers to activities that in some way communicate issues with a scientific content with the public, whether it be through a science demonstration in a museum, a newspaper article, a popular science book or a public debate on a controversial issue.

This thesis does not attempt to review science communication in all countries. However a number of examples are presented below to highlight the differences, and similarities, between countries in the recognition and inception of the recent movement in science communication.

The phrase 'public understanding of science' became prominent in the UK in 1985 after the release of The Royal Society's report *The Public Understanding of Science* produced by a working party chaired by Sir Walter Bodmer (The Royal Society 1985). The report, popularly known as the *Bodmer Report*, prompted the establishment of the Committee on the Public Understanding of Science (COPUS) in 1986 by three British scientific bodies: The Royal Society, the British Association for the Advancement of Science, and The Royal Institution. In 2001 COPUS underwent a major review, requested by the Minister for Science, and suggestions were made to the committee to change its name to reflect activities that did not just promote greater *understanding* of science. COPUS is now written as 'Copus', in lower case, to maintain its already established name.

Copus' role has been to improve the public understanding of science by undertaking activities such as networking, research and providing grants for innovative projects. The main target groups for these activities are practising scientists, science communicators and the general public[2]. Since its inception Copus has organised or funded many science communication initiatives such as media training for scientists, public debates, interactive exhibitions and demonstrations.

The *Bodmer Report* and Copus were not the first efforts in the UK to communicate science with the public. In 1826 Michael Faraday introduced the Christmas Lectures and Friday Evening Discourses which could be considered one of the first science communication initiatives[3]. Both activities continue to this day. However, the *Bodmer Report* prompted many scientific institutions, government bodies and the media in the UK to start communicating science with members of the general public. This activity has been referred to as the recent public understanding of science movement (Gregory and Miller 1998) although similar events in different countries do not use the phrase 'public understanding of science'.

In the USA the public promotion of science and its achievements can be traced back to the 1920 when scientific institutions launched a science news agency. In 1951 the American Association for the Advancement of Science (AAAS) considered its role in the public understanding of science when one of its board members, Warren Weaver, raised the issue. However, it was not until the launch of the first satellite into the earth's orbit by Russian scientists that the US government significantly increased its support for science education. Two decades later the term 'scientific literacy' was established by the National Science Board which was interested in the levels of the public's knowledge and understanding of science.

Two scientists promoted the science communication movement in Australia. In the mid-1980s the government provided significant funding for the National Science and Technology Centre which motivated other institutions to pursue initiatives in the area of public awareness of science, as it is referred to in Australia.

[2] see website http://www.copus.org.uk accessed on 14 March 2002
[3] see website http://www.ri.ac.uk/History, accessed on 14 March 2002

In 1993 the Irish government announced a policy on eliminating funding for basic research. The Irish Research Scientists Association (IRSA)—a voluntary body that promotes excellence in scientific research—instigated a focused campaign in response to the government's announcement[4]. IRSA claim their campaign was instrumental in the reversal of the government's decision and the establishment of the Science, Technology and Innovation Advisory Council (STIAC) in 1994, chaired by Dan Tierney. One of IRSA's objectives is to "create an awareness of the importance of science and scientific research for the technological, industrial and cultural life of the country". IRSA stated that, in Ireland, to make a permanent difference to attitudes toward science it is not enough to lobby the government; both the electorate and politicians need to have a greater awareness of science. The STIAC review produced the *Tierney Report* (Science Technology and Innovation Advisory Committee 1995) in 1995 and as a partial response to it the *White Paper on Science and Technology* (Office of Science and Technology 1996) was drafted in 1996. The *White Paper* represented the first official recognition given to science communication in Irish Government policy. The Science Technology and Innovation Awareness Programme (STIAP), launched for three years in 1996, was the first official government programme promoting the communication of science[5]. STIAP is still in existence today, and is managed by Forfás.

The four examples provided above indicate that science institutions or scientists have had a key role in instigating the recent movement of science communication. Challengers of the recent movement of science communication have argued that the need perceived by scientists to communicate science arises only when government funding of science is under threat. Another common feature of the recent movement across different countries is the use of surveys to measure levels of public understanding which have been conducted to legitimise the need to communicate science. These surveys represent some of the first research projects to be conducted in this emerging field.

In the US the first survey to determine the public's attitude to, and knowledge of, science was carried out by the National Association of Science Writers in 1957. The survey concluded that the general public had a low factual knowledge of science and

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[4] see website http://www.irsa.ie/ accessed on 14 March 2002
[5] see www.science.ie, the official website for STIAC accessed on 14 March 2002

resulted in an increase of US federal government funding to science education in public schools. The rationale behind this increase in funding was that a more scientifically knowledgeable society would enable the US to compete internationally in an increasingly technological society. Fifteen years later the National Science Board first attempted to measure the effectiveness of the increased funds. The comparison of the surveys conducted in 1957 and 1972 showed no significant difference in the attitudes to, and knowledge of, science by the American public (Gregory and Miller 1998; Miller 1987). The National Science Board still conducts these surveys—the Science and Engineering Indicators—every two years. The 2000 Science and Engineering Indicator concluded that although there was high level of support for science the level of public understanding was poor[6].

Countries around the world have followed suit in trying to determine how scientifically aware and knowledgeable their populations are. In 1988 a survey to determine the level of British public knowledge of science was conducted by John Durant, Geoffrey Evans and Geoffrey Thomas, using similar questions to those in the US surveys (Durant, Evans, and Thomas 1989). They also concluded that the public's understanding of science was low.

Surveys of this type also have explored public opinions and attitudes toward science. The first two surveys of this type conducted in Australia concluded that the majority of teenagers considered scientists to be "dorks and nerds" (Woolcott Research 1991; Woolcott Research 1995). Questions about science were included in Eurobarometers, large surveys conducted throughout countries in the European Union on a range of issues, such as opinions on holiday travel and support for political institutions. Attitudes toward biotechnology were the focus of the 1996 Eurobarometer 46.1 *Europeans and Modern Opinions about Biotechnology* (European Commission 1997).

In Ireland Forfás has commissioned a marketing research company—Marketing Research Bureau of Ireland (MRBI)—to conduct National Opinion Polls to determine public opinions, attitudes and knowledge of science. An example is the 2001 survey on the public knowledge of biotechnology that was commissioned by Forfás on behalf of the Inter-Departmental Group on Modern Biotechnology (IDGMB). One of the survey's

[6] http://www.nsf.gov/pubsys/index.htm#StatisticalReportsonUSScience accessed on 14 March 2002

conclusions was that the awareness and understanding of the term 'biotechnology' was low[7].

So far I have highlighted two common features of the recent movement of science communication across the world—the involvement of scientific institutions and scientists in the establishment of science communication programmes and the implementation of surveys measuring public knowledge and opinions of science. The final common feature to be discussed in this chapter is the approach taken by science communicators to increase the level of the public's understanding of science.

Governments throughout the world have established programmes that focus on science awareness or understanding, such as STIAP in Ireland, Copus in Britain and the Foundation for Education, Science and Technology in South Africa. However, non-government programmes also promote science communication initiatives. Individuals, universities, private companies and associations have all been involved in organising, supporting or sponsoring a range of activities to increase the public awareness and understanding of science. The following are generic examples: science centre exhibitions, science lecture series, science weeks, science festivals, science roadshows and science writer competitions. Over the past five years there has been a dramatic increase in the number of such activities in Ireland. These include the Science Bus[8], a privately run Science Roadshow of science demonstrations, a Science Festival organised by Forfás, science journalism awards sponsored by IBM and STIAP, and the proposed Science Centre announced recently by the Tánaiste[9], Mary Harney.

There are many critics of the approaches adopted in the recent movement of science communication based on any, or all, of the following three reasons: the methods used to determine public attitudes to, and knowledge of, science, the reasons for pursuing activities to increase public understanding of science, and the type of activities organised to increase public understanding of science (Bauer and Schoon 1993; Bauer, Petkova, and Boyadjieva 2000; Michael 1992; Wynne 1993). The first two reasons will be addressed in this chapter. The third reason is related to communication processes and is discussed in the following chapter.

[7] see website www.biotechinfo.ie accessed on 14 March 2002
[8] The Science Bus is a travelling science laboratory sponsored by Pfizer.
[9] The Tánaiste is the deputy prime minister.

Public Awareness Research Methods

The use of surveys to determine the public's awareness of science has two main limitations: respondents are self-reporting their opinions and attitudes and questions in the surveys have their own limitations. For example, in the British survey conducted in 1988 only eleven percent of the respondents who were asked the open-ended question, "What does it mean to study something scientifically?", gave an answer mentioning the idea of experimentation (Durant, Evans, and Thomas 1989). Only three percent included the idea of testing a hypothesis. However, when given a choice of potential techniques in the testing of a new drug more than half of the respondents chose the answer that included use of experiments involving hypotheses.

The sophistication of surveys has evolved with the field of science communication. But no matter how valid and reliable the surveys are, at what level does the respondent become deemed to be scientifically literate? Do they need to answer all of the factual questions correctly—such as does the earth go around the sun?— or just have an appreciation of the scientific process? Durant has argued that knowing many scientific facts does not mean the same as understanding science—the process of science, the implications of science and the significance of science (Durant 1993). Of course understanding science is something that sociologists, historians and philosophers have debated for many years. The meaning of science is explored later in this chapter.

I have briefly outlined that surveys conducted to determine levels of public awareness or understanding or attitudes or opinions do not necessarily reflect what all members of the public think, or do not think, about science. Nor do the surveys determine if members of the public think it is important that they understand science. Science communicators involved in the recent movement of science communication have provided a number of reasons why they think it is important that the public understand science.

Reasons for Science Communication

What arguments have been given to legitimise the recent activities of communicating science? Over the past fifteen years large quantities of resource have been poured into science communication activities throughout the world at similar times. *The White*

Paper on Science Technology and Innovation, released by the Irish government in 1996, stated: " . . . the promotion of greater awareness, and appreciation of the contribution which science, technology and innovation can make to economic and social development in Ireland, could contribute greatly to achieving structural change and a consequent increase in both national and firm-level competitiveness" (Office of Science and Technology 1996, p 131).

Besides the two arguments indicated above—benefits to Ireland's economy and its political power and influence—there are numerous other arguments for science communication such as benefits to science and benefits for the democratic society we live in. The rationale that science will benefit from improved science communication is based on a greater tolerance of scientific research; if more people appreciate science more money will be spent on it. However, there is little evidence to support this argument.

In 1988 sociologist Brian Wynne coined the term 'deficit model' to describe what he referred to as the conventional approach to public understanding of science or the recent movement of science communication. His model of public understanding of science assumes that the public have a deficit of scientific knowledge and that once the public gain this knowledge they will be more accepting of science and its applications. The model assumes that the level of knowledge is standard even though those who subscribe to the deficit model never justify the correct level or type of knowledge needed for the public to understand science. Science communicators, including John Durant, were disparaging of Wynne's assessment of their approach and asked Wynne to offer an alternative (Wynne 1993). However, as Wynne has indicated, as the deficit model is more an "ideological construct than a research method" (Wynne 1993, p 322) it is not as simple as offering alternatives.

Wynne has argued that science communicators perceive science to be the best way to view the world and although one often feels that scientists believe that they are the only people interested in science communication, there have for some time been other scholars, the theorists, interested in the public communication of science. I must admit when I first became interested in science communication, from the science centre perspective, I was unaware that there were other interested disciplines beside science. A number of challenges have been made to the recent science communication movement and a division of ideas has grown between the practitioners of science communication and those that study the role of science in society.

One academic field interested in elements of science communication is the multidisciplinary research area of historical, philosophical and social issues in science and technology, known as Science and Technology Studies (STS). Prior to STS the field of science studies had been founded by scientists who were disillusioned by science and who applied the 'scientific method' to science itself (Fuller 1998b).

Although there is often a measurable tension between the two camps—theorists and practitioners—the boundary is not always as well defined as I have indicated. There is a recognition that the gap should be bridged and research collaborations, networks and conferences have been set up to attempt this.

The Science Policy Support Group's Public Understanding of Science initiative, funded by the UK's Economic and Social Research Council, was one such collaboration of practitioners and theorists. The research programme, coordinated by Alan Irwin and Peter Healy between 1998 and 2000, led to the establishment of other research projects such as the Science and Society Forum.

> The [Science and Society] Forum is building a broad range of participants—from research policy, research management, science-based industry, issue-based groups, consumer organisations—for three reasons. First, because we believe that a reflexive and critical engagement with social science research can contribute to the development of policy, practice and evaluation within participants' own organisations. Second, because research and analysis—particularly when comparative in approach—frames issues in new ways which may lead to new and shared understandings between such organisations. Finally, research itself can learn greatly itself from engaging with practice: about issues, approaches, cases and what does and does not work[10].

There are two international peer-reviewed academic journals—*Public Understanding of Science* and *Science Communication*—dedicated to this area, where both practitioners and theorists publish. Although it is important to note that theorists—and practitioners to some extent, particularly science educators—actively publish in their own respective discipline's journals, as well as the two aforementioned.

[10] see website http://www.spsg.org/science_society/index.html accessed on 14 March 2002

The final example I would like to offer that indicates the less than clear boundary between the recent science communication movement and the academic discipline of science and the public is the Public Communication of Science and Technology (PCST) network. This network, established in 1990, is an international science communication network linking professionals and researchers who work in the many diverse fields of science communication. The majority of the members of the network are science communication professionals as indicated by the PCST network aim to incorporate "all bodies, networks, foundations, and associations that share similar aims (e.g. scientific museology, scientific journalism, science/technology/society associations, information and communication sciences, public relations in research centers, etc.)"[11]. The PCST community organises international conferences every two years providing the opportunity for its members to meet regularly. The conferences do attract academics, many involved in media studies, however, there were few STS scholars present at the last conference, *Trends in Science Communication Today: bridging the gap between theory and practice,* held in Geneva, Switzerland, in 2001. The previously mentioned tension between practitioners and theorists was present at the conference even though its aim was to bridge the gap. STS academics may not be attending the conference could be for two reasons: the PCST network is perceived to be more for practitioners, and STS academics prefer to publish in their own discipline's journals and attend their own conferences. For example, STS academics would be more likely to attend conferences held by the European Association for the Study of Science and Technology (EASST) or the US's Society for Social Studies of Science (4S) than those conferences organised by practitioners of science communication.

Defining Science and the Public

The different disciplines involved in science communication and the need to establish better working relationships to facilitate new learning accentuate the necessity for clear definitions of what science is being communicated and who the public are.

I first read about the dissecting of the phrase 'public understanding of science' in the early 1990s (Cossons 1993; Shortland 1988; Silverstone 1991) and believed that this was a pointless exercise. These sentiments were expressed in my MSc thesis written in

[11] see website www.pcstnetwork.org accessed on 14 March 2002

1997: "Little has been said of the opinion that there is no significant difference between the [popularisation of science and public understanding of science]. Perhaps the science communication movement should focus its efforts on determining the best procedures in communicating science to the public." (Barbagallo 1997, p 19)

That was my sentiment six years ago. I was a product of six years' studying and working with scientists interested in science communication who were themselves practising the deficit model of science communication. And even at the time I remember rebutting the argument, frequently recited by a senior member of staff, that communicating science will allow others to experience the joy of science. The reason I raise this issue here is to demonstrate the differing degrees of the deficit model mind-set among practitioners, let alone between the theorists and practitioners. I feel that I am in the privileged position having experienced working as a practitioner of science communication before undertaking this theoretical thesis. I am familiar with the wants, needs and frustrations of practitioners working in science communication and of their general lack of awareness of what STS can offer. The past four years have provided me with the opportunity to understand the differences between the two groups.

The science that practitioners communicate is one of the main concerns of theorists. Science is often presented as the dominant form of knowledge, the collection of facts and as being removed from society in which it operates. This representation of science, for example in government reports on risk assessment of GMOs, only further alienates the public from science (Wynne 2001). An example highlighting that science is not always depicted as superior and out of social context is the National Museum of American History's exhibition *Science in American Life*. The exhibition, primarily sponsored by the American Chemical Society (ACS), used "about two dozen case studies from 1876 to the present . . . [to explore] critical intersections of science, technology and society . . . (Molella 1997, p 132). Examples of the case studies included in the exhibition are the contraceptive pill, mass production of penicillin and the Manhattan project. The sponsors saw this depiction of science as an attack on science.

The next section explores what science is in relation to how it is represented to the public.

What is Science?

Scientists are expected to produce scientific facts that are incontrovertible, yet the number of controversies involving science is increasing. This escalating level of uncertainty does not correspond with the traditional view of 'science'. In this section I address how scientists and non-scientists understand, interpret and represent science.

A good place to start is with the previous example of the *Science in American Life* exhibition. *Science in American Life* was not presented in style typical of science museums or science centres in particular. Their exhibitions often portray science as non-social, authoritative, powerful, factual, non-political and progressive. This type of representation does not explore how science has been shaped by society, the failures of science, scientific procedures or the unknowns of science. The debate that arose among the curators of the exhibition and senior officials from the ACS[12] and the American Physical Society (APS) was about the different interpretations of science. Officials from the ACS and APS demanded a complete revision of the exhibition. The sponsors did not want the inclusion of case studies that were problematic or not straightforward. In the evaluation of visitors' experiences of the exhibition it "demonstrated conclusively that visitors came away . . . with overwhelmingly positive feelings about science and technology" (Molella 1997, p 133). Members of the general public are aware of the limits of science through their every day interactions with society.

There are many interpretations of science[13]. The National Museum of American History did not aim to present science in a positive or negative light, just to place it into a social context. However, science has been described as both good and evil; as the provider of a solution or the cause of a problem. Science can be seen as a tool that enables society to progress, for example a cure for cystic fibrosis, space exploration and information technology that has transformed communications. On the other hand people become disenchanted with science when they hear of examples such as the Chernobyl power station disaster that polluted the environment, the construction of weapons of mass destruction and genetic testing that threatens the privacy of individuals' lives. Scientists

[12] Molella noted in his article that 42 of 43 members of the ACS who toured the exhibition were highly supportive of it in their responses to an informal written survey (Molella 1997).
[13] In this chapter I generally use the term science to include areas that could be better referred to as technology. I am aware of the distinction between the two terms and this distinction is explored in Chapter Three.

themselves are also represented by opposing images, for example rational or eccentric, crazy or intelligent. Wynne has argued that it is not the public that uses the meaning of 'science' inconsistently, but that science "means different things to different people in different situations" (Wynne 1991).

Robert Merton was one of the first sociologists to study science socially. Merton asked scientists what they thought of science and from his research he claimed that science operates to a set of norms that direct scientists how to play the 'rules of the game'. This representation is the ideal of science that is often put forward to the general public. These norms were the outcome of scientists' reflections on what they do; Merton's method was self-reporting. Scholars who do not view science as a practice outside of society and not deserving of special treatment have challenged Merton's norms and his image of the 'scientific community'. Merton's norms were an account of science by scientists and he did not subject scientific ideas or facts to sociological analysis.

In 1967 Berger and Luckmann argued that reality is socially constructed and that reality is a 'quality' not a thing (Berger and Luckmann 1967). They suggested that everyday life holds a privileged position and that we procure everyday life through intersubjective reality. These ideas were the foundation for the field of sociology of scientific knowledge (SSK) which addresses the content of scientific ideas, theories and experiments. Before this time the sociology of science was concerned with science as an institution and the study of scientists. This 'standard view of science' is often presented in science textbooks, at least the ones that I learnt 'science' from.

Since the 1970s investigations of science and scientists have revealed the "uncertainties, the negotiations, the dilemmas and controversies that inform . . . the very making of science" (Webster 1991 p15). There have been different approaches to this quest to understand the 'nature of science', and they have all faced large opposition from the scientific community. One approach to understanding the 'nature of science' is the 'Strong Programme[14]' in SSK, that originated at the Edinburgh University in the early-1970s. Sociologists David Bloor, Barry Barnes, Steve Shapin and Harry Collins argued that scientific knowledge is in no way better or more rational than other knowledge claims in a scientific debate.

[14] The Strong Programme is so named as it initially focused on the knowledge in the 'hard sciences'.

The idea that scientific knowledge is socially constructed implies that there is nothing special about scientific knowledge; it is just one in a series of knowledge cultures. Social processes occur in the formation of all our beliefs. For example, beliefs in witchcraft or the genetic code are on the same social footing. However, certain knowledge systems have been more or less successful than others. It is the job of the sociology of knowledge to explain the success and failures of certain knowledge systems.

In the late 1970s two sociologists—Latour (French) and Woolgar (English)—adopted another approach; that of looking at the process of science or 'science in the making'. Their approach followed how ideas and claims of scientists turn into accepted 'facts' (Latour and Woolgar 1979). Latour argued that in scientific controversies where there are disagreements between two camps of scientists (laboratories) there should be no expectation of finding the 'truth' because that is merely a construction of the activity within the scientists' community. Latour also challenged Merton's norms arguing that science displays one side of science to the scientific community—the insiders—and another side to general public—the outsiders (Latour 1987). This projection of science protects science from outside interference.

The research described above presents science as socially constructed, in other words there are social influences that affect science and scientific knowledge. For example, in our current society science plays a central role in national economies, and this role affects the nature of science. But not only has the independence and objectivity of science been questioned, the method of scientific research has also been examined.

There is an assumption that if something has been established using the scientific method it is more credible or reliable. For example, in a controversy involving science scientists often present their argument as the only rational form of knowledge acquired by 'the scientific method'. But is there such a thing as 'the scientific method'?

Philosopher of science Alan Chalmers reviewed the theories of science that have been put forward by other philosophers in his book *What is This Thing Called Science?* (Chalmers 1978). Chalmers argued that the popular conception of the nature of science can be used to support positions by stating that science offers the truth to solve a problem. The fact that the truth has been arrived at by means of 'the scientific method' is meant to support particular causes. For example, in a recent television commercial advertising shampoo the narrator says, "now for the science bit", to prove to potential customers that it is not only the word of the celebrity who supports the qualities of the shampoo but that science has proven its capabilities, which are now beyond dispute. This popular depiction of science is one of careful observation and experimentation to establish the 'facts'. Developments in the philosophy of science, with support of the history of science, have identified a number of difficulties with this traditional view of science.

Thomas Kuhn, a historian of science, concluded that his collection of historical evidence did not support either inductivist or falsificationist accounts of science[15]. Kuhn presented a different view of how scientists operate in *The Structure of Scientific Revolutions* in 1962 (Kuhn 1970). He suggested looking at the reactions of scientists to experimental results that disagreed with current theories and how scientists structure their experiments. Kuhn distinguished between two modes in the operation of science: normal science—science practised on a day-to-day basis, working within a paradigm or knowledge system; and revolutionary science—the replacement of one paradigm with another. He argued that scientists making observations and collecting data from experiments are doing so according to a predetermined set of rules. He argued that the 'facts' cannot be separated from the scientist's experiences and previous knowledge, and that scientific knowledge cannot be absolute. Scientists, like all other human beings, bring to their work their experiences as active members of society, not just their experiences of their academic disciplines. They operate in broader social structures, other than science, that produce knowledge such as economics, religion and politics. For new theories to be accepted Kuhn suggested that it depends on the persuasive nature of scientists and their power and standing in the scientific community.

[15] Induction is the process of building up theories from observations. Based on a limited number of observations theories can then be justified. Once there are theories a scientists can deduce other theories by using prediction and explanation. However no matter how many white swans you observe, there is no way to prove that all swans are white. Karl Popper argued that scientists should also seek counter evidence to a theory and not just observations that support it because there could be an occurrence that is not observed that could falsify the theory (Chalmers 1978). Falsification is not to prove that a theory is right but to seek experiments that could disprove the theory. How the choice of theories was made was not fully determined. Popper argued that as knowledge progresses, one theory gives way to another. One of the problems with falsification is that there are limitations of examining theories in isolation because observations involve numerous assumptions.

Paul Feyerabend, a philosopher of science, argued that although science is a single word "there is no single entity that corresponds to that word" (Feyerabend 1975, p 238). He asserted that it is difficult to answer the question 'what is science?', as there is no one scientific method and scientists in, and within, the different disciplines proceed in different ways.

Sociologist Steve Yearley has pointed out that scientists themselves are aware that they might not follow 'the scientific method'; they "simply know that they are doing science" (Yearley 1994, p 249). Even if scientists know that they are not following 'the scientific method' it is still this method that is largely presented to the public. Feyerabend argued that there are important political consequences for opting for 'the scientific method'. There is no single 'world-view of science' and he asked what the idea of this comprehensive view could offer? The general public may see science in this way even though it is aware of different disciplines within science, but they assume there is "the scientific way" (Feyerabend 1975, p 247). Feyerabend questioned what is so good about science and why does it have such a high reputation? He did not argue that science had nothing to offer, but that scientific knowledge can be offered alongside other theories of knowledge.

Members of the public are disadvantaged if they are only made aware of one form of knowledge, or are led to believe there is only one correct form of knowledge.

> The objection that citizens do not have the expertise to judge scientific matters overlooks that important problems often lie across the boundaries of various sciences so that scientists within these sciences don't have the needed expertise either. Moreover, doubtful cases always produce experts from the one side, experts for the other side, and experts in between. But the competence of the general public could be vastly improved by an education that exposes expert fallibility instead of acting as if it did not exist (Feyerabend 1975 p 251).

Lewis Wolpert, a biologist and not a supporter of Feyerabend, has agreed that there is "no such thing as *the* scientific method" (Wolpert 1992, p 108). He stated that famous scientists have provided advice to philosophers in search of the scientific method, such as "trying many things; do what makes your heart leap; think big; dare to explore where there is no light; challenge expectation; . . . be sloppy so that something unexpected happens, but not so sloppy that you can't tell what happened . . ." (Wolpert 1992, p 108). Wolpert suggested that scientists themselves have helped create this illusion of one scientific method and "[l]ittle would be lost if less science were taught but some insight were gained into the processes of science. Learning about creativity in science, with an emphasis on psychic courage and failure, may well be very much more valuable than some of the science itself" (Wolpert 1992, p 177).

Similar to the one popular view of science and *the* scientific method, the 'public' is often referred to within the science communication community. In the next section a definition for 'the public' is explored.

Who is 'The Public'?

When we speak of communicating science with the public, who is the 'public'? Different science communication initiatives often state their target audiences in their aims or objectives. These target audiences give us some sense as to who the 'public' is. For example, the Irish STIAP has five target audiences: young people, the general public, Irish business, opinion leaders and the media. A science centre's main target groups are often school students and families. Anti-GMO lobby group Genetic Concern used a more specific target audience for their supermarket campaign, including consumers or household shoppers.

However, not all initiatives define their target audiences and, as indicated above, a target audience might simply be the general public. In the recent science communication movement the members of the general public, or the public, tend to be people like an aunt or a next-door neighbour. Sociologists have researched the concept of 'the public' and can offer assistance in its definition to science communicators. For example, the public can be active citizens of a society, such as the citizens that are involved in the "public sphere" defined by Jürgen Habermas (Habermas 1989). Mass audiences that are recipients of mass communication such as television represent another concept of 'the public'. However, the grouping of such large audiences offers little distinction between members of the public. In fact, Habermas has argued that the development of mass media is responsible for the erosion of the public sphere.

But who are the members of the public that are referred to in science communication as the general public? This term is generally used to describe people that do not have a science background—the lay public or the lay citizen. In science communication a layperson has no expertise in science. Can a scientist who is not an expert in the scientific topic of interest be considered a layperson? In the same way that there is no such thing as one scientific method there is no such thing as one scientist. I would argue that a scientist involved in an area outside her expertise is not the same as a layperson without any scientific training, nor can she claim to be an expert just because she is a scientist. A scientist has knowledge of science, has trained as a scientist and works as a scientist therefore is involved in the culture of science and how it sees itself. A person within the scientific domain would view science in a different perspective from someone who is outside the scientific domain. For this reason I would not include any scientist as a lay person in any issue involving science.

Sociologists Brian Wynne and Alan Irwin, among others, have pursued the concept of the lay citizen possessing lay expertise. Each of us, scientists and non-scientists, are experts in a few fields. For example, members of the general public would be experts in the area of where they live or in the types of food their children like to eat. My father is an expert in sugar cane farming practices of his farming community in Queensland, Australia. However, he is not an expert in sugar beet farming in County Carlow, Ireland. Lay knowledge is usually not transferable to other situations or areas. When considering scientific issues scientific experts tend to be dismissive of the local knowledge that lay experts have. One of the case studies presented by Alan Irwin, in his book *Citizen Science*, highlights the different perspectives of scientific experts—the UK Advisory Committee on Pesticides—and lay experts—the farmworkers. The farmworkers used their own experience with 2,4,5-T pesticide to conclude that it was not safe because of the high rate of sickness, miscarriage and birth defects in their local area. When they called on the government to review the safety of the pesticide they met with resistance. The farmworkers' claims were said to be unscientific. However, the farmworkers' knowledge gained by using the pesticide everyday in farm conditions was more accurate in the assessment of the safety of the pesticide than the knowledge of the scientific experts (Irwin 1995).

Communication with the farmworkers would have helped the scientific experts gain additional knowledge of the use of the pesticide that only farmers could provide. Science communication should not just be about scientific experts providing information *to* lay people but about communication *with* lay people where scientific experts can learn from lay citizens.

Those organisations and individuals committed to communicating science cannot prescribe the level of science or just one scientific understanding. Wynne has argued that to enhance public uptake of science the communication should not be about controlling people's interpretations of the science but more about providing access to information and motivation.

Wynne provided the example of hill farmers in Cumbria, UK, who refused offers of whole-body radioactivity scans after Sellafield and Chernobyl contaminations, because they could do nothing except worry if high levels were discovered (Wynne 1996). At the same time the farmers' requests to test ground water levels of radiation were ignored, even though water supplies could have been changed. The sheep farmers' perspectives of this experience were that the knowledge offered by the scientists was useless, and their own useful knowledge was ignored.

Some members of the public choose not to know about science. Wynne provided an example of Sellafield apprentices who knew little about the basic radioactive process and felt they did not need to know. The scientific experts who had designed the plant and its operating procedures held the scientific understanding. The apprentices learned these procedures rather than the science and as a result placed their confidence in the institution. The apprentices did not reject science but trusted knowledge derived from science. Wynne further argued that members of the public show 'unreceptivity' to scientific information because they think it might not be useful or they have no experience of it. In contrast, others, such as a parent understanding their child's genetic disorder, birdwatchers or amateur astronomers, see a personal or practical need to understand science and hence are motivated to learn.

Discussion

In this chapter I have identified two different groups involved in science communication—researchers and practitioners—whose members are increasingly developing, implementing and researching public participation methods. The different reasons for the involvement in science communication and the different interpretations and definitions of 'science' and the 'public' have a direct effect on the rationale and type of public participation approaches that are adopted for communicating controversies.

In the recent movement of science communication, as described by Gregory and Miller (Gregory and Miller, 1998) assumptions have been made as to who 'the public' is and what 'science' is to be communicated. The two main themes of this chapter, which are relevant to the research presented, are the social construction of science and the value of lay expertise.

There are many critics of the view that science is just one form of knowledge and that science is not an all-encompassing word to describe the rational and progressive activity that 'the public' is so often told it is. There appear to be different world-views: one sees scientific knowledge as privileged and providing our best understanding of the world, and another argues that science is "nothing but a chimaera" (Feyerabend 1975, p 242).

Philosophers, historians and sociologists studied science for many decades before the emergence of the recent movement in science communication. Why is it that within the recent movement of science communication, and the scientific community, there is considerable resistance to researchers investigating the nature of science? For example, Wolpert argued that "[f]ortunately for science, these philosophical claims have no relevance to science and can be ignored" (Wolpert 1992, p xiii). Unfortunately for the science communication community, particularly researchers, this is not the case. The independent and objective image of science that is presented by the scientific community is continually being eroded by the increasing number of controversies where differing interests and viewpoints are presented to members of the general public.

The need to augment the traditional representation of science was recognised by the House of Lords Report *Science and Society* where it stated that, "one of the major factors engendering mistrust (in scientific expertise) is the failure of institutional science at the frontiers of knowledge to admit publicly its own uncertainties and provide accordingly" (UK House of Lords 2000).

Critics of science communication activities argue that such activities are science-centred and reflect the beliefs of members of science circles. The framework in which science is communicated and organised needs to be widened to assist with public uptake of science.

The second theme of this chapter is the recognition of lay expertise. The recent movement of science communication does not typically consider the public to be lay experts but to be made up of aunts and neighbours, or specific target groups such as families and children. Initial communication activities by the recent movement in science communication were indicative of this perception of the public; the activities did not allow for communication with lay experts. However, more recent events focus on dialogue using for example consensus conferences and citizen juries. The type of public that is recognised by science communication practitioners is beginning to change.

Chapter 2

Communicating Controversy

The two original case studies examined in this thesis—genetically modified foods and water fluoridation—have both been controversial in Ireland. Each case has involved opposing groups and each group has used scientific evidence in their communications to support their respective campaigns. The aim of this chapter is to determine what constitutes a controversial issue involving science and to demonstrate how such controversies are communicated among interest groups, scientists, policy-decision makers and the general public. This chapter addresses:

i. how an issue becomes controversial;
ii. how a controversy is framed as a scientific issue; and
iii. how a controversy is communicated.

In order to do address these three points the meaning of controversy and communication processes are discussed. The concepts of trust, power and risk are raised.

Controversial issues involving science are not new, although the applications of science, in particular those in biotechnology, are becoming increasingly controversial. It is not unusual to read more than one controversial issue involving science in daily newspapers. For example, on the day that this paragraph was first written *The Guardian* ran three controversial stories involving science: a controversial new reprocessing plant at Sellafield, a dispute over the location of an renewable energy wind farm, and concerns over dioxins released during the burning of carcasses of foot and mouth infected animals[16].

To continue listing controversies involving science is easy. Xenotransplantation, genetic screening, gene therapy, stem cell research, assisted reproduction techniques, cloning, genetically modified foods, nuclear waste storage, vaccinations, animal research, water fluoridation, alternative energy sources and climate change are a few examples in an incomplete list.

Some of the above controversies, such as nuclear power and reproductive techniques, have been in the public domain for more than 30 years. Sometimes controversies, after years of appearing to lie dormant, resurface because of a new development, such as new scientific material or increased local activity. For example, the debate over research using foetal tissue has been revived due to recent developments in stem cell research.

But who is involved in the controversies? The earlier example of the wind farms, described in *The Guardian,* quoted four different sources: the UK Ministry of Defence who opposed the wind farm proposal, a wind farm developer, the British Wind Energy Association, and Friends of the Earth. The latter three all disagreed with the Ministry of Defence, however each group raised different concerns. The article also demonstrated the possibility of conflict within the government, as existing government policy aims to produce ten percent of the nation's electricity from wind power. This example shows that controversies often involve more than two disagreeing parties. Usually a number of social actors with a variety of positions are involved; hence a controversy is not as simple as one 'right' and one 'wrong' answer, but a complex situation where it may be impossible to reach a consensus.

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[16] *The Guardian*, 31 May 2001.

How an Issue becomes Controversial

In this chapter I will refer to 'controversies involving science' rather than 'scientific controversies' to avoid framing issues primarily as scientific. Generally it is not 'science' that is opposed but particular developments that involve science, such as GM foods and xenotransplantation. Furthermore, when people become interested in controversies involving science their motives may be broad. For example, someone with concerns over a new development may use the opportunity to highlight their concerns over issues such as who sets the research agenda, the exploitation of the environment or specific communities, the growing power of industry or their own societal beliefs.

In the period of rapid economic growth that followed World War II in industrialised countries, science was seen as progress and was largely unquestioned by the general public. In the 1970s when interest groups began to question developments in science and its regulation, around issues such as chemical pollution and cancer causing drugs used to stimulate growth in cattle, they were not necessarily critical of all science. Earlier still Rachel Carson's book *Silent Spring* highlighted the dangers of pesticides and chemicals that posed a threat to human health and the environment (Carson 1962). Then and now such concerns have been raised and investigated by concerned scientists. It is not just those outside the scientific community who are involved in controversies involving science.

The author of *Controversy,* Dorothy Nelkin, has argued that the issue of political control underlies nearly all controversies involving science (Nelkin 1992); in this context political control relates to who has control over which direction scientific developments and applications should take. Nelkin argued that it was critics of science, such as environmentalists and animal rights activists, who were the initiators of protests that began in the 1970s. However, I would disagree with labelling environmentalists, or indeed all members of activist groups, as 'critics of science'. Perhaps they are critical of a type of development but not necessarily of all science.

In *Controversy*, Nelkin arranged twelve case studies into four major groups to reveal the diversity of the concerns raised in controversial issues involving science. The four underlying concerns she identified were: infringement of social and moral values, questioning of political priorities, fear of risk, and the threat to individual rights (Nelkin 1992). However, Nelkin was aware that each case study may involve several, if not all, of the four major concerns. Not all of these four major concerns involve scientific issues.

To illustrate each of the four categories of concern I will use examples from Nelkin's book, before providing an example of how one particular issue can involve all four concerns. The first category, the infringement of science on social and moral values, is the major concern surrounding the use of foetal tissue and animals in scientific research, as use of these techniques threatens the moral convictions of some members of our society.

Recent examples of controversial political judgements—the second category—have more global implications than the local political conflicts such as the sites of power plants and waste disposal dumps of the 1970s and 1980s. Today the main tensions are between environmental values and political or economic priorities, and an example might be the debate surrounding global warming. The orchestrated demonstration of 100 000 protestors at the World Trade Organisation conference in Seattle in November 1999 provides an indication of the relevance that political decisions have on controversies.

The third major concern is the fear of risk and here Nelkin focused on health hazards associated with industrial and commercial interests. An example is the nature and extent of risks associated with the potential of a food product to be carcinogenic because of food additives or food irradiation. The fear of risk does not depend on experts disagreeing about 'known' science but on the heightened fear that arises from unknowns and uncertainties. The types of uncertainties involved in science are explored in the following chapter.

The final group of controversies illustrates the conflict between individual rights and broader social goals. Nelkin draws on the example of the creation-evolution debate, which highlighted how everyone must comply with the decision of what will be in the school curriculum. Another example of a threat to individual rights is water fluoridation where it is argued that once water is fluoridated people do not have the choice over whether or not to consume fluoride.

The controversy over GM food and crops involves all four major concerns. I will list these briefly to highlight that more than one resolution mechanism may be needed to address the various elements of a controversy involving science. Adding to the complexity are the publics that may be concerned about the four areas of conflict described by Nelkin. In the GM food and crops debate the following issues have been raised:

i. moral concerns, particularly for religious groups and animal rights groups;
ii. political priorities of the government involving the national economy and the benefits to the biotechnology industry;
iii. concerns due to the uncertainty of the risk to the natural environment and human health which have been expressed by environmental and citizen groups; and
iv. both the threat to individual rights due to the lack of consumer choice, according to consumer groups, and to the rights of citizens in the third world, according to religious and citizen groups.

The level of controversy depends on the types of concern raised, the number of people potentially affected and the level of risk involved. For example if an issue evokes only social and moral objections from a small proportion of the population then the controversy may be small and short lived. The water fluoridation issue in Ireland has implications for the majority of the population, yet the level of controversy surrounding it is not high. The reasons for this include little political bias and a low level of fear, as the water in Ireland has been fluoridated for over 40 years. The GM food issue has been very controversial because it raises all four concerns and affects the whole population.

The above examples provide reasons why issues may be controversial and demonstrate the type of publics that become involved in a controversy. But how does an issue actually become a controversy?

For something to be controversial it has to be raised in the public domain but it does not have to involve all members of the public. For example the media coverage of a dispute engaging only scientists and professional interest groups is a controversy. However, if the dispute did not have a public presence—media coverage, visible public campaign such as a demonstration outside a government building, a strike or political debate—it would just be a disagreement between two groups. For a controversy to be maintained, however, a wider group of people needs to be involved (Nelkin 1995a). For example, a controversy can only be maintained if the activist group gains support from a wider group of people (Nelkin 1995b). Therefore a common tactic of pressure groups is to pool their resources for specific issues to increase levels of support for their cause and to organise public campaigns that aim to attract media coverage.

A controversy depends on the type of issue that is raised as well as the people involved. For example if an individual opposes the close proximity of a new waste disposal site, he or she may form a pressure group to begin a local campaign. The amount of support the pressure group receives from other local citizens will determine the level of interest in the issue and the relevance of the campaign. A second example of how an issue is initially raised is taken from the controversy surrounding the depletion of the ozone layer. Two atmospheric chemists with access to the scientific data first raised concerns over the depletion of the ozone layer within the scientific community. It was then the chemists' responsibility to bring their concerns to a wider group of people. The publishing of the chemists' findings made front-page news. However, at this stage it was only news and the controversy started when industry refused to stop all non-essential uses of chlorofluorocarbons (CFCs) because they rejected the chemists' claims (Brown and Lyon 1992).

Individuals are attracted to a controversy because of an interest in the issue as opposed to their political alignment. For example, an individual is more likely to be involved in a controversy if a waste disposal site is in the vicinity of her home than if it is in a neighbouring county. This lack of a political view but presence of a personal objection has been referred to as the NIMBY—not in my back yard—syndrome.

An example of personal motivation, described in *The Golem at Large,* is the action of a gay community in San Francisco that formed an activist research group (Collins and

Pinch 1998). Their main aim was to smuggle experimental AIDS drugs into their community and distribute them in a controlled and safe manner. This group was undertaking community research because of the lengthy drug trial periods required by the Food and Drug Administration (FDA).

There are many other examples of lay citizens becoming involved in controversial issues for personal reasons, such as the example discussed in the previous chapter of the farmworkers concerned with the health hazards of a pesticide (Irwin 1995). The examples clearly indicate that controversies do not only arise from well-established activist groups opposed to 'all science'.

In summary there are different aspects to a controversy involving science including the infringement of social and moral values, the questioning of political priorities, the fear of risk, and the threat to individual rights. Different social actors can become involved in any or all of these aspects depending on their interests. The opposition to a development involving science by an individual or group does not automatically imply that they oppose the science involved in the issue or are critical of all science. For example the farmworkers were not anti-pesticides they just wanted the regulators to acknowledge that there were dangers in the use of the particular pesticide and to take suitable action. The farmers concerns constituted a consumer health issue rather than a scientific issue. The next section of this chapter addresses how an issue becomes framed as scientific.

Framing Controversy as Science

How does a controversial issue first become framed as scientific? To address this question the example above will be used. When the farmworkers presented their concern to the committee responsible for pesticide regulation the farmworkers were informed that their concerns were unfounded, as scientists had proven the safety of the pesticide. The committee asked their experts to answer the query with a scientific answer, thus placing the issue in a scientific framework. The important question to address now is, 'why did the committee ask scientists?'.

The answer lies in the way our society seeks to find answers. We live in an age where science is seen as progress and the knowledge obtained from science is power. For example science is central to a nation's economic development. In this sense science is in charge, whereas in previous times religious or local civic leaders had great authority.

Scientific evidence is used to legitimise decisions. For those in authority the use of science in legitimising decisions is a source of power. The authority of science exists because of the assumption that it is objective. Science is looked upon as rational, independent and immune to political influences, and scientists are viewed as neutral, presenting only the 'truth'. However, two problems are associated with this assumption. First, as described in the previous chapter, science is not separate from society and therefore cannot be unaffected by political influences. Second, it is rare that the scientific evidence is conclusive allowing a definitive decision to be made. This lack of certainty in scientific knowledge can result in evidence being manipulated by different adversaries to justify their claims. To the general public disagreements among experts blur the discussion of the controversy.

Sociologists Ulrich Beck and Anthony Giddens have argued that modernity is emerging into a new stage (Beck 1992; Giddens 1998). The first phase was the industrialisation of society and the disenchantment with religion. The next phase, that we are already moving into, is the 'risk society'. Not that risk is new; it is the nature of risk that has changed. In a risk society risks are beyond the control of individuals. We cannot negotiate with risks, for example those associated with climate change, BSE and GM foods, and we cannot see them.

Giddens argued that science is losing its dominant position as the expert advisor and citizens are forced to make decisions on other grounds because of conflicting expert advice (Giddens 1998). New ways of looking at our world and a new language to describe what is happening in it are required. The risk society offers a new alternative to politics. At the moment politicians and experts do not know how to say that they do not have an answer to everything. If politicians do not recognise the ignorance and uncertainty of experts then public scepticism of science and lack of trust in regulators will only increase. New political processes are needed to address the new forms of risk, as experts cannot guide us through safely. The authority of science has to be removed to enable experts, the public and politicians to negotiate decisions that need to be taken.

The new form of politics will need to take into consideration the public issues involved in controversies and to ensure that decisions do not focus solely on the more technical and scientific issues. In recent years there has been a decline in the levels of public trust in government regulation. For example, in Britain the catastrophe of bovine spongiform encephalopathy (BSE) and its human form Creutzfeldt-Jakob disease (CJD) led to mistrust which may have exacerbated reactions towards genetically modified food and crops. Regulators are interested in methods that will restore public trust; however, an increase in public trust will not occur if the political system remains one that seeks only the opinions of experts on issues that raise broader concerns.

Nelkin argued that the framing of issues as scientific is a tactical manoeuvre (Nelkin 1992). The use of scientific or technical expertise is an influential and political resource, even in controversies that involve a limited scientific dimension, such as surrogate motherhood. It is not just governments and politicians that frame an issue as scientific. Those disputing policy decisions also rely on science in their campaign tactics. Environmentalists hire scientists to challenge policy decisions by questioning the potential risks of projects. Those motivated by social or moral values also focus on technical aspects rather than moral elements. For example, the morality issue that surrounds foetal research is reduced to a debate about the point at which life begins (Nelkin 1992).

Groups who object on social and moral grounds may find it tactically advantageous to fight with scientific expertise and indeed are often left with little choice. The issue presented by policy makers may already be framed as scientific and the power that comes from scientific expertise often negates concerns arising from someone's feelings, wants or needs. Scientific evidence holds more weight than a personal opinion, such as a consumer's 'gut reaction' that GM food just is not right. The use of scientific rhetoric may be the only way for protestors to raise their concerns if they want to be taken seriously.

The recent objection to the construction of electricity pylons in Cork Harbour provides an example. A variety of issues including human health concerns, aesthetics of the harbour and unneeded increase in energy consumption have been raised. The ESB's (the Electricity Board) reason for the construction of the pylons is to upgrade, and increase, the power supply for industrial and commercial users. This is a technical issue: that is to say that there is not enough electricity for future development. The main argument put forward by the anti-pylon group surrounds the health risks from electromagnetic radiation, a scientific argument more concrete than the aesthetics of the harbour. The health concern of living near electricity pylons is a well-documented and continuing debate also existing in other countries. The ESB responded to this scientific issue by stating that their experts find no evidence to suggest that there are dangers from above ground power lines. Independent experts were called upon to decide if there were health concerns associated with the ESB plans.

In this case independent experts, chosen by both parties, are being used to make a final decision on something that is not just about health issues. Residents have spoken about unsightly power lines, which might decrease the value of their property, and environmental groups are concerned with increasing energy consumption. However, these issues are secondary in the dispute. The growing reliance on expertise in policy decision-making limits the democratic process when decisions are taken with limited involvement from citizens. Furthermore, the use of experts to legitimise a decision that has already been formed further limits the democratic process. New scientific developments have reduced the power of parliament and government. To quote Beck: "The promotion and protection of 'scientific progress' and of 'the freedom of science' become the greasy pole on which the primary responsibility for political arrangements slips from the democratic political system into the context of economic and techno-scientific non-politics, which is not democratically legitimised" (Beck 1992, p 186).

In summary, controversial issues involve a range of concerns and not just a scientific element. The argument that controversies involving science are about a struggle between those who see science developments as essential to social progress and those who do not is too simplistic. The framing of an issue as scientific can be a tactical decision because scientific evidence is seen as influential and legitimate compared with social and moral issues. As more controversies arise less trust is placed in science and its regulators and there is a need for a new system for decision making. The next chapter further addresses the role of the expert and ways to democratise science. The next section, however, explores the role of the mass media in communicating controversies.

Communicating the Controversy

Much of the work in science communication has grown out of scientific understandings of the world that treat communication as largely mechanistic and unproblematic. Here I will present the idea of communication from its own disciplinary perspective rather than from the perspective of science.

Two of the earliest models in the study of communication as a social science[17] were the Lasswell model and the Shannon and Weaver model (Fiske 1998). Both are linear models that see communication as the transmission of messages, raising the issue of effect rather than meaning. There is little recognition of the audience's different interpretations, which depend upon how they construct meaning due to their own experiences. Lasswell's model, a verbal version of Shannon and Weaver's model, is expressed in the stages of communication:

Who
Says what
In which channel
To whom
With what effect?

The Shannon and Weaver model, Figure 2.1, is a basic model that presents communication as a simple linear process (Shannon and Weaver 1949). Its simplicity has attracted many critics; however, further communication research built on their terms 'source', 'message', 'channel' and 'receiver'. Because of the model's influence, I will provide a brief description of its terminology. The information source decides to send a message. The transmitter turns this message into a signal, which is sent through a channel. The receiver then receives the signal. For example in a telephone conversation

[17] Communication can also be studied as a natural science: for example when a speech therapist studies speech disorders, or a linguists studies the making of sounds.

the information source is the person who speaks the message into the handset, which is the transmitter. The signal is an electric current that travels through a wire—the channel—and is the physical means by which current is transmitted. The receiver is the handset of the telephone at the other end of the conversation. Along the way the signal can gather unintended 'noise' which is anything added to the signal between the transmission and receiver. Noise within the channel, such as a distortion of sound or crackling, is the main concern of Shannon and Weaver's model. The term 'medium', not used by Shannon and Weaver, refers to the means of converting the message into a signal capable of being transmitted along the channel (Fiske 1998). For example, a newspaper is a medium.

One criticism of this model is the omission of semantic noise that can occur between the receiver and the destination. Also lacking in the Shannon and Weaver model is the concept of feedback, which is the transmission of the receiver's reaction to the information source. There are numerous other models of communication, as Lewenstein commented "communication theorists have been creating more sophisticated models at the rate of about one a year" (Lewenstein 1995a, p 405), and today's researchers consider communication to be an interactive process.

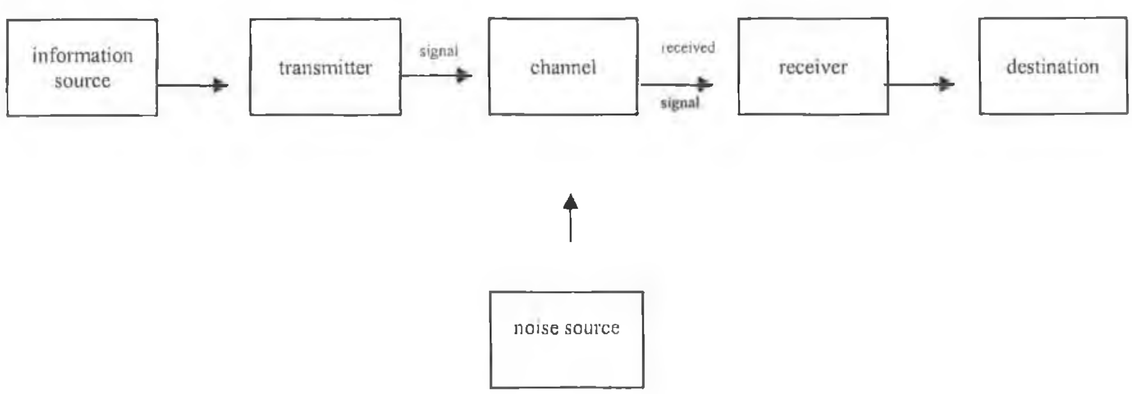


Figure 2.1: The Shannon and Weaver model of communication (Fiske 1998)

The pioneering research into mass media investigated how communication influences people's political opinions and attitudes. At the time the research was performed the media were popularly thought to be omnipotent and easily used for manipulation (Blumler and Gurevitch 1995). Hence early media studies focused on the persuasive effects of the media on audiences at the expense of other elements of mass communication.

In 1960 Joseph Klapper's review of research into mass media showed that there were no predictable or major effects due to the mass media (Klapper 1960). Klapper argued that media messages were interpreted by different readers in different ways because of their prior beliefs, personal experiences and the attitudes of those around them. He concluded that the media was a contributing factor, but not the primary cause of the public's attitudes and beliefs. Research into media effects continued with research on agenda setting, public information campaigns and advertising. Similar results were found in all three; the effects of the media were small and were not found to be predictable. Communication scholar Denis McQuail commented that "the entire study of mass communication is based on the premise that there are effects from the media, yet it seems to be the issue on which there is least certainty and least agreement" (McQuail 1987).

By the 1970s researchers were looking for alternative ways to investigate and understand communication. It became clear that people's interpretation of messages were complex and varied and communication research moved towards understanding the way we make meaning, investigating what people do with messages (Sless 1986).

The communication research approaches detailed above are not specific to science communication. The research described was carried out prior to STS and the recent movement of science communication and consequently has been used and further developed by science communication researchers.

In the 1970s the work conducted by sociologists involved in the then emerging field of SSK, discussed in the previous chapter, began to question the idea that science is created in one sphere and then disseminated to other spheres. This new perspective argued that science takes on meaning once it is expressed in specific contexts and addressed to specific audiences. In his analysis of the controversy about the relationship between diet and cancer, sociologist Stephen Hilgartner showed that scientific information changes form depending on the purpose of the communication and the audience to which it is addressed (Hilgartner 1992). The communication of scientific information is not a simple linear process.

Einsiedel and Thorne, communication researchers in Canada, agreed that the uptake and use of information on scientific issues is not linear and also suggested that it is not unidirectional. Information obtained from the media is part of a "tangled web within a large information environment" (Einsiedel and Thorne 1999, p 54). Bruce Lewenstein, in his analysis of the controversy over cold fusion, also suggested a web of communication rather than a linear model (Lewenstein 1995a). The web model is a more integrated approach to communication research, exploring the role of the mass media with all other media. Lewenstein concluded that one cannot understand the role of the mass media in science without considering the full communication context of all media.

However, the recent movement of science communication adopted the linear approach to science communication, and used little of the research conducted by social science researchers. 'Deficit model' supporters place knowledge and expertise with science, place scientists in a privileged position and view the public as ignorant. The 'deficit model' is an example of a linear and unidirectional model of communication with scientists and science communicators at one extreme sending messages to the public at another. It assumes that the messages sent are of benefit to the public and are in a form that the public can understand and find meaning in. Furthermore, there is little scope within the model for the public to provide feedback to the scientists or science communicators.

The term 'deficit model' was coined in the early 1990s yet it is only in the past two years that governments in the UK and Ireland have formally acknowledged its failings. There is a "new mood" within the policy maker camp and that is one of "dialogue", "consultation", "public involvement, "public participation" and "two-way communications" (Inter-Departmental Group on Modern Biotechnology 2000; UK

House of Lords 2000). Prior to this many science communication activities tended to be unidirectional.

Risk communication, originally conceived in the late 1970s, is another area that previously conformed to a unidirectional model of communicating with the public. The communication was designed to persuade the general public to accept the risk based on sound scientific evidence. As risk analysis models became more realistic, risk communication studies began to question the assumptions of how risk messages were received. Studies addressed how people use information and choose the source of information with which to make decisions. Those sending messages about risk realised that their earlier attempts did not have the desired effect. A risk communication protocol was developed by two communication scholars, JoAnn Valenti and Lee Wilkins, which suggested the need for more dialogue allowing the sharing of information and opinions (Valenti and Wilkins 1995).

In summary, the activities of the recent movement of science communication tended to involve unidirectional communication and provided little opportunity for members of the general public and, more pertinently, lay citizens to involve themselves in communication with scientists. The areas of sociology, risk communication and the recent movement of science communication have all called for communication activities that foster dialogue among social actors and lay citizens. However, employing initiatives that allow dialogue does not automatically mean that the resulting communication will achieve a greater understanding of the different participants' positions. This limitation is discussed in detail in Chapter Four.

The mass media has a large role to play in the communication of controversies. For an issue to be deemed controversial it needs to be introduced into the public domain. The use of the mass media by interest groups, scientists and policy makers is one way to readily capture public attention.

Mass Media

The media study conducted in this thesis is a small, but vital, component of the total work. The main focus of this work is how the public can be more involved in policy making. The media's current and potential role in facilitating public discussion and public participation in policy formation is explored. An issue is framed by the media when they select which events to cover, which sources to interview and which arguments to emphasise. The following aspects of the mass media are addressed: what is understood by mass media, the role of mass media in dealing with controversies involving science, research conducted on mass media, and assumptions of problems with science in the media.

Mass media includes media that communicates with mass audiences, that is audiences comprising a very large number of people. Examples of mass media include newspapers, television, radio, magazines, films and compact discs. Research into mass communication is not simple because the system of communication with large numbers of people is very complex. Each of the media has different goals, constraints, quality and target audiences. Mass communication has the ability to provide entertainment, information and education, or any combination of these.

The final message received by an individual not only depends on the content of message, the sender and the method of transmission, but on how the receiver interprets the message and other messages from different sources. For example, the primary goal of a Hollywood blockbuster movie, such as the science fiction film *GATTACA,* is entertainment, yet the film's audience is also exposed to information about fictional scientific procedures and regulations regarding genetics. To complicate matters further the extent of believable information communicated in the movie depends on other events communicated in different mass media. For example, a newspaper reporting on potential concerns regarding genetic screening by insurance companies may make the scenario in the movie more believable. Therefore the movie may not just be a source of entertainment but also a source of information about science. This example is provided only to highlight the complexity of mass media research; it is not as simple as the Shannon and Weaver model in Figure 2.1.

The mass media has the ability to entertain, but also to provide information for the general public. It is the latter function that is the main focus in this thesis. The mass media has the ability to affect public attitudes and, more importantly, to provide access to the knowledge upon which our society depends to function.

People's knowledge may be affected by mass media, but it is difficult to ascertain the effect of the mass media on opinions about scientific issues, or any issue. Although the mass media is an important source of information it is not the only one (Dunwoody and Neuwirth 1991). Other sources include friends, family, formal education, support groups and professionals, such as doctors.

In every day life we sometimes hear phrases such as 'the media are to blame' or 'the media have too much power' to describe the source of many controversies. Recently a friend told me that it was the media's fault that English soccer fans had such a bad reputation at away-games, as opposed to the fans' behaviour. Is the media that powerful? And what effect does the media have on society? These questions are not new to communication research and extensive research has been carried out in order to answer these questions in areas beyond science.

The erosion of the myth of the media's power to affect public beliefs and attitudes was a gradual process for those in communication and media studies. Science communication, as discussed in the previous chapter, is a new field that finds its home in a number of academic disciplines, and science communicators have not been a part of this journey to eradicate the myth. The science communicators' way of looking at science in the media is therefore often quite different from researchers in media studies. As a result, research conducted by the recent movement of science communication has found that science in the media has unique characteristics. However, researchers in media studies would attribute these simply as characteristics of the media itself. As Gregory and Miller described it, "while science-in-the-media is a useful vehicle for understanding the media, few scholars have used it that way" (Gregory and Miller 1998, p 105).

Denis McQuail, a communication scholar, developed a categorisation of theories, operational and normative theories, that is useful in the assessment of science in the media (McQuail 1994). Operational theories investigate the way the media works and normative theories are about the way the media *should* work. Journalists, sociologists and media theorists tend to recognise operational theories whereas scientists, and some science communication researchers, would like to tell the media how it should work. These differences do not improve the communication of science and provide another example of the friction between those involved in researching and practising science communication.

In this body of work, as in the vast majority of science media studies, the focus is on newspapers, which provide the most efficient medium for study. Newspapers are easily accessible. Hard copy newspapers are also a good tool for researchers as they are inexpensive, easily accessed, can be cut up and stored with little fuss. For a student with a small budget, and sometimes limited access, newspapers provide an unending source of data. In recent years the Internet has made newspaper research even easier. Not only can newspapers be accessed easily and cheaply, an electronic search of newspaper archives can be used to find topics, words and dates. No longer do your hands get black from flipping through the inked pages and the time spent searching for an article has been drastically reduced. However, the findings of media studies focused on newspapers cannot be extrapolated to incorporate all media. Furthermore, newspaper reports do not necessarily imply that their content is what people know.

Although newspapers are an efficient medium to study, it is important to note that newspapers do not have as large a readership as is sometimes thought. For example *The Irish Times*, which has a regular science content, has a circulation of 120 000 copies per day[18]. Public opinion surveys suggest that most information is gleaned from television programmes. However, this information is based on the public's own perceptions of where they get their information. In a review of the public's use of media, Robinson and Levy concluded that newspapers and news magazines are the public's main source of information (Robinson and Levy 1996).

The study of newspaper coverage of science is varied, as is the type of researcher. A brief description of the type of studies and the assumptions made during the research will be provided. These assumptions highlight a number of problems in how science in

[18] See www.ireland.com/about/print/printcirculation.2000.htm accessed on 13 December2001

the media is researched and consequently how science will be reported in the future. Studies in science in the media have focused on the:

i. *content*: amount, type and accuracy of the science;
ii. *role of journalists and scientists*: the roles of each and the relationship between journalists and scientists;
iii. *presentation*: how science is represented and presented and the language used;
iv. *agenda setting*: how journalists decide what to cover;
v. *effect and influence*: the media's influence on public understanding, awareness, attitudes and beliefs; and
vi. *sources*: the selection of sources.

I will address each of these six elements and the assumptions associated with them in the following sections.

Content

Anders Hansen, a researcher in mass communications, stated that many studies of science in the media have a narrow definition of 'science' resulting in the exclusion of many articles with a scientific nature (Hansen 1991). Hansen suggested that approximately half of all representations of science and scientists in the mass media are not specifically about science. When a narrow definition of science is used for content analysis of 'science' a misleading image of the extent of science in the media is produced. Science can be reported in a number of ways, such as environment or health, which would be excluded from a search for the word 'science'. A search may be restricted to a certain part of the newspaper excluding political affairs or crime, for example, and missing articles that could easily have a scientific content. If Hansen is correct in his estimation and science is presented in a range of articles and sections, then there is little basis for the frequent requests made by scientists and science communicators to increase the amount of science reported in newspapers. Many broadsheet newspapers have opted for a regular science section, on a particular day of the week. However, presenting science within a social environment may result in more people who are not interested in 'science' reading the article.

Surveys have indicated that adults would understand science if scientific knowledge were explained more clearly and that they would like to read more science in newspapers (Gregory and Miller 1998). However, these surveys are misleading because they ask the public what they think they would like to read and their results do not indicate that people will actually read more science. Furthermore, the obvious answer to 'would you understand the science better if it is explained more clearly?' is yes.

The accuracy, or inaccuracy, and lack of detail of articles are frequently analysed. These studies are conducted by scientists who are used to their work appearing in scientific journals rather than by readers. Hansen argued that it is not the accuracy that is often criticised but 'sloppy reporting' when the media deals with issues of uncertainty and represents different views to those of the scientific community (Hansen 1991; Dumwoody 1999). It is scientists and science communication researchers who are most vocal about the science content of in a controversial issue (Priest 1999).

Role of journalists and scientists

The criticisms of journalists' 'sloppy reporting' have caused the strained relationship between journalists and scientists that is often reported. Numerous workshops are conducted by professional science communicators and institutions committed to science communication whose aim is to promote good relations between journalists and scientists[19]. Their main objective is to increase the amount of 'good' science reported in the media. The workshops assume that for a greater coverage of 'good' science to occur scientists need an understanding of how the media works. But what is the underlying reason for scientists communicating with the public? Hilgartner stressed that scientists rarely supply scientific information for the public in a value-free way (Hilgartner 1990).

> [A] mountain of evidence shows that experts often simplify science with an eye toward persuading their audience to support their goals: whether they seek to motivate people to follow public health recommendations, build support for research programmes, convince

[19] The Royal Society organises a Programme of Media and Communication Skills Training for postdoctoral research scientists, which is tutored by journalists and communication experts. The Media Skills workshop provides details on interview techniques, on how to write a press release and how to increase press coverage of their research. See www.royalsoc.ac.uk for further details.
Two professional science communicators, Toss Gascoigne and Jenni Metcalfe, provide training in media skills for scientists throughout Australia. The main aim of the workshops is to overcome the barriers between scientists and journalists by involving five working journalists as participants (Gascoigne and Metcalfe 1997).

> investors that a finding shows commercial promise, or advocate positions in science-intensive policy controversies. (Hilgartner, 1990, p 531)

Sharon Dunwoody, Professor of the School of Journalism and Mass Communication at the University of Wisconsin-Madison, argued that the scientific community has, in the past, enjoyed control over the dissemination of scientific knowledge in the social arena. However, in the current climate of increasing controversy it is journalists that exercise greater authority over whose voices are heard and consequently it is more difficult for science to "speak with one voice" (Dunwoody 1999, p 61).

As the relationships between journalists and scientists develop more scientists are speaking out, and are using scientific uncertainty to their advantage (Zehr 1999).

Does this strained relationship exist between journalists and experts in areas other than science? Hansen argued that science journalists, like other journalists, are dependent on their sources for further information. Because of this dependence journalists do not purposely alienate their sources by misreporting or misrepresenting their work. Is it perhaps the case that scientists have a problem with the media? For example, Professor Susan Greenfield at the Royal Institution, recently felt the need to set up a new independent media centre to pull the media into line so that more scientists' views would be included in stories on controversial issues such as animal research, cloning and genetically modified food.

According to Christopher Dornan the unhappy relationship that scientists have with the media has influenced the way science in the media has been researched (Dornan 1990). Dornan argued that science communication scholars do not draw on extensive media studies literature and have therefore distorted the way in which science is reported in the media. He, like Nelkin (Nelkin 1995b), goes further to argue that journalists specialising in science are often closely affiliated with the scientific community and have produced a false representation of science. The articles produced by science journalists may be correct in fact but are lacking in the social contexts of science. This adds to the image of science as one of authority and only increases the concerns of social actors involved in any controversy involving scientific uncertainty.

Students embarking on the MSc in Science Communication course, which I have been involved with teaching at DCU,[20] commonly believe that the better science journalist will be the one with a scientific background. The obvious reason is that the scientist will be able to explain the science better. I must admit believing the same assumption during my postgraduate degree in science communication. I recall the almost heated discussion that arose during a media workshop with the then science writer for *The Australian*, Julian Cribb, when asked his opinion on this issue. He replied that it did not matter whether or not the journalist has a science background, as the most important criterion for a journalist is a nose for a good story.

Science is covered in a broad range of stories and is therefore not always covered in science stories or by science journalists. Reporting on science is not just writing a description of the scientific research. Science occurs in different settings, such as government institutions, industry and universities, each with different objectives and implications for society. A journalist must manage these differences and report on a particular account of the science, whilst targeting his or her audience. For example, the journalist must indicate who is using the science to support their claims and why.

Presentation

Those who study science news have also researched the presentation and representation of science and the language used to describe science.

As more journalists with scientific training emerge, more journalistic reporting is done with the value of 'science'. Friedman, Dunwoody and Rogers argued that science journalists are under pressure to conform to science values (Friedman, Dunwoody, and Rogers 1986). As a result the way in which science is presented reflects the science community rather than non-scientists. This type of reporting reinforces the belief that science is superior. According to Nelkin:

> Although individual scientists are sometimes criticised as biased, science as an institution is assumed to be a neutral source of authority, the engine of progress, the basis for just solutions in controversial public affairs. Seldom do science writers analyse the distribution of scientific resources, the social and political interests that control the use of science, or the limits of science as a basis for public decisions. (Nelkin 1995b, p 63).

[20] A programme jointly administered by Dublin City University and Queen's University, Belfast.

However, not all press coverage presents this image of science. Science in the media is not merely a description of the research. Journalists interpret scientific information to make it digestible for their audience. This interpretation is a social representation of science and it is when science is presented as an ingredient of social and political issues that it becomes newsworthy (Hansen 1994).

The presentation and representation of science cannot be 'improved' by scientists providing more of the type of information they would like to see in the media. Science in the media is shaped by social and cultural contexts, not scientific knowledge (Lewenstein 1995b). Structural relationships among groups affect media coverage, for example the political relationships among social actors which are constantly changing. Another factor that journalists have to contend with is the difficulty in presenting the evolution of science involved in complex issues (Friedman 1999).

The language used in media coverage has a role to play in how science is presented. In their analysis of news broadcasts of industrial disputes, the Glasgow Media Group at Glasgow University concluded that news can be presented in a selective and slanted way through the selection of terms and words, (Glasgow Media Group 1976). Hansen has also examined the language used to describe scientists or those involved in issues arising from science. In his analysis of Greenpeace and related press coverage he found that different papers used different terms to describe environmental groups and their activities (Hansen 1993). For example, an environmentalist can be referred to as an 'eco-warrior', an 'environmental rebel' or a member of an environmental pressure group, reflecting a more positive or negative image. The choice of words and metaphors in both the text of the article and in the headlines can legitimise or criticise certain events. For example "is genetic engineering a 'boon' to agriculture or 'tampering' with genes" (Nelkin 1995b, p 11). There is no such thing as value-neutral language and it should not be the goal of a science communicator to attempt to achieve it. Instead the communicator should make their values explicit and justify them.

Another way of analysing the presentation of controversial media stories is to determine how certain or uncertain the science is. For example, a single-source story may underplay the amount of scientific uncertainty (Stocking 1999).

Agenda Setting

Agenda setting describes the role that the media plays in deciding which stories are presented to their audience. The timing of media involvement is also important. For example, the analysis of media coverage by Rogers and Chang blamed lack of media coverage for the delay in AIDS/HIV public awareness from the first clinical concerns (Rogers and Change 1991).

Journalists can choose which events get reported. However, they are also bombarded with press releases and promotional materials from various organisations and individuals. Nelkin stated that media coverage of an event could often have direct influence on public policy and force agencies and organisations to act simply out of concern for their public image (Nelkin 1995b). For example, the reporting of disputes over the location of waste disposal dumps helped to bring about changes in the Environmental Protection Agency (EPA) in the 1980s (Nelkin 1995b). Media coverage of gay activists demanding the release of the AIDS drug AZT also helped convince the FDA to release the drug before the completion of clinical trials (Collins and Pinch 1998). As Nelkin stated: "The media can influence public policy even in areas where there is broad indifference on the part of the electorate. Indeed, the media's power to generate pressure for policy changes may be relatively independent of prevailing public attitudes" (Nelkin 1995b, p 73).

Nelkin has argued that the media has a direct role in influencing policy decisions and deciding on how an issue is framed. I would agree that the media is powerful in placing an issue on the political agenda; however, the way an issue is framed cannot be solely attributed to the media. As discussed previously in this chapter, the framing of an issue also depends on whom the question is asked of.

Effect and Influence

What effect does science in the media have on the public understanding of, awareness of, belief in and attitudes toward science or an issue involving science? Another pertinent question to ask is do media "studies indicate that media effects are small because the effects are indeed small, or because we do not yet have an efficient method for measuring them?" (Gregory and Miller 1998, p 128). For example, how do you measure the effect of one newspaper story or one television programme? How long after the event to you attempt to measure its effect and how do you know that it was the media or other influences in our lives that caused the effect? The study of human behaviour is very difficult.

In order to illustrate the complexity of media effects research, Gregory and Miller used the example of the analysis of the impact of a single television programme, carried out by Fiona Chew and colleagues (Gregory and Miller 1998, p128). The programme, *Eat Smart*, gave health advice about nutrition. Before the programme was broadcast 1000 people were telephoned and asked about their current understanding of the topic. Of the 1000 originally telephoned 400 watched the programme and these people were asked the same questions after the programme and then again six months later. A number of difficulties arose in interpreting the data. First, the 1000 people were prompted to watch the programme, which they might not have done. Second, although the participants were not told there would be a post-survey, they were already stimulated by the questions asked in the pre-survey. The sample was therefore different from those people who had not been called at all. Third, there was no control group that were telephoned before and after the programme that did not watch it, due to the doubling of research costs. Finally the programme may have been watched by people with an interest in the topic and who wanted to learn something about it. They may have retained the information simply because they were interested. The result was that people who watched the programme knew more about the topic and remembered it for some time afterwards. However, they had been quizzed twice about the programme. In the conclusions the researchers made no claim that the programme influenced the audience's behaviour.

It is difficult to assess the influence of the media on the public's view of science. Nelkin has provided a number of specific examples of 'bad news' stories involving science that have had an effect on consumer behaviour. For example, sales of Tylenol declined after reports of tampering, as did sales of certain brands of tampons after coverage of toxic shock syndrome (Nelkin 1995b, p 70). Although these two examples are very specific and effect the health of individuals the media can have an effect on public attitudes.

Susanna Hornig Priest, a communication researcher who investigates the media's role in the formation of public opinion in relation to issues involving science, has argued that science in the media does not "create a belief in science" (Priest 1999, p110) because beliefs exist independently of mass media accounts. Priest argued that although the media can nurture science, a belief in science is not an effect of the media.

Another important factor affecting the influence of the media on public attitudes and understanding is whether an individual is actively seeking information or passively absorbing new information (Einsiedel and Thorne 1999). As Hansen succinctly summarised, the media is "better at influencing what people think *about* than what they think." (Hansen 1993).

Sources

The focus of this section is the range of sources that journalists rely on. These sources may range from scientific journals, pre-publication press releases or their own original sources. In science communication research emphasis is placed on the barriers between scientists and journalists and scientists are seen as reluctant to deal with the mass media. Hansen argued that this assumption is invalid and, in his analysis of journalistic practices, found that journalists had no sense that scientists were avoiding them. The journalists interviewed in his research "spoke of scientists as 'willing' and 'co-operative' sources" (Hansen 1994, p 118).

The same journalists stated that finding appropriate and relevant sources was straightforward and indicated that these skills were central to being a journalist. They stated that the defining characteristic of being a specialist journalist is "knowing who is who in science" (Hansen 1994, p 120). Einsiedel and Thorne raised concern with journalists' reliance on particular sources over others, providing the audience with only a partial picture of an issue. This reliance arises because of the journalist's familiarity with the sources, as well as the ability of certain sources to attract the focus of the press (Einsiedel and Thorne 1999). The journalists interviewed in Hansen's study were also aware of this issue as they stated that the most difficult aspect of their job was dealing with "incessant and often sophisticated and carefully packaged pressure to cover stories and products . . ." (Hansen 1994, p 121). The presence of this pressure is indicated in a quote by one of the interviewees:

> You get endless invitations or phone calls, particularly from PR companies, to cover stories promoting products or promoting a piece of research that's been funded by them which shows that this or that type of product will save you from heart disease, save you from cancer, whatever, so there's a lot of pressure there which is largely ignored. (Medical correspondent (5), popular daily paper) (Hansen 1994, p 121)

The basis of Hansen's study was the reflection of journalists on their own work. He interviewed 31 specialist reporters—in the areas of science, technology, medicine and the environment—who had worked as specialist journalists for an average of eleven years.

The credibility of sources, particularly in controversial issues, is a factor that journalists value (Hansen 1994). Hansen argued that journalists seek top scientists and regard government scientists as credibility safeguards. However, it was recognised that government departments are increasingly willing to manage information, for example by carefully timing the release of sensitive or controversial news. A basic journalistic principle is to get opinions from different sources such a non-government organisation, university scientist or an established environmental pressure group (Hansen 1994).

Nelkin argued in *Selling Science* that the "norms of objectivity and fairness" that encourage a journalist to balance a story by presenting different views not only exposes them to criticisms from all angles but also is restrictive in communicating controversies: "[In] trying to balance opposing positions, the media seldom explore the scientific issues involved in risk disputes or the methods of risk analysis that would provide a basis for meaningful judgements about competing claims." (Nelkin 1995b, p 48)

Nelkin claimed that journalists want definite answers and are not willing to explain how risk is evaluated or that scientists do not know the extent of a given risk. In doing so the journalists present an image of science of one that holds the solution to all problems (Nelkin 1995b). However, if an article presents at least two different scientific positions this does not give the image of 'science' knowing all.

Priest observed that industry and government sources tend to dominate information on biotechnology and as a consequence the focus is on economic and health benefits, rather than ethical or social issues (Priest 1995). Einsiedel and Thorne stated that the power of industry and scientific institutions influences the media coverage of science and that the resulting information frames downplay the uncertainties and the areas of ethics, morality and risks (Einsiedel and Thorne 1999).

In summary, the media are often blamed for the development of, or at the very least for sustaining, controversies. However, the media have an important role in facilitating public discussion. The myth that the media can change their audience's beliefs or attitudes is a concept still adhered to by the recent movement of science communication. The recent movement of science communication has also made other assumptions, such as one regarding the media's role in communication science. For example, there are too few science stories presented, scientists are sceptical of journalists' abilities to report on science accurately and the negative image presented of science. By not drawing on existing knowledge, the research methodologies and assumptions made by science communication researchers have attracted the criticism of media researchers.

Discussion

The communication of controversies cannot be separated from how our society seeks answers to these controversies. In the past science has provided the answers and there was little dispute about its ability to do so. However, in the past 30 years there have been an increasing number of controversies in which science has not been able to provide unequivocal answers. There have always been risks in our society but the nature of the risks has changed. The uncertainties and unknowns surrounding issues that involve science are increasing.

In this chapter I have discussed Nelkin's four concerns underlying all controversial issues: the infringement of social and moral values, the questioning of political priorities, the fear of risk, and the threat to individual rights. For an issue to become controversial it does not need to contain all four concerns; however, the number of concerns does have an influence on the level of controversy. The level of controversy also depends on the extent to which the issue is in the public arena and the level of risk involved.

The notion of a risk society was drawn on to explore the nature of today's risks and the inadequacies of framing controversial issues involving science as purely scientific.

These new risks are harder to identify and have the potential to not only affect us but future generations across the globe. A new framework of decision-making that does not depend on scientific evidence alone will enable motivated members of the public and social groups to negotiate with decision makers and scientists on controversial issues involving science.

The mass media is largely responsible for communicating controversial issues with members of the public. If the issue is not in the public domain then it will not be maintained as a controversy but merely a dispute among the parties involved. The mass media provides the social actors involved in the controversy with access to a wider audience and provides society access to knowledge. Despite the media's role in facilitating public discussion, journalists have been accused of being irresponsible when presenting controversial issues involving science.

There is an increasing awareness among science communicators that the media has a complex role in the communication of science. While communication researchers have been researching mass media effects since the 1960s, the complex role of the media has only recently been recognised among the science communication community. Scientists had experienced a certain level of control over the image of science that was presented to the general public. However, with increasing controversy it is the journalists who have a greater say over whose voice is heard, and how often, because of the different factions in the scientific community. The relationship between journalists and scientists is developing, to the extent where scientists acknowledge the presence of scientific uncertainty in support of their claims.

Along with the change to reporting different voices involved in controversial issues there are increased options available to us—lay citizens, experts, social actors, governments—to improve how we currently make decisions on controversial issues involving science. These options are examined in the next two chapters.

Part B

Strategies for Democracy

Chapter 3

Making Decisions

I almost called this chapter 'Making Better Decisions', however, I decided against it for two reasons. Firstly, the chapter is dedicated both to processes for making decisions as well as better decisions and, secondly, the alternatives proposed might not in fact make better decisions.

The decisions discussed in this chapter refer to those made by public policy makers, interest groups and members of the general public. To place these decisions involving science into context, the way societies are governed is explored, with particular reference to Ireland. This chapter addresses policy making in Ireland and the democratisation of science.

The concepts of democracy, globalisation, the precautionary principle and the authority of scientific expertise are all explored.

Policy-Making in Ireland

This section explores Ireland's political culture and identifies the processes, persons and influences involved in making public policy.

Irish Political Culture

Political culture is an "elusive concept" and is difficult to measure (Coakley 1999, p 67).It is used to describe political values and expectations that are dominant in society as well as the kinds of attitudes that underlie political decision-making. Different elements make up a political culture and in this thesis I will only be referring to how decisions are taken, the outcomes of these decisions and to what extent they match the public's expectations. Additional factors that shape political culture include socio-economic development, cultural evolution and long-term political experience (Coakley 1999). Ireland has its own unique political culture, which has not come about by accident. I will not expand on the factors that have helped shape Ireland's political culture as these are not the focus of this work. However, an understanding of how decisions are made in Ireland is needed as Chapters Six and Seven investigate the decision-making process of two Irish case studies—genetically modified foods and water fluoridation. In order to place the two case studies within an Irish context exploration of Ireland's political culture was of greater importance and is particularly relevant in my experience, as I have only resided in Ireland for four years.

Many things have changed in Ireland since the 1970s. At that time it was possible to describe Ireland as a country dependent on small family farms and Irish people as strongly attached to the Catholic Church (Coakley and Gallagher 1999). Although the Ireland of today is more progressive in its outlook, these past characteristics combined to produce Ireland's distinctive political culture, and have had an impact on today's decision making.

Some observers of Irish political culture see authoritarianism as one of its central characteristics (Chubb 1992). In this context authoritarianism represents a respectful attitude toward the views of established leaders and an intolerance of those who dissent from these views. The persistence of authoritarian values, in a society open to democratic values, has been explained by the dominance and influence of the Catholic Church. The Irish had placed greater confidence in their major institutions than other Europeans had in their own institutions. However, by 1997 trust in the parliament and political parties was lower than elsewhere in Europe (European Commission 1998). This decrease in trust coincided with the start of investigations into political scandals in Ireland. In the 1990s the Irish people's sense of influencing the political process had risen (Coakley 1999).

In 1973 Ireland, alongside Britain and Denmark, joined the European Union (EU). In doing so Ireland did not lose its national identity, rather it became a part of a wider set of political and legal processes.

The Council of the EU is the chief policy-making body of the Union and is where Irish ministers meet with their counterparts from other member States. The Commission proposes legislation to the Council of the EU and is responsible for putting the decisions into effect. Ireland does not have the best record for the incorporation of Commission legislation: political scientists Keatinge and Laffan stated that Ireland has "difficulties in implementing directives in the fields of transport, the environment, and food legislation" (Keatinge and Laffan 1999, p333).

The European Parliament provides a forum for discussion between its elected members, fifteen of which are Irish Members of the European Parliament (MEPs). The European Parliament has no legislative powers, which raises a concern among people who believe that the EU is essentially undemocratic. The reason for the lack of legislative power is that the founders of the EU conceived the European Parliament as a consultative rather than legislative body.

Briefing materials are prepared before Irish ministers and civil servants travel to Brussels for the formal legislative process. This preparation provides the opportunity for consultation within, among and outside the government's departments. It is here that interest groups try to influence those formulating the Irish position.

What is Public Policy?

The term 'public policy' was defined by William Jenkins in 1978 as "a set of interrelated decisions taken by a political actor or group of actors concerning the selection of goals and the means of achieving them within a specified situation where these decisions should, in principle, be within the power of these actors to achieve" (Chubb 1992, p 153). Making public policy includes how the government decides what major issues of public importance are to be considered, how problems or opportunities involved in these issues are to be tackled, how to draft legislation that will be proposed to the Oireachtas[21], and how bills will proceed through the Dáil or Seanad. Once the policies have been passed, the term 'public policy' also includes how policies will be implemented to produce an output.

The courts can also make policy, for example when their decisions force state authorities change their actions. This form of public policy will not be dealt with in this thesis, as it is separated from politics and the pressures of interest groups.

Other state bodies, beside government departments, can make policies. For example we could speak of the EPA's policy on monitoring genetically modified crops. However, the EPA's policy is an interpretation of the law made by superior bodies, namely the Council of the EU and the Irish Department of the Environment and Local Government, and it is therefore constrained by these parameters. The EPA's power to make policies has been delegated to them by the government. This type of policy making is also not included in this thesis. Public policy discussed in this thesis is limited to all stages before a bill or motion is passed by the Dáil.

Making Public Policy

In liberal democratic systems, like Ireland's, the parliament should play a key role in the democratic process. The parliament is elected by the people to decide how the country is to be governed; the government is accountable to parliament and carries out its decisions. Many have argued that the Dáil "stands out for its exceptional weakness"

[21] The Oireachtas is Ireland's parliament, consisting of a President and the two houses—the Dáil and the Seanad. The Dáil is Ireland's lower and directly elected house of parliament and the Seanad is the upper and indirectly elected house of parliament.

(Gallagher 1999, p 177) or, in Chubb's colourful words, that it is "a puny parliament peopled by members who have a modest view of their functions and a poor capacity to carry them out" (Chubb 1992, p 189). Ireland is not alone in the limited control that its parliament has over the government; frequently it seems that once a government is in power it can do its own thing.

The Dáil should have a role in making policy; however, it is not seen as an active participant. The Dáil generally follows the Westminster system in the area of policy making, and thus is not seen as the real maker of laws. In the Westminster system the government raises a proposal and the parliament provides a forum for discussion to take place. The government does not need to take into account the views of the opposition nor is the opposition's agreement needed for legislation to be passed[22]. However, the Dáil does provide an opportunity for the opposition to raise issues that the government might like to conceal. Gallagher stated that "governments are usually more concerned to bring the major interest groups round to their way of thinking than placate the Dáil, whose backing they tend to take for granted" (Gallagher 1999, p 189). However, according to Norton, cited in Gallagher (Gallagher 1999, p189), parliaments can play an important symbolic role in that the elected representatives must pass all legislation, providing citizens with the feeling that they are ruled democratically.

On my first visit to the Dáil, for a debate on genetically modified foods, I was surprised that few Deputies were present. However, I was more surprised by the quick exit made by the Minister of Environment and Local Government after his short delivery. The Minister was not present for any objections, questions or comments raised by the opposition. Chubb stated that the low attendance of Deputies and the brief appearance of Ministers are not unusual, and my visit to the Dáil on this day corroborates this claim (Chubb, 1992). It has been stated that the Dáil is not an adequate forum for the discussion of proposals because of the low attendance Ministers and the nature of any discussions that take place.

Once a proposal is raised in the Dáil there is little the public can do to alter it. In Ireland it is usually the government that takes the initiative in shaping laws and policies. With

[22] The other policy-making model is the Consensus Model where the government prefers not to railroad their legislation through, but tries to find a consensus within parliament for their proposals.

this fact in mind interest groups and members of the general public must try to influence the government's position before a proposal is presented to the Dáil.

Influencing Public Policy

Techniques used to influence public policy include direct contact with ministers, public servants, politicians, political parties and the media. Interest groups and professional lobbyists are on the increase in Ireland and the latter include "former government press secretaries, former officials of all the major parties, some ex-TDs and a host of former journalists" (Murphy 1999, p 286). These lobbyists have extensive experience of how the political and administrative system in Ireland works.

Gary Murphy, a lecturer in government at Dublin City University, has a broad definition of interest groups that includes any group with autonomy from government, which has an interest in attempting to influence public policy (Murphy 1999). This definition excludes political parties or anyone trying to occupy a position of authority. Interest groups can include environmental, citizen, consumer and patient care groups, private business, corporations, scientists, farmers, retailers, and more. Interest group politics is the attempt to influence the formation, passage through parliament and implementation of legislation. Interest groups also try to change existing legislation.

Interest groups can be very powerful and have a major role to play in the decision-making process. There are two models of interest group behaviour in the decision-making process—corporatist[23] and pluralist[24] models—outlined by Heisler and Kvavik (1974), as cited in Murphy (Murphy 1999, p 272). In Ireland interest groups display characteristics of both models and are therefore neither purely corporatist nor pluralist.

Murphy divided Irish interest groups in a different way due to the lack of consensus on the application of the corporatist and pluralist models in this case. Rather than

[23] The corporatist model is where interest groups are closely associated with the political process and have a key role in the making of major public policies. Usually these are large, well-organised interest groups—such as the Irish Business and Employers Confederation, the Irish Farmers' Association and the Irish Congress of Trade Unions—and they negotiate with each other, and government, to produce agreed outcomes that will satisfy all parties. However the interest groups can also oppose each other if they perceive their interests to be threatened. Within this model the interest groups play a comprehensive role in the implementation of policy.

[24] The pluralist model suggests that interest groups apply pressure in a competitive way, which is usually organised to exclude other interest groups from the policy process. The interest groups are usually voluntary and they are not offered a formal position in the policy-making process.

distinguishing the way groups are allowed by government to participate in policy making, he examined two types of interest group: sectional or cause-centred groups (Murphy 1999). Sectional groups include trade unions, farmers' associations and business organisations as well as professional bodies such as the Irish Medical Association. Cause-centred groups are just that, those that lobby for a particular cause, such as Greenpeace or *ad hoc* groups formed to press for a single idea, such as Genetic Concern. Cause-centred groups, particularly those involved in moral disputes such as divorce and abortion campaigns, have become more visible in the past 20 years.

Although sectional and cause-centred groups use similar tactics there are differences between the two. The main differences are resources and links to political parties. Sectional groups spend much of their resource on maintaining access to bureaucratic channels, both nationally and internationally. Representatives of sectional groups can be found on boards of state companies, advisory committees and review bodies at the local and European level. For example, the Irish Farmers' Association spends approximately half of its income on lobbying the EU and it has a permanent office in Brussels. The activities of cause-centred groups often aim to increase public awareness in their attempt to influence policy and many are effective at obtaining media coverage.

Another avenue for interest groups wishing to influence the policy-making process is by direct interaction with the Oireachtas, for example by getting a representative elected to the Dáil. In 1989 Tom Foxe, a member of the interest group Roscommon Hospital Action Committee, was elected solely on the platform of saving the Roscommon Hospital from closure. A motion of no confidence in the Minister of Health, because of the health cuts, was defeated only when Foxe changed his vote after receiving guarantees about the state of the Roscommon Hospital. Tom Foxe was rewarded for his actions by being re-elected in the next election.

The benefits and dangers that arise when interest groups become involved in the policy process are summarised in Table 3.1. For example, although an interest group represents members of the public the general public's opinion is not always reflected. Political leaders also tend to take more notice of public opinion nearer to a general election (Chubb 1992).

Table 3.1: Advantages and disadvantages of interest group involvement in policy making. Adapted from Andrew Heywood's balance sheet (Heywood 1997, p 259)

Advantages	Disadvantages
Provide a check on government power	Non-legitimate power, as they are not representative of society
Provide other views overlooked by political parties	Advance minority interests against those of society as a whole
An alternative to conventional party politics	Strengthening the voice of the wealthy and privileged
Another channel of communication between government and the people	Can block government initiatives and make policy unworkable
Create a more informed electorate	

Who are the Policy Makers?

Basil Chubb, former Professor of Political Science at Trinity College Dublin, used two categories to distinguish between policy makers—the proximate policy makers and the participants who influence them in policy decisions (Chubb 1992). The proximate policy makers have the authority to decide on specific policies and are directly involved in policy decisions. In Ireland the proximate policy makers are members of government, members of the Dáil and Seanad, senior civil servants and temporary advisors, such as scientists, economists or chief executives of state-sponsored bodies.

The second category is that of the influencers and includes political parties, interest groups, the public service, the media and public opinion. Sometimes those that influence the proximate policy makers can be drawn in so close that they themselves become proximate policy makers. This arrangement is the corporatist model of decision-making. As discussed previously, not all of Ireland's policy making conforms to the corporatist model.

What about the role of the civil service? Sometimes it is difficult to separate the contributions of ministers and the civil service. Peter Self, a political scientist, distinguished between those who made decisions on specific policies and those that "set the climate" (Self 1977). Setting the climate refers to the identification of major objectives and priorities and is more often than not done by ministers. The civil service wait for their ministers to indicate which policies they will be pursuing, although the civil service does make contributions in this area. Setting the climate provides a framework within which policy is made. The civil servants play a greater role once a framework has been established.

The civil service has another role that is less obvious. In the course of gathering information from the interest groups the civil servants apply their own judgements and draw conclusions before presenting it to their superiors. The information has therefore been given a departmental flavour.

The policy-making process described above is for all types of policy. The features of policy making that involve contemporary science are increasing reliance on expert advice, increasing intertwining with social and economic issues, multiple interests demanding involvement in the policy-making process, and the lag time after the development of science and the policy to address that development.

To address these concerns governments have set up expert advisory committees, ethics commissions and some countries, such as Denmark and Germany, have established institutions specifically tailored to technology assessment. The Irish government tends to rely on specially appointed advisory committees for particular issues. But recently the government announced plans for an ethics committee that would monitor and advise on developments in genetic research. This type of ethics committee is designed to look at a specific issue, rather than tackle the fundamental questions of democracy. Technology assessment institutions may have a greater role to play as they tend to have a broader remit. Ireland does not however have such an institution.

In 1988 the Office of Science and Technology was created for streamlined science policy making within the central administration in Ireland. However, due to the narrow definitions of science and technology under which this body operates, each government department remains responsible for assessing and making policy on developments in science in their particular sector. For example, the Department of Environment and Local Government (DoELG) make environmental policies involving elements of science. Recently an Inter-Departmental Group on Modern Biotechnology (IDGMB) had to be established to develop a coordinated Government position on genetic engineering because it impinged on the environment, health, economy, agriculture and education sectors. A technology assessment institution could consider implications in all of these sectors, including social impacts, when making an assessment.

Democratisation of Science and Technology

In Pursuit of Democracy

Before I address the democratisation of science and technology, the idea of 'democracy' needs to be explored. A greater number of societies are embracing democratic ideals (Garvin 1999; Giddens 1989; Held 1996). But what is democracy? It is a term that has taken on a variety of meanings. Democracy, a word that comes from the Greek word *demokratia*—*demos* meaning people and *kratos* meaning rule—is a form of government in which, in contrast to monarchies or aristocracies, the people rule (Giddens 1989). It is government by the people. There are different types of democracy and scope for disagreement (Held 1996). Problems emerge when definitions for 'the people' and 'rule' are examined in detail. For example, who are considered the 'people' who will participate in policy making? how will they participate? and how broad or narrow is the scope of the 'rules' made by the 'people'?

The difference between the ideology and practice of democracy is becoming increasingly obvious, but the greater move towards democracy is not without problems in all countries, not simply that have recently adopted the system (Giddens 1989). In Ireland, Europe and the USA there is increasing dissatisfaction or indifference towards the current political system (Chubb 1992; Coakley and Gallagher 1999; Giddens 1989). The number of citizens exercising their political choice in countries where voting is not compulsory is decreasing. Many argue that the power and wealth of corporations are an undermining factor in our democracy. The sociologist Daniel Bell observed that national governments are too small to deal with issues, such as global warming, that not only impinge on its own citizens but on the citizens of other nations and too big to respond to smaller local questions facing cities and towns (Bell 1973). The Irish government, for example, has little control over the closing of Irish-based American production plants, which are looking to lower costs to remain competitive. Small nations like Ireland have little control over the world economy. Issues on a more local scale, such as crime and homelessness, are increasing and pressure groups argue that local governments are doing little to help fight these social problems. As a result people lose faith in their government and in democracy. One response to the diminishing powers of nation states was the formation of the European Union (EU).

In ancient Greece decisions were made jointly by those affected by the decisions, a method which is known as participatory or direct democracy. Direct democracy is not achievable today; it would be impossible for everyone to be actively involved due to the massive population and geographic limits. Ireland, like other western European countries, the USA, Australia, Japan and India, operates a liberal democracy where its citizens can choose between two or more parties. Referenda held today are reminiscent of direct democracy, and are still regularly used by Ireland and other European countries.

Many of today's controversial issues raise questions about lack of choice and lack of avenues for the public to formally express their views. Although the liberal democratic system is one of the most egalitarian it also tends to be oligarchical[25] (Garvin 1999). Democracy does not always provide all of its citizens with the opportunity to voice their opinions, and more importantly have their opinions listened to and respected. There is also a discrepancy between the value given to some people's opinions over others; some are more eagerly sought and are regarded as more significant. This discrepancy is a major concern for many involved in controversial issues today.

The current system of policy-making is fully entrenched in political life and merely adopting new consultative approaches would not address fundamental objections. But under what conditions is it possible for citizens to enjoy opportunities of effective participation that guarantee collective decision-making? This question is not easy to answer. In addition, there is no certain or absolute evidence that an active and knowledgeable citizenry will lead to consistent and desirable political outcomes.

[25] Oligarchy refers to a state being ruled by a small group of people.

For a democracy to live up to its name its citizens must have the power to be active as citizens. Held has suggested limiting the influence of corporations and powerful interest groups over the political agenda. In doing so "old patterns of power in civil society" would have to be broken up and new mechanisms created for citizens to be more active in their own projects (Held 1996, p 323). It is not just government bodies but all sectors of civil society that can adopt a more participative democracy. Smaller communities and workplaces would also benefit if more direct democracy were to occur.

There are still questions to be answered such as: what should be the balance between new public consultation procedures and existing decision-making mechanisms? which institutions will ensure independent procedures? and who should decide how issues are framed and put to citizens?

For example, which citizens should make decisions on issues that go beyond national borders, such as AIDS, deforestation, energy use or the disposal of nuclear waste? It becomes more difficult for citizens to participate in policy-making as globalisation shifts the boundaries of power. By globalisation I refer to the world becoming more of a "single social system" (Giddens 1989, p 63) with growing multidimensional interdependence in areas involving the environment, economy, politics, technology, cultures and the military. The decisions made by one nation state can easily affect citizens in another community. For example, a decision to build a nuclear power plant near the border of a neighbouring country may not consult the citizens of the neighbouring country and a decision to log rainforests may affect not just a neighbouring country but global ecology.

The formation of international organisations and agencies, both governmental and non-governmental, has led to changes in the decision-making process of world politics. The United Nations (UN), the United Nations Educational, Scientific and Cultural Organisation (UNESCO), the World Bank and the World Trade Organisation (WTO) are politically active and have developed an air of authority. Therefore national communities are not the only force influencing their governments and the latter do not exclusively determine what is right for their own citizens.

The meaning of democracy has to be rethought to include these overlapping local, regional and international systems. In 1995 proposals were put forward by the G7[26] to seek changes to international governance, including reforms for the UN. Currently the concentration of power rests with leading financial and productive states, influencing and affecting citizens beyond their borders. An alternative to this system is democratic autonomy on a global scale, which has been referred to as cosmopolitan democracy (Held 1996). Democratic autonomy would seek to develop democratic institutions at regional and global levels, complementing those at the level of the nation state, and it could create opportunities for citizens to be active participants in policy making.

Democratic autonomy would be a radical change to the way in which our society functions. It can be distinguished from other models of democracy on the principle that "the liberty of some individuals must not be allowed at the expense of others, where others are often a majority or significant minority of citizens" (Held 1996, p 332). This approach may restrict the actions of some citizens but it could also create different kinds of opportunities for them.

To extend the current level of democracy in our society, additional initiatives need to be taken to enable all members to have a greater role in the policy-making process. This thesis focuses on two case studies involving science, and investigates the level of public involvement in the policy-making process.

As democracy in general has now been explored, the next section addresses science and technology specifically. The main concept of the next section is rethinking how science and technology can be better incorporated into a democratic society, one that may be somewhat different that the one we live in today. Again it is challenging the demarcation of science and society. The role of technology and science is addressed by drawing on the work of Andrew Feenberg, Richard Sclove and Steve Fuller. The role of expertise is addressed in relation to how it is assessed by policy makers and members of the public in our democratic society.

[26] The Group of Seven (G7) comprises of the USA, Canada, United Kingdom, France, Germany, Italy and Japan.

Technology

Technology is not just the application of science and it does not always need to follow on from science. It is often stated that it is not the technology that does harm, but how people use that technology. The same can be said about guns; it is not the gun that kills but the human who fires it. Ian Wilmut, creator of Dolly the cloned sheep, also used this type of argument in response to criticism about the potential to misuse his cloning procedure to clone humans by stating that any potential misuse would not be his responsibility. Within each technology there is the potential to use that technology for a whole variety of different purposes. Therefore in the creation of a technology the creator is inherently responsible for its intended use, any foreseen and unforeseen harms, *and* for unintended uses (Giddens 1990).

In the past the democratic movement had full confidence in technological development and technology was viewed as independent from society. However, for democracy to extend to the technical sphere this concept of technology must be altered. Technology can have an impact at many levels including economic, political, religious and cultural dimensions. If we continue to see the technical and the social as separate domains then technology will not be incorporated into a democratic society.

Andrew Feenberg, a philosopher of technology, has emphasised the need to develop a new type of democracy in response to technology (Feenberg 1999). Feenberg asked why democracy has not been extended into the technically mediated domains of social life. While his main argument is that technology has been used to block democracy, he has also suggested that it may be possible for technology to be incorporated into a more democratic society than ours. Feenberg has predicted that technology will be driven by the environmental movement to enter the democratic circle.

Richard Sclove, a political scientist, has also explored the democratisation of technology in his book *Technology and Democracy* (Sclove 1995). Sclove identified six main problem areas in the current policy-making system:

i. the exclusion of lay citizens from anything but trivial roles;
ii. questions are normally raised too far down the decision-making path to be useful;
iii. technologies are evaluated on a case-by-case basis;

iv. cutting edge technologies are focused on to the virtual exclusion of other emerging and already existing technologies;

v. unintended cultural and social consequences are ignored because of the focus on the intended purposes of the new technologies; and

vi. the failure to address the question of the structural bearing of technology on democracy (Sclove 1995, p 240).

To incorporate a more democratic process in the assessment of technology Sclove has identified various proposals, such as observing technologies on a trial basis in selected communities. Sclove, in his role as executive director at the Loka Institute—a non-profit research organisation promoting democratic politics of technology—is attempting to democratise technology. The Loka Institute is involved in projects whose aim is to expand the role of interest groups and citizens in policy making. One of the Institute's projects is the Loka Alerts, essays that are regularly distributed to an email list[27]. The essay published in January 2002 was a discussion paper on Sheldon Rampton and John Stauber's book *Trust Us, We're Experts: How Industry Manipulates Science and Gambles with your Future*. The Loka Institute has also collaborated with universities on public participation programmes. The influence the Loka Institute has had on democratising technology should be a sum of all its projects. However, without a commitment from policy makers to be involved in these initiatives the influence of the Institution will be limited for the present.

While we function in a technocratic society people's struggles to influence technology will have little impact. As technology embraces more of social life each day these struggles will only increase. Feenberg does not argue that we have to turn away from technology but that we need to recognize the nature of our subordinate position in the technical system. Weber referred to this position as rationalisation. The AIDS patients who demanded access to experimental procedures challenged the technical system to incorporate a wider range of human needs. Feenberg has described this type of challenge as subversive rationalisation because "it requires technological advances that can only be made in opposition to the dominant hegemony[28]" (Feenberg 1992). Other

[27] The email address is loka@amherst.edu

[28] Hegemony as described by Feenberg is a form of "domination so deeply rooted in social life that it seems natural to those it dominates" (Feenberg 1999, p 86).

social movements that have challenged the management of technology include the environmental, women's, peace, and workers' movements.

Technology like science, takes place within society. Although it has been argued that technology has a closer relationship with the worlds of political, military and economic power than science. Technology cannot determine how its products will be defined or granted roles, as these are outcomes of societal processes. However, public opinion can impact the direction of technical development. The contemporary sociology of technology has shown that technological progress is not linear. Wiebe Bijker, a sociologist, illustrated this fact with the early history of the bicycle (Bijker 1997). The bicycle design of today started out as two different contraptions, a sportsman's racer and a practical transport vehicle. The racer had a high front wheel to attain high speeds although it caused a loss of stability. The bicycle with equal-sized wheels was designed for a safer and less exciting ride. The two designs satisfied different needs and occurred in the same time frame. Bijker argued that they were different technologies with shared elements. Looking back, with the knowledge that only one bicycle design exists today, we could assume that the bicycle of equal-sized wheels succeeded over the more dangerous high-wheeler. This approach is an example of Whig history, where the end result seems inevitable from the very beginning (Bijker 1997). In the bicycle's case it would seem that the high-wheelers were a less efficient stage in the progressive development of safety leading to today's design. Bijker demonstrated that the development of the bicycle was not linear and that technology can be shaped by society.

For technology to be shaped by society—or to democratise technology—policy makers will need to listen to the experiences and needs of the individuals affected by the applications of technology, for example, a community struggling against the location of a toxic waste dump or the political demands for tighter regulations on planting genetically modified crops. The future of technology is not predetermined, as shown by the increasing number of challenges to many of its applications.

Feenberg, aware that technology lends itself to an authoritarian system, has suggested that it could operate just as well democratically. For our society to be truly democratic we need to not only change politically but also undergo radical technical change (Feenberg 1999, Held 1996, Iwrin 1995).

Science

In sociologist Steve Fuller's book *Governance of Science* he challenges the current practice of science policy and suggests three strategies for democratising science: finalisation, cross-disciplinary relevance and epistemic fungibility (Fuller 2000). Fuller has argued that science has "failed to apply the democratic spirit to itself" (Fuller 2000, p 135).

The first strategy, finalisation, was developed in the 1970s at the German Max Planck Institute under the direction of Jürgen Habermas. A finalisation policy would allow science to mature to a consolidated theoretical base and then a government agency would fund projects to divert the scientists towards interdisciplinary approaches that could solve outstanding social problems. Although cancer research has adopted this kind of strategy, there are no general finalisation science policy strategies in any country. Fuller also recognised that finalisation could result in public problems being redefined as scientific ones. For example, advocates of research into conception and contraception to reduce the world's population and help solve global environmental problems, have good intentions but have missed the real issue. Technically the earth has sufficient resources to feed the current world population; the solution is not scientific but involves political and economic reform. Therefore if finalisation were to be adopted as a policy strategy care must be taken to ensure decisions are made by a cross-section of society and not solely by members of the scientific community.

Cross-disciplinary relevance, the second strategy put forward by Fuller, is a way of increasing the number of potential beneficial outcomes of expensive research by encouraging projects that have a cross-disciplinary approach. The strategy was proposed by Alvin Weinberg who supported by the principle that "the more expensive the research proposal, the more value it must have for fields outside the principal investigator's field" (Fuller 2000, p 139). Providing large research grants for one project could result in the termination of a competing programme because of lack of funding.

The third strategy, epistemic fungibility, challenges the way scientists form their research agendas. It grew out of the observation that the cross-disciplinary approach would be difficult for policymakers to put into practice. One particular reason for this is that grant applications are often geared toward experts in their author's own field, due to peer-review of these research proposals. The peer reviewer is unlikely to ask questions outside their particular expert field, therefore cross-disciplinary opportunities would not normally arise. Fuller suggested that research proposals be discussed, debated and reviewed by scientists from different fields in an open forum. During the course of discussion the language used would be stripped of all jargon making it possible for non-experts, and perhaps members of the general public, to understand, resulting in "open communication channels across the corresponding disciplinary communities" (Fuller 2000, p142). How to evaluate competing claims is where the unusual name, epistemic fungibility[29], comes in to play. Some areas of research are more fungible than others. For example, Supercollider research is less fungible than survey work: half a Supercollider would not function whereas meaningful results could be obtained from half a survey. Fuller argued that non-fungible fields should develop proposals that not only outline what their own goals will be but also how they will compensate other scientific proposals that they are competing with. If this was the case perhaps scientific communities would begin to explore avenues to increase the fungibility of their fields.

> Fungibility does not presume that there are separate well-defined domains of inquiry for each discipline: instead, it presumes that any potential site of inquiry is a contested space defined primarily in terms of available resources and potentially subject to a variety of jurisdictions, each corresponding to the agenda of a particular discipline or even an interest group in the wider society. (Fuller 2000, p 146)

Fuller has challenged current science policymaking in the hope of democratising science and opening up the decision-making process to the general public. He has encouraged cross-disciplinary approaches, reviews by scientists from other fields and the stripping away of jargon and the aura of expertise. This encouragement would place experts in one field in communication with experts in other fields and with members of the general public. This type of communication could potentially reduce the gap between science and the public and reduce its lack of trust in experts.

The need to democratise science and technology does not argue that experts will not have a role in the policy-making process, but that they should have a role that links them more closely with members of the public. The next section explores this very role.

[29] Fungibility is the amount of ease with which one goods product can be interchanged with another whilst still satisfying the customer. Some things are more fungible than others. Petrol is fungible because half a tank of petrol will enable you to travel half the distance of a full tank. However you will not be able to travel half the distance in half a car. Thus the car is not a fungible good.

Expert Knowledge

The events surrounding BSE exposed the UK's scientific expertise and policy making to the harsh light of public scrutiny. Since the late 1960s and early 1970s there has been a decline in the favourable position held by science. Adding to the lack of trust in scientific expertise are the increasing levels of scientific uncertainty. Some of the main problems with BSE were that scientists knew little about its origins, its mode of transmission, the infectious agent itself and its relationship with Creutzfeldt-Jacob Disease. These uncertainties surrounding BSE were not indicated in the confident presentations made by the UK's Ministry of Agriculture (Morris and Bate 1999).

Experts and Policy Makers

As previously discussed, public policy makers must consider other factors, such as potential economic, political and moral consequences, in addition to scientific evidence. This position is not taken to undervalue scientific knowledge, as it is vital to any policy decision where there is a scientific element. However, many governmental advisory and expert committees only have scientific and technical representation. Scientific advice given by scientific institutions and scientists outside government bodies is socially constructed and any evidence provided to policy makers follows the pluralistic approach (Edwards 1999). Nelkin has argued that science advisors act like any other self-interested actor (Nelkin 1995a). Scientists themselves, as well as policy makers and the general public, should be aware of their own, and science's limits. In my opinion the policy-making process must be opened up to include broader perspectives other than science and must not be restricted by the continual framing of issues as scientific.

The need for the most up-to-date scientific advice "drives the recruitment of expertise far beyond the realm of consensual knowledge right up to the research frontier where knowledge claims are uncertain, contested, and open to challenge" (Weingart 1999, p 158). Adversaries demand scientific expertise to legitimise their position, pushing the boundaries of certain science. Policy making exacerbates this process because controversial issues have uncertain facts, disputed ethics and morals, and often economic consequences. A German sociologist Peter Weingart has argued that "scientification of politics literally produces its opposite, the politicisation of science" (Weingart 1999, p 158).

The more scientific knowledge is relied upon to deliver certainty, safety and reliability, the more expectations are transferred to scientists, who represent that knowledge. This in turn leads to a greater chance that the scientist will exceed their abilities, ultimately resulting in the growing distrust of scientific expertise.

But why do policy makers still rely on scientific advice when there is the general recognition of the loss of authority of scientific expertise? Weingart argued that there is no alternative as science and politics are firmly institutionalised (Weingart 1999). This perceived lack of alternatives is one reason for the need to democratise science policy.

The vast selection of experts with differing opinions has provided the impetus for scientists to pool their resources. Countries have established, or are establishing, national science councils or academies that can act as the ultimate authority. The Irish government recently established the Science Foundation Ireland. Perhaps one of its unofficial tasks may be to neutralise the array of expert opinions from non-governmental organisations. This pooling of resources is also occurring at an international level with examples such as the Intergovernmental Panel of Climate Change who confidentially agree on research findings before releasing them to the public. Powerful international networks of interest groups are trying to influence policy debates. In the risk society, Beck has argued that nothing goes unchallenged, even "experts are undercut and deposed by other experts" (Beck 1995, p 11).

I am not arguing against policy makers being able to access the best available knowledge. However, an open process would allow dialogue among a range of experts, policy makers and the general public in the search for a community solution.

Experts and the Public

Currently the relationship between scientific expertise and policy making is not complicated by the relationship between citizens and their politicians. These relationships are represented in Figure 3.1, where the public sphere and scientific expertise have little direct interaction. Figure 3.2 depicts the public sphere as having an integral role in policy making involving scientific expertise. The dotted lines in both diagrams represent the formal democratic process of voting.

According to political scientist Arthur Edwards the model in Figure 3.2 is gaining ground with policy makers who are willing to "look on scientific advice-giving . . . as a way to conduct public discussions" (Edwards 1999, p 164). The key to making this model work is to build a partnership between experts and the public.

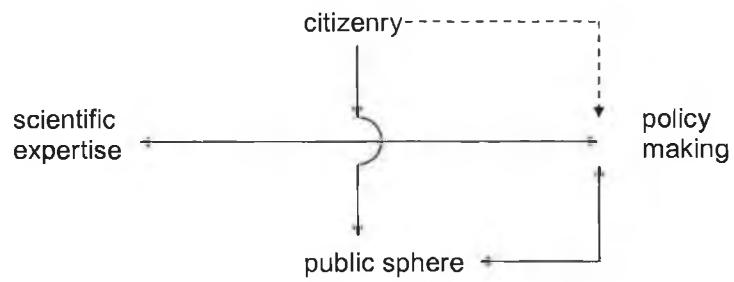


Figure 3.1: The public sphere does not intervene in the relationship between scientific expertise and policy making (Edwards 1999, p 164)

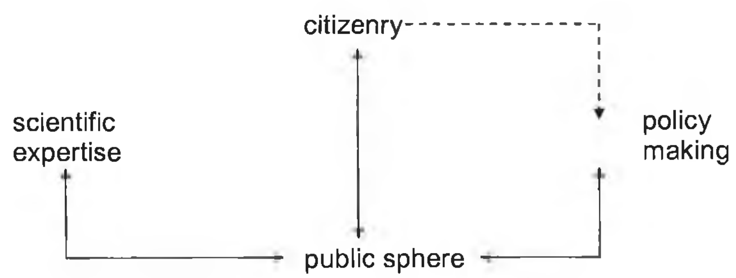


Figure 3.2: The public sphere as an intermediary structure between scientific expertise and policy making (Edwards 1999, p 164)

It is not just government experts who place a barrier between themselves and the general public. Sociologist Steven Yearley, in his review of the removal of the Brent Spar oil platform, noted that experts acting on behalf of Greenpeace carried out measurements and calculations away from public participation. As a result their relationship with the public was the same as that of experts from Shell and the UK government (Yearley 2000). This finding highlights the fact that the relationship between the public and different types of experts—government scientists, industry scientists or environmental group scientists—is the same and yet the public evaluate the expert's information differently.

As Brian Wynne has stated, people do not experience science as separate from their everyday lives (Wynne 1991). Therefore scientific expertise communicated from various sources is incorporated with what people already know and have experienced. People have previously formed beliefs and value systems and evaluate information depending on its source. For example, a study on farmers' perceptions of the credibility of information sources on bovine growth hormone concluded that farmers distinguish between expertise and trustworthiness (Marquart, O'Keefe, and Gunther 1995). The farmers rated information sources with similar attitudes and opinions to their own as more trustworthy, but not more expert.

Wynne proposed a framework of four different kinds of uncertainty in expert knowledge that is involved when science and public come face to face (Wynne 1992). The four kinds of uncertainty, summarised in Table 3.2, are risk, uncertainty, ignorance, and indeterminacy. Wynne's framework provided a departure from how uncertainty and indeterminacy had been previously distinguished. Risk is where the 'odds are known', usually in a closed system. Uncertainty describes the situation where the main parameters are known and the 'odds that are not known', but they are usually included in the analysis. Ignorance refers to areas of a controversy that are not investigated perhaps because they are outside a discipline's remit. Ignorance is not unusual in science; in fact it is necessary in the process of investigation. Ignorance only becomes a problem when it is not recognised in policy making. Wynne argued that conventional risk assessment aims to control risk, uncertainty and ignorance by gathering more scientific knowledge within the recognised system. Indeterminacy refers to the unknown nature of outcomes because it depends on how the actors involved in the

Table 3.2: Wynne's breakdown of uncertainty in expert knowledge (Wynne 1992; Yearley 2000)

Risk	we know the odds	
Uncertainty	we don't know the odds	the main parameters may be known uncertainty may be reduced but commonly at the expense of increasing ignorance
Ignorance	we don't know what we don't know	the main parameters are not known for sure ignorance increases with increased commitments based on given knowledge
Indeterminacy	we don't know how a system will work because its operation depends in part on (unchecked) social behaviour	overcoming indeterminacy calls for the inclusion of contingent social behaviour in the analytical and prescriptive framework

controversy interact and behave. The actors include, for example, workers in a slaughterhouse and researchers extrapolating data from a scientific paper. This fourth consideration is "embedded within the risk or uncertainty definition, not an extension in scale on the same dimension" (Wynne 1992, p 116).

Wynne has argued that experts tend to refer to all variations of unknowns as uncertainty and also that local expertise may be more discerning to unknowns that fall into the indeterminacy category (Wynne 1992). Wynne suggested that this greater awareness of indeterminacy accounts for public lack of trust in current assessment of unknowns.

This approach is not about public acceptance of science but how the public makes assessments of how science is involved in their lives. According to a study conducted as part of Eurobarometer survey 46.1, members of the public make decisions based on levels of perceived risk, moral acceptability and usefulness (Biotechnology and the European Public Concerted Action Group 1997). The researchers reported that in all countries of the EU moral acceptability and usefulness are preconditions for support of an application of biotechnology. The study also showed that the public are able to distinguish between different organisations that provide information for different areas of biotechnology. As the applications of biotechnology have transnational consequences, so it seems that the public have less confidence in the public bodies of nation states and prefer international organisations such as the United Nations and the

World Health Organisation. Of course it must be acknowledged that the study also found that large sections of the European public are ambivalent about biotechnology and issues surrounding its application. Some would argue that members of the general public might not be fully aware of implications of biotechnology or have access to relevant information. It is important to note, however, participants in this study self-reported their trust in different organisations. In a study conducted by Frewer and Shepherd it was concluded that "stated trust in risk information sources and actual reactions to information can not be equated" (Frewer and Shepherd 1994, p 399).

The need to revolutionise democratic processes for science and technology has been discussed above. Feenberg argued that democracy has not extended into the world of technology, and it will not do so until it is recognised that technology is not separate from the social aspects of society. Fuller described ways of challenging the current science policy-making process to make the governance of science more democratic. Sclove has called for strong democracy by incorporating more citizen-based activities within policy making. The role of experts is linked to this process of democratising science and technology. In our current system their role is one of power and authority. However, within this system there are attempts, such as the precautionary principle described below, to increase the involvement of local or lay knowledge.

Precautionary Principle

The precautionary principle has its origins in the German term *Vorsorge* which means foresight (Von Moltke 1988). This principle was developed in Germany in the early 1970s and has since been an integral part of German environmental law. A precautionary approach is a political decision made in the face of uncertainty: whether to proceed, undertake additional scientific studies or seek alternative procedures. In the current climate of policy making the precautionary principle is highly controversial due to the extreme variations in its interpretation. In its strongest formulation the precautionary principle can mean that there needs to be 100 percent proof of safety before an activity gets the go ahead. There is concern that with this interpretation scientific evidence might have a reduced role to play in policy decisions. Another interpretation of the precautionary principle is the cost-benefit analysis approach. At present the precautionary principle is ambiguous and different interest groups use it to their advantage. A European Commission document stressed that the need for reliance on scientific data and logical reasoning. It provided the following five guidelines on how to use the precautionary principle:

i. proportionality: measures to be taken must not be disproportionate to the desired level of protection and must not aim at zero risk;
ii. non-discrimination: comparable situations should not be treated differently;
iii. consistency: measures should be comparable in nature and scope with measures already taken in equivalent areas in which all the scientific data are available;
iv. examination of the benefits and costs of action or lack of action; and
v. examination of scientific developments: measures must be provisional pending the availability of more reliable and complete scientific data (European Commission 2000a).

Three scientists associated with the WHO have stated that these guidelines still lack enough direction regarding the amount of evidence needed to trigger the use of the precautionary principle and for deciding which of the large range of precautionary measures should be applied in given circumstances (Foster, Vecchia, and Repacholi 2000).

In 1984, at the First International Conference on Protection of the North Sea, the precautionary principle was introduced. Following this conference the precautionary principle has been integrated into many international strategies including the Maastricht Treaty on the European Union and the Global Climate Change Convention, and national strategies particularly in Sweden and Denmark. One of the most important strategy documents to include the precautionary principle was in the Rio Declaration written at the 1992 United Nations Conference on Environment and Development. The declaration stated:

> In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities Where there are threats of serious and irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to protect environmental degradation [30].

[30] http://www.igc.apc.org/habitat/agenda21/rio-dec.html accessed on 24 October 2001

Current scientific methods cannot always fully establish a direct cause and effect connection, but there may be other evidence to suggest that certain activities are causing health and environmental problems. Prior to the precautionary principle individuals and ecosystems had no protection unless the evidence of damage was clear. Risk assessment and management is a type of decision-making that tries to establish what the acceptable risk is for society. This type of system has typically excluded those who are affected by the decisions. What is acceptable to one person may not be acceptable to another as it is a matter of personal judgement.

The fact that in July 2000 the UK's Royal Institution hosted a one-day conference entitled *Interrogating the Precautionary Principle* demonstrates that scientists have acknowledged the ambiguity of the use of the precautionary. The conference brought together scientists, social scientists and journalists to question whether and how the precautionary principle can operate in today's society.

The use of the precautionary principle is fine in theory. However, it is still operating in the current political environment. The precautionary principle needs to be implemented in a more democratic process.

Discussion

Parliamentary procedures that occur in the public domain usually begin after the government has prepared a policy to its final stages. In this sense policy making in Ireland is not as democratic as it could be. As a result interest groups have developed sophisticated lobbying tactics to try to influence the policy process prior to the parliamentary stage. In a country the size of Ireland a relatively small number of people comprise proximate policy makers and those who have direct contact with them. However, these proximate policy makers are easily identified. Recent tribunals of political corruption in Ireland[31] have aided the opening of the political process to the public.

[31] For example the Moriarty Tribunal and the Flood Tribunal.

This chapter has identified two types of interest group that lobby government, namely sectional groups and cause-centred groups. Both types of group are involved in the two case studies investigated in this thesis. The number of cause-centred groups has increased over the past twenty years and more recently they have been invited to participate in the policy-making process. However, as these invitations are handed out for specific projects there is no overall formula to ensure that the public's involvement will help guide the development of science. When a controversial issue is framed as scientific, policy makers find themselves in a position of trying to include (or exclude) the opinions of social actors, other than scientists, in the policy-making process.

The framing of issues as merely scientific is not just a problem for Ireland; it is a global phenomenon. However, some countries, such as Germany and Scandinavian countries, are more progressive in their assessment of science. In these countries governments have recognised the need to address the role that science plays in society and the important role society plays in the outcomes of science.

The second half of the chapter looked at the democratisation of science and technology. Democracy was explored and the differences between ideologies and practice detailed. Direct democracy is no longer possible because of the size of populations, geographical barriers and the nature of global issues. As a result international agencies have been formed to include overlapping local, regional and international systems.

The work of Feenberg, Sclove and Fuller was explored because of their suggested strategies to democratise science and technology and to open up the policy making process beyond scientific experts in an attempt to address the fact that science and technology are shaped by society. Currently the interaction between policy makers and experts occurs away from the public arena, although this is changing. Wynne argued that policy discussions involving science need to involve organisations and people outside the scientific community. Greater involvement of the community could overcome uncertainty by identifying the limits of social behaviour. Wynne suggested that knowledge created in the private scientific community must be deconstructed in the wider community.

The next chapter explores possible methods, such as consensus conferences and citizen juries, for involvement of members of the public in controversies around science.

Chapter 4

Public Participation Programmes

The previous three chapters have addressed the theories of democracy, communication and scientific and lay expertise. This chapter explores practical initiatives that aim to allow greater public involvement in the policy-making process and discusses the:

i. definition of public participation;
ii. recent interest in public participation methods;
iii. origins of public participation;
iv. reasons for public participation;
v. examples of public participation; and
vi. evaluation frameworks for public participation initiatives.

The evaluation framework used in the assessment of three examples of public involvement in policy-making is described. The three Irish public consultations are discussed in detail in Chapter Seven.

What is Public Participation?

The term 'public participation' encompasses a broad range of ideas and methods and is used by different social actors with a variety of meanings. The individual meanings of 'public' and 'participation' differ and their definitions, although not always supplied, provide insight into the meaning of 'public participation' for a particular programme. For example, the 'public' in 'public participation' can refer to members of the general public, social actors or anyone who is not a scientific expert. 'Participation' may suggest consultation, involvement, interaction, deliberation, representation, information, communication or education, or any combination of these. The common theme in the different interpretations of the term 'public participation' is the opportunity for the 'public' to have an input into the policy-making process. Another term for public participation is Participatory Technology Assessment, a variation of the Technology Assessment (TA) method which was developed in the USA in the 1960s to provide independent and objective information on science issues to members of Congress.

Simon Joss, a senior research fellow in democracy at University of Westminster, defined 'public participation' as "the active involvement of social actors from outside the specialised expert communities" in the policy process (Joss 1998, p 2). In a later publication Joss defined the term 'public' as "representatives of non-governmental organisations, local communities, interest groups and grassroots movements, as well as individual lay people in their capacity as citizens and/or consumers" (Joss 1999, p 290). This inclusive definition of the 'public' excludes the professional expert who would normally participate in policy-making processes.

In their evaluation of public participation methods, Gene Rowe and Lynn Frewer, senior researchers at the Institute of Food Research in Norwich, used the word 'input' to differentiate participation methods from other communication strategies (Rowe and Frewer 2000). They describe the public's input as ranging from opinions to judgements and decisions that might be used in the policy-making process. Different public participation methods elicit different inputs. For example, public opinion surveys gather 'opinions' whereas a consensus conference panel would elicit decisions and recommendations.

Methods for public participation are numerous and include consensus conferences, citizen juries, stakeholder dialogues, deliberative polling, focus groups and referenda[32]. However, no definitive list of public participation methods exists. Joss argued that public participation is the 'active involvement' of social actors in policy making, yet focus groups and public opinion surveys are often included in lists of public participation methods (Beierle 1998; Inter-Departmental Group on Modern Biotechnology 2000; Rowe and Frewer 2000; UK House of Lords 2000). Public opinion surveys would not be included in Joss' definition because survey participants would not necessarily be aware of their potential effect on policy and are therefore not actively involved. At the other end of the scale, Brian Wynne, Professor of Science Studies at the University of Lancaster, has argued that the procedures described by Rowe and Frewer, among others, are not inclusive enough as they include only formal mechanisms of public participation and exclude more informal methods that are not organised by a policy institution (Wynne 2000). Examples of informal participatory initiatives would be those implemented by interest groups, such as direct action and lobbying, media campaigns and legal challenges.

This thesis discusses the more formal public participation methods, particularly those promoting two-way communication, which have been or could be initiated by policy institutions. Informal processes are excluded not in order to belittle their role in influencing public policy[33], but to reflect policy institutions' growing interest in more formal procedures. For example, the report by the IDGMB recommended that "**Forfás should examine the use of [public participation] mechanisms in other countries with a view to developing and piloting proposals for implementation in this country** [original in bold]" (Inter-Departmental Group on Modern Biotechnology 2000). It is hoped that this thesis might assist policy institutions in Ireland in their understanding of the different types of public participation initiatives.

[32] Details of specific public participation programmes and their strengths and weaknesses are discussed later in this chapter.
[33] In fact one could argue that the informal procedures are a welcome addition during formal participatory methods.

Interest in Public Participation

In recent years there has been an increase in the use of public participation initiatives to include public issues in policy-making processes involving technical and scientific content. The importance of such initiatives has been acknowledged throughout Europe and many European countries are following the example of countries with a history of public participation, notably the Netherlands and Denmark.

The European Commission (EC) has acknowledged the importance of public consultation on issues with technical and scientific content. In October 2000 the EC organised a conference on 'Science and Governance', gathering policy makers, government officials, scientists and representatives of civil society to address why European citizens are sceptical about the policy-making process (European Commission 2000c). The official agenda recognised that Europeans are demanding "the entire process, from problem definition to the assessment and implementation of policy solutions, . . . to become more democratic [and that] the need becomes particularly acute when policy decisions are influenced by or dependent upon scientific evidence" (European Commission 2000c).

The previously mentioned report by the Irish IDGMB addressed the need to increase the role of the public in policy-making and the regulatory process. The report contained a section 'Improving Public Communication and Consultation' and, according to my research, represents the first time that an Irish government report has actively encouraged a government agency to undertake public participation initiatives.

Another example of the increasing importance of public participation initiatives can be found in the British House of Lords Select Committee on Science and Technology report, *Science and Society,* published in March 2000, which highlighted "issues currently treated by decision-makers as scientific issues in fact involve many other factors besides science [and] framing the problem wrongly by excluding moral, social, ethical and other concerns invites hostility". The report insisted that public dialogue should become "a normal and integral part of the [science-based policy] process" (UK House of Lords 2000). The House of Commons Information Committee endorsed a review of public participation initiatives by the Parliamentary Office of Science and Technology (POST) to inform members of both Houses of Parliament. At the time of writing POST was addressing three key issues: where and to what extent public participation informs public policy, how public participation can be evaluated, and the level of current research in this area (Parliamentary Office of Science and Technology 2000).

Countries interested in learning more about public participation initiatives have requested that institutions employing these initiatives share their experiences. The Rathenau Institute for Technology Assessment, in the Netherlands, is one such institute. The institute's director stated that "a direct role [of lay people] in the decision making is not what is essential . . . [but w]hat is important is to widen the debate, to take citizen perspectives into account and to inform experts of the questions uninitiated people are asking and the reasons that lie behind them" (European Commission 2000c).

Researchers at the Danish Board of Technology and a lay participant in one of its consensus conferences publish frequently on their experiences. The Board has developed and implemented a framework to embrace: "the wisdom, experience and visions of citizens; the insight and tools of experts; the needs and working conditions of decision makers; and the democratic traditions in Denmark" (Klüver 1995). The Danish Board of Technology was established in 1985 and is continually looking at ways to improve its methods (Joss 1998; Klüver 1995).

The above examples indicate that official policy institutions are calling for greater public participation in policy-making processes. It may seem unusual for policy institutions to invite lay members of the public who lack expertise—non-scientists—to advise them on policy where science is centrally involved. However, there is an increasing number of examples that highlight the inadequacies of traditional methods of Technology Assessment. The regulation of development and planning in Ireland provides more opportunities for members of the public to be involved in decisions through Bord Pleanala (the Planning Appeals Board). However, this involvement is one of appeal; the public have one month to object to a decision already made by the local authority.

In the light of recent controversies, such as that surrounding bovine spongiform encephalopathy (BSE), storage of nuclear wastes and GM foods, which have shaken public confidence in the ability of decision-makers, there is a call from a range of social actors, including policy institutions, for more democratic, transparent and participatory policy processes. Policy institutions and scientific experts sense that they need to re-establish their credibility and authority and reduce conflict. Before exploring the different reasons and various arguments for public participation, it is important to look at the origins of public participation and the reasons for its inception.

Origins of Public Participation

One of the founding procedures for public participation was Technology Assessment (TA) in the US. TA was introduced in the mid 1960s in the US House of Representatives to review the critical role of technology and its potential for unintended consequences (Brooks and Bowers 1970). TA was to assist policy-makers on technological programmes in considering the programme's social, economic and environmental implications.

After many independent studies, the Office of Technology Assessment (OTA) was established in 1974. Concerns had been raised that TA would impede the development and use of technology, although this was not one of the main reasons for establishing the OTA. A 1969 report from the National Academy of Engineering emphasised that TA "would aid the Congress to become more effective in ensuring that broad public as well as private interests are fully considered while enabling technology to make the maximum contribution to our society's welfare"[34].

In the 1960s and 1970s there was widespread public interest in new health care technologies and these provided topics for early TAs. The Office of Medical Applications of Research (OMAR) was established as the result of the 1977 White Paper *The Responsibilities of NIH [National Institutes of Health] at the Health Research/Health Care Interface*. OMAR introduced a new process for assessing

[34] Reference cited in the National Information Centre on Health Services Research and Health Care Technology, United States National Library of Medicine, website: www.nlm.gov/nichsr/ta101/ta103.htm accessed on 9 November 2000.

medical technology called consensus development conferences. The first of these initiatives was held to discuss breast cancer screening and since that time the NIH has held over 100 conferences.

In the 1980s many medical consensus conferences were held in Europe. Sweden held its first in 1982 on total hip-joint replacement. Other topics included breast cancer, depressive orders, chronic leg ulcers, *in vitro* fertilisation, haemorrhoids, cochlear implant, treatment of drug abuse and screening for foetal abnormality. Many European countries subsequently adapted the TA method to assess topics outside the medical area.

Although members of the general public were not included in the original format of the US Technology Assessment, TA was devised so that the social implications of the application of health technology would be considered in the policy-making process. The second wave of TA, in the 1980s, extended beyond health issues to all areas of science and technology, and invited members of the lay public to participate. In Denmark the first consensus conference was held in 1987 and TA in the Netherlands took the form of science shops. Other areas of Europe showed little interest in TA methods at this time. The third, and latest, wave of interest, originating in the mid 1990s, involved a variety of countries which conducted consensus conferences or variations of them as well as experimenting with new participation methods such as citizen panels. During the past ten years countries that have used public participation methods to explore controversial issues are Norway, Germany, France, Austria, United Kingdom, New Zealand, Australia, South Korea, India, USA and Canada.

I would argue that the reasons for initiating methods of public participation differ in the second and third stages described above. For example, as consensus conferences in Denmark are often held before an application of science has become the focus of a controversy, conflict reduction is unlikely to be their goal. However, in the latest wave of public participation initiatives this does appear to be a principal aim. The public's contributions to initiatives also differ in the second and third waves. Public values were the main participatory input in the second wave of TA whereas more recent requests for public participation also include citizen knowledge.

The next section of this chapter explores the reasons for the recent interest in public participation in discussion issues that involve science.

Reasons for Public Participation

Research articles and government or policy institution reports provide numerous arguments for the various types of public participation. Public participation initiatives are not only being explored by the science communication community, concerned with increasing public participation in policy issues that involve science, but in the broader fields of citizenship and politics. For example, in 1998 a National Crime Forum provided an opportunity for a range of experts to express their views to assist the formation of crime policy; and during 1983 and 1984 thirty submissions from democratic political parties addressing peace in Ireland were made to the New Ireland Forum. Greater public consultation has been recognised as an element of open and transparent governance. However, this thesis concentrates on policy decisions of issues that involve science and how members of the general public and interest groups can be involved in such decisions.

The five main arguments often put forward to support public participation initiatives are:

i. to improve the democratic process of decision making;
ii. to incorporate lay knowledge and benefit from the wisdom of lay experts and the inclusion of social issues;
iii. to make better decisions;
iv. to reduce conflict; and
v. to increase levels of trust in policy makers.

Each of these five main arguments is discussed below.

The Democratic Process

The democratisation of science and technology was explored in the previous chapter and therefore will not be discussed in this section. The advocates of public participation for democratic reasons are mainly researchers in social science and science communication (Anderson and Jæger 1999; Fisher 1999; Irwin 1995; Joss 1999; Wynne 2000). However, other social actors call for greater public participation on the basis of democratic ideals. The supporters of the protest at the WTO summit in Seattle in 1999 are one example; they were concerned with the power of corporate business over science and policy makers. In contrast, objections to the tactics of interest groups, whose motivation is often democratic ideals, are that they do not represent a majority view.

The second and third factors in support of greater public participation in policy making—broadening the knowledge base of decisions and making better decisions—are in themselves linked to improving democracy. However, they are treated separately in this thesis because advocates of greater public participation have acknowledged them individually.

Lay Knowledge

The second main argument used to support public participation is the inclusion of lay knowledge in policy making. There are two dimensions to lay knowledge in public participatory initiatives. The first is the knowledge of members of the general public with no interest in the issue other than as citizens. The involvement of members of the general public provides an opportunity for social and moral issues to be raised. Results of public participatory initiatives in the 1990s demonstrated that the general public is capable of discussing complex issues involving science, not at a scientific level of understanding but as members of society (Barns et al. 2000; Dürrenberger, Kastenholz, and Behringer 1999; Hörning 1999). These public opinions are not proposed to displace scientific evidence but to be considered alongside scientific evidence and other factors, such as economic considerations.

The second dimension involves the knowledge of groups that have a specific interest in the issues, such as environmental organisations and patient care groups. The addition of this knowledge—which has been referred to as specialist lay knowledge (Irwin 1995) or expert-stakeholder knowledge (Klüver et al. 2000)—would enable policy makers to draw on a broad range of experience. Irwin argued that local lay knowledge can offer practical experience and a different perspective to that of scientific expertise. Irwin's example of 2,4,5-T pesticide, previously discussed in Chapter One, highlights the different perspectives of the scientific experts and the lay experts—the farmworkers. Irwin questioned why citizens with high understanding and personal experience are excluded from decision-making.

The farmworkers' experience with the 2,4,5-T pesticide suggested that it was not safe and they repeatedly called for official experts to review its safety. The farmers presented evidence of what they felt to be a high rate of miscarriage and birth defects in their local area and accounts of their own ill-health. However, when the members of the Advisory Committee on Pesticides received this evidence they claimed that it was 'unscientific'. The advisory committee made its decision on reports of laboratory experiments on specially-bred animals using pure chemical specimens of the active ingredient of the pesticide. The advisory committee continued to assert that the pesticide was safe and made the assumption that the results from the laboratory experiments were an adequate representation of the risks faced by farmers using the pesticide in real world conditions. The advisory committee's insistence on the recommended conditions for using the pesticide made little sense to the farmworkers. Irwin argued that the farmers were lay experts in the everyday use of the pesticide, such as spraying "through thick undergrowth, in high winds, at the top of a ladder [and] in hot weather" (Irwin 1995, p 113).

A second example highlighting the importance of including lay knowledge in policy making is the dispute over the site of a nuclear plant in California where local citizens organised their own experts to show government experts an earthquake fault line running under the proposed site (Hill 1992).

Making Better Decisions

The third main argument for public participation is that it will enable better decisions to be made. The body of knowledge about any topic is not static and cannot always be found in one place. Nor is it complete. The initial reasoning behind TA in the 1960s in the USA was to enable members of Congress to consider social, economic, ethical and legal implications, alongside the technical information, to ensure maximum benefit from the technology while considering the welfare of society. It is certain that greater participation of the public would enrich the knowledge base of the decision-making process. However, whether public inclusion will lead to better decisions is not certain. This uncertainty is one of the difficulties in evaluating public participation initiatives.

The uncertainty and unpredictability of modern technology is increasing, even within the scientific domain (Giddens 1990). Even without a large body of evidence suggesting that better decisions are made with greater public participation, or vice versa, broadening the knowledge base could make the policy-making process easier, by highlighting that the uncertainty does not simply lie between two polarised camps. On the other hand, operating with more opinions, values and information could further complicate the process. When a final decision is made it is guaranteed that not all viewpoints will be accommodated, but at least those making the decision are aware of the different perspectives and the reasons behind them.

Reducing Conflict and Increasing Levels of Trust

The final two arguments for greater public participation will be addressed together as one is rarely presented without the other. From a practical point of view, the implementation of unpopular public policies may result in increased conflict and reduced trust in policy institutions. However, reducing conflict and building trust are more recent objectives of policy institutions interested in public participation, particularly in countries that do not have the tradition of participatory methods.

For example, in Ireland the report by the IDGMB highlighted the need to consider the "decline in public confidence in regulatory bodies and scientists", "mistrust of the large corporations that have pioneered GM crops" and "the campaign . . . waged by environmental groups" (Inter-Departmental Group on Modern Biotechnology 2000, p 16). Another example is the UK's House of Lords *Science and Society* report, which identified a "crisis of confidence" in science regulation and "public unease, mistrust and occasional outright hostility are breeding a climate of deep anxiety . . ." (UK House of Lords 2000, p 13). One of the recommendations in both reports was to trial public participation programmes.

Public participation in these two reports is seen as a political solution to the rising controversy and conflict. Reducing conflict and increasing trust will not occur through implementation of public participation programmes, however they could be potential outcomes of these initiatives. How the public participatory methods are organised, how fair and inclusive they are and at what stage of the process the public are invited to participate will help decide the level of conflict and trust. These issues, among others, are addressed in the evaluation section at the end of this chapter.

Limitations of Public Participation

Wynne highlighted two assumptions about public participation in science initiatives used by scientific and science-led policy institutions. The first assumption is that 'public participation in science' initiatives presume how public issues are to be framed. Wynne, who supports the move toward greater public participation, has argued that public participation initiatives systematically frame public issues as scientific when they could potentially be framed as economic, ethical social or environmental. The early British movement of Public Understanding of Science, was similarly criticised for its deficit model approach (Wynne 2000).

This chapter only addresses formal participatory exercises that are institutionally co-ordinated. Less formal approaches, such as media and legal campaigns, direct actions and lobbying, are frequently used to inform policy-making processes. Traditionally these 'informal approaches' have not been welcomed by policy institutions (Wynne 2000). The second assumption highlighted by Wynne is that merely formalising the process will not spontaneously make policy makers listen to and understand public concerns and values. The institutions implementing the public participatory exercises must be ready to listen. Wynne suggested that sometimes such initiatives are "accompanied by the unstated and maybe unconscious belief that these public inputs are still *intellectually vacuous and irrelevant* [italics in original]" (Wynne 2000, p 6).

Individual public participatory methods will not alone broaden policy discussions and decisions. For such broad discussions to take place, I argue that policy institutions need to make cultural changes. Policy-makers and scientists must accept these initiatives as legitimate contributions to the policy-making process and not just an exercise to allow citizens to give their opinions or vent their anger. The contributions made by lay citizens must be recognised not as substitutes for scientific or technical information, but as components to be considered alongside scientific advice. As the UK's House of Lords *Science and Society* report clearly stated, although "these [public participatory] approaches have value . . . they are isolated events, and no substitute for genuine changes in the cultures and constitutions of key decision-making institutions" (UK House of Lords 2000).

The initial proposal for the title of my research was 'Public Participation in Science Controversy'. I was unknowingly supporting the deficit model by framing controversies as scientific. I believed that the 'public' had a role to play in making decisions about science, not that science might be just one aspect of a societal issue. The framing of an issue as science has been discussed in previous chapters, yet I feel it is important to raise it again here. The 'unconscious' belief raised by Wynne is a difficult issue to tackle. It has only been in the process of the past four years of research that I have personally realised the limitations of framing an issue as 'scientific'. How easy will it be for policy institutions to recognise this limitation?

Public participatory mechanisms, I argue, should not be undertaken as a way to increase public confidence in regulation, although such confidence may be an outcome of the decisions taken. Public participation initiatives implemented by public policy bodies will not automatically lead to increased trust in that body. Trust can only be earned; one would hope through the outcomes of the process.

In March 2000 a citizens jury on the issue of GM crops was held in an Indian farming village. Over four days the jury, a cross-section of fourteen farmers, heard evidence from experts including the Monsanto India R&D Director, government officials and academics. Tom Wakeford, a biologist at the University of East London, reported that the "poorest farmers [on the jury had] a sophisticated knowledge of the way new types of crops can impact their lives . . ." (Wakeford 2000, p 3). However, the Monsanto India R&D Director's response to the citizen jury vote against GM crops was "[the farmers concerned] have no experience with [GM crops]. They (and also others) have a long way to go in understanding the science behind these products. Thus whether they speak in favour or against these crops at this stage should not be given undue importance" (Wakeford 2000, p 10).

This above example illustrates that the outcomes of public participation initiatives are not automatically accepted as legitimate or worthy by the people who have opportunities to influence policy.

The next section of this chapter describes different types of public participation initiatives that are used in countries throughout the world.

Examples of Public Participation Methods

There are many different types of public participatory methods and the list provided in Table 4.1 is not exhaustive. The nine of public participation methods selected and described have been used in different countries to explore both controversial and non-controversial issues that involve science. Some methods have been adapted from similar origins to suit individual national characteristics. All the methods selected in Table 4.1 provide opportunities for social actors and members of the general public to make direct representations as opposed to indirect representations such as voting. Other procedures with unique attributes have been used, but the nine selected as examples in this thesis have been developed, implemented and to varying degrees evaluated, and all have become formalised in policy-making processes throughout the world.

Deliberative public participation initiatives are distinguished from other forms of public participation, such as opinions polls and referenda, because they last a few days and participants are invited to consult with a range of experts. At the end of a deliberative participation event the participants' findings are presented as a report (Hörning 1999). One example of a deliberative method is the often cited consensus conference.

The **consensus conference**, based on the Danish model, was derived from a health care model applied in the USA in the mid 1970s (Jørgensen 1995). The Danish Board of Technology adapted this consensus conference by including members of the general public and calling it a lay panel. The lay panel involves up to sixteen volunteers who have replied to an advertisement. It is not representative of the population but is a cross-section of members of the general public. Prior to the actual conference the group meets privately to review information on a specific issue and decide the key questions it wishes to raise. The public part of the consensus conference lasts up to three days during which time invited experts address the panel's questions. The panel have the opportunity to pose further questions to the experts before writing the final report in private. The press and members of the public are allowed to watch the conference. The level of media coverage is determined by a country's perception of interest in the topic.

Today's model of the consensus conference described above was first developed by the Danish Board of Technology on behalf of the Danish Parliament. This clear connection with policy makers is often lacking in other countries, such as UK, Australia and Canada, all of which have held consensus conferences.

The Danish consensus conference model, which has been used in many European countries, is a varying mixture of three components: a judicial process with a jury, where direct and circumstantial evidence is heard, a scientific meeting among peers, where scientists discuss the matter to seek scientific 'truth' and do not focus on application or feasibility, and a town meeting with public participation, where the public are able to ask questions and express their views and opinions in a non-threatening environment.

One example of an adaptation of the Danish consensus conference model is the **citizens' conference** on GM food organised by the French Office Parlementaire d'Evaluation des Choix Scientifiques et Technologiques (OPECST) in 1998. OPECST's task was to inform the parliament about the consequences of scientific and technological choices. In the Netherlands the term **public debate** is used in reference to a process similar to the Danish consensus conference.

Citizen juries and citizen panels are deliberative initiatives involving lay participants who receive, question, discuss and evaluate presentations made by experts on a particular issue over a period of two-to-four days. The final outcome is a set of recommendations made by the jury or panel. These methods are used on issues not confined to science. The difference between a citizen jury and a citizen panel is the number of participants and the way in which they are selected. A citizen panel has the larger number of participants of the two, and has two or more lay groups running in parallel. The participants of the citizen panel are selected at random from the electoral role without considering demographic values, possibly because of the high number of participants. A consensus conference differs from both a citizen jury and panel by allowing its participants more time to become familiar with the technical material and admitting the press and public.

In **scenario workshops** citizens interact with other actors to exchange knowledge and experience, develop common visions and produce a plan of action. A scenario workshop involves business representatives, citizens, policy makers and experts who start with a problem and looks for solutions. Before the workshop a set of scenarios is written describing alternative ways to solve a problem and the participants are asked to comment on them. Scenario workshops have been used in Denmark, Greece, France, UK and the Netherlands, and are often used for Local Agenda 21 projects[35].

Focus groups are used as qualitative research tools to identify public opinions and attitudes. A focus group involves between six and twelve people who are invited to discuss an issue with a trained facilitator. Results from focus group research are not representative of the population as a whole and the results are often used to design a quantitative public opinion survey. Some authors include focus groups of this type as a

[35] Local Agenda 21 is the local community element of an international initiative of the United Nations to protect and preserve the earth and its people. Local Agenda 21 is an outcome of the Rio de Janeiro Earth Summit of 1992.

public participation method (Rowe and Frewer 2000). However, in Germany the use of focus groups has been extended to be more of a deliberative event (Dürrenberger, Kastenholz, and Behringer 1999). So called **integrated assessment focus groups** involve the same participants discussing the same topic in five weekly sessions. At the end of all of the sessions the participants are required to produce an 'output', such as a video or report, summarising their policy recommendations on an issue that has a science or technical aspect. Computer models are also characteristically used in integrated assessment focus groups.

The ULYSSES (Urban Lifestyles, Sustainability and Integrated Environmental Assessment) project is one example that used integrated assessment focus groups assisted by a range of computer models, such as a personal carbon dioxide calculator, to support discussions on climate change and other sustainability issues. ULYSSES was a European research project, which aimed to bring the judgements of citizens informed about climate policy to policy makers (Dürrenberger, Kastenholz, and Behringer 1999). Between 1996 and 1999 Spain, Italy, Greece, Switzerland, Germany, Britain and Sweden participated in the ULYSSES project. In one of the focus groups the recommendations were presented to a member of the city council responsible for the Local Agenda 21. The multiple-staged format allows the participants to become familiar with a topic that initially they may perceive to be 'too scientific' or 'too complex'.

Public hearings or public inquiries are a traditional way of providing information to a community, and are usually held in a centrally located area such as the town hall. Public hearings are frequently used by governments and are often held in the late stages of the policy-making process. Politicians and experts usually make the presentations at the public hearings and those who choose to attend a public hearing often represent an organised interest. As a result the discussion and information presented at public hearings may provide little value for members of the local community.

Certain countries, such as Switzerland, have a tradition of **referenda**. In 1997 Switzerland consulted with its citizens directly on genetically modified organisms using a referendum. The main advantage of referenda is the potential involvement of the whole of a nation's population.

A **stakeholders' dialogue** meeting is restricted to those who have an interest in, or express an interest in, the particular issue, such as industry, scientists and citizen groups. Government bodies, industry groups and non-government organisations could undertake a stakeholders' dialogue. A professional facilitator is usually present to encourage the meeting's participants to be outcome orientated. Members of the general public are excluded from such an initiative.

The **science shop** model is considered a tool that can be more frequently used to increase debate on public issues involving science (Irwin 1995; Sclove 1995). Science shops originated in The Netherlands in 1979 and today are established in all Dutch universities and in universities in Germany, Austria, Denmark, Northern Ireland and France. The university provides a public 'shop' where members of the public can request information or assistance on social issues. The 'scientific' question can be social science, science and technology, or humanities issues. The science shop refers the queries to university volunteers, both staff and students, with the aim of including the research into their regular workload, thereby minimising the cost of the investigation. The clients of science shops include local community groups, environmental groups, welfare groups, trade unions and local governments. One major advantage of science shops, besides seeking answers to queries, is building links between researchers and members of the public and therefore increasing the awareness of each other's situation and perspective.

There are other public participation methods, such as roundtable discussions and numerous variations and combinations of the methods listed above, including those that use the internet as a medium. In the example given below two participation methods—citizen panels and scenario workshops—were used to investigate carbon dioxide emissions in Germany.

In 1996 the German Technology Assessment Centre organised eleven parallel citizen panels by randomly selecting 220 participants from the electoral roll (Hörning 1999). The panels' task was to discuss strategies to reduce CO_2 emissions by 25%. At that time there was political deadlock on the issue in Germany and it was hoped that the citizen panels would stimulate debate and lead to an eventual decision.

Three scenarios to reduce CO_2 emissions, their current energy system and further expert opinions were presented to the panellists. After questioning the experts, the panellists split into smaller groups of three to five people to discuss the three scenarios as well as develop their own proposals for reducing CO_2 emissions. At the end of the three days their conclusions were presented to the press. Fifty-three proposals were created by the smaller groups of all eleven panels.

The proposals were categorised into three main types: improve technologies and increase nuclear power, take the middle ground approach, and reduce energy consumption and eliminate nuclear power. Despite the many different strategies to reduce CO_2 emissions four measures appeared in most of the 53 proposals: increasing technical efficiency, increasing the use of renewable energy sources, increasing the use of public transport, and changing behaviour to improve energy efficiency. The vast majority of the participants' strategies did not raise new suggestions, nor was that expected. However, the preferred options were to save energy by using improved technology rather than by changing behaviour.

Hörning in his analysis of the citizen panels concluded that the "impact of the citizen panels was unsatisfactory", perhaps due to insufficient promotion and involvement of policy makers (Hörning 1999, p 356). A more positive outcome of the participation method was the broadening of the knowledge base of decisions.

Table 4.1: Summary of a number of public participatory methods (Rowe and Frewer 2000; UK House of Lords 2000).

Participation Method	Nature of Participants	Time Scale	Characteristics	Examples
Referenda	Potentially all members of national or local population	Vote cast at single point in time	Vote is usually a choice of one of two options. All participants have equal influence.	Switzerland
Public Hearing or Public Inquiry	Interested citizens, limited in number by size of venue. Experts and politicians make presentations.	May last weeks, months even years; usually held during working hours	Presentations by agencies; public may voice opinions but have no direct impact on recommendations	US and Australia
Consensus Conference	10-16 members of public randomly selected	Preparatory demonstration and lectures to inform lay panel; then three day conference	Lay panel, with independent facilitator, questions and expert witnesses chosen by stakeholder panel; conclusions made by report and press coverage	Denmark and Netherlands; undergone trials in UK, France, NZ, Australia, Canada
Citizen Juries	12-20 members of public selected by stakeholder panel	Generally involve meetings over a few days	Lay panel similar role to consensus conference but can show less initiative	Germany, UK, US
Public Advisory Committee	Small group selected by sponsor to represent views of various groups	Takes place over an extended period of time	Committee convened by sponsor to examine an issue; interaction with industry	Particularly US
Focus Groups	5-12 (6-8) selected to be representative of the public; several groups used for one project	Up to three meetings, usually up to two hours	Free discussion; little input from facilitator; may involve output stimulus	Switzerland, Germany, Austria, UK, Canada
Scenario Workshops	20-25 members, either from same or different locality	Local meeting; may last 1-2 days	Scenarios written prior to meeting are used as inspiration; to develop visions for future solutions and proposals	Netherlands, France, Greece, UK
Science Shop	Any member of the public, including interest groups, welfare groups and trade unions	May take months depending on nature of investigation	Science shop provides technical advice by drawing on university volunteers' expertise	Netherlands, Germany, Austria, France, Northern Ireland
Stakeholder Dialogues	Representatives of all stakeholders	Workshop lasting 1-2 days	Independent facilitator to encourage dialogue	Ireland, UK

Evaluation of Public Participation

The evaluation of public participatory methods is problematic. Few evaluation frameworks exist but, more significantly, difficulties arise when comparing initiatives with different goals and objectives. Some public participatory initiatives have specific goals, such as influencing a particular public policy, while others aim to stimulate general public debate. A number of evaluative frameworks have been developed in recent years in an attempt to evaluate and compare different public participatory methods. Different studies conducted to evaluate participation methods have reached the following conclusions:

i. Members of the public are capable of discussing complex issues competently and rationally, using their background knowledge to address public issues surrounding technology developments (Barns et al. 2000; Dürrenberger, Kastenholz, and Behringer 1999; Hörning 1999).

ii. The impact of public participatory initiatives on policy outcomes is difficult to evaluate (Cronberg 1995; Klüver et al. 2000; Rowe and Frewer 2000).

iii. Public participation is not a final solution to controversial policy decisions (Cronberg 1995; Klüver et al. 2000; UK House of Lords 2000).

iv. More than one participatory method should be used and different methods should be employed in different situations and for different topics (Klüver et al. 2000; Rowe and Frewer 2000).

v. The cultural context, size or heterogeneity of the population and political decision-making processes need to be considered when adopting and adapting public participatory initiatives (Joss 1998).

The different goals—some more achievable than others—of the many public participatory methods include: increasing public awareness, decreasing public concerns, evaluating public attitudes and values, presenting alternative paths, resolving conflict, influencing policy, and widening how an issue is framed (Joss 1998; Klüver et al. 2000; van Eijndhoven 2000). Deliberative participatory processes provide avenues for dialogue to occur between policy makers, social actors and members of the general public. The public participation methods reviewed in this section are not all deliberative in nature. Examples of top-down, one-way communication processes have been presented including education and information campaigns. Other examples of one-way communication processes, although down-top, are public opinion surveys, such as questionnaires, focus groups and polls. These methods are beneficial because of the large sampling opportunities; however, the validity of responses to these public opinion surveys can be limited. Traditional public consultation methods, such as an institution seeking written submissions based on a published document or a public hearing, although somewhat limited, are examples of two-way communication.

Evaluation Frameworks

As mentioned above, the different goals and types of communication of the various public participation methods make it difficult to draw meaningful comparisons between them. In order to do so different criteria have been developed to determine the effectiveness of an initiative and include its impact of policy making, the fairness, independence and competence of the initiative, its cost-efficiency, and representation of the population. No one initiative is better than another as the appropriateness of each depends on the specifics of the situation. I selected two frameworks from the literature in order to develop an evaluation framework to assess the DoELG's National Public Consultation on GMOs and the environment, BioResearch Ireland's BioDivulga Stakeholder Workshop and DoHC's Forum on Fluoridation. The two frameworks, referred to as the Rowe and Frewer framework and the EUROpTA (European Participatory Technology Assessment) framework, are briefly discussed.

These two frameworks are not the only ones to be found in the literature but were chosen for detailed review because they are the most comprehensive. Numerous authors, including Simon Joss and Arthur Brownlea (Joss and Brownlea 1999), Thomas Beierle (Beierle 1998), Michael Garland (Garland 1999), Kieran Keohane (Keohane 1999) and Alan Iwrin (Irwin 1995), have attempted to evaluate, or at the very least highlight, what they believe to be essential elements to be included in any initiative. Although the characteristics or conditions of these additional frameworks are not described in detail, elements of them are drawn upon in the construction of the evaluation framework presented in this thesis.

Rowe and Frewer Framework

Rowe and Frewer used the term 'public input' to describe ways that the public can participate in policy-making processes. They have included procedures that "elicit input in the form of opinions" such as public opinion polls and focus groups, as well as input acquired from deliberative procedures (Rowe and Frewer 2000, p 7). Rowe and Frewer argued that the two criteria needed to completely evaluate a public participation method are acceptance and process criteria. Their acceptance criteria, related to the effective construction and implementation of the procedure, have five components: representativeness, independence, early involvement, influence and transparency.

Acceptance Criteria

Representativeness refers to the type, number and range of participants, how representative of the general population they are, or whether they are an affected subgroup, and ease of attendance. Without representativeness, Rowe and Frewer argued, the credibility of the method would be undermined.

The management and facilitators of the initiative should be **independent**, as well as seen to be independent, and the participants should be independent of the sponsor. Rowe and Frewer suggested that a steering committee is one way to reduce the influence of the sponsoring organisation.

For greater acceptance of the final policy decision, the public should have **early involvement** in the policy-making process. However, Rowe and Frewer argued that too much involvement, or involvement at too early a stage, may intensify the arguments of each stakeholder and hinder the clarification of the issues.

Two of the main criticisms of public participation methods are their lack of **influence** on public policy and their formal ties with the policy-making process, resulting in "skepticism [sic] and distrust concerning the motives of sponsors" (Rowe and Frewer 2000, p 15). Rowe and Frewer suggested that a way to reduce these criticisms is to ensure that at the start of the procedure participants accept the methods by which outcomes will be used in the policy-making process.

In order to increase the acceptance of final policy decisions, all stages of the method and the nature of the decision making process should be **transparent**.

Process Criteria

The process criteria, related to the potential public acceptance of the participation method, involve four components: resource accessibility, task definition, structured decision making and cost effectiveness.

Rowe and Frewer stressed that unlimited **resource accessibility** is vital to allow the participants to fulfil their brief. These resources include information, time, witnesses or experts and equipment.

Clear guidelines and expectations should be published for tasks to be performed by participants at the outset to reduce the possibility of any misunderstandings. However, the **task definition** should be flexible enough to accommodate important new information.

The public participation method should utilise **structured decision making** so that the process of reaching the decision, as well as the decision, can be displayed for example in the form of documentation. This will not only assist in increasing the transparency of the process, it will also assist the participants in analysing material, drawing conclusions, working as a team and making decisions.

Rowe and Frewer argued that the method should be **cost effective** in terms of the level of importance of the policy decision.

Although these nine components of the two sets of evaluation criteria are appropriate tools to evaluate the effectiveness of a public participation programme, they are not exhaustive. The framework makes two assumptions that have an impact on its effectiveness. The first assumption is that all participants want the same things from the participation process. This is unlikely; for example members of the general public may accept a level of independence different to that of a particular interest group. Secondly, Rowe and Frewer framed the issues of interest as scientific and stated that for highly technical issues it might not be 'sensible' to involve the public in the decision-making. They argued that not all situations warrant public involvement. However, all issues, no matter how technical, will have some impact on society, and to exclude the public from participation in these issues loses sight of the fact that members of the public should be involved, not because of their technical expertise but for their expertise as citizens. Furthermore, Rowe and Frewer were cautious of premature public participation, which they considered might hinder the policy process. However, the timing of a participation initiative does need to be considered, in order to optimise its role in the policy-making process. The selection of an appropriate participation process to complement the type of input required at the time would be a more sensible approach that not having any public participation at all.

EUROpTA framework

The second framework selected takes a three-layered approach by addressing societal surroundings, the institution's setting and the TA method itself. The advantage of the EUROpTA framework is that it incorporates both micro levels of participation, such as individual contributions, and macro levels of participation, for example organisational interests and societal perspectives.

Societal Context

The societal context of the framework questions the political culture and traditions of the area and the impact that these will have on implementation of the outcomes of the public participation method. The three aspects included in the societal context are the state's level of technological innovation and development, its political traditions and the involvement of the public in technological controversies.

Institutional Context

In order to evaluate public participation methods, the involvement of the organising institutions, the structure of the institution and its approach to public participation were included in this second dimension. The types of institution evaluated in the EUROpTA framework were those whose purpose is technology assessment. In Ireland the responsibility of technology assessment lies with respective government departments, as there is no one body assessing all issues with a technological or scientific basis.

Participatory Technology Assessment (PTA) Arrangement

The third dimension, the PTA arrangement, was the focus of the EUROpTA project and consisted of three parts: the set-up and process of the PTA method, its aims and objectives and, finally, the products of the PTA and the impacts they had.

The first part refers to the type of physical set-up and communication processes of the PTA, including:

i. *design*: whether the project has political or indirect aims;
ii. *participants*: the number, type and representativeness of the project;
iii. *interactions* between participants and experts and the rules of communication; and
iv. *unintended events* that management have to contend with, such as changes in government, media campaigns or other new developments.

The values, assumptions and goals of the PTA arrangement, arising from the type of type of conception of technology assessment, the political system and the type of involvement of science and technology, form the second part of the EUROpTA project. The research team highlighted the fact that the choice of the PTA varies depending on the issue and these three underlying elements. To investigate the values, assumptions and goals involved in PTA the EUROpTA team distinguished between problem definition,—by social actors and policy makers, definition of participation—the role of participants and the expected outcome of participation and the rationale for PTA—the criteria used by the institution to decide on a PTA.

The final part of the PTA arrangement was the impact of PTA in terms of outcomes and results. The outcomes are physical outputs such as a concluding written report, a vision or a decision. The results are the effects of these outcomes, whether direct or indirect. Indirect results, such as a scientist gaining a better insight into the social dimensions of his or her specialist area, may be immeasurable.

The model also allows for evaluation of the influence that the three dimensions have on each other. This model is the more thorough of the two frameworks presented and provides the backbone of the evaluation framework that will be used in the evaluation of three recent Irish events.

Evaluation Outcomes

The two frameworks presented above were the result of different research agendas. Rowe and Frewer set out to evaluate individual public participation methods in order to measure their strengths and weaknesses, and their quality of output. The EUROpTA research team used case studies of sixteen public participation initiatives to understand the role of participation in policy making and did not score the various initiatives in order to compare them against each other. Because of these differences the findings of the two frameworks cannot be compared. However, both contributed to the framework devised for this research. To begin with I will explore the outcomes of Rowe and Frewer's research, and then the findings of EUROpTA.

Rowe and Frewer's research rated public hearings as low for both the acceptance and process criteria. Referenda and public opinion surveys rated well on acceptance criteria—they seem to be credible to the public—but scored low on process—poor quality decisions appear to arise from their results even though their influence would be high due to the large percentage of the population represented. This finding suggests that referenda would be inappropriate for the most complex, multi-faceted decisions and public surveys might be useful exploratory tools. Consensus conferences were rated 'high' in both the acceptance and process criteria, but the evaluation pointed to possible improvements in the selection of participants and the working relationships of the group. Rowe and Frewer concluded that no one method was the best, hybrids could be useful, and a combination of methods would complement each other.

The EUROpTA researchers also noted that there is no ultimate public participation method due to numerous factors including societal aspects and the aims and objectives of particular processes. The EUROpTA research team distinguished between three types of technology assessment: classical TA, where only experts and researchers within the policy institution are involved in policy making, expert/stakeholder PTA, when outside experts and stakeholders have a central role, and public PTA when lay citizens are involved in the policy-making process. The researchers found that new scientific or technological developments with many uncertainties and visible public debate were often assessed using public PTA. This approach would not be adopted when the science is less uncertain or is not the central cause of the concern. The EUROpTA team found that the type of method chosen depended on the way the policy institution analysed the issues, considering the type of technology involved, the type of problem caused in society and the level of public involvement with the issue.

Generally the EUROpTA research team found that institutions that had implemented public participation were satisfied with the results and many were actively pursuing the same or other such initiatives. However, there was little evidence that the initiatives had any influence on the policy-making process. One of the recommendations of the EUROpTA team was to develop new methods that directly involve decision-makers in the participatory initiative.

The research collaboration concluded that "classical TA has certain limitations regarding social functions and credibility in comparison with participatory TA [and] generally TA methodology ought to be complemented with participatory measures" (Klüver et al. 2000).

Original Evaluation Framework

The evaluation criteria presented below provides the framework that was used in the empirical study of three public participation initiatives conducted in Ireland during the past four years. The evaluation framework has two dimensions, the societal context and the public participation arrangement. The EUROpTA model had an additional dimension, which has been excluded in this evaluation framework, because it primarily deals with Technology Assessment Institutions. Ireland has no formal TA bodies; however, the relevant criteria of this dimension have been included in the societal context. Figure 4.1 provides a general overview of the evaluation framework and indicates using arrows the relationships between some of the criteria and each of the two dimensions.

Societal Context

The first dimension—societal context—addresses science and society issues, specifically how science is governed, the history of the policy institution or institutions involved in the issue of interest, the level of public awareness and the types of uncertainty that the issue raises.

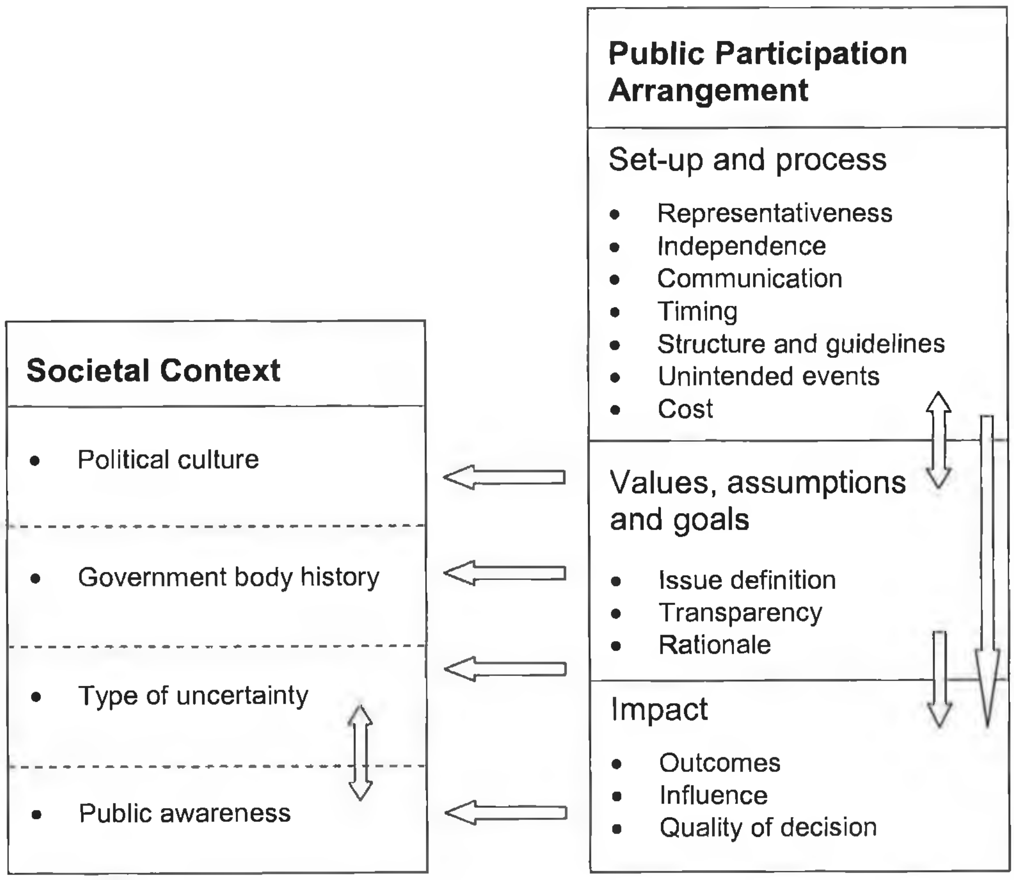


Figure 4.1: The original evaluation framework for the evaluation of public participation initiatives

Political Culture

The evaluation focuses on both science policy and the political environment. The political culture has a determining effect on the level of citizen involvement in the policy-making process. Areas of interest are the government's approach to science, the level of politicians' interest in science and the balance between the regulation and promotion of science.

History of Government Body

The publics' previous experiences with, and their perceptions of, the involved policy institution play an important role in its acceptance of a process and its outcomes. For example, the level and type of public involvement and consultation that have occurred in the past both influence the acceptance of a process. This history is important in terms of trust building and whether or not an institution is perceived to be credible and legitimate.

Uncertainty

In the previous chapter the different breakdowns of uncertainty, according to Wynne, were introduced. Risk, uncertainty, ignorance and indeterminacy of expert knowledge will have an effect on how the issue is presented to the public and how arguments are constructed. The level of uncertainty will have a bearing on the experts and the material that is presented at the public participation initiative and how credible it is deemed to be.

Public Awareness

The number and range of social actors, the level of public awareness and the nature and level of a controversy will vary according to the issue. These factors may be important in how the policy institution decides if or when to initiate public participation.

Public Participation Arrangement

The second dimension of the evaluation framework is the public participation arrangement. The term arrangement was chosen for the same reasons as in the EUROpTA model; firstly it is more than the choice or structure of the participatory method and, secondly, there may be more than one participatory event or participatory and non-participatory events may be coupled. The three groups of criteria in this dimension are the set-up and process of the initiative, its underlying values, assumptions and goals and the resulting outcomes of the public participation initiative.

Set-Up and Process

The first group of criteria is related to the structure and implementation of the initiative and the type of communication and interaction encouraged between participants. The seven components, which are each dealt with separately, are representativeness, independence, communication, timing, structure and guidelines, dealing with unintended events and cost efficiency.

Representativeness refers to the number, type and range of participants. The participants can include members of the general public, lay experts, experts, key social actors, stakeholders and policy-makers. Different initiatives require different levels of representativeness. For example, a contested issue may concern a large proportion of the general public compared with a local issue where only a limited number of affected groups is interested. However, all viewpoints should be taken into account for true representativeness. Various selection methods can be used to ensure a diversity of participants. However, the focus will not be on the selection methods but on how biases are avoided or at least taken into account.

The **independence** criterion is two-fold; participants should be independent and the management of the participation process should be independent as well as seen to be independent. There should be no connection between the participants or the management and the sponsoring organisation. A facilitator and steering committees are useful in maintaining this independence.

The **communication** that occurs among all participants reflects the atmosphere of the public participation event. The type of communication—such as direct, facilitated, one-way, dialogue, formal presentations, conversation or written— between the participants varies according to the public participation initiative. The important outcome is that all of the participants feel able to communicate on an equal basis and that an understanding of their different perspectives is achieved.

The **timing** criterion refers to when the public participation method is organised in relation to the length of the controversy and time frame of the policy decision. The two points of emphasis of an evaluation using this framework are the appropriateness of the chosen initiative or initiatives in relation to the level of controversy and public awareness and the time required to organise and conduct the participatory measure within the timeframe of the policy process.

The **structure and guidelines** of the public participation initiative should enable each of the participants to be fully aware of their role and the link between the initiative and the policy-making process. A structured and organised event will enable the participants to demonstrate how their decision was reached and will help to maintain their focus.

The criterion above also needs to be flexible enough to accommodate any **unintended events** that may occur during the public participatory procedure. Examples of such unintended events are a change in government, new research, campaigns by non-involved social actors and media coverage. An unintended event may be highly influential in predicting the success of the participation initiative.

The criterion of **cost** refers to the appropriate selection of the participatory initiative for a particular policy decision. Prior to the organisation of a participatory process the potential costs, in terms of time and money, should be evaluated to ensure that complete and successful implementation of the process can be achieved.

Values, Assumptions and Goals

The values, assumptions and goals—the second group of criteria of the Public Participation Arrangement—brought to bear on public participation and individual methods originate with the political culture and the history of the policy institution. These in turn shape the conception, organisation and implementation of the initiative, and its outcomes. This group of criteria distinguishes between issue definition, rationale for public participation and transparency.

The **issue definition,** or how the policy institution considers an issue, will have a bearing on the participation initiative and the way the issue is addressed. The way the policy institution defines an issue will also influence how members of the general public and social actors, who have their own values, assumptions and goals, respond to the participatory method.

The **rationale for public participation** refers to the policy institution's reasons for choosing public participation and the particular participation method or methods. Determining why an institution decided to implement public participation is difficult to measure if there are no clear objectives. The objective of an initiative may be to increase the democratic process, to reduce conflict or to increase the knowledge base. The choice of the participation method may also be difficult to determine, although more factors will present to enable this choice to be elucidated. For example, if the policy institution frames the issue as scientific then greater emphasis may be placed on allowing technical input. However, if there was a perceived lack of public awareness, the method chosen would lend itself to increasing information and access to it.

Transparency refers to all elements of public participation including how the method was chosen, how the decisions during the public participation initiative were made and what the policy institution does with the results of the initiative.

Impact

The final group of criteria relate to the impact of public participation, and are the most difficult criteria to evaluate. To assist in the assessment of the impact of public participation the following criteria have been distinguished outcome, influence and quality of decision.

The **outcomes** of the public participation initiative refer to the process itself, such as the discussion, deliberation and assessment, the physical output, such as a written report or a recommendation, and the public recognition of the process including any resulting media coverage.

The **influence** of the outcomes on further public debate and the policy-making process may be direct or indirect. For example, the written report of a public participation initiative may not be enough to influence the policy process, however, together with any further public debate resulting from participation initiative the two may have a synergistic effect on the policy-making process.

The impact of public participation on the **quality of the decision** is difficult to assess as it is difficult to define what constitutes a better decision? However, if a decision is made with a larger knowledge base, and there is evidence to suggest that this has occurred, then this supports the objective of having greater public participation.

Discussion

Public participation refers to the inclusion of members of the general public, social actors or anyone who is not an expert in the policy-making process. The term public participation has a variety of interpretations because of the different definitions that are given to 'public' and 'participation'. Different terms are also given to public participation depending on the country and type of institution implementing the public participation initiative.

Over the past ten years the number of public participation initiatives involving science content has increased in countries without a history of this type of policy making. Some countries have adopted approaches used elsewhere, while others have evolved their own initiatives that may be more suitable to their individual political culture. The Irish government has acknowledged the growing interest in participatory methods, but has yet to implement such procedures.

There are many different methods of public participation ranging from the Netherlands' innovative science shops to more traditional style public hearings, which are frequently adopted in the USA. Consensus conferences, originating in Denmark, are one of the methods more commonly imported by different countries throughout the world.

The five main arguments supporting the use of public participation methods are to improve the democratic process of policy making, to broaden the knowledge base of decision making, to make better decisions, to reduce conflict and to increase levels of trust of the policy makers. Evaluation frameworks have been established to determine if public participation methods can achieve such goals. Research into public participation initiatives has found little evidence to support any direct impact on policy making in countries where the participation initiative was not formally linked to the policy-making process.

These findings do not devalue participation initiatives, however, as the benefits of such initiatives, including increasing public awareness and social learning, were also perceived. Public participation can be used as a complementary tool in policy making to determine public opinion, explore expert, stakeholder and lay knowledge, and increase the role of citizens in a democratic environment.

Whilst considering these arguments in support of participation, it is pertinent that new methods be developed to ensure that policy institutions listen to and include the contributions made by the participants of participatory methods. Participation will not truly be participation until policy institutions stop systematically defining public issues as scientific (Wynne 2000). If this framing continues to occur certain members of the public and social actors could be isolated from the participatory process.

The framework presented in this chapter consists of two dimensions, containing a total of 17 criteria. One of these criteria is how the policy institution defines the issue. The use of this framework, from the initial development of a public participation programme, will highlight 17 essential elements that need to be considered when undertaking such an initiative. The use of the framework in the early stages of an initiative will enable the more difficult criteria, such as rationale and outcomes, to be applied to the initiative.

The evaluation framework described in this chapter will be used to assess three initiatives in Ireland. This assessment is presented in Chapter Seven. The next chapter provides the background of two case studies—genetically modified foods and water fluoridation—before describing the research methods used.

Part C

Two Original Case Studies

Chapter 5

Background & Methodology

Data were collected and analysed at different stages throughout the two case studies—GMOs and water fluoridation. This chapter provides an understanding of the events leading up to or during the policy-making process for each of the case studies, before describing the methods employed to explore the three objectives of my research (see Table 1.1).

The chapter is divided into three sections:

i. GMOs;
ii. Water Fluoridation; and
iii. Public Participation Evaluation.

The third section, the evaluation of public participation programmes, takes examples from both the GMO and water fluoridation controversies.

Each of the possible research methods that could be chosen will reveal different facets of the same situation. To increase the depth of understanding of the area of study a triangulation technique—combining several research methods in one investigation—was used. Table 5.1 summarises the methods used in my research, the samples used and their corresponding sample sizes.

Table 5.1: Research methods and samples used in each case study to achieve the three key objectives of the research

Method	Sample
Case Study One—GMOs	
i. Combined Media Sample I	All articles *The Irish Times* articles (N=430) *The Irish Times* Letters to the Editor (N=66)
ii. Before Public Consultation	
1. Media Sample II	Articles and letters (N=64+22)
2. Questionnaires	Social Actors (N=102)
3. Interviews I	Social Actors (N=44)
iii. The Public Consultation	
1. Analysis of Documentation	The *Consultation Paper* Submissions to *Consultation Paper* (N=186) Report of the Chairing Panel Report of IDGMB DoELG documents requested under Freedom of Information Act (N=5)
2. Analysis of Recordings	Presentations and Questions
iv. After Public Consultation	
1. Interviews II	Social actors involved in consultation process (N=12)
2. Media Sample III	Articles (N=14)
v. BioDivulga Workshop	
Analysis of Documentation	Transcription of workshop Workshop Report
Case Study Two—Water Fluoridation	
i. Review of Information Material	Brochures and Websites
ii. Informal Meetings	DoHC, DHF (N=6)
iii. Focus Groups	Members of Public (N=9 groups or 62 participants)

Genetically Modified Organisms

A number of research methods were adopted during different stages of the controversy to generate an understanding of the different types of social actors who contributed to public discussion and who could potentially influence the shaping of public policy on GMOs.

Before discussing the methods used and why they were chosen, I will provide a brief description of the events during the controversy to highlight the different stages of data collection.

Background

Genetically modified organisms include plants, animals, bacteria, viruses and fungi which have been altered either by changing or adding new genetic material in a way that does not occur naturally. Several reasons for genetic engineering food and food crops exist. Examples include ensuring resistance to frosts, insects or herbicides, attaining longer shelf life, reducing the cost of food production, improving yields and improving the nutritional value of the food. However, the introduction of unlabelled GM foods into the EU started a wave of controversy.

In 1996, prior to the EU labelling regulations, GM soya and maize were imported into Europe from North America. The soya and maize were non-segregated, that is they were mixed with non-GM products. Until May 1998, there were no formal EU regulations for a labelling system. However, labelling of GM maize and soya is now mandatory and is enforced through testing the DNA and protein content of the food substance. Ingredients such as starch and vegetable oils (which contain neither DNA nor protein) that have come from a genetically modified plant are exempt from labelling. Environmental and consumer groups believe that the EU proposals are insufficient as many processed foods containing GM-derived products will not be labelled. In April 2000 new EU regulations stated that a product with at least one percent of GM or DNA material must be labelled, including those containing GM-derived additives and flavourings. In Ireland the Department of Health and Children is responsible for enforcing labelling on GM foods.

When GM soya and maize were first introduced to Ireland the Green Party, health food stores and environmental groups raised some concerns, however, general public awareness of the new GM foods was low. The main trigger for controversy occurred in December 1996 when the EPA received its first notification of a deliberate release of a GMO into the environment by the US chemical company Monsanto[36]. The GMO was a sugar beet plant that had been engineered to be tolerant to one of Monsanto's herbicides. The EPA placed a notice of Monsanto's request in a newspaper local to the crop trial and received 189 representations, representing over 400 signatures[37]. In May 1997, the EPA granted permission to Monsanto to test the GM crop, subject to conditions.

The approval of the test crop prompted the formation of Genetic Concern, an alliance of Irish environmental and citizen groups, in April 1997. Genetic Concern was a small interest group with 3 or 4 full-time members committed to the campaign. One of these members, Clare Watson, was an experienced campaigner in environmental causes and AIDS education and had recently written a book on how to win campaigns (Watson, Cadhla, and Dhurcain 1997). Watson sought a judicial review of the EPA's procedure in granting a licence to Monsanto. Watson claimed that the licence was not granted in accordance with EU regulations on the deliberate release of GMOs. The court case

[36] In 1994 the EPA was designated the competent authority to implement the two directives, 90/219/EEC and 90/220/EEC, that cover the release of GMOs. The EPA is obliged to assess applications, officially referred to as 'notifications', for contained use and deliberate release in Ireland and maintain a register of GMO users in the country.
When a competent authority receives notification of a deliberate release of a GMO, the procedures outlined in Directive 90/220/EEC must be followed. In Ireland, the EPA has the responsibility to evaluate the level of risk and the information provided on the GMO, review the location of release and monitor plans for waste and emergency. A notice is to be placed in a newspaper within 21 days, inviting members of the general public to make submissions. The competent authority must make the decision whether to accept a notification within 90 days, unless otherwise stated. The EPA's GMO Advisory Committee advises the agency on such notifications.
If the competent authority receives a notification to place a GMO-derived product on the market under the Directive 90/220/EEC, and agrees to the marketing of the product, all details must be forwarded to the European Commission. The Commission circulates the notification to all member states, which then have an opportunity to object. If a decision cannot be reached between the member states, the matter is forwarded to the Commission, which is assisted by a committee which votes on the notification.

[37] The vast majority of the representations objected to the crop trial. Many of the representations were letters that had been photocopied from three original sources. It was later determined that one member of the Green Party had seen the notification and organised a response.

received extensive media coverage, raising the profile of Genetic Concern and the battle it was fighting. (In October 1998 this action failed when the High Court ruled that the EPA had not failed to implement an appropriate standard when granting consent to Monsanto.)

Further publicity for the anti-GMO lobby was brought about when the Gaelic Earth Liberation Front (GELF), destroyed Ireland's first GM crop in late September 1997, shortly before harvesting. Genetic Concern commended GELF's actions, but stated that it was not involved and would not use illegal measures in its campaign.

During 1998, the EPA received two further notifications of GM sugar beet field trials from Monsanto, one of which was withdrawn. Over 3 400 representations were made by members of the public to the EPA regarding the second GM crop trial, and this crop was (again) mostly destroyed by environmental activists. Since 1996, public awareness of GMOs had clearly increased.

Prior to the 1997 election, Noel Dempsey and Joe Walsh (who subsequently became Ministers for Environment and Agriculture, respectively) issued a Fianna Fáil press release calling for a moratorium on GMOs. Once in government Dempsey was unable to deliver his promise stating that, because of EU legislation, a moratorium on GMOs would be illegal. However, he did announce plans for a public consultation process to establish Ireland's stand on GMOs, the results of which would be presented at the EU negotiations on the amendment of a GMO directive at the end of June 1999.

In August 1998 the Minister for the Environment and Local Government issued a consultation paper initiating the national consultation on GMOs and the Environment (Department of the Environment and Local Government 1998). The paper attracted 186 responses from members of the public and interested organisations, who were then invited to a two-day public debate held on 25 May and 3 June 1999.

A report written by the Chairing Panel was released in October 1999, and concluded the DoELG consultation process (Department of Environment and Local Government 1999). The report was released three months after the meeting of the Environment Council of Ministers where Dempsey was meant to present the 'democratically-decided' national policy on GMOs. The outcome of the vote at this meeting, from which Ireland abstained, was a suspension of all new commercial releases of GMOs until revision and implementation of new legislation, probably until 2002. The Chairing Panel's report recommended that the Inter-Departmental Group on Modern Biotechnology (IDGMB), approved by government in March 1999, coordinate an overall government position on GMOs and other applications of biotechnology. The IDGMB released its report in November 2000. Both reports were sympathetic to the continued development of GMOs in Ireland.

There has been controversy throughout the world over the introduction of GM foods and crops. India, Australia and many countries in the EU, including Ireland, have all joined this controversy. However, events in Britain most heightened the perceptions of the Irish public because of its access to British media, primarily their newspapers. During 1998 and 1999 there was extensive coverage of the controversy surrounding GMOs in the media, some of it involving Prince Charles, Dr Pusztai, Tony Blair, Lord Sainsbury and the supermarket chain Iceland. In the UK, France and Australia, to name a few, GM crops and produce were also destroyed by activists. Numerous legal actions were taken, including that of Guy Watson, a British organic farmer who took legal action to halt a field trial of GM maize because of the possible danger of cross-pollination of his organic crop. In Austria more than 1.2 million of the country's 8 million citizens signed a petition in April 1997 calling for a ban on the production and sale of GM food. In Austria's referendum a clear majority voted against genetic technology. Switzerland also held a referendum, in June 1998, in which over 65% of the voters voted against the restriction of genetic research. Had the vote gone the other way the government would have been obliged to stop production and use of all GM plants and animals.

During 2000 and 2001 the intensity of interest groups' campaigns and media coverage lessened. Genetic Concern disbanded in April 2000, due to lack of resources, and its two founding members retreated to an organic farm in West Cork. The business manager of Monsanto no doubt has more time to spend managing the company's Irish branch instead of presenting at public debates throughout Ireland. However, the controversy is not over.

Methods

The research methods described below are those chosen to explore the controversy surrounding GMOs. The sources of data are divided into five sections by time or event:

i. **Combined:** this time period encompasses all four sections below, including newspaper articles and Letters to the Editor published between November 1996 and November 2000.
ii. **Before the National Public Consultation:** this section includes 44 interviews conducted between February and April 1998 and media coverage from 19 November 1996 until the interviews were completed;
iii. **The National Public Consultation Process:** this stage includes the release of the Department of Environment's consultation paper, *GMOs and the Environment,* in August 1998, the two day public debate and the release of the two reports prompted by the consultation process;
iv. **After the National Public Consultation:** this refers to the period immediately after the two-day debate, when interviews were conducted with the presenters of the two-day debate, as well as the reaction of the media; and,
v. **BioDivulga Workshop:** this workshop was conducted in April 2000 on behalf of BioResearch Ireland and is one of the public participation initiatives evaluated.

Table 5.1 summarises the research methods and samples for each of the five stages, and each method will be addressed as it appears in the table.

The evaluation framework, developed and presented in Chapter Four and applied to the National Public Consultation and the BioDivulga Workshop, relied on data collected in the five stages listed above. The evaluation framework is addressed in the last section of this chapter, as it relates to both the GMO and water fluoridation controversies.

Analysis of Combined Media Sample I

Newspaper coverage of GM food was analysed in order to determine the types of issue raised. A second objective was to analyse whether or not the media provided an avenue for social actors to raise the social and moral issues identified in the in-depth interviews.

The analysis conducted in this thesis did not attempt to determine how themes were addressed, for example whether the ethical aspects of GM foods were covered in a positive or negative light. The themes identified in the media analysis of the combined media sample were compared to the themes identified in the interviews and the public consultation processes and their resulting documentation. The media coverage of GM foods was analysed using the social research method of content analysis.

Bernard Berelson was a pioneer in describing this method and stated that "content analysis is a research technique for the objective, systematic, and quantitative description of the manifest content of communication" (Berelson 1952). Many other researchers have offered further definitions of content analysis since but these tend to include three common concepts. I will use Kerlinger's terminology to explore the three concepts: systematic, objective and quantifiable (Kerlinger 1986).

Systematic techniques were applied to the selection of my sample and to the coding and analysis of the data. First I will describe the selection process of the sample. The articles and letters selected for this content analysis included references to genetically modified food, crops and animals for eating. The sample does not include articles or letters about the genetic modification of animals involved in xenotransplantation or cloning, such as ANDi the monkey that had a jellyfish gene inserted into its genome. Nor does it include GMOs that will clean up oil spills. The range of topics included in the sample was field trials and resulting protests, government policies and reports, pressure group campaigns, latest research findings and public debates and consultations.

The source of data was 745 newspaper articles and 120 Letters to the Editor published between November 1996 and November 2000. The majority of the articles and letters were from three newspapers *The Irish Times*, *The Guardian* and the *Irish Independent*. *The Guardian* was chosen because of its committed coverage to environmental issues. As the pile of clippings began to grow so too did my interest in the types of issue that were being reported in the media. I felt that the clippings would reflect the types of issue that social actors were raising. Other newspapers were sampled at times when the GM food issue received extensive coverage, such as the UK's *Daily Mail* when it published an article written by Prince Charles on his concerns about GM foods and crops. A total of 25 newspapers was represented in the entire collection.

The Irish Times is the only newspaper to have been sampled comprehensively over the four years, and it is therefore the only newspaper analysed quantitatively. Articles and letters from other newspapers are used as examples to illustrate how certain events and topics were reported. *The Irish Times* was selected because of its consistent coverage of the GM food issue, which was due to the designated journalist, Kevin O'Sullivan, the Environmental and Food Science Correspondent. As a result of this consistent coverage it was assumed that *The Irish Times* would be the paper most frequently targeted by the social actors interested in GM foods.

The first Letter to the Editor in *The Irish Times* sample was published in February 1997 and the first media article in November 1996. These were the first mentions of genetically modified foods in relation to Ireland's food chain and environment. Prior to 1997 a handful of articles about GM foods in Europe and the USA had been published. The final letter and article of the sample were published on 22 November 2000. This date was selected because it signalled the end of the DoELG's National Public Consultation process and was the date on which the release of the IDGMB report was discussed. The two samples of articles from *The Irish Times* and Letters to the Editor are presented in Appendices A and B, respectively.

A search was conducted using the powerful searchable directory of online sources, *LexisNexis*, to complete my sample of *The Irish Times* articles and letters over the four-year period. The initial search phrase used was "GM* AND food*" and received 355 hits. These articles and letters were cross-referenced with my physical media collection to determine which of the articles and letters were not retrieved in the search. Further searches were made and cross-referenced with my physical sample and the process repeated until no new articles or letters were found by the search directory and all but five articles of the physical collection had been retrieved[38]. The other search strings used were "genetically modified (food* OR crop*)", "field trial* AND beet*" and "Clare Watson". The final search on Clare Watson was to ensure that the search selected articles surrounding the lawsuit instigated by Clare Watson against the EPA.

[38] The five articles that were not selected by the online search but were present in my physical collection were about events that involved genetic engineering but did not specifically mention GM food/crops in the text. The events were reported in other newspaper articles, of the same day, which were selected by the online search. The events were the Genetics Symposium organised by Trinity College, Dublin, the Swiss referendum on genetic engineering and destruction of a field trial crop.

The online search selected articles and letters that were not included in the sample because either “GM” did not refer to the words “genetically modified”, for example when it referred to “General Motors”, or GM foods were not the primary focus. Weekly news or television reviews, roundups, or stories that mentioned GMOs in passing were not included. An example of the latter is a report that mentions the title of one of the winning entries of the Irish Science and Technology Journalists’ Awards.

Systematic techniques were applied to the coding of the data. Miriam McCaul, a student doing work experience with Brian Trench, a Senior Lecturer in Science Communication at DCU, assisted me in the initial sorting and coding of articles and letters until May 1999. Additional articles and letters collected after this period were regularly added to the sample. I redid all of the coding initially done by McCaul.

The units of analysis in this content analysis were themes identified in the media coverage. An inductive qualitative method was used in the identification of the media’s themes, that is the themes were decided on from the data, not from previously existing theories. This method is often used in qualitative research, not just in media studies. It would be remiss not to highlight the influence that coding the in-depth interviews, which was conducted prior to the analysis of the newspaper articles and letters, had on identification of these themes. Although I was aware of themes surrounding GMOs from the analysis of the interviews these themes were not used in coding the newspaper articles or Letters to the Editor. The articles were first coded according to themes and then the Letters to the Editor were analysed using the same approach. The total sample of Letters to the Editor is provided in Appendix B.

A small random sample of articles was selected in order to identify the draft themes. Once these had been decided McCaul and I worked together, systematically reading the articles and discussing the themes of each one. As we read more articles different or alternative themes emerged. The final eight themes chosen were: consumer, health, environment, policy and regulation, public awareness, social and moral, protests and campaigns, and research findings. To ensure that the coding of the data into themes was consistent a reliability check was conducted once all articles had been coded. Once the themes were decided upon, data were entered into a Microsoft Office Access database.

The data were also coded according to date, page, section of newspaper (such as Home News, Weekend, Opinion and World News), headline, by-line, format and quoted sources. The five different article formats were news reports, news briefs, features or analysis, editorial opinions and individual opinions.

The second concept of content analysis, as defined by Kerlinger, is objectivity. A researcher's own biases should not affect the outcome of the investigation. Content analysis can never be free of value judgements, however, a researcher can strive to ensure that their results are repeatable by another researcher. If this is not the case the results may not be valid or reliable (Gunter 2000). I have provided details of the eight themes, listed in Table 5.2, to ensure that other researchers can replicate my work.

A different thematic breakdown was used for the Letters to the Editor. Although the letters and articles addressed the same events surrounding GM foods, and the letters often addressed the media coverage, their emphasis was slightly different. The letters were coded according to eight separate themes[39], some of which were identical to the themes established for the articles: environment, uncertainty of science, making policy, scientific discourse, public information, social and moral, and health. The definitions of these themes are described in Table 5.3.

Multistage sampling in data analysis involves at least two stages. The first stage takes a sample of all data sources, the next stage further focuses on a particular sub-section of the original sample and this process continues until an appropriate source for the analysis is found. It is important in the first stage that the selection includes a wide range and variety of messages. In this content analysis the first data source was a combination of the letters and articles from all newspapers; however, this sample was too large to analyse. The next stage focused on *The Irish Times* and split the Letters to the Editor and articles into two separate databases. The content generated by the GM foods media coverage in *The Irish Times* over the four-year time period was small enough to analyse (Gunter 2000). After coding the articles into the eight themes the sub-sample within the social and moral categories were re-coded into six sub-themes: world hunger, industry involvement, trade and employment, science dimensions, nature and politics.

[39] The fact that eight themes were chosen for both newspaper articles and the Letters to the Editor was a coincidence.

The final concept of content analysis, as defined by Kerlinger, is that it should be quantifiable, in that the aim of the study should be an accurate representation of the content's messages. The text being counted should reflect the messages within the units of the sample. Some question how well quantitative content analysis can produce actual understanding of the content and argue that qualitative analysis can also be used, albeit with smaller amounts of data (Altheide 1996). In this analysis both qualitative and quantitative methods were used. This approach was deemed appropriate because meanings conveyed in the text would have been lost if the study was solely quantitative.

Table 5.2: The themes and definitions of articles found in *The Irish Times*

Theme	**Definition**
Health	Public safety Benefits
Environment	Superweeds Herbicides Benefits Contamination Wildlife Biodiversity
Research Findings	Latest research – biological, chemical, medical, social, environmental etc
Consumer	Labelling Consumer choice Food store responses
Protests and Campaigns	Destruction of crop trials Judicial reviews General campaigns Lobbying (pro and anti)
Public Awareness	Public awareness/understanding Public opinion/confidence Public debate Public information (including access) – not labelling issues
Social and Moral	World hunger and developing nations Industry involvement Trade and employment Process of science Nature Politics
Policy and Regulation	Applications for crop trials Specific policy/legislation Consultation (other than the public debate) Calls for moratorium

Table 5.3: The themes and definitions of the Letters to the Editor of *The Irish Times*

Theme	Definition
Health	Dangers, benefits
Consumer	Labelling
Environment	Biodiversity, pesticides, gene transfer
Making Policy	Bias of government Lack of public involvement Global/EU pressure Reneging on political promises Conflict of interest
Uncertainty of Science	Unknown consequences Previous mistakes Selective evidence Acceptance of risk
Scientific Discourse	Blind faith in scientific method Misrepresentation of science/uninformed scientific opinions/misuse of science for political gain Arrogance of scientists
Public Information	Undemocratic lobbying Unbalanced media reporting Public information events Government role in providing information
Social and Moral	Animal welfare Nature/God's work/natural Industry involvement World hunger and developing nations Commercialisation of research

Before the National Public Consultation

The research data collected in this stage, before the National Public Consultation, originates from a research project I began in October 1997 with Brian Trench, funded by the Royal Irish Academy. The research project investigated any issue that arose from the application of biotechnology, culminating in the production of the report *Genes on the Agenda* (Barbagallo and Trench 1999). At the time of writing the grant proposal for the research project, the birth of Dolly the Sheep had recently been announced to the world and I thought the focus of my research would be on cloning. However, by the time I started the research GMOs were arousing the most interest. The data collection methods for this research stage consisted of questionnaires and interviews on subjects not limited to GMOs. However, the vast majority of respondents and participants were primarily interested in GMOs. The data analysed for my doctoral research were collected only from interviewees interested in GMOs.

Sampling

In order to explore who was interested in trying to influence the policy-making process a list of associations, organisations and individuals who had already shown, or who were expected to have, an interest in issues involving science or technology was developed. The list was started by reviewing recent media coverage of issues arising from science, specifically looking for spokespeople of organisations.

I continued identifying potential interviewees by scanning the Institute of Public Administration (IPA) Yearbook and Diary, the white and yellow page telephone directories for charities, political parties, government departments, industry, state bodies and religious groups who may have an interest in this area. This task was more difficult for me than I had imagined because of my inexperience with Ireland's political system, state bodies and the voluntary sector. However, as I began telephoning potential participants and questioning them about their own organisation, they suggested various other organisations and individuals to contact.

As the list of interviewees grew the individuals and their organisations were grouped into different categories to ensure that a range of interests were included. To begin with more than fifteen categories were listed, however, after various trials with different categorisations ten final categories were decided upon. These categories reflected the range and diversity of organisations interested in applications arising from biotechnology. The final ten were:

i. citizen groups[40] (including consumer and environmental groups);
ii. farming groups;
iii. food supplier groups (including manufacturers, distributors and retailers);
iv. government bodies;
v. individuals;
vi. biotechnology industry;

[40] This category was so called because groups that I had assumed to be environmental called themselves citizen groups. For example Friends of the Earth campaign to reduce energy consumption, not only for environmental reasons, but also for health reasons and lifestyle issues such as traffic jams.

vii. political parties;
viii. professional groups;
ix. religious groups; and
x. research centres.

Initially an objective of the research was to find out how members of the public influenced policy-making. I proposed that the process of interviewing groups in the above categories would determine this objective. In some ways it did, however, I made two assumptions. The first was that I considered the members of groups in the defined categories as members of the general public. However, these participants were not the members of the public as I had originally defined it, such as the equivalent of my aunt, neighbour or husband's boss. The members of the public in categories listed have a reason to be involved in their chosen group, whether it be a necessity or a choice. The assumption made was that if any members of the (general) public had an interest in GMOs they would become involved in an interest group. This assumption was incorrect. An environmental group may have subscriptions from members of the (general) public; however, very few of these would be actively involved in the day-to-day operations of campaigning to influence public policy. Furthermore, as discussed in Chapter One, scientists contemplate issues that involve science, whether it is in their line of expertise or not, with a scientific approach unlike, say, my aunt.

This is not to say that the members of the public involved in the above categories are not important, in fact I mean to say the very opposite. However, it is important to acknowledge that they are one step removed from members of the (general) public. For example, farming groups are a specific type of community and offer an expertise—a farming expertise—in areas to do with farming.

The categories do, however, provide evidence of a wider group of interested parties, other than science-associated groups, with an interest in GMOs. In this sense I am not looking at the general public, but those lay people who have a specific interest in GMOs and may have lay expertise to offer the policy-making process. Those involved in the identified groups of the ten categories are referred to as 'social actors' to avoid confusion with members of the general public. These categories became the foundation of my research and were used to represent key groups in the social process surrounding GMOs. Table 5.4 lists the categories and the reasons for including them in the research.

The second assumption was that the participants, during the in-depth interviews, would accurately reflect their role, and that of others, in influencing public policy. The interviews did not measure an individual's level of influence in shaping public policy; however, they did provide evidence of those who were interested in shaping public policy.

The final list of organisations, companies, government bodies and individuals consisted of 210 names and the next step in the research was to survey the list. Surveys have been the subject of many criticisms and much research has been done to recognise the principal causes of error (Berg 1995).

Good survey research can be achieved with a thorough understanding of the method and an awareness of its limitations. The two survey techniques used in this study were questionnaires and interviews. Below I describe the two different data collection methods used in this stage of the research and the reasons for choosing them.

Questionnaires

Between October and December 1997, 210 questionnaires were mailed, each accompanied by a stamped, self-addressed envelope (see Appendix C). One of the problems with mailing questionnaires was that I had no control over the order in which people answer the questions, a fact that could obscure the answers. Therefore the questions were written in an order that would not influence the way the respondents answered them. Although the questionnaire consisted of open-ended questions, it was short in length and was not complex.

The questionnaire had two main functions: to find out if there was an interest in issues involving biotechnology before committing to further data collection and, if there was an interest, to provide contact names for those organisations suitable for the second stage of the survey—the interviews. A longer and more complex questionnaire would not have been of benefit as the research area is complex and it would have been difficult to capture the views and opinions of the respondents. It had been decided that interviews would be the main tool for gathering the opinions of the social actors, if the questionnaires provided evidence of a large base of interest.

Table 5.4: Categories of social actors developed in the initial stages of the research

Category	Description
Citizen group	This category includes consumer, citizen and environmental groups, all of whom have publicly expressed their interest in GMOs.
Farming groups	Farmers have been targeted as customers by those developing GM crops and other new products of biotechnology.
Food supplier groups	This category represents manufacturers, distributors, suppliers and retailers in the food industry. Retailers have been active in discussion over the labelling of GM foods and in seeking details of product origin from manufacturers, suppliers and distributors.
Government	Government departments and agencies introduce and implement the legislation regulating the release of GMOs and provide information to the wider public.
Individuals	This category includes professionals who have commented on issues on their own behalf and not on behalf of their organisations.
Industry	This category covers industries that develop and work with GMOs and have a vital interest in their regulation.
Politicians	This category covers political parties and political representatives who may highlight issues of concern to their constituents and to the wider population, and who frame legislation for regulation of GMOs.
Professional associations	These groups represent those with a direct and professional interest in the application of the technology itself or its products.
Religious groups	This category includes churches and groupings within them; religious groups have raised ethical issues surrounding GMOs.
Research centres	This category covers research institutions working in biotechnology that are staffed by experts in that technology.

The questionnaire's wording did not include the words 'ethics', 'morals' or 'social concerns'. Instead the phrase, 'issues arising from the application of biotechnology', was used, giving the respondent no prompts as to the principal area of interest.

The overall response rate for the 210 questionnaires was 50%. Association groups, religious groups, farming groups and politicians had the lowest response rates of all categories. Perhaps one reason for this low response rate was that no one person was responsible for biotechnology or had an active involvement in this area. Follow-up letters and phone calls were used to increase the response rate and ensure that each category had some representation. For example, one farmers' association, after numerous phone calls, had very little to say on the matter stating it was not one of its primary concerns. Although some farmers were being affected by the planting of trial GMO crops, it was not of immediate interest to one of the largest farming associations.

The analysis of the returned questionnaires provided a list of organisations and areas of interest for the interviews to follow. The most frequently mentioned application of biotechnology was GM food and crops and thus it became the focus of my doctoral research. I will not provide a more detailed analysis of the questionnaires in this thesis. As stated previously the primary reasons for the questionnaires were to determine if there were groups in Ireland interested in applications of biotechnology and to determine who would be appropriate to interview in the next stage of the research. This first stage was particularly important because of my limited knowledge of organisations and individuals in Ireland.

Interviews I

An interview can be described as a conversation with a purpose (Berg 1995). The type of interview employed in this research was the semi-standardised interview. I had a number of predetermined questions which I asked in a systematic order, but I had freedom to digress if the need arose. This type of interview was adopted for two reasons. The first reason is that the area of research is complex. However, secondly and more importantly, I assumed that there would be a vast range of different experiences and opinions within and between the categories. Without this prior knowledge the interviewees' views would have been difficult to elicit from a standardised interview.

The five specific areas raised as discussion points in the interview were:

i. the respondent's level of interest in issues involving biotechnology;
ii. their organisation's policy in regards the issues of interest;
iii. their views on current public debate;
iv. their views on whose responsibility it is to provide information to the public; and
v. the communication channels within their organisation and amongst other social actors and the general public.

Whilst the interviews allowed quick access to information and provided an avenue with which to obtain rich insights, the method presented some difficulties including the validity of responses and my influence over the respondents' answers. The interviews with government representatives and politicians were challenging as it was difficult to get beyond the official 'party line'. However, as time went on a rapport developed between me and some of the government officials. Scientists, particularly those supportive of GMOs, became more fluent once I made them aware of my science background, notably my experience in biochemistry. I noticed this during one of my earliest interviews and decided to consistently introduce my background after the warm up questions. The reaction was usually obvious and is in itself an interesting finding. Representatives of the citizen groups were very happy to be interviewed, however, it was difficult to keep them focused on what I wanted to discuss. A more practical problem was the amount of time it took to transcribe the lengthy interviews, although my transcription skills improved during the project. Fortunately I also had help.

Based on the responses to the questionnaires, 50 interviews were conducted between February and April 1998. Only 44 of these interviews have been used in the analysis for my doctoral research. I conducted all of the interviews. All but six were conducted face-to-face at the interviewees' place of work in order to minimise disruption to the interviewee. The remaining six interviews were conducted by telephone. The interviews lasted 45-60 minutes, except for three interviews that were considerably shorter due to the interviewees' reduced interest in the area. All interviews were tape-recorded.

The interviews were fully transcribed for analysis. The transcripts were carefully and repeatedly reviewed in order to identify common themes and were coded into main themes and sub-themes. Extracts of the transcripts were transferred to thematically defined files. The three broad themes identified were: the identification and negotiation of non-technical issues, communication in the public sphere and seeking expertise. The results from these interviews were used to address the four research questions of the first objective (see Table 1.1), and were conducted before the National Public Consultation on GMOs organised by the DoELG.

It was decided that the participants would not be identified by name as the research was based on the role of social groupings, not individual organisations and associations.

Maintaining this anonymity proved to be difficult when analysing the government category due to the profile of government departments and agencies in relation to the regulation of GMOs and the repeated identification of these bodies in the interviews with representatives of other categories. Government bodies have been identified where necessary to give meaning to the analysis. With this exception, participants are identified by codes, and the names of all individuals and organisations mentioned in interview extracts have been replaced with corresponding codes. Table 5.5 lists these codes with a brief description of the interviewee to enable the reader to appreciate the differences within the categories. A number of the descriptions may identify individual groups, however, to name the bodies explicitly would detract from the categories, which were the foundation of the research.

Analysis of Media Sample II

The content analysis carried out in this stage was conducted on a sub-sample of the combined media sample previously described. To be able to compare the issues raised in the interviews with issues raised in the media the same time period was required. Therefore newspaper articles and letters published prior to the end of the interviews, 3 April 1998, were examined in this section. The content analysis was conducted in 2001, well after the analysis of the interviews. However, newspaper articles were collected as they were published and were my initial source of social actors interested in issues arising from biotechnology. These were potential interviewees.

Table 5.5: Descriptions and codes of the interviewees

Category	Code	Description
Citizen	Cit-1	Interests in consumer rights
	Cit-3	Alliance of predominantly environmental groups
	Cit-6	Interests in environmental and consumer issues
Farming	Far-1	Farmers' representative organisation (short interview)
	Far-2	Farmers' representative organisation
Food Supplier	Fod-1	Food manufacturer
	Fod-2	Distributor of fruit and vegetables
	Fod-3	Association of retailers
	Fod-4	Retailer representative group
	Fod-5	Food retailer
	Fod-6	Food retailer
Government	Gov-1	Dept of Environment & Local Government (Republic of Ireland)
	Gov-2	Dept of Health & Children (Republic of Ireland)
	Gov-3	Environmental Protection Agency (EPA) (Republic of Ireland)
	Gov-4	Food Safety Authority of Ireland (FSAI) (Republic of Ireland)
	Gov-5	Forfás (science and technology policy advisory body) (Republic of Ireland)
	Gov-6	Dept of the Environment (Northern Ireland)
	Gov-7	Dept of Health & Social Services (Northern Ireland)
	Gov-8	Dept of Agriculture (Northern Ireland)
	Gov-9	General Consumer Council (Northern Ireland)
Individual	Inv-1	Scientist with active interest in biotechnology
	Inv-2	Scientist with active interest in biotechnology
	Inv-3	Scientist with active interest in biotechnology
Industry	Ind-1	Industry-based organisation promoting research
	Ind-2	Industrial company with interests in GM food crops
	Ind-3	Plant production representative group
	Ind-4	Biotechnology industry representative group
	Ind-5	Industry-based organisation promoting research
Politicians	Pol-1	Political party
	Pol-2	Political party's youth branch
	Pol-3	Political party
	Pol-4	Political party
	Pol-5	Political party
Professional	Pro-1	Interests in scientists' views
	Pro-2	Involved with products of biotechnology (short interview)
Religion	Rel-1	Church's media office
	Rel-2	Church committee addressing ethical issues
	Rel-3	Group with interests in environmental and third world issues
	Rel-4	Group with interests in third world issues
	Rel-5	Church committee addressing ethical issues
Research	Res-1	Interests in food research
	Res-2	Interests in science grants
	Res-3	Interests in biotechnological procedures
	Res-4	Interests in agricultural research

The National Public Consultation

The third data source section, the National Public Consultation, began with the release of the DoELG's consultation paper *Genetically Modified Organisms and the Environment* in August 1998 (Department of the Environment and Local Government 1998). Members of the public were informed of its release by a notification in the national newspapers and were invited to make written submissions. The vast majority of the 186 submissions were made public by collating them into two volumes. These volumes were borrowed from the DoELG for analysis. The two-day debate followed in May and June 1999. Data from this event were collected from my own extensive notes and tape recordings made by the DoELG of all presentations and questions on both days. Two further Government reports were included in this data collection stage: the Chairing Panel's report (Department of Environment and Local Government 1999) and the *Report of the Inter-Departmental Group on Modern Biotechnology (Inter-Departmental Group on Modern Biotechnology 2000)*, released in September 1999 and October 2000, respectively. The IDGMB's report was included in this stage even though twelve months had elapsed between the release of the Chairing Panel's report and its own publication. The decision to include the report was based on the fact that the Chairing Panel requested the IDGMB to address issues that were raised in the National Public Consultation. Documents received by Julie Kirby—an MSc Science Communication student at DCU in 1999, whose dissertation was based on the National Public Consultation—from the DoELG under the Freedom of Information Act formed the final source of data. Kirby requested all correspondence to and from the Department in relation to the National Public Consultation and handed these on to me at the end of her Masters.

The results obtained from this data collection stage provided further evidence with which address the first and third objectives of the research: which members of the public contribute to the public discussion on issues that arise from the application of science and to determine the level of public influence in the shaping of public policy.

Documentation Analysis

Content analysis was the research method used to analyse the documents of the National Public Consultation. The *Consultation Paper* was analysed for types of issue the DoELG had identified as involved in GMOs and the environment. These issues were compared with those identified from the Interviews I, which I conducted prior to the National Public Consultation.

The submissions made to the *Consultation Paper* were superficially read to develop a general awareness of the issues raised and the types of people raising them. The issues and respondents were then categorised. The DoELG had placed the respondents into four categories: individuals, NGOs, industry and academics. The NGOs were labelled as such only if they had requested a moratorium in their submission. The 20 NGOs grouped together complained that this categorisation led to too many different concerns and points of view in one category.

The reports of the Chairing Panel and the IDGMB were analysed and the issues within them were compared with the issues raised by social actors that were identified from the results of Interviews I, submissions to the consultation paper and those raised during the two-day debate (see below).

Five documents were received by Kirby under the Freedom of Information Act and the information they provided was minimal. As stated by Kirby "[it was ironic that] the absence of materials . . . told me more about how the policy process seemed to be operating" (Kirby 1999, p 15). One of the reasons behind Kirby's request was to ascertain how the DoELG decided upon the format of the National Public Consultation.

Analysis of Sound Recordings of the Two-Day Debate

The recordings made by the DoELG, in conjunction with my own extensive notes, were analysed for:

i. the content raised in the presentations and questions from the Chairing Panel and members of the public;
ii. the format of debate;

iii. the atmosphere of the debate, for example, if it allowed participants to feel relaxed and welcome;
iv. the interactions between the participants and the Chairing Panel;
v. the interactions among the participants; and
vi. the professional nature and logistics of the event.

The sound recordings were not transcribed by myself (or the DoELG). I decided against transcribing the tapes because of the length of the material. I relied on my notes and memory to guide me to the relevant sections of the tapes. The data collected by the sound recordings and my notes were supplemented with participant observation and informal conversations with participants during the recesses.

After the National Public Consultation

The fourth data source section occurred within the same time period as the above section. However, data collected in this section were opinions on the National Public Consultation and were not an analysis of the event itself. The reason for the overlap is that the government reports, released months after the actual event, were considered to be part of the National Consultation Process. Immediately after the conclusion of Day Two newspaper articles were collected for the content analysis. The second research method used in this stage was semi-standard interviews. These two methods have been used previously and are distinguished by numbering them as Interviews II and Media Sample III. The reasons for choosing these methods have been previously described.

Interviews II

The interviews were conducted two to three weeks after the final day of the two-day debate, with the exception of one interview that was conducted four months later in November. This interview was with Patrick O'Reilly, Business Manager of Monsanto, who was unavailable at the end of June. As time drew on we decided to find a mutually suitable time for the interview after the release of the Chairing Panel's report.

There were two reasons for waiting two weeks after the debate to conduct the interviews. At first I had wanted to wait until the Chairing Panel's report was released—

which had been promised one week after the debate—to include the participants' responses on the resulting report. However, once it became clear that the release of Chairing Panel's report was not imminent, I decided to interview the participants before details of the event were forgotten. The two to three week period also gave the participants time to reflect on the debate-part of the National Public Consultation. For some participants the events surrounding the debate had evoked strong feelings and this time may have enabled them to consider the whole of the consultation process and not just the debate itself.

Julie Kirby and I decided to conduct the interviews together to avoid participants being asked similar questions on two separate occasions. Twelve interviews were conducted, eleven of which I did myself, ten with the assistance of Kirby; a second follow-up interview with one of the participants was conducted by Kirby. The presence of Kirby at the interviews did not seem to hinder the interview process. The interviewees were informed of Kirby's involvement and no one objected or gave any indication that her presence was inappropriate. Kirby transcribed all of the interviews except for one.

The interviewees included all eight members of the two-day debate's stakeholder panel and represented the views of the biotechnology sector, NGOs and academics. On the second day of the debate another NGO group was allowed to present and this representative was also interviewed. The civil servant who organised the National Public Consultation was interviewed twice. Finally a representative of an environmental group was interviewed due to her role in the initial stages of the National Public Consultation.

The interview was broken down into seven discussion points:

i. the need for consultation;
ii. the *Consultation Paper*;
iii. the proposed debate (the NGOs rejected an earlier version delaying the process);
iv. representatives who presented at the debate;
v. the debate process;
vi. the Chairing Panel's report (or lack of); and
vii. the potential impact on the policy process.

Unlike the first set of interviews conducted prior to the National Public Consultation, the second group of interviews were not analysed for themes. The interviewees answered questions about the National Public Consultation and the data obtained were used, in conjunction with other data, to evaluate the consultation process.

BioDivulga Workshop

The final data collection stage for the GMO case study was the BioDivulga Stakeholder Workshop, which is an example of a stakeholder dialogue initiative, described in Chapter Four. The workshop, held in April 2000, was organised on behalf of BioResearch Ireland, as part of an EU-funded project. Thirteen people, representing diverse interests, assembled with the objective of identifying key issues surrounding the public communication of biotechnology in the food and agriculture area in Ireland. I was approached by BioResearch Ireland to coordinate the workshop. An external facilitator, Annette Bolger, from Drury Research facilitated the session.

The format of the workshop was shaped by the results from earlier stages of my research, namely the review of public participation initiatives, the identification of public individuals interested in issues surrounding GMOs and the types of issue these were. One of Bolger's colleagues recorded the workshop's dialogue and transcribed all materials produced by the participants during their small group work. These transcriptions, along with my own personal notes and the workshop report *(BioResearch Ireland 2000)* were the three sources of data. The evaluation framework, described in Chapter Four, was applied to these data and the results of the workshop are discussed in Chapter Seven.

This concludes the description of the research methods used in collecting and analysing data for the GMO case study. The next section of this chapter describes the research methods adopted analysis of the water fluoridation controversy.

Water Fluoridation

The second case study of my research is the controversy surrounding water fluoridation. Before discussing the research methods used to investigate this case study a brief description of the background to water fluoridation and the nature of the controversy is provided.

Background

Fluoride is a compound[41] that is added to public water supplies with the aim of preventing tooth decay. The fluoride is absorbed into the body where it is stored in calcified tissues, that is the bones and teeth. Fluoride occurs naturally in most water supplies, however, the level is artificially adjusted by adding fluoride to a concentration of about one part per million. Those who see it as an essential public health measure endorse this addition of fluoride.

Water fluoridation and the controversy surrounding it occur worldwide. The arguments against water fluoridation include potential health and environmental risks and the objection to mass medication. The controversy centres on the detrimental health effects of additional fluoride, particularly the uncertain links between fluoride and a long list of health concerns including bone cancer, osteoporosis, Down's syndrome and renal disease. Both advocates and adversaries state there is scientific evidence to support their claims.

Ireland is currently reviewing its forty-year-old Health Act, under the terms of which public water supplies are fluoridated. Challenges to the continuation of water fluoridation have existed since 1996 when the Green Party placed questions before the Dáil. However, in 1999 the plans to upgrade a northwest region's water scheme to a level that required the water to be fluoridated initiated a local political campaign against water fluoridation. A national campaign group, Fluoride Free Water (FFW), arguing against water fluoridation, quickly formed.

[41] When fluorine combines with another element, such as calcium, it is referred to as the compound fluoride.

The controversy surrounding water fluoridation dates back to 1956 when fluoridation was introduced in the US city Cleveland, Ohio. In Ireland the fluoridation of public water supplies began in 1964 and there was considerable opposition leading up to it. Debates were held in the Dáil and Seanad, and were followed by legal and constitutional cases taken to the High Court and finally to the Supreme Court. Thus the controversy surrounding water fluoridation is not new to Ireland.

The idea of mandatory water fluoridation was initially presented in 1958 by the Minister for Health, however, a number of obstacles had to be overcome before implementation of the policy. The main problem was that under Irish law local authorities had to supply pure water to members of the public. Special legislation was therefore needed to legalise the addition of fluoride to public water supplies. The question that arose was whether local authorities should be allowed to make the decision to fluoridate the water or whether the legislation should be mandatory. It was decided that mandatory legislation was required to avoid opponents of fluoridation influencing local councillors and causing local confrontations (Beirne 1999), which had happened in the USA and Britain. Beirne argued that the impetus for the Department of Health's actions was pressure from the Irish Dental Association, which had a number of representatives on committees within the Department of Health (Beirne 1999).

The anti-fluoridation movement was growing throughout the policy-making process and a pressure group, Pure Water Association, was formed in 1958. Its members objected to water fluoridation on three grounds concerns over the environment, state paternalism and the threat of communism, undermining the rights of parents and constitutional objections. At the time fear of communism was especially predominant in the Catholic Church and the anti-fluoride lobby expected that the Catholic Church would place pressure on the State. The reason for this assumption was that ten years prior to the water fluoridation issue the 'mother and child scheme'[42] caused a clash between the State and the Church. There were many similarities in the methods used by opponents arguing against the two proposed Public Health Acts. In the 'mother and child scheme' the State eventually withdrew its proposal. The Catholic Church did not intervene in the

[42] The mother and child scheme was a desperate attempt by the government to deal with the high infant mortality rate in Ireland. The Bill gave powers to arrest and detain persons considered as possible sources of infection of diseases such as Tuberculosis and venereal disease, and educating women potentially about contraception. Intervention from the Catholic Church caused the withdrawal of the scheme.

water fluoridation issue, a fact that surprised many. However, when approached by the advisory committee on fluoridation, which was seeking advice on the ethical implications of a mandatory scheme, an authoritative body in the Catholic Church put forward his favourable attitude towards fluoridation, and this fact was not made public (Beirne 1999).

The parliamentary debates at the time centred on bureaucratic control and caused acrimonious controversy. As Beirne summarised:

> The mandatory fluoridation policy was an 'exercise in bureaucracy'. It was the epitome of bureaucratic centralism whose main advocate was an autocratic Minister for Health. The manner in which the policy was formulated without involving any public consultation and the manner in which the measure was to be forced upon local authorities by the Minister for Health represented a resounding victory [for the bureaucrats] (Beirne 1999, p 100).

Little public outcry surrounded water fluoridation. Beirne suggested that the government suppressed the issue and by the time public opinion had formed, the parliamentary debates were completed and the government was committed to its newly adopted policy (Beirne 1999).

Now, 40 years on, the Health Act on water fluoridation is being reviewed and it is once again immersed in controversy. The Fluoride Free Water Action Group (FFW), publicly launched in October 1999, originated from the concerns raised by citizens in the northwest of Ireland. FFW was a small group of campaigners in Dublin who wanted to identify sufferers of dental fluorosis. The campaign gathered momentum in early 2000 when *Irish Independent* journalist Gemma O'Doherty interviewed Don MacAuley, the new spokesperson for FFW. The first major public campaign was organised in May 2000, when a small group of people (approximately 25) participated in a protest march to the Dáil. Between March and June more than ten letters were written to the Editor of the *Irish Independent* expressing concern over water fluoridation. Don MacAuley initiated Irish Dentists Opposing Fluoridation, which wrote a letter to the Dáil, signed by 15 dentists, demanding an immediate end to water fluoridation in Ireland.

In February 2000 the Chief Dental Officer of the Department of Health and Children (DoHC), responsible for water fluoridation, contacted Brian Trench, Senior Lecturer in Science Communication at Dublin City University, for advice on how to handle the public communication of a (potentially) controversial issue. Trench put me in contact with the DoHC and the Dental Health Foundation (DHF)—funded by the DoHC—and after two meetings it was suggested that I write a proposal on how to communicate issues surrounding water fluoridation.

The communication strategy that I suggested had three components (see Appendix D): to determine the awareness of the wider public, to provide dialogue with groups interested in water fluoridation, such as the anti-fluoridation campaign, consumer groups, industry, oral health workers and dental associations, and increase public participation in the policy review of the Health Act on water fluoridation. The public servants participating in the meetings seemed to be very interested in the suggested communication strategy.

The DoHC's public relations consultant, Drury Communications, became involved in the meetings after the DoHC had deliberated on my communication strategy. As it turned out Drury Communications was the sister company of Drury Research[43], whose Director, Annette Bolger, I had worked with on the BioDivulga project. By May 2000 Bolger and I had set out five stages that the DHF, who had now been given the responsibility to communicate water fluoridation, should follow (see Appendix E). Approval was given for the first two stages—focus groups and a public survey—which aimed to determine the level of public awareness. The dialogue initiatives were agreed to in theory and I was told to begin canvassing groups for their involvement. At this stage it appeared that both the DoHC and DHF were very interested in the idea of dialogue and greater public participation in the Health Act review. However, on 29 May 2000 the Minister for Health and Children announced the establishment of a 20-member forum to review water fluoridation. Both Drury Research and I were told of the forum on the day it was announced to the public. The roles of the DHF, Drury Communications and myself in the communication of water fluoridation were now redundant.

[43] Drury Research conducts qualitative and quantitative research for government departments and private business.

Methods

This thesis explores what issues have been raised regarding water fluoridation, who raised them and whether they were included in the Health Act review. The research methods used to address these questions are described below.

Review of Information Materials

To determine the types of issue being raised anti-fluoridation lobby brochures, articles and websites were reviewed. The websites and information brochures included those of Irish and international pressure groups. This process was unstructured because of the clear presentation of three arguments: health risks, environmental risks and lack of individual choice. The data were analysed to address the research questions pertinent to the first objective (see Table 1.1).

Informal Meetings

My meetings with the Chief Dental Officer, representatives of DHF, Drury Communication and Drury Research are described above. The meetings were informal and no minutes were taken. Meetings also occurred between Bolger and myself, where the intentions of the DoHC were often discussed. The data obtained from the meetings were in the form of my own personal notes, jotted down in my research journal during the meetings. These recordings represent a portion of the timescale over which the DoHC has managed this controversy. The framework presented in Chapter Four was applied to these data and the results are discussed in Chapter Seven.

Focus Groups

Focus groups have been used extensively in market research as a tool for uncovering what people think and why people think as they do (Morgan 1988). However, focus groups are also used in social science research. Focus groups allow the participants to engage in conversation about the focus of inquiry introduced by the facilitator. One attractive feature of focus groups is that the process provides participants with the opportunity to develop their own ideas and thoughts more clearly.

Drury Research conducted nine focus groups, with a total of 62 members of the general public, in July 2000. The groups contained a mix of people categorised by frequency of dental visits, brushing of teeth, presence of own teeth or dentures, and social groupings, gender and ages. Together Bolger and I drafted the focus group discussion outline (see Appendix F) which was proposed to DHF. The focus groups ran for approximately one hour and the discussions were tape-recorded. Drury Research transcribed all of the group discussions and these transcripts were the source of my data.

The data obtained from the focus groups were analysed to determine the public awareness, understanding of and behaviour towards water fluoridation and to develop an understanding of the public's opinions and attitudes towards experts and sources of information. Although this thesis does not explore the level of public awareness or understanding of issues involving science[44], the focus groups provided an indication of how relevant this issue is to members of the general public and how they make sense of differing expert opinions. The results of the analysis of the focus groups are discussed in Chapter Six.

Comparison of the Two Case Studies

The two case studies presented in this thesis provide me with the opportunity to investigate two different types of controversy. In this section I will discuss their similarities and differences drawing on the framework of controversy established in Chapter Two. The discussion focuses on Nelkin's four underlying concerns raised by controversy—the infringement of social and moral values, the questioning of political priorities, the fear of risk and the threat to individual rights—the level of controversy and how the controversial issue is framed.

Type of controversy

The controversy surrounding GM foods involved all four major concerns. Religious groups and animal rights groups raised moral and social concerns. The political

[44] The level of public awareness or understanding of science is not the focus of this research because I do not believe this measure of knowledge or awareness should be a factor in public participation. It is not how much science members of the general public know or are interested in that is important because this assumes that an issue is framed as scientific.

priorities of the government were questioned regarding the benefits for the national economy, the biotechnology industry and Irish farmers. Concerns have been raised about the risk to the natural environment and human health and, finally, consumer rights and religious and citizen groups have raised the rights of third world citizens.

The water fluoridation controversy is less complex than the GM foods controversy. The main controversy surrounding water fluoridation regards the potential health risks associated with the level of consumption of fluoride. Opponents of water fluoridation have also raised the threat to individual rights because people cannot choose not to intake fluoride. This lack of choice is not disputed by the DoHC. However, they bring another dimension to the debate regarding the protection of teeth for all socio-economic groups, which is a social and moral issue rather than an infringement of individual values.

Level of controversy

The level of controversy depends upon the extent of public involvement and the types of concern raised by the issue. The introduction of GM foods has been highly controversial because it affects all the population who purchase processed foods (and non-organic food), it raises all four underlying concerns and the fear of risk is high because of the uncertainties a new product presents. The level of media coverage reflects this high level of controversy even though consumers are still purchasing food that may contain GM products.

Water fluoridation has implications for the majority of the Irish population that is serviced by fluoridated water; however, the intensity of the media coverage for this issue is much less than for GM foods. The types of concern that are not raised by water fluoridation can explain this. Political priorities are seldom questioned regarding this issue and the fear of risk is very low because fluoride has been in the public water supply for 40 years.

Framing of controversy

Both the GM food and water fluoridation issues have been framed as scientific or technical issues. The DoELG set up a committee of experts to review GM crop trials and the DoHC established a forum on fluoridation to review the health implications of water fluoridation.

The campaign undertaken by Genetic Concern was more sophisticated than that of their counterpart FFW. Both campaign groups had only a few core members and were able to draw on the extensive environmental group network that exists in Ireland. However, I would argue that the experience of Clare Watson, one of the founders of Genetic Concern, was instrumental in the quick elevation of GM foods in the media. Furthermore, although FFW had assistance from Voice of Irish Concern for the Environment (VOICE), their lead spokesman, Don MacAuley, is a dentist with no experience in running a campaign.

There are many different elements in each of controversy and neither has run its full course.

Public Participation Evaluation

The final section of this chapter brings together the two case studies and the methods used in their investigations.

In Chapter Seven three public consultation events are evaluated by applying the evaluation framework established and discussed in Chapter Four. The three public consultation events that were evaluated are:

i. DoELG's GMOs and the Environment National Consultation Debate;
ii. BioDivulga Stakeholder Workshop; and
iii. DoHC's Forum on Fluoridation.

The data used to evaluate these three events, using the evaluation framework, have been sourced from the research methods and samples described previously in this chapter and summarised in Table 5.1. For example, the evaluation of the DoELG's National Public Consultation on GMOs and the Environment draws on data obtained from content analysis of newspaper articles and letters, questionnaires, interviews, analysis of documentation and debate recordings collected either before, during or after the public consultation. The evaluation of the BioDivulga Stakeholder Workshop draws on data obtained from the workshop as well as data obtained from all the research methods listed above. For example, to determine the type of uncertainty raised by biotechnology used in food and agricultural areas in Ireland, information previously obtained in relation to this area was used.

The evaluation of the DoHC and DHF's involvement in the controversy surrounding the fluoridation of water draws on data obtained from brochures, websites, informal meetings with DoHC and DHF, and the focus groups conducted with 62 members of the general public.

The following two chapters discuss the results of the data analysis that has been described in this chapter.

Chapter 6

Communicating Controversy in Ireland

So far in this thesis I have examined models of communication and democracy that are relevant to science communication. In this chapter, two original case studies—genetically modified organisms (GMOs) and water fluoridation—are investigated to determine the social actors interested in the case studies, their concerns and interests and how they have communicated amongst themselves, with the media and with members of the general public.

The two case studies will be discussed separately. The majority of the empirical work focused on the GMO issue. The water fluoridation issue became an additional case study in this thesis due to my involvement with the Department of Health and Children (DoHC) and the Dental Health Foundation (DHF) in planning their public communication strategy. At the time of writing, the DoHC was still awaiting the recommendations of the Forum on Fluoridation and as such my investigation of the water fluoridation case study is incomplete[45]. However, it does provide an example of a second Irish government department, besides the Department of the Environment and Local Government (DoELG), which has had to deal with a public controversy involving science. Furthermore water fluoridation is not a modern application of science, unlike many of today's controversies, such as stem cell research and genetically modified foods.

This chapter examines the first objective of my research; that is, to determine which social actors have contributed to public discussion involving GMOs and water fluoridation. These results helped inform the level of influence of these social actors in policy-making processes, and form the basis for the discussion in Chapter Seven. The four research questions explored in this chapter are:

i. Who are the social actors interested in issues involving science?
ii. Why are the social actors interested in these issues involving science?
iii. What are their concerns and interests in issues involving science?
iv. How do the social actors contribute to the public debate on issues involving science?

To begin, the case study of GMOs is addressed, followed by the case study of water fluoridation. Finally the results of the two case studies are compared in the discussion at the end of the chapter.

Genetically Modified Organisms

The background to GMOs in Ireland and Europe was discussed in the previous chapter. The results relating to GMOs presented in this chapter are obtained from two different time periods. In the first time period, before the Department of the Environment's public consultation process on GMOs, data were obtained from interviews, questionnaires and analysis of newspaper articles and Letters to the Editor. In the

[45] The Forum on Fluoridation report was published in September 2002. See website http://ww.doh.ie/publications/fluoridaiton accessed on 8 December 2002.

second time period, between November 1996 and November 2000, newspaper articles and Letters to the Editor, including those described above, were collected and analysed.

The results obtained from the analysis of newspaper articles and letters and in-depth interviews are used to discuss the following three themes:

i. Who is interested and why?;
ii. What are the public issues?; and
iii. Communication of controversy in the public sphere.

Who is Interested and Why?

The newspaper articles and letters provided the beginnings of a list of social actors interested in issues involving biotechnology. All but one of the ten categories of interviewee, described in Table 5.5, were represented by the quoted sources in the articles and authors of Letters to the Editor between November 1996 and the beginning of April 1998[46]. The category called 'religious groups' was the exception as at this time they did not have a public involvement in the controversy surrounding GMOs. The religious groups were included in the interviews because, in its initial stages, the research was not restricted to GM foods. The religious groups had publicly expressed their views about the potential misuse of cloning techniques. However, when interviewed, representatives of the religious groups did raise issues surrounding GMOs, and since April 1998 religious groups have become involved in the controversy surrounding GM food with a small presence in the media.

Of the ten categories of social actor that were interviewed all had some interest in the GMO issue. An immediate observation is that groups besides scientific institutions were taking an interest in an issue that scientists (and government) primarily frame as 'scientific'.

Results of the interviews indicated that three groups were predominantly responsible for communication with members of the general public on GMOs. These categories were

[46] April 1998 marks the completion of the in-depth interviews.

citizen groups (including environmental groups and consumer groups), food supplier groups (including manufacturers, distributors and retailers) and industry. Few political parties had nominated representatives to speak about biotechnology issues. Individual members of churches and individual scientists had spoken out, however, not as representatives of their organisation. Professional groups and most of the farming groups interviewed were interested, but were happy to let others take a lead in the communication of issues surrounding GMOs.

Food supplier groups were aware of public concerns surrounding GM food and had become publicly involved in the issue in early 1998. The Irish Association of Health Stores had also been lobbying government to label products containing GM soya and maize since late 1996. The media coverage of GM foods during 1997 and at the beginning of 1998 revolved around Monsanto's field trials of GM sugar beet. The media presence of both the Food Safety Authority of Ireland (FSAI) and the Irish Business and Employers Confederation (IBEC) began in February 1998. It was also around this time that the food store Iceland announced its ban on GM foods.

The Green Party were frequently quoted in the media during 1997 and 1998, including in headlines such as, "McKenna [Green MEP] praises genetic beet crop sabotage" and "Green MEP calls for moratorium on genetically modified crops". Few other political parties were quoted in the newspaper articles.

The interviews revealed that the main reason for involvement of the membership-based organisations, which include citizen groups, farming groups, political parties, professional associations and religious groups, was to represent the interests of their members.

Far-2 From our point of view . . . we have looked at the issue of GM crops because our bottom line is always representing farmers.

Non-membership-based organisations, such as biotechnology companies, food retailers and food manufacturers had formed committees to deal with GMOs. These organisations made decisions in relation to company goals and wanted to decide upon a clear direction before communicating with their clients and customers.

Fod-1 It is my role [as technical manager] to advise the board of technical and legal issues as they arise . . . We have probably had the policy [on GM foods] for about two years [after] a board decision advised . . . that if it is not an absolutely technological need to use them then we won't use them.

Ind-1 Yes [we have discussed the GM food issue], very much so . . . There would not be much controversy internally.

Ind-2 We would [use] the expertise in the company . . . strategic people, legal people, directors, [and] public relations [people] . . . We [have a] vision for the next 50 years . . . When we decide to move into an area of research we would always have an ethical aspect to the decision at the end of the day. And with biotechnology in particular being quite sensitive in that area, we spent a lot of time internally deciding what we wanted to be involved in and what we didn't—irrespective of the potential monetary value.

Government departments, particularly government agencies, had set up committees to consider GM foods. The committees included officials from other government departments and external experts. The three departments in the Republic of Ireland that have the most involvement with GMOs were Environment, Health and Agriculture, and their respective agencies, the Environmental Protection Agency (EPA), the FSAI and Teagasc (the Agricultural and Food Development Authority). A government decision was made that the DoELG would take the lead on GMOs because at the time the relevant EU directives focused on environmental safety.

The EPA was the most frequently quoted government agency in newspaper articles up until April 1998. Teagasc was rarely quoted, and the FSAI had a media presence in early 1998, as previously mentioned.

The EPA is the competent authority to implement the two EU directives regulating the use of GMOs. The EPA established a GMO advisory committee consisting of government officials, scientists, an industry representative and a representative of a non-government organisation (NGO). The FSAI also established a GMO scientific sub-committee, with representatives from government, research and industry. Both GMO committees have technical and scientific experts advising their respective agencies. The FSAI scientific sub-committee reports to the main scientific committee which, in turn, passes its recommendations to the main FSAI board. I decided not to interview a representative from Teagasc after they demonstrated limited interest in the questionnaire and follow up phone calls. Teagasc's communications on GMOs were limited to the technical nature of the field trials of GM crops and there was no evidence suggesting a change to include any public issues. In addition, Teagasc was rarely quoted as a source in media coverage about the GM sugar beet trials.

The interviews with the EPA and FSAI provided evidence that although public issues arising from GMOs had been discussed, they were not the agencies' main priority. The NGO representative on the EPA's GMO committee indicated this position:

Rel-3 [The EPA's GMO advisory committee] is very scientific, so I would be the only ... one who represents some of the NGO community. All I can do is keep the larger questions on the table . . . because the remit of the committee is very narrow . . . It is very difficult for me.

Gov-4 The board that runs the [FSAI] receives the scientific advice and they can add in their own ethical . . . or aesthetic concerns. The board is made up of non-scientists who are supposed to be the champions of the consumer . . . We can make recommendations to the government but they don't actually have to take them on board.

As mentioned previously, the three main categories of social actor involved in the communication of GMOs were citizen groups, industry groups and food supplier groups. The majority of the communication was in the form of lobbying directed toward government and politicians. Representatives of citizen, food supplier and industry groups made explicit their intention to influence the policy process and to involve political parties and government in communication strategies. There is evidence of different approaches taken to lobbying government and politicians. For example, citizen group Cit-3 and food supplier group Fod-3 approached government ministers using letters.

Cit-3 It is a sad fact of life that governments by and large listen to lobbyists more so than any constituents and if you don't have some sort of political presence or if you don't have some media coverage . . .Lobbying is part of our activity but unless the public are aware of the issues, then lobbying becomes hollow . . .

We had been seeking a meeting with the Department of Environment . . . and in a letter from [the Minister for the Environment] [he replied] . . . 'a meeting in advance of the consultation process and the draft position paper would not be necessary.' So he's saying that there is no need to meet with us, which is a bit disconcerting.

Fod-3 We sent off copies of the . . . letter to all of the green groups . . . all of the political parties . . . all of the relevant ministers . . .

Industry groups used the words 'spoke' and 'liaised' when describing their lobbying tactics, suggesting that conversations occurred between them and government representatives. One industry group, Ind-4, was confident that their views would be incorporated in the discussions at the EPA's expert committee on GMOs.

Ind-1	[We have spoken with] [Ind-4], [government] and individual companies. We have been trying to urge farming groups in taking a stand in the GM crops one way or the other.
Ind-2	We have contacted . . . everybody that's directly involved in agriculture. Be it policy on the government side, be it agronomics . . . The [government] have not contacted us directly for our opinion . . .
Ind-4	We spoke with government, industry, all MEPs, Greens, Labour, the lot, and officials from the Commission, and then to Irish-European civil service, and we spoke to the IDO, and our views would have reached the GMO advisory committee of the EPA's . . . We took advice from MEPs, we used them as a sounding board . . .

These groups appear to have greater access to the proximate policy makers. If so, these groups may have more of a role in shaping public policy than the citizen groups.

Food supplier groups and citizen groups were also attempting to communicate with the general public by supplying information on GMOs. For example, information pamphlets were produced by the Food Drink and Tobacco Federation, IBEC (see Appendix G) and Genetic Concern (see Appendix H).

Summary

A wide range of social actors, not just scientists, was found to have an interest in GMOs. The main reason for membership organisations to become actively involved in the controversy surrounding GMOs was their need to protect the interests of their members. Government agencies had established GMO advisory committees, but their main function was to decide upon technical, rather than public, issues. The interviews provided evidence suggesting that industry groups had more access to the proximate policy makers than citizen groups. The next section looks at the types of public issues that were raised by the social actors identified above.

What are the Public Issues?

The second of the three themes identified in the analysis of the interviews and newspaper articles and letters was 'what are the public issues?'.

The journalists reporting on GMOs, and the issues surrounding them, consisted of those with a specific brief and those without. Science, health, environmental, consumer, agricultural, political and financial correspondents are examples of journalists reporting on GMOs found in a sample of 745 articles from eighteen newspapers in Ireland and the United Kingdom. For a detailed breakdown of the specialist correspondents refer to Appendix I. The range of specialist areas from general science to public affairs provides supporting evidence that the issues surrounding GMOs are not just science related, but encompass many aspects of today's society. The issues raised were not just relevant to Ireland and the UK, as the stories were from correspondents based in places such as Washington, New York, Paris, Berlin, Brussels and Japan.

A sub-sample of articles from *The Irish Times* was taken in order to compare the issues identified in the data from the interviews and those in the newspaper. The themes presented in the media, from November 1996 until the end of the interviews in early April 1998, are presented in Table 6.1 with their corresponding percentages. Few articles were primarily about health issues, environmental issues or the latest research findings. During this time period the majority of the media coverage in *The Irish Times* centred on Monsanto's GM sugar beet crop trials, corresponding policies and regulations, and protests and campaigns against the crop trials.

Table 6.1: Frequency of themes in *The Irish Times* articles between November 1996 and April 1998.

Themes	**Coverage between 19 November 1996 to 3 April 1998 [n=64]**
Environment	3%
Health	5%
Research Findings	2%
Protests and Campaigns	12%
Consumer	16%
Public Awareness	22%
Social and Moral	23%
Policy/Regulation	42%

The main focus of this doctoral research was to explore the public issues that involve science that are not formally addressed in the decision making process. Health and environmental issues, although as much social as scientific issues, are not included in the exploration of public issues carried out here, unless their non-technical dimensions were presented in the relevant media article. For example, an article commenting on the conflicting evidence presented by different parties to support claims of either environmental benefits or detriments was coded as having a 'social and moral' theme.

The exclusion of technical issues should not suggest that members of the public cannot make contributions on scientific questions, but that health and environmental issues surrounding GM foods have been specifically addressed in GMO legislation, and the DoELG has received comments on these issues from a wide range of social actors and members of the general public. Similarly, consumer issues, although clearly social, were excluded because they are the subject of distinct legislation. Again consumer issues are not less important but those issues raised were very explicit and were accepted by the regulators as issues to be dealt with. Public awareness issues were not coded as 'social and moral' because there was an acknowledgement by the regulators, albeit sometimes reluctantly, that greater public information and public debate was needed. The theme 'public awareness' is discussed in a later section in this chapter. The theme of protests and campaigns was also not included in the further analysis of public issues as the media covered the event or its outcome and not the reasons for the protests.

The issues that have been included in the social and moral theme are trade and employment, world hunger and third world issues, industry involvement, nature and natural dimensions, politics and the process of science. The process of science sub-theme included the commercialisation of science, the scientific method, research priorities, the intolerance of alternative scientific views and the reductionist nature of science. Table 6.2 lists the percentages of social and moral sub-themes found in the 64 articles about GM foods and crops.

Table 6.2: Percentages of the Social and Moral sub-themes reported in articles of *The Irish Times* between November 1996 and April 1998.

Social and Moral Sub-themes	**Coverage between 19 November 1996 to 3 April 1998 [n=64]**
Politics	1.5%
Industry Involvement	3%
Nature	4.5%
World Hunger and Third World	4.5%
Trade and Employment	8%
Process of Science	15.5%

The number of themes within the Letters to the Editor was similar, however, their emphasis was slightly different. The eight themes were consumer, environment, health, social and moral, public information, making policy, scientific discourse and the uncertainty of science. Out of a total sample of 66 letters, 22 were published before 3 April 1998. A quantitative comparison of themes was not conducted because of the small size of the sub-sample.

As with the articles, health, environmental and consumer issues were not dominant themes. However, in contrast to the articles few letters focused on policies and regulations. Public issues regarding making policy, such as the bias of government, the lack of public involvement, the reneging on political promises and the government's conflict of interest, were raised by both articles and letters. The Letters to the Editor's public information category was similar to the public awareness category of the articles, although the majority of letters were written about the unbalanced media reporting and undemocratic lobbying by pressure groups.

The social and moral theme included concerns about the commercialisation of research, the power of industry, the third world, animal welfare and tampering with nature. The issues raised in the articles to do with science and the direction of research were complemented in the Letters to the Editor. However, in the letters the uncertainty of science, the level of acceptable risk and the division between the scientific and non-scientific population received greater representation.

Scientists were actively defending their territory in the letters and claimed that non-scientists were misrepresenting the process of science as well as the science itself. Claims were made that science was being "misused" for political gain and that many arguments put forward were irrational. The non-scientific community fought back by claiming scientists had a "blind faith" in science and that scientists were arrogant in dismissing the concerns of non-scientists. The vast majority of all letters (80%) were written in response to articles in *The Irish Times* and previously published letters.

How do these findings compare with issues raised in the interviews?

The questionnaire-based survey provided an avenue for filtering out those who were interested only in the research aspects of GMOs. The interviews were then conducted with social actors with an interest in the public dimensions of GMOs, even if they were sceptical of raising these issues in the public sphere.

At the beginning of this research project I had wanted to separate the different types of issue into neat categories, such as scientific, health, environmental, ethical, moral, social and justice issues. However, in the second analysis of the interviews I began to realise that this clear division is not possible and that issues cannot be divided into distinct categories. Environmental issues could routinely be considered social issues. For example, a number of proposed solutions to environmental problems, such as reducing energy consumption, rely on changing people's behaviour instead of solely relying on scientific solutions. Dennis Avery, the internationally renowned agricultural analyst of the Hudson Institute, has different beliefs. He wrote the book *Saving the Planet with Pesticides and Plastic* (Avery 1998) and promotes the use of science to save our planet. Avery stated that the only way to protect our environment and wildlife is to continue (and to improve) high-yield agriculture. After reading Avery's book, kindly supplied to me by a representative of Monsanto, I could not argue that Avery did not have a respect for nature and a commitment to our environment, even though I might not agree with his approach. Views at the opposite end of the spectrum are presented in Mae-Wan Ho's book *Genetic Engineering – Dream or Nightmare? The Brave New World of Bad Science and Big Business* (Ho 1998). Ho, from the UK's Open University, felt compelled to communicate her position. These views and ones in-between were identified in the analysis of the interview transcripts.

Interviewees sometimes referred to issues surrounding GMOs as 'ethical', 'bioethical', 'moral', 'political', 'social' and 'justice' issues. The interviewees used the word 'ethics' in a variety of ways. The results suggest that different groups with an interest in GMOs are not using the same 'language', in the sense that they have different interpretations of similar words. However, language is not the only barrier. Interviewees had different ways of looking at a particular issue, due perhaps to personal experience, cultural background and world-view. In situations where people hold different world-views, each needs to be understood if effective communication is to occur.

There was evidence that scientists, religious and industry group respondents were aware that different languages and approaches were being used by scientists and other social actors in communication about GMOs. Both advocates and opponents of GMOs expressed their frustration at these circumstances.

Ind-4 I am amazed at how ethics gets into things like GMOs. I can understand it in cloning, xenotransplantations, but . . . foods. I would have thought it is about consumer conceptions . . . [Rel-3] has lived in the Philippines . . . I would say his personal experiences are going to influence his views.

Rel-3 They [(some) scientists] have this iconic relationship between scientific knowledge and reality . . . it is like economics and the third world debt. For a banker the third world debt is a problem of finance, monetary fiscal policy. For people like myself who come out of the justice end, it is a problem of suffering, pain, hunger, malnutrition and so we come out of different corners. We try sometimes to speak the same language but even when speaking the same language . . . only one dimension is taken [the scientific]. How can one [raise] other issues? . . . There are a whole series of ethical and social and political issues.

Ind-1 The fish is just an elaborated biological organism which has more genes and can do more things [than a bacteria]. There is nothing inherently 'fishy' about a gene. It is a gene that makes a protein . . . and if that protein has a function within another organism [and] is tested to ensure that it does not produce undesired effects, I don't see that that is an ethical issue.

Industry representative Ind-1 found it difficult to understand why the public should be concerned with plant genetics. However, later in the interview he was asked if his organisation was doing any research that could create ethical concerns. The reply was 'Well that depends on your interpretation of ethical'. He thus indicated that he was aware that not everyone shared his interpretation of 'ethical'.

An Irish food supplier, Fod-2, stated that the public did not understand that genetic modification and hybridisation were basically equivalent. The only difference, he stated, was that genetic engineering was more exact. This supplier was perplexed as to how ethical issues arise from GM foods as he considered GM foods to be the same as non-GM food products.

This position is different from that of scientist Res-4 who was aware that others have ethical concerns with certain applications, even though he did not. His view that some applications of biotechnology did present ethical issues was also supported by an industry respondent Ind-2.

Res-4 It depends on what you mean by an ethical issue. An ethical issue could mean the economy of the third world or something like that. Or the ethical issue could be 'playing God'. Or the ethical issue could be throwing stuff at consumers and they know nothing about it. Well the 'playing God' one, I wouldn't consider that one an issue myself. Not unless it got to the real extreme cases [cloning headless humans were mentioned previously]. Regarding the economies of third world countries and big companies owning things, that happens anyway. I don't think you can raise the debate about any sort of breeding programme . . . [as] GMOs is just another thing that has come along.

Ind-2 When we decide to move into an area of research we would always have an ethical aspect to the decision at the end of the day . . . That is why we decided to go down the plant route only . . . We feel there are too many moral and ethical questions raised [in animal genetic modification]. We think that legislation hasn't caught up with the technology.

A representative of Irish food supplier groups, Fod-4, also had concerns about animal genetics. She stated that ethical issues of GM foods would only arise if animal genes were transferred to a plant, creating concerns for 'vegetarians and ethnic groups'. Fod-4 stated that these ethical issues could be addressed by informing consumers that GM products contain elements that they would not normally eat. This respondent stated that no ethical issues had arisen from the introduction of GM soya or maize products to the European market. According to her definition of ethical issues, vegetarians and ethnic groups could still eat these GM products. The respondent was also confident that if consumers were to approach the food industry with an ethical concern, then industry would take their views on board. But how can this be, if she does not accept that some members of the public may have ethical issues with GM soya or maize?

A religious respondent stated that it was not only the different language that was the problem but rather the type of questions being asked in public discussion and how they were answered.

Rel-5 There are so many areas of moral concern, I think really in that whole area there is even a more fundamental question—people don't even know how to approach a moral question. In other words, for some people a moral question is really: 'How do I feel?', 'How do I react?', 'If I don't feel guilty about that then it is okay'. Other people are saying, 'Is it causing other people pain?' Other people are saying, 'You have to look at the Bible and the word of God'. I think a lot of the problems about moral discussion is that they are asking different questions. Instead of getting down and saying, 'Why are we coming to different conclusions?'—it just generates heat.

The interviewees with fewer ethical concerns were those involved in the food and biotechnology industries, but they did recognise that different social groups have different interpretations of 'ethics'. However, this awareness did little to assist in the communication of public issues, as there was little common ground among the different groups. A religious group respondent stated that it was difficult to raise public issues when the debate was often limited to scientific aspects, and brings us back to the important question of how an issue becomes framed as scientific. The framing of GMOs as a scientific issue by the Irish government is addressed in the next chapter. Regardless of whether or not GMOs were framed as a scientific issue the citizen groups, retailers, government, individuals, religious groups, farming groups, politicians and scientists I interviewed identified public issues that had not been addressed by the limited nature of the EU directives. These public issues were identified during the analysis of the interviews and are grouped into three categories, which are summarised in Table 6.3. The three major issues were the research agenda, the application of research and the regulation of research. Extracts from the interviews are used to discuss these three categories.

Table 6.3: The public issues raised in interviews

Research Agenda	Commercialisation of research Public accountability Overall research priorities
Application of Research	Developing nations Control of food stocks and seeds Experimenting with nature Scientists' responsibility
Regulation of Research	Industry relationship with regulators Public involvement in decision-making Labelling Regulation process

The Research Agenda

The three issues raised in this first category were the commercialisation of research, public accountability and overall research priorities.

Commercialisation of Research

The commercialisation of research was an area of concern not only for those who were anti-GMOs but also for scientists working in the area of biotechnology. The concerns expressed most commonly fell into this category. Concerns were also expressed about the increasing level of funding that universities receive from private industry and the way in which this might affect the authority and independence of the university researchers.

Rel-3 At the moment [biotechnology] is being driven by profit and I have nothing against profit, but being driven by monopolies of profit, being forced on people by international institutions . . .

Inv-1 Money and profit is the driving force . . .

Rel-4 I am very concerned about corporate control. Real science has lost its neutrality, because the scientist today is always looking over her or his shoulder to make sure that funding is coming, either working in a university [that] is dependent on grants from a corporation or working directly with the corporation.

Inv-3 Increasingly an awful lot of universities receive considerable amount of funding—and a lot of university researchers, individually, [receive] funding from industrial sources . . .

Cit-3 If research was coming purely from academia we might trust it more.

Public Accountability

Several respondents reflected a mistrust of industry's research because industry was not required to inform the general public of the direction of their research. Industry's lack of public involvement and public accountability as to how and where the technology will be used were linked closely with exploitation concerns. As a result, concerns were raised about poorer nations being exploited and the technology being 'forced' on people.

Cit-3 The launch of genetic engineering wasn't being announced by the industry.

Gov-4 Something that may not be harmful, but still if we don't want it, where does it all stop. What used to be science fiction is no longer science fiction . . . Things creep up on people unless someone is actually looking and saying we don't want this . . . There is a debate here that isn't actually resolved. Many of these issues aren't resolved.

Rel-3 [Biotechnology] is being forced on people by international institutions . . .

Pol-2 Our main areas that we are worried about, are not the technology as such but the actual involvement of multinationals . . . there is no accountability of actions. How can we be responsible for private research and private products on the market?

Rel-5 If you take a person working hard away in the laboratory, working away, and finally they get a bit of success. And then the moralist comes in and says, 'Oh you can't do that'. Moral discussions need to be largely lay discussions, not just medical or science. And that needs to be part of it from the beginning.

It was stated that scientists did not speak out on public issues for fear of losing funding from the private sector. The interviewees also put forward the point of view that when funded by industry, scientists' opinions may alter to reflect the source of this funding.

Res-3 Not that many people are prepared to put their necks on the line publicly by expressing any opinion. That is my impression, I might be wrong. I think people are more inclined to keep their heads down . . .

Pol-4 What is the difference between a scientist and a tellytubby? You can't buy a tellytubby![47]

Research Priorities

Concerns were expressed about the role of society in prioritising research. There was a sense that the general public has little involvement, and that the little involvement they have is too late. Industry was seen to have a large role in controlling research priorities.

Rel-4 So much research goes into looking at really minority diseases, whereas clean water for everybody would make the quality of life so much better for people who have no voice . . . I wouldn't like to say to [someone] 'your daughter cannot benefit from research on cystic fibrosis, I would hope that she will . . . but we cannot let the individual case decide for all society. What is good for an individual is not necessarily good for society.

Inv-3 My biggest concern is what is driving most of this work, to tell you the truth. At the moment there are something like five million children that die before the age of five throughout the world every year. They die from the most simple, simple diseases that the only cure you need is clean water. But on the other hand, we are spending fortunes so that the companies who manufacture [genetically engineered products] or clone various things, [that] can cure a very limited number of diseases for people who are extremely rich . . . So I am worried about, you know, the focus that's on it.

[47] This joke has not aged well. This interview was conducted in December when, it seemed, every child wanted a tellytubby for Christmas. Unfortunately (or fortunately) for parents tellytubbies were in short supply.

Res-3 pointed out that, as many decisions were made outside Ireland, decision making is out of the hands of the general public. This being the case, the policy-makers outside Ireland, by virtue of being removed from the public they affect, may lack accountability for the decisions they make.

Res-3 The decisions on whether to go ahead with major applications in any of those areas are not taken in Ireland, so maybe in a sense the discussion on where the major areas of research will go is kind of less intense in Ireland because we know the decisions are going to be taken elsewhere.

Others suggested that science and those involved in it were presented as solutions to all problems and that science was always promoted as positive and progressive. This presentation of science allows little room for the discussion of public issues. Science does have a role in solving social problems, but is just one of the approaches that can be adopted.

Application of Research

The second of the public issues identified in the interviews was the 'application of research'. The interviewees, mainly religious and citizen groups, were concerned about the implications of the research once it leaves the laboratory and who is ultimately responsible for it. The four issues identified were potential outcomes for developing nations and control of food stocks and seeds (which are discussed together), experimenting with nature and the need for scientists to be responsible for their research and resulting applications.

Developing Nations and Control of Food Stocks and Seeds

Industry has suggested that GM food crops will provide increased crop production for developing nations, thus helping to feed the massive numbers of malnourished people. However, two religious respondents expressed concerns about the position of developing nations in relation to the control of food and seed supplies, and the exploitation of the poor and the marginalized.

Rel-4 I am concerned about giving some sectors the right to exploit others, particularly the poor, the marginalized . . .

Rel-3 You are talking at the very most of 10 multinational corporations with a control of the major food stocks of the world . . .

At the time of interviews there was also concern about the so-called 'termination' gene which would prevent farmers from collecting seeds for the following year's planting.

Experimenting with Nature (including animals)

A small number of the 44 interviewees raised ethical issues to do with the interference with nature. I had expected more because of the polarised nature of the debate presented in the mass media. The comment made by a representative of a citizen group, Cit-3, indicated that not all of its members had these types of concerns.

Rel-5 [GM foods] has got implications [with] moving genes from one species to another.

Cit-3 [Within our group] there would be people . . . who think that it would be blasphemy to interfere with the building blocks of creation . . .

Rel-3 Now, animals don't have the same rights as human beings . . . they have no rights to their genetic integrity as far as they [scientists] are concerned.

Scientists' Responsibility

It was suggested that some scientists do not see themselves as having an ethical responsibility for issues arising from the application of their research.

Res-1 I have thought about [ethical issues] but we did not talk about them yet, because we don't intend to do that research . . . I don't think scientists see themselves as responsible for ethical matters, other than for giving the best advice that they can based on the available evidence.

However, an individual scientist, Inv-3, stated the opposite, that is, that scientists do have a responsibility for the application of science, and felt that the majority of scientists were aware of their responsibility.

Inv-3 I belong to a group [of] . . . essentially scientists [and engineers and medical professionals] who came together four or five years ago. The purpose of it was to try and set up a declaration which would be the other side of the coin from the Declaration of Human Rights. On the grounds that the way technology and science [are] developing and particularly the way the world is becoming so international and what you do in one country affects what happens everywhere else . . . If you accept the Declaration of Human Rights then you also accept by definition that there are duties going with that. . . . There were about 40 people who worked on it initially and of those, there were fifteen Nobel Prize winners.

Regulation of Research

The final grouping of public issues is the regulation of research. Interviewees had concerns about the regulatory process, its relationship with industry and the level of public involvement. The labelling of GM foods was identified in the analysis in relation to consumer choice and is included in this category because of EU legislation on novel foods.

Regulation Process

Interviewees from government departments and agencies acknowledged that there was no one responsible for articulating public issues, particularly in relation to GM foods. Government interviewees made references to the lack of an ethical dimension in the EU directives for GM food, but also drew attention to the limits of the legislative process itself, in particular its tendency to follow rather than to lead or provide a framework for public discussion.

Gov-3 Well no doubt [ethical issues] are important issues. However, I would like to point out that they are not in the remit of the directives and they are policy issues that government should be dealing with, the ethical issues, the moral and social issues. For example, one company controlling most of the seeds.

Gov-1 The objective of the directives for which we are responsible are the protection of human health and the environment, so ethical issues isn't there in those directives . . . We are to embark now on the review of the 220 directive, so who knows what is going to come up in terms of the ethical issue.

Gov-2 The problem is that the EU legislation [novel foods] at the moment doesn't allow for ethical factors to be taken into account. It is purely public health consideration . . . The only recognition of ethical issues in the novel foods regulations is that the consumer has to be informed—in the labelling if there are ethical issues, for example if they take a gene from a pork.

Gov-2 You have to remember that legislation never leads . . . it is always miles behind. Legislation is hardly ever innovative, it always catches up on the issues. If there is going to be problems over ethical issues the chances are that these issues have to be raised and discussed and problems pointed to or clues given to what problems could arise and the legislation comes from that necessity.

A politician from Northern Ireland stated that many issues facing society today are complex and that the structures of government do not assist in dealing with such issues. It is clear that the issues surrounding GMOs do cross the departmental and disciplinary boundaries that define government structures.

Pol-5 In a sense it is not only a health issue, environment issue and an ethical issue, but also an economic issue, and it is highly likely to be an issue of education. It probably crosses every government department in some way or another. One thing that we have been discussing is whether the structural set up in relation to government departments serves today's complex problems [such as] employment . . . science and ethics and how best they could be addressed with this political structure.

Industry Relationship with Regulators

This public issue relates to the level of influence of multinational companies over the political process. The public issue was that of bias, that is, of legislators and regulators responding more to multinational companies than to voluntary interest groups with less money and resources.

Cit-3 We do know that in Europe the industry is very active at lobbying. It has quite a presence at the Commission in Brussels so there is pressure from that side, and it is disproportionate and that seems to be how industry forms its new colonialism—it's what it is seen as. In a sense we have a situation where an industry can decide that this technology is going to be how we are going to grow food and neither politicians nor public have any say in the process . . . So if industry can set the agenda to that extent, you wonder how relevant is government in controlling people's affairs.

A religious respondent expressed her disappointment in the political system when biotechnology was being marketed as a way to increase jobs.

Rel-4 There is a [dependency] within our government on multinationals for jobs. And with the political system that we have, the politicians are looking only as far forward to the next election . . .

An industry representative, Ind-2, stated that he was aware of the lack of trust of regulators from the experience of his own company in Europe.

Ind-2 The European consumer does not trust the regulator . . . The regulators in Europe are seen to be politically motivated, or can be politically swayed. Whereas in the US, they seem to be totally impartial . . . [Here] we need to get to a stage where you believe the regulatory decision . . . and that is why we focus more on the legislation and getting people to believe that that is correct.

Public Involvement in the Policy-Making Process

The lack of public involvement in the decision-making process surrounding applications of biotechnology was raised most prominently by representatives of religious and citizen groups. As with the setting of research priorities, it was suggested that industry has a larger role than lay people in policy formation.

Rel-3 There are things being forced on the people of Europe . . . There is no participation, and also the speed [at which products appear].

Cit-3 In a sense we have a situation where an industry can decide that this technology is going to be how we are going to grow food and neither politicians nor public have any say in the process . . .

Rel-5 We used to have more people who knew a little about everything. Now things have become so compartmentalised, so the whole scientific process is over before the moral questions are asked.

Gov-9 We have got to a point where technology is moving so fast, that I have often argued that we are leaving consumers way behind . . . That is why I think when problems do arise there is this loss of confidence because people don't understand. There is a big knowledge gap.

Fod-5 If we'd been consulted in the first place, we would lobby for segregation [of GM and non-GM food]. If the product had been segregated, we perhaps might not have been facing the problems we have now.

Labelling

The labelling of GM products is seen to be essential to provide consumers with choice. However, the labelling of GM foods is not simple and has provided many difficulties for EU officials drafting regulations. Public interest groups have suggested total segregation of GM and non-GM foods as the only way to give consumers a real choice.

Cit-1 We have not come down either for or against biotechnology or genetic engineering. Our main concern is that products [should be] labelled as having been produced using gene technology . . . the provision of information to consumers. Then [the consumers] can make their own minds up.

Cit-6 From consumer's rights, labelling is very important.

Gov-9 We think that people need to know and that they should be told, so they can make a choice. That is an absolute in consumer affairs. People should be free to exercise choice and that requires the information to be labelled so they can make informed choices.

Fod-3 It is a fundamental right for a consumer to know what is in the food that they are buying . . .

Ind-1 If the consumer wants labels—let's label it. I have no problems with that. Personally, I think it will become irrelevant in a short time.

Summary

The previous section identified a range of social actors interested in GMOs, including those outside the scientific community, and a range of issues that are not science based. These findings provide evidence to support the inclusion of public dimensions, including ethical, moral and justice issues, in policy-making processes on issues that involve science.

The themes that I identified in each of the newspaper articles, letters or interviews were discussed as though individual themes were presented in isolation. This was not the case. Each theme, and sub-theme, was interlinked with other themes in their relevant group. However, when analysing the data, it was necessary to apply artificial boundaries. Each of the three data sources was coded separately using an inductive qualitative method, where the themes were extracted from the data. All of the themes were present in the letters, articles and interviews with the exception of three sub-themes: animal welfare, public accountability and scientists' responsibility. *The Irish Times*, in its coverage of GMOs, provided a forum for debate of all the public issues I identified in the interviews of key social actors. This finding is further explored in the Analysis of the Combined Media Sample I section, later in this chapter.

The majority of the public issues that I identified in the media and interview analysis were not specific to GM foods and crops. The issues of interfering with nature or God's work were not prominent themes in any of the three data sources. However, issues such as the commercialisation of research, the uncertainty of science and the research agenda of science were raised in the letters, articles and interviews. The newspaper articles had a greater focus on the economic impact of GMOs, specifically trade relations with the USA and employment opportunities for Irish scientists and farmers.

The public issues that I identified in this section are fundamental, and are the result of different world-views and experiences. These issues are more difficult to define and articulate, and certainly more difficult to 'regulate', than technical issues. Given these differences, meaningful discussion would appear restricted. There may be many equally legitimate views of the rights and wrongs of a particular case. Policy-makers steer clear of this territory for understandable reasons. However, as this research indicates, the controversy surrounding GMOs cannot be addressed with factual information alone.

Given these complexities, the question is posed as to whose responsibility it is to address, in the public domain, the public issues surrounding GMOs. At the time of the interviews, no government departments had this task in their remit.

Communication of Controversies in the Public Sphere

The final theme in the analysis of the controversy surrounding GMOs is the 'communication of controversies in the public sphere'. The need to communicate the scientific and non-scientific issues of the controversy surrounding GMOs was the third most common theme identified in the analysis of both *The Irish Times* articles and Letters to the Editor between November 1996 and April 1998. Of all of *The Irish Times* articles published on GMOs in this period 22% were on the theme of public awareness. The level of public awareness in relation to GMOs (for example survey reports or articles mentioning the lack of understanding of the public), the awareness of the need to have greater public debate and the awareness of the public's differing opinions on GMOs were included in this theme. Public information and public debate were also prominent themes in the interviews and it is worth noting that these interviews took place prior to the National Public Consultation process organised by the DoELG.

The four common issues identified in all data sources over the same time period were public information and debate (including access to the information), the media's role, whose responsibility it is to communicate, and the amount and type of information to communicate. These four issues are explored using examples from the interviews, newspaper articles and letters. The first is the level of public information and public debate.

Public Information and Public Debate

In this context the term 'public information' refers to the information produced for the general public by the groups and individuals included in this study, such as media releases, public lectures and information brochures. Public debate, on the other hand, relates to events where dialogue can occur, such as conferences, debates and Letters to the Editor. These allow members of the general public, as well as social actors, to participate.

No dialogue initiatives had been proposed by the Irish government at the time the interviews were conducted. There was little dialogue and little distinction between debate and information was made by the interviewees. This distinction was made during the analysis of the data. Government had also done very little in the way of producing information. Citizen groups and food supplier groups had taken on most responsibility for providing members of the general public with information on GMOs.

A number of small public debates were organised by universities and environmental groups and these usually had a very similar line up of speakers, those clearly for or against GMOs. Industry did not organise public debates itself, but were always willing to participate in any that were organised, even those with a predominately anti-GMO crowd. A different type of event was organised by Trinity College Dublin in March 1998 to mark 40 years of genetics research at TCD, titled 'Genetics and Society in the 21st Century'. Following complaints to the organisers that the platform did not provide a 'balanced argument', a Green Party MEP was invited to make presentations. Protestors outside the venue criticised the event as a promotion of biotechnology and called for a 'major public debate'. The organisers of this event did not refute that it was not a public debate, as they had not intended it to be one. The controversy surrounding this event arose because *The Irish Times* and the government's Science Technology and Innovation Awareness Programme had sponsored it. A religious interviewee commented on the lack of resources and influence for groups like themselves to provide such a public debate.

Rel-4 The other side [not those who organised the symposium] cannot organise symposia because it does not have the funding or the same power. When you think that *The Irish Times*—which is supposedly free press, neutral and giving two sides of everything—were involved in the sponsorship, you can see the powers that are for the GMOs. So I feel that an informative debate is very important.

Prior to the National Public Consultation the vast majority of newspaper articles reporting on Public Awareness were reports about calls by social actors for more public information and debate. No features or analysis-type articles were published and few had a secondary social and moral theme. However, the authors of the Letters to the Editor did explore a number of public issues.

Let-15 This symposium is far from balanced. It is a public forum in which the industry will present the best arguments in favour of the current approach to genetic engineering, unchallenged by an opposing view. The symposium is being supported by public funds under the Government initiative to make the public more aware of developments in science and technology. *Dr Ted Hood 14 March 1998*

Let-22 How much more do we have to endure of the misleading statements of the anti-genetics lobby most recently represented by the letter from John Seymour (March 25 [1998])? The recent symposium . . . was an excellent initiative by . . . Trinity College, Dublin to provide a much needed guide for the general public to current research and trends in genetics. *Professor Peter Whittaker 31 March 1998*

Role of the Media

The second issue pertinent to communicating controversies is the role of the media in communicating with the general public. The role of the media in communicating issues of controversy is central to providing public information and facilitating public debate. Among the Irish media, *The Irish Times* was the most active in providing public information and a forum for public debate on GMOs. There was extensive news coverage on the GM food issue and lively correspondence in Letters to the Editor. The interviews revealed a number of organisations, mainly citizen groups, that were using the media to their advantage. Scientists and industry representatives acknowledged this usage and stated that they could have benefited from greater press coverage.

The role of the media was mentioned by a number of interviewees when they were asked for comments on the level of public debate. The responses below include references to both debate and information, although the respondents were in general referring to press coverage.

Rel-4 There is a lack of information in the media. By their very nature they tend to choose what is most sensational . . .

Far-1 Yes, it is important to discuss GMOs, but it doesn't warrant all this concern [in the media]. It is very emotive publicity.

Ind-3 Good news is no news. And papers don't report good news. They only report the scare stories.

Ind-1 No I don't think there is [enough public information], but it is the same old story, biotechnology is not sexy. It is never read until there is some controversy.

The different groups in this research expressed a range of views on the amount and balance of the media coverage on GMOs. All groups that commented on media coverage, with one exception, suggested that balanced media coverage was important and that coverage of the issues was warranted. Some respondents from industry and some scientists raised concerns that science was often only covered if there was an associated controversy, while some of those with the most active interest in the public issues of GMOs considered that the coverage was not sufficiently in-depth.

Rel-3 [GMOs] haven't been treated seriously at all. It hasn't been balanced in that sense, I mean the print media certainly hasn't taken it seriously . . . It has been unbalanced but it has been minuscule for an issue that is so complex and so earth-shattering.

Ind-2 [The public debate] has been very much one-sided. Everyone would say 'well that is what you would say wouldn't you?' But if you go through the press cuttings . . .

In contrast, one respondent from a religious group felt that the Irish press was reporting stories in a responsible way.

Rel-2 I think there is a considerable amount of debate going on. I think the media are pretty responsible handling the issues. We don't have tabloid press. On the other hand there is little formal debate . . . I think Britain is very good at setting up formal committees. We don't do that.

The Letters to the Editor highlighted scientists' concern over unbalanced media coverage.

Let-12 . . . I am very disappointed by the unbalanced manner in which your paper dealt with this subject. The views of professionals, particularly in the fields of molecular biology, were not aired. *Dr Tom Raftery 19 February 1998*

Let-15 Your editorial also calls for information about food so that people can make choices. *The Irish Times* is in a good position to provide this, but it will have to be less one-sided and show a greater willingness to establish a proper forum where scientific developments can be adequately discussed . . . Can we hope that in the future *The Irish Times* will redress the balance by providing more factual information and a broader base of scientific opinion? *Dr Ted Hood 24 February 1998*

Responsibility

The third issue involved in communicating controversies is who is responsible for communicating with the general public. A number of specific government agencies were identified as bodies that should organise public debate and provide public information, including the EPA and the FSAI. Other interviewees were less specific and stated that it was the role of 'government departments'.

Cit-3 In Norway, there was a consensus conference, [if] something like that were to happen on the same scale over here then we would think that there had been good public debate. We have been calling for a public debate on the issues so that the public could have a choice.

Rel-2 It would be nice to think that there would be some sort of formal commission on many of these issues, to which the general public can contribute. I don't think that is likely to happen. The government . . . tend to use a method of government subcommittees, which is a body of government officials . . . The government doesn't do as much as they ought to. I think they are afraid of failing the consultation process and would be criticised.

The FSAI has a GMO scientific committee that is considering the safety issues of GMOs. Some interviewees stated that the food safety bodies should play a greater role in providing public information and organising public debate.

Fod-4 An independent body along the lines of the Food Safety Authority, that to me would be an ideal channel, with the back-up of interested parties, such as Department of Health . . . the Department of Enterprise and Employment . . . the food industry who use the technology [and] the Consumers Association . . . And they are very well represented on the Food Safety Authority board.

The FSAI accepted they had a role in providing information for the general public, but did not mention public debate. They have an information centre, a World Wide Web site and have been targeting school students. Their preoccupation is food safety rather than public issues involving genetic engineering.

Gov-4 We have a huge role in educating public about the risks and that is the risk of any illness related to the consumption of food . . . We are just getting started. We have an information centre downstairs.

There is nobody actually looking at that [public issues of GMOs]. I'm not sure who should look at that . . . [for example] it's something that may not be harmful, but still if we don't want it, where does it all stop? . . . There is a debate here that isn't actually resolved; many of these issues aren't resolved.

The EPA was also identified as a government agency that could provide information to the general public and contribute to public debate. However, the opinion was also expressed that this role was beyond the EPA's remit as a regulatory body. The difference between public information and public debate goes some way to explain this contradiction, although some groups have called for a public debate to be held under the auspices of the EPA.

Ind-1 The EPA have a responsibility to tell the public 'don't worry—there is a process in place, everything you heard about is going through that process and if there is a problem we will let you know'.

Inv-3 It is not really [the EPA's] role [to be involved in public debate]. Indeed I would be a little bit concerned if they were dragged into too much public debate. Their job is to regulate. Their job is to apply the law.

Pol-2 There isn't any singular person responsible for it. There is the EPA, but that is not their role.

The EPA stated that it was not their role to provide public information, as their main role was that of regulation. The EPA identified the FSAI as having a role in this area.

Gov-3 It is the government's role, it is certainly not our role, we are regulators . . . Our main focus is environmental protection and health . . . We are as helpful as we can to members of the public. However, the eating of crops is a food safety issue, and perhaps that will come under the auspices of FSAI. I believe that is one of their roles, to educate the public concerning food safety.

One government representative wanted to convince people of certain facts to do with GMOs. And although he was aware of difficulties in this approach I was not convinced that he was aware of its inappropriateness. The idea of providing information for people to make up their own minds was not on his agenda.

Gov-2 Sometimes people think that by issuing a leaflet or statement is somehow educating people—there is a big gap between giving information and convincing people that the information given is correct.

The same representative stated:

Gov-2 It comes down to one issue, you are either for it or against it. Those that are for it see no reason why it shouldn't be so and those that are against it don't trust the people who are forcing the pace.

Amount and Type of Information

The final issue of the theme 'communication of controversies in the public sphere' is the amount and type of information to communicate. Differing views were put forward as to how much public debate and public information were required. The majority of interviewees stated that there had not been adequate discussion or enough information on GMOs. Some stated that there could never be enough public debate.

Pro-1 There can never be enough debate, no matter what the issue. There will always be some development which opens its own can of worms. Public debate should never be stopped.

Generally, those actively calling for more debate were the anti-GMO lobby groups.

Cit-3 No, there has not been enough public debate . . . There needs to be enough debate until people [have] by-and-large some sort of idea of what is genetic engineering.

Others disagreed with the suggestion that there had not been enough public debate or information and questioned how much debate was necessary. The comment by Ind-3 indicates the different interpretations of the phrase 'public debate'.

Ind-3 It is constantly stated 'there has been no debate'. That is untrue. The EPA operate on the directives that were discussed at length by the member-states over many years that are constantly being reviewed. It went through the whole democratic process. And the EPA now go through the process of licensing under that legislation which went through as I said the whole democratic process.

The adequacy of the democratic process, which includes the regulation of research, was a fundamental issue for the interviewees calling for greater public involvement in the policy-making process. Two interviewees involved in the policy-making process expressed the view that GMOs were of no interest to the majority of the general public and that there was no real need for further public debate.

Pol-1 In this country people are still coming to terms with family planning and divorce issues. There are other [biotechnological] issues that really haven't been addressed. None of these issues . . . are causing any great moral debate . . . in this house [of parliament], and certainly little debate outside this house.

Gov-5 Generally speaking . . . most people are more interested in the interest they are paying on their mortgage, than they are in relation to the ethics of genetically modifying fruit.

This last comment, made by a senior civil servant may be true, but that does not mean that public issues should be excluded from policy decision-making, and nor should social actors who have an interest in GMOs.

Citizen groups were aware of the need to communicate scientifically credible information in order to argue their case. They were also aware of the public issues surrounding the controversy, however they most often communicated scientific information.

Cit-6 If you want your campaign to be credible [and] successful you have to base it on decent knowledge and research . . . We would use scientific journals, scientific literature, researchers . . .

Even when scientific information was communicated, the credibility of the information or the source was subjected to criticism. One group questioned the credibility of other groups' scientific sources of information and suggested that they were not as authoritative as their own sources.

Ind-2 There are some so-called eminent scientists that are wheeled out by [Cit-3] of this world and others . . . and when you check on their eminence, there is quite a difference between [Inv-2].

This concludes the results of the first stage of the research into the controversy surrounding GM foods and crops. These results were obtained from the analysis of newspaper articles and letters and in-depth interviews which explored the three themes who is interested and why? what are the public issues? and the communication of controversy in the public sphere. Before progressing to the water fluoridation case study, the results of the combined media sample are discussed after this brief summary.

Summary

Several of the groups surveyed were active in providing public information and in promoting public debate. Citizen groups, food supplier groups and industry produced information packs and sought media coverage to help inform the public on GM foods.

One citizen group was very active in sending out media releases on GM foods. An industry organisation's response to this type of campaign, in Ireland and the UK, was an expensive media campaign[48].

Most of the groups surveyed favoured more information being provided to the public, with citizen groups most active in producing information. Industry groups did not call for more debate but were willing to participate. One industry representative commented that the regulation of GMOs had already been thoroughly debated when it passed through the democratic process of the EU. The groups that participated in this research identified government bodies as having a key role in ensuring that public debate takes place. However, there was no consensus as to which government body should take on the responsibility.

The agencies of government and of state with responsibility for the formation and implementation of policy on GMOs, were reluctant to accommodate within the policy-making process a wider range of argument and information than that of a technical or scientific nature.

With the release of the consultation paper, *GMOs and the Environment,* in 1998 the DoELG started a formal consultation procedure. The framework for this paper was largely set down by existing European Union and national environmental legislation and regulation. The paper did not address the public issues identified in this chapter. However, its release provided interest groups with an opportunity to comment on a range of issues arising, at least indirectly, from the release of GMOs into the environment. The next chapter goes on to discuss this process and evaluate its success in dealing with the controversy.

[48] Monsanto commissioned a UK advertising company to run a £1 million campaign, which did not aim at a direct sell, but whose purpose was to establish the company's *bona fides* in the controversy. The two-part advertisement ran on two consecutive pages in newspaper weekend supplements. The advertisement stated that the company will be 'presenting the benefits of food biotechnology' and gave its contact details for further information. Then the advertisement advised people to contact other organisations 'with different views', such as Friends of the Earth and Greenpeace. 'This may sound unusual, but we believe that food is so fundamentally important, everyone should know all they want to about it.' The campaign is an example of the new and controversial trend of 'trust us' advertisements.

Groups with no professional engagement with science have familiarised themselves with scientific material in order to be able to discuss GMOs with other social actors, namely scientists, government and industry representatives. Scientific experts and industry representatives have, to a lesser degree, engaged with public issues. However, GMOs were still primarily addressed by government as a scientific issue.

Analysis of Combined Media Sample I

The data presented so far in this chapter were collected between November 1996 and April 1998, the time period over which the interviews were concluded. This section explores newspaper articles collected from November 1996 to November 2000, and is referred to as the combined media sample. The main aim of conducting an analysis of the newspaper articles and letters over the four-year period was to determine if a newspaper can have a role in providing public debate on social issues involving science and technology. The types of public issue presented in the newspapers are investigated and then the ability of *The Irish Times* to act as a forum for public discussion is analysed.

A content analysis was conducted on 430 articles and 66 Letters to the Editor published in *The Irish Times* and 185 articles published in *The Guardian* between November 1996 and November 2000. The sample of articles from *The Guardian* is not comprehensive; however, the articles cover the entire four-year period and all major events in the controversy surrounding GMOs during this time period. The sample is adequate to provide an indication of the way in which *The Guardian* reported issues surrounding GMOs.

The eight themes that were identified in the analysis of articles in *The Irish Times* and *The Guardian* were: health, environment, research findings, consumer, protests and campaigns, public awareness, social and moral, and policy and regulation. The definitions of these themes were given in Chapter Five. Each article was categorised with a primary theme and one quarter of all articles in *The Irish Times* were deemed to have a secondary theme. The frequency of the primary theme, secondary theme and the combination of these are provided in Table 6.4. Refer to Appendix J for examples of text for each theme from the articles published in *The Irish Times*.

Table 6.4: The frequency and percentage of themes in *The Irish Times* articles from November 1996 to November 2000.

Theme	Frequency of theme		% [49]
	Primary [n=430]	*Secondary [n=118]*	[n=430]
Health	6	6	3%
Environment	4	9	3%
Research Findings	19	2	5%
Consumer	38	26	15%
Protests and Campaigns	60	4	15%
Public Awareness	85	23	25%
Social and Moral	90	32	28%
Policy and Regulation	128	16	33%

Few articles in *The Irish Times* had the primary theme of either health or environment. The majority of articles, 86%, focused on 'policy and regulation', 'public awareness' and 'social and moral' issues. The articles categorised in the policy and regulation theme are not discussed in this thesis because of their technical nature. The public awareness theme is discussed in the following chapter in relation to the National Public Consultation process.

The social and moral theme had greatest variation of all eight themes and 28% of articles explored these issues. The 122 articles that raised social and moral issues became a sub-sample of the entire sample from *The Irish Times*, and the following six sub-themes were identified: nature, world hunger, politics, industry involvement, trade and employment, and the process of science. A total of 147 sub-themes were found in the 122 articles as some articles raised more than one sub-theme. Definitions of the themes and the frequency with which each was raised are provided in Table 6.5. Examples of text taken from *The Irish Times* for each of the sub-themes are presented in Appendix J.

The majority of the social and moral issues presented in *The Irish Times* were categorised in the two sub-themes of trade and employment and the process of science. These two sub-themes are not specific to genetic engineering and many of the issues are relevant to science itself, for example the commercialisation of science and research priorities.

[49] The percentages in this column represent how often a particular theme is raised in all the articles. Because some articles raised more than one theme the percentages add up to over 100.

Table 6.5: The definition and frequency of the Social and Moral sub-themes in *The Irish Times* articles from November 1996 to November 2000.

Sub-theme	Definition	Frequency of Sub-theme [n=147]	% of all articles [n=430]
Nature	Interfering with God's work Exploiting nature Expanding on nature's work	14	3%
World Hunger	A solution to world hunger Not a solution to world hunger	15	3%
Politics	Relationship with industry Conflict of interests Secrecy	16	4%
Industry Involvement	Monopoly of food stocks and seeds Profit	17	4%
Trade and Employment	World trade Livelihoods of farmers (including Irish) Employment in biotechnology industry for Ireland	36	8%
Process of Science	Research priorities Commercialisation Progress and usefulness Reductionism approach Intolerance of differing 'expertise'	49	11%

My research revealed that *The Guardian* covered more stories on social and moral issues surrounding GMOs than *The Irish Times*. This result is also reflected in the format of articles published in both newspapers. Eighty-three percent of articles on GMOs in *The Irish Times* were news reports or news briefs, whereas *The Guardian* tended to publish more feature articles and opinion pieces. This difference reflects the overall layout of each of the newspapers. More sections of *The Guardian* are devoted to long articles, for example daily supplements such as *Society* and *G2*, and more space is give to individual and editorial comment and analysis. Social, moral and ethical issues tend not to be 'newsworthy' or event orientated and are best covered in a non-news format. Examples of public issues relating to GMOs covered in *The Guardian* included: "The Food Revolution" where at least two full pages were devoted to GMOs, including the front page, between 15 and 18 December 1997; the article "Testing testing: the latest scientific research shows … well, what? Tim Radford wonders what you can believe" on 20 May 1999; George Monbiot's regular contributions to the Comment & Analysis page providing an environmentalist perspective; and "The Seeds of Wrath", a cover story in the weekend magazine on 19 June 1999 where John Vidal reported on Indian farmers "taking on the GM giants".

The Irish Times does publish opinion pieces and features, however, more than 70% of these articles were written by Kevin O'Sullivan and Dick Ahlstrom. In total 6% and 11% of all articles were opinion pieces and feature/analysis articles, respectively.

The coverage in *The Irish Times* tended to be event orientated; local events were given the greatest coverage, although major British, EU or international events were also given comprehensive coverage, as indicated in Figure 6.1. The local events included Monsanto's application to the EPA requesting permission for GM field trials, crop sabotage, court cases and the National Public Consultation event, as well as any EU policy or regulation that applied to the regulation of GMOs in Ireland. Although *The Irish Times* reported on social and moral issues, this coverage was invariably prompted by social actors. Therefore, despite presenting many of the facts surrounding the controversy of GM foods and crops, *The Irish Times* provided limited comment on or analysis of its implications.

Letters to the Editor in *The Irish Times* provided a better forum for the discussion of public issues and most of the letters referred to articles or previous letters.

The majority of letters raised issues about the representation of science and the social and moral dimensions of GMOs (Table 6.6). The theme of scientific discourse reflected the tensions between scientists and non-scientists. In this case a discussion of GMOs had prompted the comments, however, the arguments could be transposed to any scientific topic, or to science itself.

Let-6 . . . the Green Party attempts to bolster its arguments by claiming scientific knowledge and precedent. In many instances it is obvious that its members possess neither. The party's representative on Daily Record . . . did not know the difference between a herbicide and a pesticide! She then proceeded to warn against the admission of [GM] sugar to the human food chain. As sugar does not have any genes, how could it be genetically modified? *Dr Conor Long 8 October 1997*

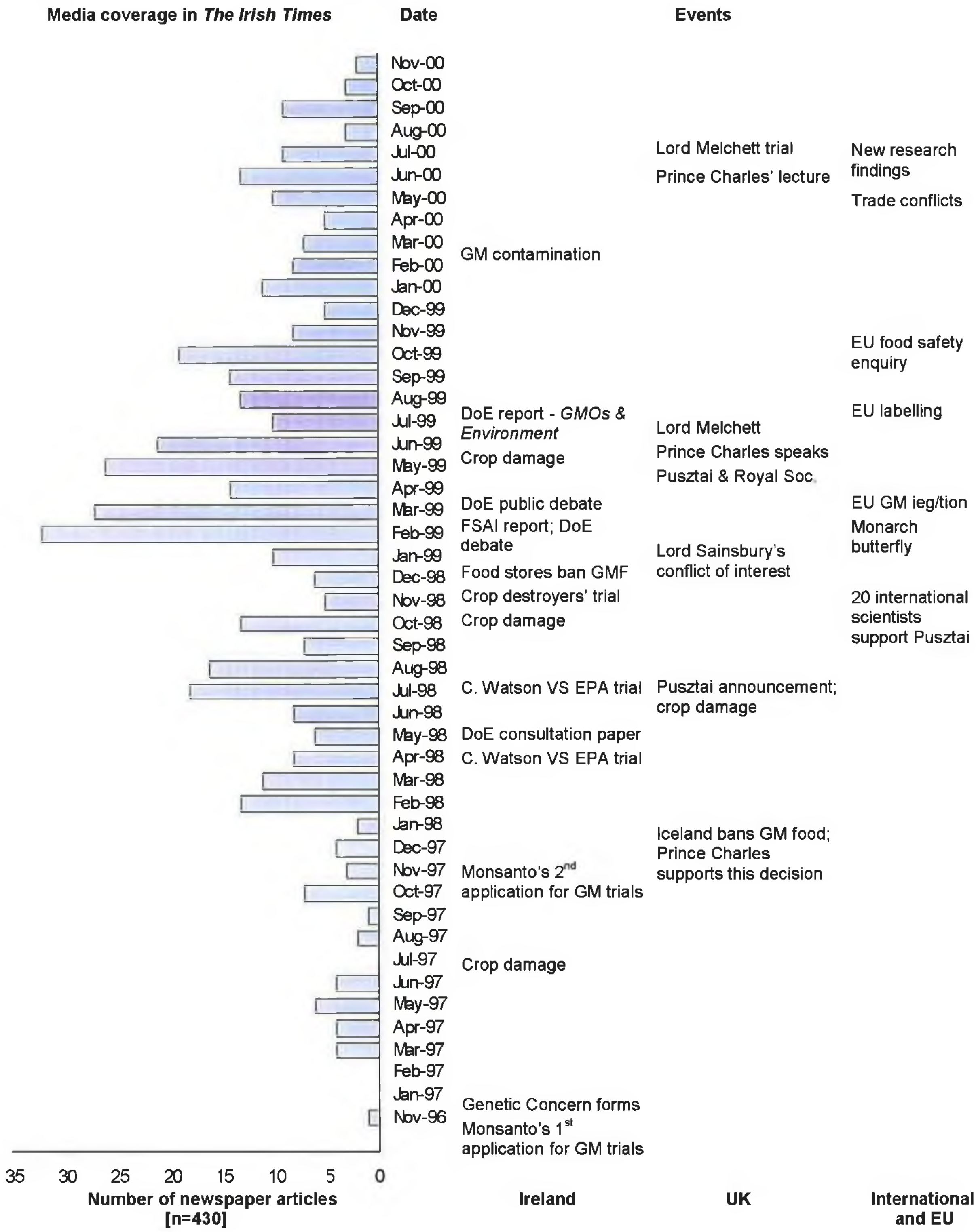


Figure 6.1: Timetable of GM events covered in *The Irish Times*

Table 6.6: The frequency and percentage of themes in *The Irish Times* letters from November 1996 to November 2000.

Theme	Frequency [n=117]	% of all letters [n=66][50]
Health	4	6%
Consumer	5	8%
Environment	9	14%
Making Policy	13	20%
Uncertainty	13	20%
Public Information	17	26%
Scientific Discourse	26	40%
Social and Moral	30	45%

Let-7 Dr Conor Long . . . glosses over and belittles many legitimate arguments against genetic engineering . . . Dr Long appears to be one of the many scientists who have a blind faith in this new technology, but many geneticists who have worked in the area of medicine feel it is less safe. *Mr Quentin Gargan 15 October 1997*

Let-8 Mr Gargan's letter provides another example of misuse of scientific argument . . . The scientific method requires that all opinions and theories, including his, should be subjected to reasoned and informed criticism. *Dr Conor Long 21 October 1997*

Let-9 Where scientific evidence does not suit companies and governments it is often left to people such as greens, environmentalists and community groups to break the silence and secrecy . . . Incidentally I would have thought a scientist of such eminence would know that the technical term pesticide includes herbicides. *Ms Nuala Ahern 22 October 1997*

The issues categorised under the social and moral theme were animal welfare, commercialisation of research, industry involvement, world hunger and developing nations and nature. The majority of these letters raised concerns over the power and monopoly of industry and their claims that GM technology can solve world hunger problems. The fact that GMO research might be interfering with nature or God's work was raised in five letters.

[50] The percentages in this column represent how often a particular theme is raised in all the letters. Because some letters raised more than one theme the percentages add up to over 100.

Discussion

A number of newspapers, especially *The Irish Times*, were initially used to identify social actors interested in GM foods and crops. From the analysis of the interviews conducted with 44 of these social actors, eleven public issues were identified and were categorised under three themes, the research agenda, applications of research and the regulation of research. These three themes concentrated on public issues that were not the focus of the EU directives. Using a second research tool, media analysis, I mapped the types of issue raised in *The Irish Times*, the newspaper which provided by far the most extensive coverage of GM food and crops in Ireland. Many of the social actors interviewed, or their organisations, were also quoted in *The Irish Times*. However, as social actors raised issues publicly in the media and privately during interviews, the two data sources could be differentiated.

The public issues identified from the two data sources were very similar. However, public accountability and scientists' responsibility were not raised in *The Irish Times*.

The coverage in *The Irish Times* tended to be event driven and took the format of news reports or news briefs. *The Irish Times* provided little reflection of the public issues surrounding GM foods, however, I do not want to imply that newspapers (or the mass media) are unable to explore public issues. The social actors themselves prompted the public issues raised in *The Irish Times*. The Letters to the Editor section of *The Irish Times* provided a forum for public issues to be debated, although on a smaller scale. Furthermore, there is evidence to suggest that *The Irish Times* could have increased their reporting on social, moral and ethical issues, for example by including more individual and editorial comment sections. This was achieved by *The Guardian* newspaper.

A wide range of issues were covered in *The Irish Times*, and other papers, including environmental, health, consumer, social and moral, economic, political and public awareness issues. The next chapter investigates the inclusion of these public issues in the two public consultation processes on GM foods and crops.

Water Fluoridation

The background to the recent controversy over water fluoridation in Ireland was described in Chapter Five. This chapter identifies the social actors involved in the public communication of water fluoridation, and the issues surrounding this controversy.

The initial process of identifying the social actors involved in this controversy was not as complex as it was for the GMO case study. Names of individuals and organisations interested in water fluoridation were identified in newspaper articles and Letters to the Editor. The Chief Dental Officer of the Department of Health and Children (DoHC) and Director of the Dental Health Foundation (DHF) also provided me with names of their own contacts interested in this area. As I did not administer questionnaires or conduct formal interviews, both of which can reveal interested parties, I may not have identified other social actors involved in this controversy. It should be pointed out that this issue, to date, has not been as controversial as GMOs, and has attracted less media attention and pressure group campaigns.

The inclusion of this case study has three benefits: a different government department is responsible for the public policy, different social actors are involved, and it is a controversy that does not involve biotechnology.

The three themes used in the GMO case study to examine the first objective of my research are used again in this case study. These are who is interested? what are the public issues?, and communication of controversy in the public sphere.

Who is Interested?

The following categories of social actors were identified and are similar to those identified in the controversy surrounding GMOs: citizen groups (including environmental and consumer groups), industry (manufacturers of toothpaste and mouthwashes containing fluoride), government departments and agencies, research centres, dental health workers and politicians.

Religious groups have not had an obvious presence in the media or their dealings with DoHC or the DHF. A nun was listed as the information contact on one of the anti-fluoridation group's brochures, and was involved in anti-fluoridation meetings throughout Ireland. However, there has been no indication that the nun represents a formal view of the Catholic Church. I have had no interaction with the Catholic Church or other religions regarding water fluoridation.

The obvious group of professionals, the Irish Dental Association, has not been involved in public communication surrounding water fluoridation. However, the association is represented on the DoHC's Forum on Fluoridation. More recently, in October 2001, a group of fifteen dentists launched Irish Dentists Opposing Fluoridation.

Toothpaste manufacturers have privately expressed their concern about the controversy to the DHF. Their concern stemmed from the potential impact of the controversy on the sale of products containing fluoride. According to the DHF the manufacturers were interested in how the DoHC would manage the conflict.

What are the Public Issues?

The second of the three themes used to explore the water fluoridation case study is 'what are the public issues?'. A number of data sources were used to determine the public issues surrounding the water fluoridation controversy including anti-fluoridation websites and brochures, anti-fluoridation public events, informal meetings with spokespersons of two anti-fluoridation interest groups, meetings with officials of DoHC and DHF and documentation provided by DoHC.

The social actors opposing the continuation of water fluoridation were united in their objections. The groups raised concerns over health risks, dental fluorosis and the lack of individual choice. Environmental groups raised environmental concerns. However, the media coverage and literature produced by Irish anti-fluoridation groups focused on the two key issues of health risks and mass medication.

Communication of Controversy in the Public Sphere

The third and final theme is the 'communication of controversy in the public sphere'. In this section I will discuss how the main anti-fluoridation group, Fluoride Free Water (FFW), the Green Party and the DoHC have communicated issues in the public sphere and the level of awareness of these issues by members of the general public. At the time of writing little public communication had been attempted by industry, consumer groups, DoHC, research centres or dental health workers, excluding the recently formed group Irish Dentists Opposing Fluoridation.

Public Communication

FFW has links with Voice of Irish Concern for the Environment (VOICE), local community opposition groups and international spokespersons renowned for their anti-fluoridation stance. FFW is the main interest group in Ireland and has organised public meetings, media campaigns and events, such as street marches. Throughout the country FFW has organised small meetings where one or two speakers argue against water fluoridation. These contrasted with public meetings on GMOs[51], which had a formal debate structure with equal numbers of opposing presenters and a mediator or chairman. Again in contrast to the controversy surrounding GMOs, the anti-fluoridation groups were fighting their battle solely against the DoHC. In the former case, the government sought to maintain the middle ground between the opponents of GM foods and industry scientists who were heralded as 'bad guys'[52].

When I approached FFW, inviting them to be involved in a public discussion or a dialogue workshop organised on behalf of the DoHC and DHF the suggestion was immediately rejected. They did not trust the government and were wary of any public meeting organised by the government. FFW did not want to give the government any opportunity to say that they had consulted the public regarding water fluoridation.

Public confidence in the DoHC was generally low at this time due to other ongoing controversies involving HIV contaminated blood products and the removal of children's

[51] These events were organised by anti-GMO pressure groups, universities and political parties.
[52] This might not be the view of the anti-GMO groups.

organs without parents' consent. The whole situation made the DoHC even more cautious about providing any information on water fluoridation. This lack of information added to the frustrations of FFW and VOICE. Before setting up the interest group, the spokesperson for FFW repeatedly wrote to the DoHC seeking information as a concerned dentist, but he never received a reply from them. The DoHC made a conscious decision to avoid media coverage because of the "complexity of the issues" (Gavin 2000, p 1). They responded to the growing debate by establishing an internal review, surveying the dental health of children and advising the Minister of their results.

In my first meeting with him, the Chief Dental Officer stated that members of FFW believed the government was involved in a conspiracy. At this stage the DoHC did not want to be involved in any communication with FFW, VOICE or journalists reporting on the health risks of water fluoridation. However, the DoHC and DHF agreed in principle to my communication proposal, which emphasised the need for dialogue with all interested social actors. No dialogue initiatives have been planned by the DoHC to date. The main strategy of the Green Party, who was seeking greater public debate about water fluoridation, was to place questions concerning fluoridation before the Dáil.

Public Awareness

The media coverage of anti-fluoridation campaigns, the DoHC's announcement of a Forum on Fluoridation and the Green Party's comments on the forum occurred in the first six months of 2000. When the Forum on Fluoridation was announced in May 2000 the only part of my communication strategy that had been approved by the DoHC was the focus group research on public awareness. The focus groups were conducted with members of the general public in July 2000 and one of their aims was to determine the public awareness of and behaviour towards water fluoridation and its relationship with dental health.

When participants of the focus groups were asked to write down their immediate reactions to and associations with the word 'fluoride' the majority made an instant connection with toothpaste. Many of them deduced that fluoride provides some sort of dental protection. There was also a spontaneous association of fluoride and water, especially among older age-groups.

G9 I think I remember legislation about [water fluoridation] in the 60s.

The majority of people assumed there was a benefit in having fluoride in the water but had difficulty providing evidence for their assumptions. Most believed that the primary benefits of fluoride were its cleansing and purifying properties, and its dental protective properties were not as readily identified.

G9 If there is a contaminant in [the water] they'll just pour more fluoride in to kill the contaminant.

G8 Fluoride is in the tap water. It's supposed to keep the water clear.

G5 Is it a bleaching agent?

The level of interest and concern about fluoridation was low. Many groups admitted to never discussing the issues with friends or family. A small minority recalled media exposure about the potential carcinogenic links and lead poisoning.

G2 No one knows anything about fluoride so they can't say it is high on their priorities.

One man indicated that people did not discuss fluoridation because they could not do anything to change the situation or to influence the policy-making process.

G9 It's way down there [on the list of priorities] . . . There isn't anything you can do about it. You can do something about other things. You can fail to sell your house, you can refuse to buy a house and you can decide to change your vote but with fluoridation . . .

The results of the focus groups suggest that the level of awareness or understanding of the purpose and function of fluoride in water is low. It was often mistakenly perceived as a cleaning agent or purifier.

Type of Information

Participants of the focus groups displayed differing levels of awareness of the recent fluoridation 'debate'. Even those who were aware of the media exposure remained poorly informed about the arguments for and against fluoridation. The participants welcomed the increased debate on the issue and perceived this desire for increased debate to be indicative of the changing attitude in Irish society to question, rather than simply accept, government policy.

G8 Well I do think we were much more trusting in those days, that we certainly believed that everyone was out for our good. I think it has been proved now, like, that we should have questioned a lot more things, you know, and maybe that is why somebody has questioned the fluoride and why it is there.

G6 They would have to sell it to us, show that it is worthwhile. Not only for your teeth, but for your health as well.

G8 If there was an open forum in a hotel you'd have the experts who were for it and against it. I think an open discussion is very important

After reading the anti-fluoridation material I had collected I was concerned about the potential health effects of Dublin water. The list of health risks was comprehensive and I expect that anyone who read this material without prior knowledge of the subject would want to know if it was true. The Chief Dental Officer assured me that no reputable evidence to support the anti-fluoridation groups' claims had been published and that there were many studies that did not establish a link between the list of health concerns and fluoride. However, this point of view was not being communicated with the general public.

The Irish DoHC awaited the release of the *York Report* before making any decisions on the information that would be communicated about water fluoridation. The study was commissioned by the Chief Medical Officer of the UK's Department of Health and conducted by the University of York (McDonagh et al. 2000). The report, released in September 2000, supported the use of water fluoridation. However, it did not completely rule out all potential harms: "the research evidence is of insufficient quality to allow confident statements about other potential harms or whether there is an impact of social equalities" (McDonagh et al. 2000, p xiv).

When he presented to the DoHC's Forum on Fluoridation in October 2000 Professor Paul Connett, a known supporter of the immediate removal of fluoride, stated that the *York Report* was limited in scope and that many issues were not addressed. Connett and other high profile, international anti-fluoridation protagonists were used by FFW, either in person or through citations in their information material. Connett also published a Letter to the Editor in the *Irish Independent* in April 2000.

The focus groups also explored the credibility of experts and sources of information. When the participants were asked who they thought would be the most credible source of information, the issues of independent and objective opinions were raised. Government Departments, Local Authorities and the DHF were thought to be reputable, but it was felt that their underlying agendas should be questioned.

G8 I feel the Department of Health might be reluctant to tell you all the potential negatives of fluoride because it could open a can of worms.

G5 The Department of Health is possibly influenced by pharmaceutical companies.

G3 [The DoHC] covered up about blood transfusions and all the rest of it. They would tell you what they think you want to hear.

G9 You want someone who is independent, who has no axe to grind.

The participants were asked how they would decide which expert or information source to believe. The results suggested that participants would trust those with whom they had already established a relationship, for example their dentist, and would prefer to hear all sides of the argument before choosing which one to believe.

G8 Well that is the reality [differing points of view]. That's in everything, it's not only in fluoride. It's nice to hear both sides of the story and, well, I think it's a personal choice in the end.

G2 It would depend on what they were saying. You'd have to listen to both of them and then you're going to have to use your common sense to figure out which one you believe to be the right one.

These comments provide evidence of the ability of members of the general public to weigh up different expert advice and make their own decisions, as long as information is available. The participants were asked what questions they would ask if given the opportunity to speak to a fluoridation expert? The key questions and potential areas of concern raised were:

i. What are the supposed benefits and what is the evidence to support such claims?
ii. What are the negative impacts of fluoride and what evidence is there to support these claims?
iii. What is the current fluoride level in the Irish water supply and how does this compare to our European neighbours?
iv. Have any studies looked at the potential dangers of long-term fluoride consumption?

v. Is there a viable alternative to fluoride?

vi. Is fluoride naturally present or has it been artificially added?

vii. How much fluoride is acceptable for one to be exposed to per day, considering the combination of water and toothpaste?

viii. How frequently is it monitored?

ix. How does fluoride interact with other chemicals in the water supply?

The Chief Dental Officer may believe that water fluoridation is too complex an issue to cover in the media. However, the focus group participants, members of the general public with no former interest in water fluoridation, have shown that they were capable of asking intelligent and pertinent questions about such an issue.

Summary

The only non-technical issue surrounding water fluoridation concerns the lack of choice of individuals to take in fluoride when an entire water supply is fluoridated. The two other issues most often raised in the controversy are the health and environmental risks of fluoridation. FFW is the main pressure group calling for the removal of water fluoridation in Ireland and no other social actors are publicly involved in this controversy. There is also little public awareness of the issue.

The controversy centres around the differing opinions of experts on the health benefits or detriments of fluoridation. International experts have been used by both FFW and DoHC to support their opposing claims. The participants of the focus groups stated that they wanted the opportunity to make their own decision on which expert to heed and to be provided with information on both sides of the argument from an independent source. The government agencies were thought to be reputable, but were also perceived as having their own agendas.

DoHC and the DHF had the opportunity to communicate technical and non-technical issues with social actors and members of the public, but they chose not to do so.

Discussion

The controversies surrounding GMOs and water fluoridation were framed as technical or scientific, however social actors, as well as scientists, were involved in discussion of these issues. Many of the issues raised in the discussion regarding GMOs were not specific to this subject area, in contrast to those raised in relation to water fluoridation. However, in both cases concerns were raised about the lack of public involvement in making decisions that will directly affect them. Decision making had been taken out of public hands. The interviews with social actors involved in the controversy surrounding GMOs also indicated that, due to the increasing power of multinational companies, decisions may not even be made by the Irish government.

For the public to be involved in the policy-making process more public information and public debate are required. Although the media provided information on these issues, there was little reflection on the events themselves or the concerns raised. Government departments did not initiate the provision of public information or promote public debate at the start of either controversy. Perhaps they hoped that the controversy would die down if they ignored it. When dealing with public concerns or queries the government provided too little information too late.

Comments provided in the cases studies indicated that the government had no clear plan of action regarding what type of communication was wanted or needed by members of the public. There was a sense that providing information might increase the level of controversy surrounding an issue. For example, the Chief Dental Officer indicated, in private conversation, that he would be willing to recommend the removal of fluoride from Irish water in approximately five years, if and only if the vast majority of the population had improved oral hygiene. To ensure that oral hygiene would improve in lower socio-economic areas the Chief Dental Officer suggested a large, well-targeted education campaign. However, neither the DHF nor the DoHC announced this opinion publicly and no plans for an education campaign have been put forward.

More social actors were involved in the controversy surrounding GMOs and the range of issues raised was wider than in the case of water fluoridation. In the latter case the controversy was simply between the government, which supported water fluoridation for public health reasons, and anti-fluoridation groups.

The next and final chapter explores whether the public issues and social actors identified in this chapter were included in the policy-making process. Three public consultation initiatives are evaluated using the framework established in Chapter Four.

Chapter 7

A Search for Irish Dialogue

This chapter analyses two cases of policy making—GMOs and water fluoridation—and evaluates the following three different consultation initiatives:

i. **National Public Consultation** on GMOs and the Environment, organised by the Department of Environment and Local Government;
ii. **BioDivulga Stakeholder Workshop** on the use of biotechnology in food and agriculture, organised on behalf of BioResearch Ireland; and
iii. **Forum on Fluoridation** addressing water fluoridation, established by the Minister for Health and Children.

The aim of this chapter is to establish the level of public participation that occurred in the above three initiatives. The evaluation framework, established in Chapter Four, was used to address the societal context of the issues and the arrangement of the public consultation. Figure 4.1 provided a summary of the evaluation framework.

Genetically Modified Organisms

Both of the Irish initiatives evaluated in this section were organised to address issues surrounding genetically modified foods. The consultation process organised by the Department of Environment and Local Government (DoELG) was made up of a number of different components beginning in August 1998 and finishing in October 2001. In contrast, the BioDivulga Stakeholder Workshop, held in April 2000, was a one-day event organised on behalf of BioResearch Ireland.

The data used in the analysis of the two initiatives were obtained through a variety of research methods including interviews, content analysis of newspaper articles and official documents, sound recordings, transcripts and personal notes. Further details of the methods used are presented in Chapter Five.

The DoELG's National Public Consultation

In order to place it in context, I will provide a brief description of the National Public Consultation before presenting the results of the evaluation.

The consultation process began with the release of a technical consultation document, *GMOs and the Environment: A Consultation Paper*, in August 1998 (Department of the Environment and Local Government 1998). The release of this paper was anticipated for six months and was advertised in the national newspapers. Submissions from the public were called for. The respondents to the *Consultation Paper* were invited to a two-day public debate in May and June 1999. A report was produced in September 1999 by the debate's Chairing Panel (Department of Environment and Local Government 1999). Although not formally part of the DoELG's consultation process, my evaluation also includes the report issued by the Inter-Departmental Group on Modern Biotechnology (IDGMB) in October 2000. I included it because the Chairing Panel frequently referred to the IDGMB in their report. They recommended that the IDGMB should address numerous issues raised at the two-day public debate that were outside of the remit of DoELG.

Day One of the two-day public debate was held on 25 May 1999 at the Sutton Castle Hotel in County Dublin. Three groups were involved in the debate: a Chairing Panel consisting of four members, a Stakeholders' Panel consisting of eight speakers from NGOs, academia and industry and the audience consisting of all remaining members of the public who had made submissions in response to the *Consultation Paper*.

The primary objective of Day One was to set an agenda of four key issues to be discussed on the second day of the debate. This agenda was to be formulated from an open-floor debate between the members of the Stakeholder Panel and the audience. However, the participants failed to agree on an agenda by the end of Day One and so the Chairing Panel decided to take the task upon themselves. After reflection of the issues raised on Day One, the Chairing Panel circulated the agenda of four key issues a number of days prior to Day Two. The 21 NGOs held a meeting to discuss the proposed agenda and nineteen of the 21 groups decided to withdraw from Day Two. Day Two went ahead as scheduled on 3 June 1999 in the absence of the vast majority of the NGOs and many of their supporters.

The conclusions of the National Public Consultation were to inform national policy position on GMOs and the environment and to assist in coordinating the overall position of the government on genetic modification.

The National Public Consultation has been analysed according to two groups of criteria—the societal context and the public participation arrangement—of the evaluation framework, as shown in Figure 4.1.

Societal Context

The social context of the public participation arrangement relates to the interaction of the scientific and social elements involved in an issue. The four criteria used to evaluate the societal context were the political culture, the history of the government body, the type of uncertainty of expert knowledge and the level of public awareness and public debate.

Political Culture

Evaluation of Ireland's political culture included the political tradition of public involvement in decision making, particularly decisions that involve science, the regulation and promotion of science and the GMO debate at a political level.

Ireland does not have a history of involving its citizens directly in the policy-making process. Ireland has a liberal democratic system where a citizen's role is limited to electing representatives who are then directly involved in the policy–making process.

Science policy over the past 40 years has had little input from Irish citizens. It was only in 1993 that research scientists first formed an interest group to campaign actively to secure funding for basic research. This focused campaign was led by the Irish Research Scientists Association (IRSA) and they claim that it was instrumental in the reversal of the government's decision to cut science funding and in the establishment of the Science, Technology and Innovation Advisory Council (STIAC) in 1994.

Science policy has been linked to industrial policy and economic benefits for Ireland since the 1950s (Kerr 1996; Yearley 1989; Yearley 1995). Appendix K provides a timeline of the major developments in Irish science policy. Since the 1980s government science policy has focused on particular areas of science. Research grants were given to work that could benefit biotechnology, information technology and new materials (Yearley 1995). Biotechnology and information technology gained further support in 2000 through state funding of over 600 million Euros, which was to be directed by the new state agency called Science Foundation Ireland.

In the mid-1990s the government committed funding to increasing public awareness of science, with the focus on the benefits of science, technology and innovation. The initiatives that have been supported by the Science and Technology and Innovation Awareness Programme could generally be referred to as 'information events' where the advantages of science are presented to the public. At the time of writing no public participation initiatives had been organised.

The extent of the public debate on GMOs was not mirrored at the political level where only a handful of politicians were interested in the issue. When the current Minister for

Environment and Local Government was in opposition he, together with the spokesperson for Agriculture, issued a press release supporting a moratorium on GMOs because of the lack of scientific evidence:

> Current scientific knowledge is inadequate to protect the consumer and the environment from the unpredictable and potentially disastrous side effects which may appear immediately or at any time in the future . . . [Fianna Fáil] believe however that it is wise to be conservative and put safety first. The rush to market with genetically modified foods is unscientific, unseemly and premature. Prevention is wise because cure is impossible. Genetically modified organisms once released can never be recalled.
> (Dempsey and Walsh 1997)

When Noel Dempsey became the Minister for the Environment he did not initiate a moratorium stating that it was illegal to do so under EU legislation. Two months before the two-day public debate a Dáil debate took place and, for the first time since becoming the Minister for the Environment and Local Government, Dempsey made a public statement on GMOs. The Minister announced the format of the two-day public debate and stated that his policy position would be made on completion of the National Public Consultation. The Minister left immediately after delivering his speech limiting the actual 'debate' to three Deputies. This early departure reflects the lack of interest in GMOs by the political parties and the inadequate role of the Dáil in contributing to public debate.

Local and international politicians supported the use of GMOs. A *Washington Post* article reported that the US government had lobbied the Taoiseach[53] to support GM products in the EU (Lambrecht 1998).

History of the Government Body

Due to its approach and perceived position on GMOs, the DoELG had an important role to play in determining the outcomes of the public consultation process. The DoELG is the primary government department responsible for regulation of GMOs, although the EPA was designated as the competent authority for approval of notifications regarding the planting of GM crops. The DoELG are also the primary focus of this research, as it held responsibility for political considerations under Article 21 of Directive 90/220 and it initiated the National Public Consultation procedure.

[53] The Taoiseach is the Prime Minister of Ireland.

The process adopted by the EPA (and government) to assess GMO notifications reveals the political acceptability of GM technology and indicates that GMOs could be adequately treated by the regulatory approaches of the EU. The lack of apparent opposition to the assessment process informally indicates that Ireland accepts GM technology and its commercialisation.

The research submitted by an applicant, for example Monsanto, forms the basis for Ireland's assessment of GMO notifications under Directive 90/220. The EPA has made decisions based on an absence of evidence of risk rather than evidence of safety. Ireland does not carry out independent research on the safety of non-contained GMOs, as it is not required to do so under the EU directive. Prior to the National Public Consultation the DoELG and the EPA, as well as other government agencies, exhibited a general acceptance of genetic modification and its regulation system.

Once Dempsey was elected he discovered from his department that delivering his pre-election promise of a moratorium on GMOs was not straightforward. Prior to the instigation of the National Public Consultation the Minister met with Clare Watson of Genetic Concern, requesting information to support their position.

NGO 1 Shortly after the election [Minister Dempsey] met with Clare. He said 'listen you have got to get the data to back up the position we have committed ourselves to. We are coming under huge pressure'. We . . . pulled out about 500 pages of reports and papers and so on and we presented it. We never even got an acknowledgement . . . As soon as [Minister Dempsey] got in in 1997 . . . he found that he had committed himself to a position that he found untenable within whatever . . . bureaucracy is behind the permanent government—as we call it, as opposed to the elected one.

No government department, including the DoELG, had ever conducted such an extensive public consultation on an issue involving science. Prior to the National Public Consultation the DoELG did not actively support public debate. It avoided the chance to participate in public debates on GMOs and frequently stated that a report on the Minister's position was imminent. When the document was released it took the form of public consultation rather than a formal position.

Type of Uncertainty

The uncertainty of scientific knowledge and the different arguments that have been central to the public debate are evaluated using this criterion. The legislation distinguishes between two types of GMO use: *contained use*, for example the laboratory use of a GMO to produce insulin, and the *deliberate release* of GMOs into the environment, either for research purposes, such as field trials, or the placing of GM products on the market. It is the latter use of GMOs with which the majority of the anti-GMO lobby are concerned. The adamant supporters of GMOs often cite examples of the contained use of GMOs to prove the safety of GMOs. One prominent Irish scientist has argued that genetic engineering has had a 25 year and 100% safety record. Statements such as these are not supported by all scientists and do not address many of the issues raised in opposition to the deliberate release of GMOs. In this sense Brian Wynne's breakdown of uncertainty is very relevant. The uncertainty (or certainty) expressed by experts and members of the public are very different. And it is the unwillingness of some scientists to recognise the presence of unknowns that intensifies controversy and perpetuates the polarisation between adversarial groups. The anti-GMO lobby considers the current regulatory system to be insufficiently broad to include factors which experts may be unaware of. Wynne defined this situation as 'ignorance' (see Chapter Three). However, embedded in the ignorance is a level of indeterminacy. A good example of a situation that could not have been predicted by scientific research was an incident surrounding GM sugar; this sugar was mistakenly packed and prepared for market by factory workers. The mistake caused an outcry from environmental groups and forced campaigners to raise concerns over how individual farmers will dispose of GM crops and avoid contamination. And finally, uncertainty arises when crop trial research is carried out by a single company, for example Monsanto, which is not examining the full range of issues surrounding the controversy.

Public Awareness

The public attitudes toward, and awareness of, GMOs and the level of interest of different social actors have been evaluated to highlight the societal climate at the time of the National Public Consultation. The controversy surrounding GMOs has captured the attention of a vast range of social actors because of its implications on farming, food retail, human health, environment and third world nations. Because of the different groups interested in GMOs, media coverage by a range of specialist reporters has been extensive and has increased the number of people exposed to the controversy surrounding GM foods and crops. The media included electronic and print news, documentaries and TV and radio soap operas.

The 1997 Eurobarometer 46.1 and the 2000 Eurobarometer 52.1 attempted to measure public attitudes toward GM food (European Commission 1997; European Commission 2000b, respectively). The majority of the Irish surveyed on both occasions did not accept the risks involved with GM food. However, the results of these surveys could be misleading for a number of reasons. Firstly, the validity of questions in surveys like the Eurobarometer is disputed. Secondly, a survey conducted by Lansdowne Market Research, on behalf of Genetic Concern, found that only eleven percent of the public surveyed listed GM food as an area of concern[54] (Lansdowne Market Research 1999). When prompted 62% of the public questioned stated that they were concerned over GM food, but this represented the lowest level of concern of all the food safety issues listed. And, finally, few consumers have refused to buy unlabelled products containing GM soya and maize since their introduction to Ireland in 1996.

The DoELG, in accordance with the government's general promotion of biotechnology, has exhibited satisfaction in the regulation and assessment of GMOs. Thus, for the regulators, the main barrier to the commercialisation of GM products was not one of safety but the level of public acceptance. To increase public acceptance the government has fully supported labelling GM products to allow consumers to make their own decisions. The regulators similarly stated that they do not object to GM products that have been deemed safe if consumers can exercise choice. However, the labelling of GM foods is not straightforward. Despite the fact that all social actors involved in the GM controversy support the labelling of GM products, there is disagreement as to extent and practicality of labelling. The two main areas of contention are the segregation of GM and non-GM food, such as wheat from the US, and products derived from GM plants that do not contain any genetic material, such as sugar from a GM sugar beet.

[54] Issues of greater concern regarding food were BSE, Salmonella, chemical residues, general freshness, additives and preservatives and antibiotics in meat.

It is not the aim of this thesis to determine the level of public awareness or public understanding of GMOs. However, this level of awareness is relevant in terms of the reaction of policy makers to the issue. The intensity of the public debate—media coverage, anti-GMO campaigns and organised debates involving key social actors—would have had a role in prompting the DoELG to establish a consultation process.

Summary

Prior to the National Public Consultation the Irish government accepted the regulatory procedures for GMOs as adequate. However, to form a national policy on GMOs and the environment, the Minister for Environment and Local Government opted to undertake a national consultation process. Both the level of public awareness of the issue and the need to find a way out of his pre-election promise could have motivated the Minister to take this step. The societal context of the consultation process presented here has a bearing on the public participation arrangement that is evaluated in the next section.

Public Participation Arrangement

The second dimension of the evaluation framework addresses the set-up and process of the public participatory initiative, its underlying values, assumptions and goals, and the resulting impact of the National Public Consultation. The evaluation is not just conducted on the two-day public debate but on all stages of the National Public Consultation beginning with the release of the *Consultation Paper* by the DoELG, the resulting 186 submissions from members of the public, the events leading up to the two-day public debate, the two-day public debate itself, the media coverage of the two-day public debate, the Chairing Panel's report and the report of the IDGMB. Interviews conducted with twelve participants of the two-day public debate provide additional data used in the evaluation of the consultation process.

Set-Up and Process

The set-up and process criteria relate to the structure of the National Consultation and the interaction and communication among the audience, the Stakeholder Panel, and the Chairing Panel. The seven criteria addressed below are representativeness, independence, communication, timing, structure and guidelines, unintended events and cost.

Representativeness

The representativeness of the National Public Consultation not only refers to the type, range and number of participants but also to the issues that were raised by the different social actors and members of the general public. The following elements are addressed:

i. How many of which type of participant were part of the initiative and why this choice was made;
ii. The selection of the participants;
iii. The kinds of decisions, if any, the participants made; and
iv. The issues that were raised and if they were included during the public participation arrangement and reflected in the outcomes.

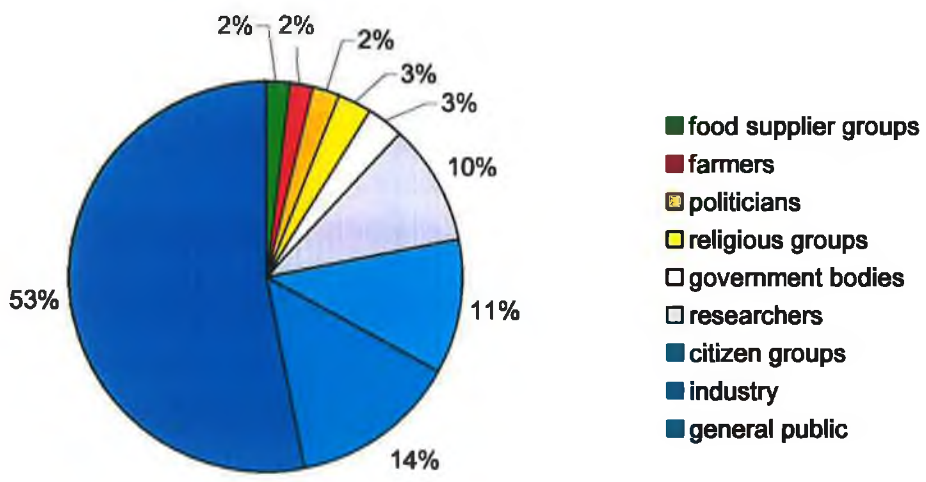
Type of Participant

The consultation document released by the Minister for the Environment and Local Government in August 1998 limited the type, number and range of participants in the remainder of the public consultation process. Only those who responded to the *Consultation Paper*, by sending in a written submission to the DoELG, were invited to attend the second stage of the consultation process—the two-day public debate. The release of the *Consultation Paper* was advertised in the national newspapers and opened the *Consultation Paper* to all Irish citizens, however, only persons or organisations with an interest in GMOs would have responded.

One of the declared purposes of the *Consultation Paper* was to stimulate public debate by identifying "key issues of concern and establish the views of all interests, including the general public, non-governmental environmental organisations, and the biotechnology industry, healthcare and agriculture sectors" (Department of the Environment and Local Government 1998, p xiii). The DoELG identified the general public as one of its target audiences, yet the way in which the *Consultation Paper* was written restricted the public's involvement. It comprehensively reviewed the regulation of GMOs. However, the document was very technical and made difficult reading for anyone not already familiar with the GMO regulation process. Furthermore members of the public had to obtain a copy of the document before writing a formal submission to the DoELG. In this sense the representativeness of the participants involved was limited to members of the public with an active interest in GMOs, who were confident and determined enough to lodge a submission. Either the DoELG were not actively seeking submissions from members of the general public or little thought was given to how best to include this group in the consultation process.

The 186 submissions in response to the *Consultation Paper* provided evidence of the type of the participants involved in the National Public Consultation. I identified nine categories of respondents including citizen groups, farmers, food supplier groups, government bodies, industry, politicians, general public, religious groups and researchers[55]. The general public category consisted of individuals who did not represent an association or organisation, and did not indicate a profession. Figure 7.1 presents the frequency of the categories of respondents of the 175 submissions analysed[56], and clearly indicates that over half of the respondents were members of the general public.

Figure 7.1: Percentages of categories of respondents to the *GMOs and Environment Consultation Paper*



[55] Eight of these categories were used in the analysis of the interviews prior to the National Public Consultation and definitions are listed in Table 5.4.
[56] Eleven of the 186 submissions were not analysed because they were either illegible or were not publicly available.

Forty percent of the submissions made by people in the general public category were orchestrated, as indicated by the fact that they were identically worded letters. All of the copied letters voiced objections to the use of GMOs. This finding suggests that these respondents had an affiliation with anti-GMO lobby groups. Eight percent of respondents had knowledge of biodynamic farming, but were not categorised as farmers because their profession was not explicitly given in their submission. The number of remaining submissions in the general public category has been reduced from 53% to 22% of the total, and the true nature of these respondents is not known. In hindsight I should have sent off questionnaires to all respondents to determine their true nature.

Copied letters were also used by 11 of the 24 respondents from industry. There is evidence to suggest that the Irish Bioindustry Association (IBA) coordinated this response.

Selection of Participants

The next stage of the consultation process was the selection of speakers to make formal presentations during the two-day public debate. These speakers formed the Stakeholder Panel and were selected individually by the stakeholder groups.

The academics decided amongst themselves through written correspondence, although a misunderstanding by the DoELG forced the selection to become accidental rather than democratic. The DoELG suggested that the IBA facilitate the selection of industrial representatives. The IBA convened a meeting at which the Director of the IBA and a representative of one of its members, Monsanto, were selected. The process of selecting speakers for the NGOs was more complicated. On 18 February 1999 the 21 NGOs had a preliminary meeting to decide on their two representatives. At the end of the meeting the NGOs announced that they had withdrawn from the consultation process[57]. They provided a number of reasons for this move including a greater representation of support for GMOs on the Stakeholder Panel because industry and academia basically had the same point of view, the grouping all of the 21 NGOs together restricted the

[57] After two further negotiations with the DoELG regarding the number and selection of speakers on the Stakeholder Panel the NGOs agreed to participate on 15 April 1999. Six weeks later the two-day public debate commenced.

representation of many diverse interests and the large group of individual members of the public had no representation.

Members of the Chairing Panel were selected by the Minister himself.

Decisions

The only participants involved in the consultation process to make any decisions were the members of the Chairing Panel. They drafted the agenda of Day Two and decided on the conclusions of the two-day public debate, which were presented to the Minister in the form of a report.

Issues

The nine themes that emerged in the submissions to the *Consultation Paper* were environment, health, consumer, agriculture, economic, evidence, public awareness, social and moral, and policy and regulation. Appendix L lists the definitions of these themes, as well as the frequency with which each was raised. The majority of submissions raised more than one theme, and, as submissions rarely prioritised concerns, no discrimination was made between the primary themes and subsequent themes. Figure 7.2 indicates the frequency of the issues raised and by each category of respondent.

The vast majority of the respondents—73%—did not support GMOs for reasons that included health, agricultural and environmental concerns, lack of scientific evidence, social and moral issues, lack of consumer choice and economic disadvantages for farmers and Irish tourism. A small number of submissions, 4%, were neither in favour nor against GMOs. For example, the submission made by Brian Trench and I focused on increasing public consultation to enable public issues to be addressed. The remaining 23% of respondents supported the use of GMOs.

Industry and government respondents raised economic issues or questions regarding policy and regulation. Their submissions emphasised the need for clear, objective, science based legislation to enable Ireland to benefit from the economic potential of GMOs.

The issues raised most frequently by both citizen groups and the general public were those in the social and moral category, and their main concerns surrounded the monopoly and power of industry.

Researchers, citizen groups and the general public raised the uncertainty of science (in the evidence theme) and the need for further research.

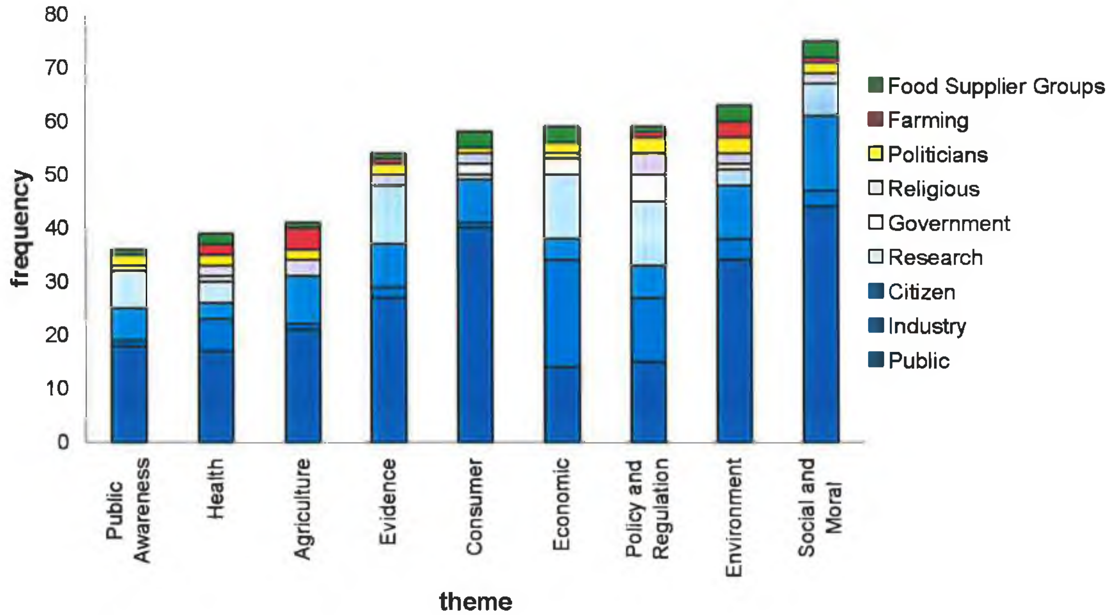


Figure 7.2: Themes raised by each category of participant in their responses to the *GMOs and Environment Consultation Paper.*

The theme of public awareness included the need for greater public discussion and consultation and was raised predominantly by the general public and citizen groups. The main issues in the researchers' submissions were the need to address public concerns and to supply the public with information to appease these concerns. For example, the submission made by the National Cell and Tissue Culture Centre referred to the concerns and fears of the general public due to a lack of information rather than "[c]riticisms arising from a rigid anti-technology agenda . . . [with] irrational and emotional objections . . .".

The submissions contained a larger range of concerns than had been addressed in the *Consultation Paper*. The Minister for the Environment and Local Government limited his consultation to the scope of his remit, and more particularly to the EU GMO directives. However, the Minister would have been aware of the range of concerns being raised in the public sphere and by excluding these from the *Consultation Paper* he restricted the representativeness of the process.

Independence

No issues of a lack of independence arose in the media coverage, questions at the two-day public debate or in the interviews conducted after the two-day public debate. The speakers, members of the Chairing Panel and audience participants were independent of the management and sponsor—the DoELG.

Communication

This criterion was applied to the types of communication in the *Consultation Paper* and during the two-day public debate. The format and content of the *Consultation Paper* were previously determined to be unsuitable for members of the general public. The document was written as an information document not one of consultation.

NGO 3 [The DoELG] don't seem to understand the nature of the word consultation. To me consultation means to consult, to ask the advice of, to seek counsel of, but the interpretation of consultation in the document they seem to think it was more in nature of educating the public as opposed to consulting with them.

The first three stated purposes of the document—to explain regulations, to outline planned amendments and to provide information on the biotechnology sector in Ireland—clearly indicated it was planned as an information-providing exercise. . The only paragraph in the document that refers to consultation was the one in which the DoELG invited "all persons and bodies … to make representations or submissions to the Minister for the Environment and Local Government" (Department of the Environment and Local Government 1998, p xii). One of the respondents admitted that he did not refer to the content of the document in this submission. The same was true of Brian Trench and I in our submission.

ACA 1 I thought the content [of the Consultation Paper] was a little bit turgid and I needed to do a wade through it . . . Being brutal I more of less ignored the document in my submission and I said what . . . I felt were the important issues.

Using the communication criterion the *Consultation Paper* is again found to be lacking. The remainder of this section evaluates the communication that occurred during the two-day public debate.

The two-day public debate involved three separate groups: the Stakeholder Panel, the audience and the Chairing Panel. Each of the eight speakers on the Stakeholder Panel had fifteen minutes to present their arguments. The presentations were formal and most speakers used visual aids. Questions were not permitted until all speakers had presented. After the presentations 90 minutes were allocated for participants to work together to identify and prioritise four key environmental issues. Very little guidance was given to aid selection of these key issues and the open-floor debate was very unstructured. The format did not foster discussion between the speakers and the audience as the Chair allowed concerns or questions to be raised at random. As the flow of questions was not continuous, it was very frustrating to listen to the debate. The Chairing Panel said little, except in the selection of participants to ask questions. The audience on Day One comprised approximately 120-150 people with polarised opinions and I have no doubt of the difficulty of the Chair's task. However, no facilitation skills were used to encourage discussion. Towards the end of the day the atmosphere at the event was one of frustration. Cheering and clapping occurred at the end of audience members' presentations. The scientists were the loudest both in support of their fellow scientists, and unfortunately, in jeering their opposition. During a question raised by a woman, who identified herself as a concerned mother and farmer, two scientists seated directly in front of me started sniggering and booing. This environment was not conducive to discussion and did not encourage participation from members of the general public.

NGO 5 The whole thing was chaotic as far as we were concerned . . . the first day was just mayhem really . . . There were accusations made left, right and centre . . . As it was everyone was going in there with a lot of pent up stuff that they had to get off their chest and it just went away from consensus rather than toward it.

The purpose of Day One was to decide on an agenda to which all participants were to agree; however, the format did not facilitate this. There was no attempt to discuss one issue at a time, let alone achieve a consensus for an agenda.

NGO 3 I felt that it was extremely important that the audience be allowed to participate, but I just felt it was extremely unstructured . . . We weren't given a chance to defend or answer other people's presentations. At one point . . . the Chairman said 'we are not here for a backward and forwards thing'.

ACA 1 There were a lot of good points coming from the audience but the panel of speakers didn't really have an adequate opportunity to come back and discuss some of those points . . . I had more discussions with the opposition during the breaks and after the end of the meeting than during the thing.

NGO 1 Very seldom did [the Chair] intervene and say 'sorry could you support that now, and I don't understand'. Very seldom did he engage people and challenge what they were saying.

ACA 2 In retrospect I think it was a smart move the way it was on the first day, because it did facilitate in an unplanned, unstructured way to allow people to get things off their chest . . . There was a lot of repetition . . . I'd say there were times on the first day [the Chairing Panel] were biting their tongues . . .

As mentioned by one of the interviewees above, and observed by me during Day One, the lunch and coffee breaks did provide a chance for audience members to engage in discussion with members of the Stakeholder Panel. During these informal conversations attempts were made to decide on an agenda for Day Two, but the results of these discussions did not transfer to the larger arena. Nevertheless, the informal conversations did have an impact on the following sessions. For example, when one NGO representative raised her concern about animal welfare she was told by the Chair that the debate was about GM crops and food, not GM animals. The Chair moved directly on to another person's query, giving the NGO representative no time to establish if this position was correct. During the following lunch break she approached the Chair and the DoELG organiser to query the remit of the debate and Directive 90/220. The issue of animal welfare was addressed in the following session after lunch.

NGO 6 I was quite shocked at how [the Chair] just cut [my question about GM animals] off as if this was not part of it, without even trying to establish whether it was or not.

In summary, the format of Day One did not encourage discussion. Neither the lack of overall structure nor the ineffectiveness of the Chairing Panel facilitated dialogue.

The four members of the Chairing Panel had been hand-picked by the Minister and were retired from their well established careers in academia, administration and the judicial system. One NGO speaker felt that their concerns could not be readily understood by the members of the Chairing Panel, putting their cause at a distinct disadvantage. Whether they were at a disadvantage or not, the fact that a participant was not comfortable with the Chairing Panel would have reduced her confidence in the procedure and as a result assisted in jeopardising the outcome.

NGO 5 One of the concerns that I had . . . no matter how senior and amazing they are and all their life experience . . . was the very fact of their generation, their seniority, would put them in a position where they couldn't understand where we were coming from. When they were growing up, when they were young people in careers as judges, as lawyers, as scientists, there were no NGOs, there were no groups articulating concerns from a space in civil society. I'm not saying they are not intelligent people—I am sure they are very smart and they can understand anything people tell them—but it is not about being smart. It's about being sensitive to where people are coming from. I don't think they would have been able to do that . . . I feel that they would be instinctively more willing to listen to arguments made by authorities . . . You know how it is if you had your grandparents up there making decisions about GM foods would they . . . understand Genetic Concern? . . . Would they understand that worldview? . . . When it comes down to issues about worldviews you really have to be very careful about who you put there to arbitrate . . . I'm sure they will do a great job [in chairing] but I have no confidence that they really necessarily understand where we're coming from.

At one point the Emeritus Professor of Chemistry stated that sugar from a genetically modified plant was identical to sugar produced from a non-genetically modified plant.

ACA 1 The only time I felt that the [Chairing] Panel showed any hint of bias was when [Professor of Chemistry] explained—I suppose David McConnell invited her as a chemist to tell us that sugar was sugar and not anything else—and she confirmed that sugar was sugar. I think that she should have not said that at that time really.

The reasons given by 19 of the 21 NGOs for withdrawing their participation prior to Day Two were that the Chairing Panel was biased, the dialogue lacked structure and the agenda provided by the Chairing Panel was inappropriate.

The atmosphere on Day Two was completely different to that on Day One. The day was structured by the agenda; its format allowed more discussion to occur and the communication was more focused. Greater dialogue was also assisted by the fact that there were 60-80 fewer people in the room, representing a narrower range of opinions. Presentations on issues set out in the agenda were made by the remaining speakers of the Stakeholder Panel. The majority of the discussion occurred between members of the Chairing Panel and the speakers. Less audience participation occurred than on Day One and the discussion was heavily dominated by scientists and industry representatives.

The name given to the two-day event was 'debate'. In his opening address delivered on Day One the Minister indicated that dialogue was to be a feature of the two-day public debate:

> There is as great a need for dialogue as for advocacy of particular points of view. I regard the debates you will have today and on 3 June as crucial in our policy formation process—open, participative, democratic with frank scrutiny of issues by all interests . . . (Minister for the Environment and Local Government 1999).

However, very little debate or dialogue occurred on Day One. In contrast, the structure of Day Two was more conducive to debate and at times dialogue occurred between the Chairing Panel and the Stakeholder Panel. Although it did not occur during either of the formal sessions of the two-day public debate, the lunch and coffee breaks did provide an opportunity for true dialogue.

Timing

This evaluation of the timing of the National Public Consultation considers its relationship to the timeframe of the policy decision and the time taken to organise the event. In Ireland, controversial issues surrounding GMOs were first raised in early 1997 with Monsanto's application to the EPA for GM sugar beet crop trials. Not long after this event Genetic Concern was formed[58]. However, the DoELG did not issue their *Consultation Paper* until August 1998, eighteen months after the first public campaign against GMOs and six months after the Minister had stated that it was imminent. The second stage of the consultation process took place after another nine months in May 1999. The Minister's briefing material for the Dáil Select Committee on 16 June 1999 stated that the timing of the consultation process was influenced by the proposed amendments to Directive 90/220, the increasing economic importance of GMOs and increasing levels of public concern and awareness. However, all three of these reasons were known to the Minister prior to the release of the *Consultation Paper*. The type of debate organised by the DoELG would not have taken this long to organise, even with the two-month delay imposed by the first withdrawal of the NGOs.

The aim of the consultation process was to help shape Ireland's national policy on GMOs and allow the Minister to vote on the amendments to Directive 90/220 at the

[58] Figure 6.1 indicates the frequency of media coverage and the events involving GMOs from this period until November 2000.

European Council of Environmental Ministers on 24 June 1999. However, as the Chairing Panel's report was not completed until 28 July 1999 the Minister abstained in the vote. The report was not made public until September 1999. The organisation of the National Public Consultation extended over eighteen months, which one would assume would have been ample time for the Minister to form a policy decision on behalf of Ireland. It was not.

Structure and Guidelines

Each public participation initiative should have a clear structure and guidelines to enable all participants to be sure of their role and the aims of the initiative. The National Public Consultation is evaluated in terms of its link to the policy-making process and the presence of formal objectives and clear guidelines as to how the process would take place.

The National Public Consultation lacked structure primarily because no indication was given, either in the *Consultation Paper* or at the two-day public debate, as to how the process would inform the Minister's decision. During Day One an audience member directly asked the Chairing Panel how they would arrive at their conclusion. They stated that they would take all points of view into consideration, but otherwise gave no indication of how they would reach their conclusions.

On Day One the Chair did not provide adequate guidelines for the audience or the Stakeholder Panel as to how the open-floor discussion would occur. The audience was not aware that the primary objective of Day One was to decide on four key issues to be discussed on Day Two, until the Chair mentioned it in passing after the morning session. All of the speakers were aware of this objective through their communication with the DoELG organiser, and they had all structured their presentations with this in mind. However, the structure of the day had not been made clear to the speakers.

IND 1 [The debate] was not what I expected in the sense of the format. As I understood it . . . it would have allowed the cross examination in some organised fashion . . .From the way the letter from the Department of Environment was written that was my assumption going into the debate.

NGO 1 [Other debates that I had been involved in] got to the issue in an hour and a half in much more depth . . . We've done loads of these debates and [with] all of them you have a good chairperson and the audience challenge you with questions and the chairperson consults the panel and you really feel you've got to the meat of the issue

> at least . . . I don't think we got to that at all. It was just popcorn—people standing up saying whatever they wanted to say and not be challenged on it.

There was little focus to Day One, but the DoELG argued that the lack of structure was beneficial.

GOV 1 I thought the Chair handled Day One quite well—they were breaking very new ground [and] he had nothing to go on . . . I regarded the first part of the open floor debate, after the presentations, to be quite sort of loose for want of a better word . . . [The Chair] let people talk . . . and I think that that was useful.

One academic felt that the unstructured format worked well and that it was a conscious decision of DoELG to let the debate occur in such a fashion.

ACA 2 I think there was something behind the scenes, which we weren't privy to, but I could read between the lines in terms of wheeling and dealing and the poker play that went on. So I think there was a very genuine and conscious decision made on the first day to say very little to get the process going, to let these people get it off their chest and say what they like about it. But at the end of the day it worked.

Whether it was a conscious decision of the DoELG to have an unstructured format on Day One is difficult to prove. However, to assume that a room full of people, with vastly differing opinions, can reach a consensus on four key issues within 90 minutes clearly indicates a lack of experience in and understanding of consensus building exercises. The debate on Day One may have allowed the participants to state their concerns or interests, but its format only further polarised the views of those involved.

The agenda provided structure to Day Two but the way in which the interaction between audience, Chairing Panel and Stakeholder Panel was to take place was not made clear, resulting in little discussion with members of the audience.

Unintended Events

The DoELG's consultation process was able to cope with a number of unintended events including the two separate withdrawals of the NGOs. How the final withdrawal affected the outcome of the consultation process is difficult to determine. The process was not limited by its ability to deal with unintended events. The main limitations were the structure of the two-day public debate and the values and assumptions of the DoELG brought to bear on the process.

The organisers should be commended for their willingness to change the structure of the proposed two-day public debate to include the NGOs. Without the presence of the NGOs the consultation process would have been very one-sided and, as it turned out, Day Two was exactly that.

Cost

The cost of the consultation process was not established. The two-day public debate would have been the most expensive stage of the consultation process due to hiring the venue and cost of food. However, the event would have been less expensive than a consensus conference where participants' and experts' travel and accommodation costs are included in the overall budget. The DoELG did not appear to cut corners in order to complete the consultation process.

Staff resources and time would have been considerable, especially during the negotiations with the NGOs to ensure their participation in the two-day public debate. The DoELG organiser stated that the National Public Consultation had taken up the majority of his time for twelve months.

In summary, analysis of the set-up and process criteria has indicated that the National Public Consultation did not adequately involve members of the general public thereby failing to achieve one of its stated purposes. The participants did not have any role in making decisions during the consultation process, except in their selection of speakers and the content of their presentations. The Chairing Panel had full control of deciding the agenda and of drawing conclusions from the process. The issues raised during the National Public Consultation were not reflected in the report of the Chairing Panel.

Communication during the consultation process was poor as discussion did not occur and therefore the different values and interests of the participants could not be recognised and respected. The lack of structure in the format and chairing of the two-day public debate ensured that it was neither a debate nor a discussion. The process provided little guidelines for its participants and no indication as to what their role was in the consultation process.

The preparation and build-up to the National Public Consultation was long and drawn out, yet an immediate decision was needed at the end of the two-day debate for the Minister to vote on the proposed amendments to the Directive 90/220. After eighteen months of deliberation, the DoELG still had no formal policy on GMOs and the Environment. The cost of the National Public Consultation would not have been exorbitant, which is fortunate considering the reduced input from a substantial number of respondents. The event was primarily organised by a single person in the DoELG with little experience of the development or organisation of such an event and a lot of his time was taken up by it.

The next group of criteria in the evaluation of the public participation arrangement are values, assumptions and goals.

Values, Assumptions and Goals

The underlying values, assumptions and goals of a public participation arrangement are present from its conception to completion, and as such play a substantial role in its outcomes. The three following aspects of the National Public Consultation are evaluated: issue definition, the rationale of the public participation arrangement and the transparency of the process.

Issue Definition

All of the participants and the DoELG had different opinions as to the issues at stake. I argue that one of the purposes of the consultation process should have been to identify and understand these differences. Some of the Stakeholder speakers did attempt to do this. However, the dialogue needed to explore the issues did not occur. One of the main differences of opinion was in the definition of the precautionary principle. Risk assessment was addressed on Day Two in reference to management and regulation of GMOs but not the environment.

The DoELG's underlying assumptions about the concerns of the NGOs were made immediately obvious by the fact that all groups calling for a moratorium on GMOs were grouped together despite the diversity of their concerns.

The *Consultation Paper* identified four technical issues and a further four issues that the government considered to be of public concern. These issues of public concern included labelling of GM products, monitoring the products on the market, public consultation of marketing notifications and the criticism that a product can be approved without the support of a majority of member states. The document did not address any of the other ethical, judicial or moral issues that I identified in the interviews conducted prior to the National Public Consultation and the analysis of the newspaper articles and Letters to the Editor. Although the DoELG consistently reminded the participants that the remit of the *Consultation Paper* was limited to the environment, it failed to recognise that social issues are intrinsically linked to the environment.

Table 7.1 compares the issues raised in each stage of the consultation process with those identified during the interviews conducted in 1998 and in the analysis of the combined media sample. It is immediately obvious that the scope of the *Consultation Paper* and report written by the Chairing Panel were limited in comparison with the report produced by the IDGMB. The latter report was very comprehensive and addressed all the concerns that had been raised at the two-day public debate. Although the IDGMB did address issues raised by key social actors, the report predominantly framed GMOs as a scientific issue and addressed ethical and moral concerns separately. In doing so the report confirmed that the government viewed the concerns of various social actors as secondary to scientific knowledge.

Table 7.1: A comparison of the issues raised at each stage of the National Public Consultation, in the Interviews conducted before the commencement of this process and from the analysis of the combined media sample.

Issues	Inter-views I	Media Analysis	Consultation Paper	Public Submission	Two-day Public Debate	Chairing Panel Report	IDGMB Report
Research agenda							
Commercialisation	✓	✓		✓	✓	✓	✓
Public accountability	✓			✓	✓		✓
Research priorities	✓	✓		✓	✓		✓
Application of Research							
Developing nations	✓	✓		✓	✓		✓
Control of food and seeds	✓	✓		✓	✓		✓
Nature	✓	✓		✓	✓	✓	✓
Scientists' responsibility	✓				✓		✓
Animal Welfare				✓	✓	✓	✓
Regulation of Research							
Industry relationship with regulators	✓	✓		✓	✓		✓
Public involvement in decision-making	✓	✓		✓	✓		✓
Public confidence		✓	✓	✓	✓	✓	✓
Labelling	✓	✓	✓	✓	✓	✓	✓
Regulation process	✓	✓	✓	✓	✓	✓	✓
Risk assessment/ precautionary principle		✓	✓	✓	✓	✓	✓
Technical Issues							
Environment	✓	✓	✓	✓	✓	✓	✓
Health	✓	✓	✓	✓	✓	✓	✓
Economy		✓	✓	✓	✓	✓	✓

For example the IDGMB report stated, in the section on balancing risks and benefits of biotechnology, that: "the risks associated with genetic modification should neither be minimized or magnified but should be assessed and managed in accordance with scientific principles and procedures" (Inter-Departmental Group on Modern Biotechnology 2000, p 15). The IDGMB recognised the need for better communication with the public, however this was not in the context of making better decisions. The report stated that decisions, albeit based on the precautionary principle approach, should be "guided by scientific principles and procedures" and the regulatory system based on "the best available scientific expertise and advice" (Inter-Departmental Group on Modern Biotechnology 2000, p 22). The report referred to strengthening the regulatory and policy framework at the EU level stressing that there should be a "fundamental commitment to safety and environmental sustainability based on scientific risk assessment and management" (Inter-Departmental Group on Modern Biotechnology 2000, p 24). The report was consistent in its message that Ireland should use GMOs to take advantage of the economic benefits, but only if scientists were to conclude that GMOs are safe.

The IDGMB report began well by identifying the need for more public communication and consultation to enable the public to be involved in decision-making concerning biotechnology. However, as discussed above, the report gave no indication that decisions would be based on both scientific and public issues. The IDGMB recommended that information communicated with the public should include more than the technical details of GMOs but should also convey "an appreciation of the economic, social, environmental and ethical implications of the science and its applications . . ." (Inter-Departmental Group on Modern Biotechnology 2000, p 23).

The report promoted the deficit model of science communication[59] stating that because the public have a lack of scientific knowledge and appreciation of the 25 years of scientific research in this area it is understandable that their judgement is clouded.

> The health, environmental, and ethical issues raised by genetic engineering are complex and challenging even for those with a reasonable knowledge of the subject. Where the issues are clouded by misconceptions of the kind evident here, rational public debate is that much harder to achieve. There is clearly a need to find more effective ways of improving public understanding of biotechnology (Inter-Departmental Group on Modern Biotechnology 2000, p 96).

[59] The deficit model is discussed in Chapters One and Two.

Rationale of Public Participation

The rationale of public participation refers not only to the selection of the participation method but also the reasons for choosing to involve the public in the policy-making process. To begin with I will address the government's overall commitment to public participation.

The five stated purposes of the *Consultation Paper* were to:

i. Explain the environmental controls which apply to the deliberate release of GMOs in Ireland and the EU;
ii. Outline planned changes to these control procedures;
iii. Provide information on Ireland's biotechnology sector;
iv. Identify particular areas of public concern in regard to the potential impact of GMOs on the environment; and
v. Provide an opportunity for the general public to participate in the development of national policy on GMOs and the environment (Department of the Environment and Local Government 1998, p ii).

A large proportion of the *Consultation Paper* provided information about technical aspects of GMOs and current regulations. Its final two stated purposes were addressed in one paragraph.

In the Minister's opening address at the two-day public debate he mentioned the need for dialogue to ensure a democratic process. But he did not explain how the dialogue was to increase the democratic process. The lack of a formal strategy around how the views and concerns of the public were to influence the policy-making decision was the biggest weakness of the consultation process. Without it the process was seen to be a token effort of public participation.

A number of speakers on the Stakeholder Panel, besides those from NGOs, were sceptical of the rationale behind the consultation process stating that it was a "smokescreen" to assist the Minister in changing his view of GMOs.

ACA 1 . . . it always seemed to me that this was a smokescreen and that the real decisions had either been taken or would be taken without reference to this and this was just a way for Noel Dempsey to change his viewpoint saying that following public consultation he had decided to abandon the moratorium once and for all . . . I believe that there might have been a small part to play in that consultation in the final decision making process, but I suspect other factors will have been more important in making the final recommendation whatever it is.

In general the public consultation process did what it set out to do. It explained the regulatory process and identified areas of interest and concern to members of the public, including stakeholders. During the consultation process issues and concerns that were not strictly technical environmental issues were raised, and many of these were not addressed in the Minister's policy decision.

The rationale for the selection of the format of the consultation process is even more difficult to identify. There is little evidence to suggest that DoELG investigated alternative consultation procedures. Julie Kirby[60] requested, under the Freedom of Information (FOI) Act (1997), documents detailing the DoELG's process on the selection of a particular public participation method. There is no evidence, from the FOI documents, two formal interviews and informal conversations with the DoELG organiser of the consultation process, to suggest that there was any formal consideration of any established public participation methods.

The process of consultation evolved in response to the submissions. When the respondents sent their submissions to the DoELG *Consultation Paper* they were not aware that there would be a further stage to the consultation, as the DoELG itself had not decided that there would be a further stage.

GOV 1 Not to any serious extent [did we review other countries' approaches to consultation] . . . We had heard various different bits . . . but we decided what we wanted to do and we set out on the road of a written consultation process. We did not have a debate in mind at that stage—it was purely a straight forward and simple public consultation process by written procedure. And . . . on the basis of the submissions received make a policy statement and that was the end of it.

The organiser of the consultation process indicated to me that he thought the DoELG process was more democratic than a consensus conference. However, the FOI

[60] Julie Kirby was a MSc student in Science Communication at DCU whose dissertation was based on the National Public Consultation.

documents contain no evidence that the consensus conference method was ever investigated or considered, or that the process was decided upon because of its democratic characteristics. It was also clear from the interview that the organiser had little understanding of the role of a consensus conference.

GOV 1 How do you pick a lay jury from 184 interests? And say 'we regard you as the lay jury and the rest just have to accept what you say'? . . . In democratic terms [there are only] 24 winners and the rest of you are all bystanders.

Transparency

The transparency of the consultation process was limited. At no stage was the public's potential involvement in the policy-making process made clear. Nor is it clear how the consultation method or members of the Chairing Panel were selected. This lack of transparency did not assist the credibility of the process or decisions derived from it.

In summary, the evaluation of the National Public Consultation against the values, assumptions and goals criteria indicated that the rationale of the process was to provide information about the current regulations of GMOs and call for public responses regarding these regulations. It was the first time that Noel Dempsey had publicly addressed the GMO issue since becoming Minister for the Environment and Local Government. The *Consultation Paper* did stimulate debate, however, at the time of its release public debate was already occurring among the key social actors who made up 75% of all submissions to the *Consultation Paper*.

The content of the *Consultation Paper* was restricted to the environment because of the Minister's remit. However, the interpretation of 'the environment' was limited to technical issues and did not include any of the social implications arising from the use of GMOs. The agenda prepared by the Chairing Panel did widen the scope of the debate to include economic and educational issues related to GMOs, but excluded other relevant issues, such as health, ethics and agriculture.

There was no evidence to suggest that the DoELG had given any serious consideration to the format of the two-day public debate, or any other type of public participation programme. The lack of transparency in the selection of the format and the members of the Chairing Panel, and how the National Public Consultation was to inform the Minister did not aid the credibility of the process.

The final group of criteria relating to the impact of the public participation arrangement is evaluated next.

Impact

The impact criteria used to evaluate the National Public Consultation relate to the outcomes of the process, their influence on the policy-making process and the quality of decision made.

Outcomes

The National Public Consultation had two key outcomes. The first outcome was the Chairing Panel's report, which was primarily intended for the Minister, and the second was a policy statement from the Minister, based on the Chairing Panel's report, which recommended that the government accept the conclusions of the Chairing Panel.

The Chairing Panel's report recommended that the IDGMB address a number of issues raised in the National Public Consultation that were outside the DoELG's remit. The IDGMB's report on biotechnology related issues was published approximately twelve months later.

The media coverage of GMOs increased at the time of the two-day public debate. The media had no formal association with the process but were present at the two-day public debate and covered the process as it unfolded. The coverage generally focused on the evidence presented and the questions raised during the debate. Two opinion pieces were published in *The Irish Times*, both criticising the lack of debate and the further polarisation of public opinions on GMOs.

Influence

There was an obvious link between the National Public Consultation and the policy-making process. The Minister accepted all the recommendations of the Chairing Panel's report. The IDGMB followed-up on the recommendations made by the Chairing Panel and produced a report outlining the overall coordinated government policy on GMOs.

Quality of Decision

The quality of decision is evaluated in relation to the public participation initiative, rather than considering it independent of that process. It is impossible to determine whether the Minister's decision would have been different if there was no National Public Consultation. However, the evaluation of the Chairing Panel's report and the Minister's policy statement provide evidence that the decision considered issues presented during the consultation process.

The agenda prepared by the Chairing Panel was the beginning of the distillation and prioritisation of issues presented by the participants. The four key areas, according to the Chairing Panel were environment, economy, regulatory procedures and processes, and information and education. The agenda limited discussion on the environment as the Chairing Panel decided that issues surrounding the economy and public education were equally important. The key issues on the agenda reflected the issues presented by the speakers of the Stakeholder Panel on Day One, in particular the academics and industry representatives. At the outset, the *Consultation Paper* had limited its remit to environmental issues. With the broadening of this remit, the amount of time within the agenda for discussion of substantive issues surrounding the environment and GMOs was reduced to 90 minutes.

The concerns of insufficient evidence or lack of knowledge on the subject of GMOs, although not included on the agenda, were highlighted in the Chairing Panel's report. The Chairing Panel recommended that a strong precautionary policy be adopted and noted that there was no foundation for concerns among members of the public on the lack of the independence of the scientific research.

I would conclude that the Minister's knowledge base was wide, probably wider than before the National Public Consultation. However, my research found little evidence to suggest that this wider knowledge base had any influence on his decision.

In summary, it is clear that the National Public Consultation was linked to the policy-making process as indicated by fact that the Minister accepted the recommendations of the Chairing Panel. However, the way in which the participants' input was linked to the policy-making process was never made clear. The Minister could have formed his policy position using a wider knowledge base from the outcomes of the National Public Consultation.

Conclusion

The DoELG is to be commended for attempting the first consultation process of its type in Ireland. However, I would argue that as a consultation process it was unsuccessful for a number of reasons.

There is no avoiding the fact that the Minister for the Environment and Local Government had created a problem for himself with his pre-election promise of a moratorium on GMOs. His government was an advocate of biotechnology and saw it having a pivotal role in the economic development of Ireland. The government's acceptance of GMOs was highlighted by the fact that the EPA was not conducting any independent tests to aid its decision making, relying instead on evidence, or perhaps lack of evidence, presented by the company trialling the GMO. I was told informally that the Minister needed a way out of the situation. The Minister stated that it was illegal under EU regulations to impose the moratorium as he had promised. The idea of a consultation process, with the objective of establishing a new national policy on GMOs, was then conceived.

The Minister avoided the issue for more than six months, despite the increasing level of public debate due to the intensity of the Genetic Concern campaign. After eighteen months the Minister still did not have a formal position on GMOs and consequently abstained from a number of votes at the Council of the EU on GMOs.

The entire consultation process and the way in which participants were selected were inappropriate and did not allow the best possible result to be obtained from the consultation of interest groups and members of the general public. It is for this reason that a number of social actors called the consultation process a 'smokescreen'.

Public participation initiatives are a way to explore different values and knowledges. Communication, such as discussion, dialogue or facilitated debate, needs to be in place to support this exploration. During the National Public Consultation, dialogue communication only occurred in the lunch and coffee breaks on the first day of two-day public debate. Without dialogue participants did not get the chance to listen, accept, understand or appreciate the different values or knowledges used to assess GMOs. For the anti-GMO lobby groups, the absolute assurances given by scientists about the safety of GMOs were one of the main areas of contention. The fact that GMOs released in the environment were new and relatively untested was not acknowledged. Scientists, or at least the majority of scientists, were very reluctant to acknowledge this kind of uncertainty in science. The issue of uncertainty was not the primary focus of the National Public Consultation. In fact, there was little focus to the event at all.

For the government the main barrier to the commercialisation of GMOs was the level of public acceptance, rather than safety. They dealt with the lack of public acceptance by supporting labelling, even though 100% meaningful labelling is impossible.

In the interviews conducted after the two-day event almost all of the interviewees asked whether I agreed with the withdrawal of the majority of the NGOs before Day Two. I responsed that I had not reached my conclusion. I have now. In all fairness it is completely understandable why the NGOs withdrew. The reasons given by the NGOs were accurate. No discussion took place during the two-day debate, the participants had no control over the agenda, the DoELG assumed that all NGOs had the same concerns, members of the Chairing Panel indicated a bias in support of GMOs, the consultation was restricted to the environment, only to be extended to include the economy and education on Day Two, and there was evidence to suggest that the consultation process was just a 'smokescreen' to help the Minister renege on his pre-election promise.

Genetic Concern had campaigned for a consensus conference on GMOs. However, given the rationale and assumptions of the DoELG regarding public consultation, I doubt whether the outcome of the event would have been different if the DOELG had opted for this type of format.

BioDivulga

The second consultation initiative, the BioDivulga Workshop, to be evaluated also addressed the controversial issue of GM food and crops.

The BioDivulga Stakeholder Workshop was part of an EU-funded project involving five countries—Ireland, Germany, Portugal, Spain and the United Kingdom. The aim of the EU project was to explore the public understanding of biotechnology in an attempt to suggest actions that could be taken to improve public perception of biotechnology and promote its acceptance. The project was commissioned by the European Commission DG XII and undertaken by companies or state agencies involved in the commercialisation of biotechnology. The project had three objectives : to review of public perceptions of biotechnology in food and agriculture, to review past public awareness activities informing the public of biotechnology and to recommend actions that could be used in the participating countries to improve the public acceptance of biotechnology in food and agriculture. The Stakeholder Workshop discussed here was set up to address this last objective. The founder of the BioDivulga project, the Spanish management company Socintec, drafted the objectives and the proposed format of the workshop.

The Director of BioResearch Ireland was familiar with my research and asked me if I would coordinate the workshop on their behalf. After reading the literature prepared by Socintec I was very sceptical of the objectives of the project, which presumed that increasing public understanding was a method to create a greater acceptance of biotechnology. I negotiated with BioResearch Ireland, who in turn negotiated with the Spanish coordinator, and reached a compromise with them, which ensured that the workshop did not focus solely on how to impart knowledge to a largely uneducated public. The two objectives of the Stakeholder Workshop, which took place on 12 April 2000, were to explore the communication issues surrounding public awareness of the use of biotechnology in the food and agricultural industry and to prioritise key actions that would enhance public awareness of biotechnology and the social implications of it.

The same framework used previously to evaluate the National Public Consultation has been used here. The two groups of criteria used in the evaluation are the societal context and the public participation arrangement.

Societal Context

The four criteria used to focus the evaluation of the societal context of the Stakeholder Workshop were political culture, the history of the government body, the type of uncertainty and the public awareness.

The political culture at the time of the workshop was very similar to culture at the time of the National Public Consultation, except that the Minister had announced his department's position in favour of GMOs. The overall position of the government was unknown; however, one could assume that the Irish government would support all aspects of biotechnology, including GMOs.

BioResearch Ireland is a national state agency with a remit to promote the commercialisation of biotechnology. Its Director at the time, Dr Jim Ryan, had been involved in numerous Irish debates on GMOs and was well known within the circle of social actors interested in GMOs for his adamant support of GMOs. This absolute reassurance of the safety and benefits of GMOs by some scientists has prompted the greatest public debate. When invited to attend the workshop, three NGOs questioned the credibility of an event whose sponsor was an organisation, in this case BioResearch Ireland, responsible for promoting biotechnology. BioResearch Ireland had never undertaken any type of public participation initiative prior to the workshop.

The level of public debate on GMOs had changed since the two-day public debate. Rumours were spreading that Genetic Concern was to disband. Clare Watson and Quentin Gargan, the two founders of Genetic Concern, had 'retired' from active campaigning and retreated to a more peaceful life in the country. A relatively inexperienced campaigner was just managing to keep Genetic Concern viable by running GM supermarket tours. Despite the reduced capacity of Genetic Concern, media coverage of events related to GMOs in Ireland and Britain was still considerable.

Public Participation Arrangement

The second dimension of the evaluation is the public participation arrangement including the set-up and process, values, assumptions and goals, and impact.

Set-Up and Process

The evaluation of the set-up and process of the public participation arrangement was structured around the same seven criteria used in the evaluation of the DoELG consultation processes. These were representativeness, independence, communication, timing, structure and guidelines, unintended events and cost (see Figure 4.1).

Representativeness

The thirteen participants in the workshop were chosen for their active involvement in biotechnology itself or the communication of applications arising from biotechnology, and their ability to listen rather than make absolute safety statements about GMOs[61]. The participants were not members of the general public but were key social actors who had expressed an interest in GMOs or the issues surrounding them. A wide variety of interests were represented, including the biotechnology industry, food retailers, print media, government bodies, consumer groups, a promoter of organic foods, scientists and a science communication lecturer.

Several environmental groups were invited but refused to participate because of the nature of the sponsoring organisation. The new representative of Genetic Concern stated that she did not want to be involved in an exercise that was biased and did not focus on the general public, Genetic Concern's only remaining campaign strategy. A compromise was reached with Ruth McGrath of VOICE, who participated in a limited capacity. McGrath did not attend the workshop but her opinions were sought retrospectively and her comments were included in the workshop report.

Each participant present at the workshop had equal opportunity to suggest and decide on the key actions of communication.

Independence

To ensure that the workshop was independent of the sponsoring body, I chose the participants and the agenda of the workshop (see Appendix M). However, the Director

[61] Two anti-GMO lobby groups had refused to participate in other public debates that involved two particular scientists because of their aggressive behaviour towards two of the NGO representatives. I was present at one of the debates and found one scientist's behaviour to be inappropriate.

of BioResearch Ireland stipulated that he wanted to be present at the workshop. I agreed to his participation with the condition that he would be treated like any other participant.

Communication

In order to foster dialogue by allowing participants to feel relaxed rather than threatened, an informal atmosphere was chosen. The participants were requested to dress informally and the venue, a small boutique hotel, provided a neutral and friendly environment. An independent facilitator, Annette Bolger, facilitated the day's session.

The participants were informed that they did not need to prepare any formal presentations. The day was split between general group discussion including all thirteen participants and smaller sub-group discussions. The participants of the sub-groups were previously arranged to ensure a mix of viewpoints in each one.

Considering the diversity of opinions little, if any, hostility was detected during the day and at times there was even laughter. Although differing opinions were put forward each participant was encouraged to listen and contribute. Both the presence of the professional facilitator and the use of sub-groups assisted with the nature of the communication. A professional facilitator could have enhanced the DoELG debate in two ways. Firstly, a facilitator could provide assistance in the design and structure of the event to ensure that there were plenty of opportunities for dialogue and, secondly, they could have facilitated the dialogue during the formal sessions of the two-day debate.

If a representative from an NGO had been present on the day I assume that the atmosphere would not have been any different. However, it is possible that different key actions would have been recommended.

Timing

The entire BioDivulga project was to be completed in six months. However, the compilation of the reports from the five countries delayed the submission to the Commission by two months. I was contacted by BioResearch Ireland at the end of January 2000, one month into the project. The Stakeholder Workshop was organised and held in ten weeks, and a further two weeks were required to complete the report.

The process was concluded in three months and was facilitated by the ease of identifying relevant participants and their willingness to commit to such an event.

The workshop was not linked to any formal policy-making processes. However, BioResearch Ireland was keen to inform the IDGMB of the workshop's outcomes, prior to the publication of its report in October 2000, despite the fact that it was never an objective of the workshop to try to influence the IDGMB.

The workshop was conducted in one day beginning at 10 am and finishing by 5 pm. It was a full day and the final ranking of the key actions was not accomplished. This task was completed during the following week by corresponding with the participants using email. The workshop would have benefited from an additional session, but the participants had already been generous by devoting a day of their time to the project.

Structure and Guidelines

The participants were sent the objectives of the workshop prior to their attendance (see Appendix M), and an agenda was provided to help maintain the participants' focus. The professional facilitator was crucial to the success of the workshop, ensuring the agenda was adhered to and summarising the participants' contributions enabling them to remain focused on their task.

Unintended Events

The initiative proceeded as intended, with the exception of direct participation from an environmental group.

Cost

The overall cost of the workshop is not known. However, the main expenses of the day were the facilitator, the transcriber, the organiser, lunch and the cost of hiring the hotel. Little time or resources were required from BioResearch Ireland.

In summary, the Stakeholder Workshop was timely in that the issues surrounding GMOs were still controversial and the IDGMB had still not published their report of the government's overall policy on GMOs. All major stakeholders were represented, in some capacity. The atmosphere of the event facilitated discussion between all participants and enabled a consensus on seven key communication actions to be formed.

Values, assumptions and goals

The second group of criteria of the public participation arrangement evaluate how the participants, BioResearch Ireland and I perceived the GMO issue and how these perceptions were translated into the workshop.

Issue Definition

The workshop's original objectives were to determine public perceptions of biotechnology and to decide on actions that could improve the public acceptance of biotechnology. These objectives were to be achieved by gathering opinions about public perceptions of biotechnology from scientists, industry representatives, retailers and journalists, irrespective of their lack of experience in this area. For this reason, together with the fact that the convenor had assumed that increasing the public understanding of biotechnology would increase the public acceptance of biotechnology, the two objectives of the workshop were rejected.

After negotiations, the final objective of the workshop was to highlight ways to enhance the public awareness of biotechnology and its social implications. A number of the scientific participants did not differentiate this objective from the original, even though no reference had been made to it. No difficulties arose during the workshop because of this view and the recommended actions, on face value, did not reflect the original objectives. However, one reason given for recommending these actions was to increase trust and confidence in science and the regulators, indicating that some participants may have been operating from the deficit model approach.

Transparency

The process was as transparent as possible. The participants were informed of the sponsor, my involvement, the selection process of participants and what the intended outcomes were. The draft report was sent to all participants for comment before the final version was published. All participants were aware that a representative from VOICE was to review the document and make comments on it.

Rationale

The rationale put forward by BioResearch Ireland for hosting the workshop was not ideal. Their idea was to host an event that would lead to activities and events that would inform the public of the benefits of biotechnology. To lend credibility to the workshop and to ensure that the participants had a wide range of interests BioResearch Ireland agreed to the new objectives.

Informal conversations with staff at BioResearch Ireland, also led me to believe that this event presented BioResearch Ireland with an opportunity to be seen to be involving itself in public awareness of biotechnology. The workshop and BioResearch Ireland both received positive media coverage.

Impact

The final group of criteria relating to the impact of the event focused on its outcomes, influence and quality of decision.

Outcomes

I produced a written report from the transcripts of the day's proceedings. It outlined seven key actions to improve communication with the public on biotechnology and issues arising from its application.

Less tangible, but important, outcomes were the civilized discussion that had occurred among adversaries and the consensus that was reached on seven key actions of communication.

Influence

The Stakeholder Workshop was not linked to any policy-making process, although a number of participants were members of government advisory committees or were civil servants of government agencies involved in the regulation of GMOs.

When the combined report from the five countries was presented to the European Commission the sponsoring organisations were told that it was their own responsibility to ensure their countries acted on the recommendations.

Although the key actions have not beencarried out, the report provided further evidence of the need to involve the public in decisions about science. I later met with two officials from Forfás, who were aware of the outcomes of the BioDivulga report, and were researching the feasibility of a science centre possibly including an independent information agency—two of the recommended key actions.

Quality of Decision

This criterion is not applicable because no policy decisions were linked to this process.

Summary

The evaluation of the public participation dimension of the Stakeholder Workshop identified the workshop to be representative of all social actors involved in food and agriculture and interested in biotechnology, except environmental groups who perceived it to be biased. However, the workshop was flexible enough to allow a representative of an environmental group to participate in an indirect manner.

The participants each brought different assumptions and values to the workshop. These assumptions and values were represented, not in the recommended key actions, but in the reasons given for these actions, such as increased trust in regulators.

As the workshop was not linked to any policy-making processes it could not have a direct effect on policy. However, it is possible that the workshop may have an indirect influence on policy.

Conclusions

The Stakeholder Workshop attempted to involve representatives from organisations that had an interest in biotechnology or in the communication of biotechnology. In order to increase the public's awareness of biotechnology, the workshop aimed to draw on the participants' experiences to suggest communication actions. Some of the scientific participants assumed that the key communication actions would fix the problem of the public lack of acceptance of biotechnology even though this assumption had purposefully been avoided.

It is interesting to note that none of the countries involved in the BioDivulga project managed to persuade environmental groups to attend their Stakeholder Workshops, although some countries did not change the workshop's original objectives. The environmental groups in Ireland were sceptical as to what the sponsoring organisation would do with the outcomes. The workshop was held at a time when the anti-GMO movement was coming to a halt. After many nights and weekends preparing and attending public debates, they had not secured the moratorium they were hoping for. How was this workshop, already perceived to be biased, going to be any different? In reality it was not.

The main failing of the workshop, as a public participation initiative, was that the participants did not have the chance to participate in the policy-making process. Although representatives from the EPA, the Food Safety Authority of Ireland, and the Office of Science and Technology were present, they were not the decision makers of these government bodies. The presence of the government officials could have had an indirect influence on the policy-making process, but this effect would be difficult to determine.

One of the positive outcomes of the Stakeholder Workshop was that the participants, who all had different values and opinions of GMOs, worked together and discussed issues that could potentially improve the communication of biotechnology and issues surrounding its application. This provides evidence that public participation in this format would work in Ireland. Dialogue allows the participants to have a better chance to understand each others' points of view, compared to uni-directional communication. The second benefit of the workshop was the report, which provided further evidence of the need to increase public communication and public participation in controversies involving science. The report was presented to the DoELG, DoHC, EPA, IDGMB and Forfás. The IDGMB recommended that Forfás examine cost effective communication, consultation and participative mechanisms.

Water Fluoridation

The final public consultation initiative that I evaluated involved the second case study—water fluoridation. The government department responsible for the review of the Fluoridation Health Act is the Department of Health and Children (DoHC).

Forum on Fluoridation

In May 2000 the Minister for Health and Children announced the establishment of a 20-member Forum on Fluoridation, to review the current policy of water fluoridation in Ireland. Although the Forum is like an advisory committee it has requested the input of social actors interested in water fluoridation and undertaken a written public consultation exercise. Both the Forum on Fluoridation and the written public consultation exercise are evaluated in the third and final public participation arrangement.

The Department of Health and Children (DoHC) placed an advertisement in the national newspapers, on 27 November 2000, inviting members of the public to make written submissions to the Forum on Fluoridation by 31 March 2001.

On the same day, 27 November, I received a letter from the Forum inviting me to give a joint presentation with Drury Research and the Dental Health Foundation (DHF), on the research we had carried out. Unfortunately I was out of the country at the time and so, with the agreement of the Forum, Annette Bolger presented a paper about public participation initiatives on my behalf. In March 2001 I had further correspondence from the Forum requesting more information on my work, in particular research articles referring to the inclusion of public opinions in policy-making processes and public participation initiatives.

The evaluation was conducted using the two dimensions the societal context and public participation arrangement.

Societal Context

The societal context refers to the environment in which the public participation arrangement was initiated. The four criteria used to determine the societal context were political culture, history of government body, type of uncertainty and the level of public awareness.

Political Culture

Since 1996 the Green Party has sporadically challenged the 40-year-old Fluoridation Health Act. In 1999 county councils were made aware that they would be legally required to fluoridate their water and since that time they have become actively involved in the controversy.

Government Body History

The DoHC is currently involved in a number of controversies that have weakened its credibility, including the removal of organs during post-mortem examinations of babies without the permission of parents, blood products infected with HIV and the on-going debate about a referendum on abortion. Inquiries are currently investigating the organ removal and infected blood product controversies. Although these inquiries involve dialogue, the investigations are occurring after the events have taken place. The DoHC has also been involved in a public consultation about abortion, which is primarily an ethical, as opposed to a technical, debate.

The fact that the DHF is relatively unknown among the general public may be the reason why the DoHC delegated the public communication of water fluoridation to them. However, the Minister of Health and Children, when relatively new to the position, took a very active interest in water fluoridation by appearing on television and being interviewed by a print journalist known for her anti-water fluoridation stance.

Neither the DoHC or the DHF has attempted any public participatory initiatives.

Type of Uncertainty

Water is artificially fluoridated to strengthen the enamel of teeth preventing or reducing the number of teeth cavities in children. The anti-fluoridation lobby argue that there is no conclusive evidence that fluoride protects teeth and that the disadvantages of fluoridation are numerous. Their list of disadvantages includes serious health effects, pollution of the environment and a lack of choice for the public. On the other hand, the advocates of water fluoridation argue that all credible scientific evidence indicates that there are no links between fluoride and the implied health problems. In fact they argue that fluoridating water is a health measure, which ensures that all socio-economic groups have healthy teeth.

Although there have been no health studies conducted on the possible side effects of fluoride in Ireland, the DoHC based its conclusions on the numerous studies conducted in other regions where water is fluoridated. These studies have investigated possible links between fluoridation and various health problems, such as bone cancer, hip fractures and Down's syndrome. The risks of fluoridation are disputed as each side of the argument can present what they deem to be credible scientific evidence.

Public Awareness

The level of public awareness of water fluoridation in Ireland is low. The results of surveys and focus groups described in the previous chapter indicate that many members of the general public are not aware of the function of fluoride in water or of the controversy surrounding it. The public interest is limited to a small minority of dentists, environmental groups, County Councils and local citizens whose water is soon to be fluoridated.

Summary

Although this controversy involves a substance that is vital to our health and is consumed by all of us—water—little interest has been shown by members of the general public, despite the efforts of the anti-fluoridation lobby. No social dimensions, such as the power of multinationals, are involved in this issue and it is not a new technology with unknown consequences. Water-fluoridation was introduced by the government 40 years ago to improve its citizens' oral health. The only reason the DoHC became involved in this issue at this time, was the concerns expressed by an increasing number of County Councils.

Public Participation Arrangement

The arrangement of the Forum on Fluoridation and written consultation process is not independent of the societal context established above. The following are addressed in this section: the set-up and process of the public participation arrangement, its values, assumptions and goals and its impact.

Set-Up and Process

The set-up and process criteria evaluate the structure of the public participation arrangement and type of communication encouraged between the participants. The same seven criteria used to evaluate the two GMO public consultations (representativeness, independence, communication, timing, structure and guidelines, unintended events and cost) were also used here.

Representativeness

The 20-member Forum of Fluoridation comprised representatives of regional health authorities, relevant government bodies, scientists involved in relevant research, consumer groups, environmental groups, and ethical, legal and sociological authorities. The selection of the Forum's members was controversial because two representatives of VOICE had not accepted the Minister's invitation prior to the membership announcement. Both individuals since declined the Minister's offer. In December 2000, six months later, an environmental representative from the Irish Doctor's Environmental Association became a member of the Forum.

The Forum on Fluoridation invited members of the general public to send their names and addresses to the Forum to receive relevant documentation before sending in their submission. The documentation was a questionnaire with a brief introduction to the Forum and seven questions prompting comments on water fluoridation (see Appendix N). The public consultation was advertised in national newspapers and on the radio. The questionnaires were also available from health board clinics. The Forum received just over 600 submissions, a number which cannot possibly represent the whole population especially considering that the submissions were simply responses to a questionnaire. The submissions were not made public so I was unable to determine the types of respondent who participated in the consultation.

Independence

The members of the Forum on Fluoridation are independent of the DoHC, however, the anti-fluoride group, Fluoride Free Water, has claimed that the majority of experts have supported water fluoridation in the past.

Communication

One-way communication resulted from the written consultation exercise; the general public informed the Forum. There was no further correspondence with respondents unless an acknowledgment of receipt was requested.

Social actors interested in issues surrounding water fluoridation have been invited to make presentations at the Forum's meetings. The presenters were asked to submit a summary of the presentations beforehand to enable the members of the Forum to submit their questions to the Chair. The presentations were formal and as much time as possible was given for discussion. The Forum stressed that all claims about water fluoridation should be substantiated by publications in peer-review journals or from recognised health authorities. Two international opponents of water fluoridation were invited to present.

Timing

During 1999 the DoHC was aware of the increasing level of controversy surrounding water fluoridation. On 1 March 1999 Dublin City Council adopted a motion requesting that the Taoiseach set up an expert technical group to review the effects of fluoridation of water. In February 2000 I met with both the Chief Dental Officer and the Director of DHF to discuss communication strategies. By this stage a number of pressure groups had started campaigning against water fluoridation. In the early part of 2000 more than fifteen Letters to the Editor were published in the *Irish Independent* on the concerns of fluoride in Ireland's drinking water. It had taken the DoHC twelve months to think about communicating with members of the general public. Three months after my discussions regarding public participation initiatives and communication strategies with the Chief Dental Officer, DoHC and DHF, the new Forum on Fluoridation was hurriedly announced. On questioning the Chief Dental Officer to determine the reason behind the announcement I was told that it was a Ministerial decision which attempted to balance the negative media coverage of the previous few weeks.

At the time of this writing, almost eighteen months after the announcement of the Forum on Fluoridation, the Minister has still not received recommendations. The media has stated that the report is imminent[62].

Although the process has taken a long time, there have been periods when rushed decisions have been made, such as the announcement of the Forum and the decision to invite members of the general public to make written submissions. The DoHC may have acted quickly in order to reduce conflict at times when media coverage was high. There now seems to be less urgency, as the DoHC's fear that the issue would become as controversial as GMOs did not materialise.

Structure and Guidelines

The written public consultation process was straightforward. The questionnaire guided the respondent through the submission. However, the role of the submissions in the policy-making process was not specified. The Forum has a clear link to the policy-making process and their role is to make recommendations to the Minister after their review of the issues surrounding water fluoridation.

Unintended Events

As the public consultation is not time bound, unintended events could readily be accommodated.

Cost

The cost would have been minimal. The advertising of the written public consultation and the printing and postage of 600 questionnaires would have been the main material

[62] The Forum on Fluoridation report was published in September 2002. See website http://www.doh.ie/publications/fluoridation accessed on 8 December 2002

costs. Time spent reading the submissions would not have been considerable, because of their format. The cost of administering the Forum would also be minimal.

Values, assumptions and goals

The values, assumptions and goals surrounding the consultation of water fluoridation were investigated using three criteria: the definition of the issue, the rationale of the public participation arrangement and the transparency of the process. The same criteria were used in the evaluation of the DoELG consultation process and the BioDivulga Workshop.

Issue Definition

Water fluoridation has been defined as a public health issue and as such it is under the remit of the DoHC. The inclusion of non-scientific members in the Forum indicates that the issue has not been restricted to a technical definition. However, the majority of the Forum are researchers in health or dental health areas.

When I asked the Chief Dental Officer how, if at all, the proposed public participation initiatives were to be incorporated with the Forum on Fluoridation, his response indicated that all future plans regarding public participation depended on the outcome of the Forum. After the presentation of my paper on promoting public participation in policy making, the members of the Forum informed my colleague from Drury Research that the Forum was to address the scientific issues before addressing public participation.

The anti-fluoride lobby groups and County Councils have primarily defined water fluoridation as a health issue.

Rationale

My involvement and discussions with the Chief Dental Officer and the Director of DHF, led me to believe that the Minister rushed to establish the Forum in order to demonstrate that he was addressing the issues surrounding water fluoridation. The objective of the Forum is to provide an expert decision on whether or not fluoride should be removed from the Irish drinking water.

If the issue of water fluoridation had not been raised by a number of County Councils and further fuelled by pressure groups, water fluoridation would have remained unchallenged and the DoHC would not have initiated a review of the 40-year-old Health Act.

Transparency

All meetings of the Forum and presentations to the Forum are summarised on the Forum's website[63], increasing the transparency of the Forum. However, at no stage has it been made clear how the public's involvement would be included in the policy-making process.

The lack of transparency in the selection of the Forum members did not assist in the credibility of the Forum and will affect the credibility of the decision yet to be determined. A lack of openness between the DoHC and the DHF also exists and is indicated by the frustration expressed by the Director of DHF on the announcement of the Forum.

Impact

The impact of the DoHC consultation process cannot be evaluated because the review process is not complete. The one outcome of the Forum at the time of writing was an interim report for the Minister. Members of the public made over 600 submissions, but the way in which these have informed the policy-making process is not known.

Summary

The set-up and process of the water fluoridation consultation are simple and predictable. The structure of the Forum allows interested social actors to engage in dialogue with the Forum members. However, the controversy surrounding the announcement of the Forum restricted the involvement of a number of anti-fluoride interest groups. All interested parties have primarily defined the water fluoridation controversy as a health issue. The rationale of the Minister's Forum is to review scientific evidence related to water fluoridation.

[63] The Forum on Fluoridation website is www.fluoridationforum.ie last accessed on 10 March 2002.

Conclusion

The level of public awareness of, and public debate on, water fluoridation is not high. Public debate has been limited to a small number of dentists, environmentalists and citizens who have recently been, or will shortly be, exposed to artificially fluoridated water. The controversy surrounding water fluoridation is four decades old, but has been placed back on the public agenda by local politicians and a number of interest groups. Without this recent interest in water fluoridation the DoHC would not have decided to review the Fluoridation Health Act.

Although health issues are the primary concern of the Forum, its format allows water fluoridation to be reviewed by cross-disciplinary experts, including scientific, legal, ethical and social experts. The Forum has invited representatives of interest groups and other researchers, such as scientific, dental and social researchers, to make presentations and engage in discussion. These invitations indicate that the Forum is interested in issues besides technical issues. But at what stage will these other issues be considered? Members of the Forum have stated that it will deal with the scientific element of the review before considering measures of public participation. This suggests that the issue has been framed as scientific and essentially excluded from its social context. At this time it is difficult to draw any conclusion because the review process is not complete.

The appropriateness of the Forum's selection of a written consultation exercise was not supported by this evaluation; in fact the evaluation supported the inappropriateness of this choice. Members of the Forum were unofficially aware of the lack of public awareness of water fluoridation from the results of the focus group research. Therefore they would have been able to conclude that only a small percentage of the population would respond to a written consultation, and a large percentage of these would be affiliated with persons or organisations specifically interested in this issue. If the Forum were truly seeking responses from members of the public with an interest in water fluoridation more suitable methods could have been chosen. One obvious one would be to invite more people to make presentations to the Forum.

One possible reason for using of a written consultation is that the DoHC wanted to be seen to be consulting with the public to further hinder accusations of the anti-fluoride lobby that the public have little say in whether fluoride is added to their drinking water. One would hope that the format of the consultation has not further eroded the credibility the DoHC.

The Minister's Forum has provided a chance for experts and interested members of the public, though to the exclusion of some, to discuss issues surrounding water fluoridation. However, the Forum remains an expert committee that will make final recommendations to the Minister. Therefore I conclude that the Forum is not a method of public participation but one of public consultation involving two-way communication.

Discussion

I would argue that public participation methods should be used to include the knowledge, values and perceptions of social actors and members of the general public who would not normally be involved in the policy-making process. In doing so the depth of knowledge on which policy makers will base their decisions will increase. The outcomes of public participation methods can then be used alongside, but not instead of, the technical advice provided by scientific experts. In some cases, depending on the type of public participation method used, the technical advice is included as part of the public participation initiative.

The interaction of a variety of social actors and members of the general public will increase the complexity of the policy-making process by increasing the range of knowledge and the number of perspectives. One of the aims of a public participation initiative should be to explore the different interpretations of uncertainty.

The policy decision made at the end of the day is firmly placed within the political system, which means that the Minister is pressured by his or her own government and international bodies, particularly regarding national economic development and security. The only decision a Minister can make is one that is consistent with decisions that have been made elsewhere in the government.

These are the limits of public participation. To assume that they do not exist could lead to false expectations. However, despite these limitations public participation can have an important role to play in the assessment of science. How an initiative is used and organised will determine its level of success.

The DoELG National Public Consultation, for example, failed many of the criteria established in the evaluation framework. The lack of dialogue or discussion limited the exploration of different values and perceptions. The two-day public debate was a heated and polarised event where the participants' role was reduced to 'sound bites'. No indication was given as to how the outcomes of the consultation would influence the policy-making process. The National Public Consultation highlighted the lack of experience of the DoELG in public consultation and showed their unwillingness to explore alternative methods used successfully in other countries. One indirect yet positive outcome of the National Public Consultation was the IDGMB's recommendation that Forfás should explore the use of public participation initiatives, even though the rationale behind this recommendation is questionable. However, it could signal the beginning of Irish dialogue on issues that involve science.

The BioDivulga Stakeholder Workshop was successful in terms of discussion and dialogue. However, it was severely limited in its capacity to influence public policy. I would recommend that the format of this initiative be repeated as one of the strategies in public participation. The event brought together key social actors, with a range of experience, values, perceptions and knowledge, to discuss and form a consensus on issues involved in a controversial topic.

The Forum on Fluoridation also had success in facilitating Irish dialogue among a range of interests. However, evidence suggests that the expert committee does not recognise the limits of scientific knowledge and the potential role of lay experts.

In three initiatives evaluated there was evidence of dialogue, as summarised in Table 7.2. The next step for Irish policy making is to link this dialogue to initiatives that provide opportunities for participants to directly influence the policy-making process.

Table 7.2: Summary of the evaluation of the three public consultation initiatives

Dimension	Criteria	DoELG's National Public Consultation	BioDivulga	Forum on Fluoridation
Societal Context	political culture	government committed to biotechnology	government committed to biotechnology	government were reviewing the Health Act.
	government body history	assumed to support GMOs no experience in public participation activity	supportive of GMOs no experience in public participation activity	DoHC linked to other health controversies no experience in public participation activity
	type of uncertainty	ignorance indeterminacy	ignorance indeterminacy	ignorance
	public awareness	very high	very high	low
Public Participation Arrangement	set-up and process	poor dialogue present	good dialogue present	average dialogue present
	values, assumptions and goals	poor	average	poor
	impact	low, though had potential to be high	very low	unknown

At the outset of this research I wanted to establish a framework that would facilitate the appropriate selection of a public participation method depending on the type of issue. However, I have found that it is not the choice of method that needs attention but the current political climate in which scientific knowledge is viewed as the dominant form of evidence.

An appropriate method of participation will be evident once the criteria of the evaluation framework, established in Chapter Four, are addressed. For example, the type of controversy and level of public awareness will help decide who is to be represented in the public participation initiative. An awareness of the time and money available will further provide pointers to an appropriate method, and so on. Many methods of public participation are available and it will be a matter of trial and error for the institution that decides to attempt such procedures. However, for public participation initiatives to succeed, events need to deliver on their promise of being truly participatory.

Conclusions

Public participation methods are useful in increasing the level of public involvement in the policy-making process on issues that involve science. They have been used for a range of issues involving science for over fifteen years and are not just a means to resolve controversial issues. For example, the Danish Board of Technology, which developed today's model of the consensus conference, has sought lay citizens' advice on issues before they become controversial.

In recent years countries without a history of using public participation methods have been trialling such procedures. Often the motivation for implementing public participation programmes is to reduce conflict and to increase public trust in science and its regulators. However, the mere implementation of public participation programmes does not guarantee that these objectives will be fulfilled. For true public participation to occur, the public needs to have the opportunity to participate in the policy-making process. Two important characteristics that are needed to ensure the participation of members of the public are:

i. The public participation programme and its outcomes must be formally linked to the policy-making process. The outcome of the public participation programme must be recognised as a legitimate contribution to the policy-making process.

ii. The issue that involves science must not be exclusively framed as scientific. The nature of the public participation programme should not be 'public participation in science' as this assumes that other dimensions of meaning are secondary in the policy-making process, thereby allowing science to be the dominant authority.

Decisions to adopt these two characteristics cannot be made solely in relation to a public participation programme. The characteristics must be intrinsic to the governmental policy-making process.

The initial aim of my PhD was to identify a model of public participation that would enable the Irish government to engage with social actors and members of the general public on controversial issues that involved science. However, in the process of reviewing public participation programmes in different countries and combining this knowledge with the theories explored in the previous chapters of this thesis, I have come to realise that there is no one 'perfect' model for Ireland. In fact, it is not the model that will determine whether or not dialogue will occur among the different social actors but how scientific institutions and regulatory bodies make claims about scientific knowledge.

Wynne, in his recent work, suggested that public controversies are continually fuelled by how scientific and policy institutions distinguish between the public 'perceived risks' (or emotions and irrational fears), which are often described as the 'ethical' dimension, and the 'objective risks' (or 'facts') of the scientific establishment (Wynne 2001).

There is no artificial boundary between scientific and ethical dimensions of a controversial issue such as GM foods and crops, as my research has shown. The public issues identified in this thesis are not just concerns about the manipulation of nature or

God's work but about the process of science and how it is regulated. The public issues surrounding GM foods and crops are not just specific to GMOs, but to the process of gathering scientific knowledge, its regulation and its role in the continual benefits of the knowledge society. Perhaps this is the key reason why the fluoridation of water was not as controversial as expected; it is not a new technology that is entangled with issues involving commercial benefits.

The majority of the issues surrounding GM foods and crops were to do with the regulation of research, the setting of the research agenda and the potential application of the research. If governments do not recognise public issues, as described in this thesis, as legitimate concerns and not merely emotional reactions, they will have little success in engaging in public dialogue, as the DoELG found with their public consultation initiative. 'Public Participation in Science' is, as suggested by Wynne, the deficit model with a different face (Wynne 2000). Social actors and members of the public will not be fooled by new initiatives that only appear to be democratic.

Public participation in policy making is just one method of extending the democratic process in relation to science. Academic researchers previously identified in this thesis have suggested other ways of democratising science (and democracy), including lay citizen representatives on research councils, greater cross-disciplinary research and observation of technologies on a trial basis in selected communities. One advantage of public participation initiatives is that lay citizens and key social actors have the opportunity to influence the regulation of science prior to the implementation of its applications.

Analysis of the consultation processes adopted by the respective government departments in relation to GMOs and water fluoridation in Ireland yielded little evidence to suggest that public participation initiatives will not be approached from the 'deficit model' mindset. It has only been recently, since 1995, that the Irish government has committed itself to science communication, and only in the past two years have they acknowledged the need to explore public participation options. In Ireland, scientific knowledge holds an authoritative position over other types of knowledge. For example, the main focus of the government's science communication programme, the Science, Technology, Innovation Awareness Programme (STIAP), is communicating the benefits of progress and innovation that science and technology can offer. The activities organised or sponsored by STIAP do not primarily involve dialogue with their target audiences.

There is recognition of the need to engage in 'national dialogue' between the general public and key social actors interested in issues that involve science. However, unfortunately the term 'dialogue' is often misused. For example, the biotechnology task force of the Irish Council for Science, Technology and Innovation (ICSTI) recently released *ICSTI Report on Biotechnology,* which recommended that an information centre be linked to Ireland's proposed Science Centre[64] in order to promote "dialogue in biotechnology" (Irish Council for Science Technology and Innovation 2002, p 65). It was suggested that this independent information centre could present balanced and unbiased information to the general public. However, this type of centre does not provide an opportunity for dialogue to occur nor does it present unbiased information as whoever presents the material will be representing a particular point of view. It will provide uni-directional communication in which the scientific community communicates *to* the public. It should be noted that the seven members of the biotechnology task force who made this recommendation were all scientists with little, if any, experience in dialogue initiatives. There is no suggestion that this information agency would also be resourced to research and organise initiatives that could foster dialogue. Further, it is intended that the suggested independent information agency would be linked to the proposed Science Centre. This proposed linkage is undesirable for two reasons. Firstly, science centres typically present science as positive and progressive and rarely present science as part of society. When a science centre or science museum does not present science in this traditional way it is often surrounded in controversy; an example is the National Museum of American History's exhibition *Science in American Life*. Science centres and science museums are increasingly seeking private funding to develop new exhibitions and as long as science centres are dependent on outside funding sources, such as scientific associations, institutions and companies, the exhibitions will be vulnerable to outside pressures to present a positive image of science. Secondly, the linking of an information centre to a science centre is an

[64] The Tánaiste Mary Harney announced a commitment to funding an Irish Science Centre in September 2000.

indication that the government will primarily frame issues that involve science as scientific, as opposed to, for example, agricultural, health, social or economic issues.

Ireland's political system is not self-contained and is subject to external influences. Therefore it is not only the Irish government, but European and international governments, that need to display willingness to increase the role of lay citizens in policy making. Further, many of today's controversies are not only faced by Ireland but all countries around the globe and decisions made in one nation have the potential to affect citizens of other nations.

This thesis focused on controversies that involve science. However, the area of governance and democracy is not just of interest to the science communication community but to a range of political, economic and social communities. These communities are perhaps even more aware than the science communication community of the need to improve decision-making processes.

Issues involving science are not the only controversial issues facing society today. For example, Australian Aboriginal people have been fighting for titles to land currently occupied by mining companies, pastoralists or cities. In 1993 the High Court recognised that Aboriginal people had title to land prior to Captain James Cook's declaration of possession in 1770 and that Australia was not a *terra nullius*—no-one's land. This decision has caused a great deal of controversy and tension in Australia. Since the decision, Aboriginal people have been laying claim to land that is now occupied by a variety of different interests. Mining companies and pastoralists are concerned that their titles of land may be extinguished and land right claims have restricted operations of mining companies, which are major contributors to Australia's national economy.

The respective governments of each state of Australia are responsible for how land rights claims are settled within their own state. The Queensland and Western Australian state governments have made progress in recent years by adopting a mediation, as opposed to a litigation, approach. These two governments are committed to solving conflicts between mining companies, pastoralists, municipal councils and the traditional landowners through dialogue. The traditional landowners are able to communicate their needs and desires in a process and in geographic locations where the 'white man' is not the dominant authority. As a result of the success achieved using dialogue to resolve land rights claims, other states are beginning to adopt the mediation approach.

Although this issue does not involve science it does show similarities to the controversial issues surrounding the use of GMOs. Prior to the adoption of the mediation approach, resolution of Aboriginal land rights claims was dominated by 'white man' culture, which restricted the involvement of the traditional landowners as they needed representation by people familiar with 'white man' culture. Similarly lay citizens were restricted in their involvement in decisions surrounding the use of GMOs because the issue was framed as scientific. Another similarity between the controversies surrounding land rights and GMOs is the manner in which they demonstrate the power of the non-dominant community to potentially prohibit activities essential to the economic well being of the nation. In Australia, the mining and agricultural industries were threatened by the potential loss of their land. In Ireland the future of GMO crops was uncertain due to the activities of the anti-GMO lobby groups, which potentially could affect the national economy of Ireland.

Dialogue is being used to resolve land rights claims that involve a range of different interests. Solutions have been reached that are acceptable to all parties. This example indicates that parties representing different interests in a controversy can work together to agree the way forward. It shows that where all parties are willing to reach a consensus, this benefits not only themselves but also other interested parties. The mediation approach has not only provided solutions to controversial land claims; it has provided opportunities for mutual understanding.

A feature of dialogue initiatives that is often overlooked is the opportunity for social actors and members of the general public to develop a greater understanding of each other. It is this feature that allows consensus to be reached and renders the level of support which each party enjoys of less importance. The BioDivulga Stakeholder Workshop example shows that adversaries can work together if the environment and communication process allows dialogue to occur. These are the types of initiatives that need to be established to ensure that all points of view are understood and recognised as legitimate. Public debates and consultation processes such as the Department of Environment and Local Government's National Public Consultation, where opportunities for discussion were severely limited, do not facilitate the understanding of different worldviews. During the past four years Quentin Gargan of Genetic Concern and Patrick O'Reilly of Monsanto, have met on numerous occasions at public debates to present their respective opinions of GMOs. Little dialogue occurred at these events. However, on no less than three occasions I observed Gargan and O'Reilly discussing issues surrounding GMOs informally at the end of the public debate. After four years of attending the same public debates the two spokesmen had established a relationship where they appreciated and respected the other's point of view. However, the types of debate, such as public debate and the National Consultation Process, did not allow this relationship to be recognised.

Public participation initiatives are not only of benefit to lay citizens or interest groups that want to have more involvement in policy making. Public participation can provide the means for a government that is committed to this approach to reach a decision faster, benefiting themselves and other social actors. For example, the campaigns of the anti-GMO lobby essentially placed a three-year moratorium on the commercial release of GMOs in the EU. Had the GMO issue been discussed and resolved earlier fewer GM crop field trials may have been destroyed by campaigners. Further afield, had UK government officials listened to veterinary associations, farmers and scientists in the early-to-mid 1980s the consequences of BSE would have been less catastrophic. The delay in listening to the different social actors has had devastating consequences, including public health implications, consequences to the farming community and, more recently, to meat plant workers[65].

Public participation should be seen as an important step in the policy-making process. The early involvement of key social actors and lay citizens would provide policy makers with wider knowledge on which to base their decisions. This in turn could lead to better decisions. The two case studies presented in this thesis provide further evidence of the need to encourage the implementation of public participation methods during policy-making procedures.

[65] In January 2001 it was announced that 50 jobs were lost at a Monaghan meat plant as a direct consequence of the BSE crisis (*The Irish Times* p 10, 11 January, 2001).

The science communication community can have an active role in ensuring public participation programmes are used appropriately and to their maximum potential. The objective of a public participation process is not to limit or reduce the value of science expertise in policy-making but for science to be integrated with other components. As Alan Irwin concluded in *Citizen Science,* it is "which form of science" that is most appropriate to a situation that needs to be addressed, as opposed to whether or not science has a role to play (Irwin 1995, p 171). The science community needs to be more open and honest with the public and itself about the limitations and uncertainties of science and to recognise that science is only one component that should be considered when formulating a policy decision.

Science communicators have a significant role in assisting the scientific community to confront these limitations. For science communicators to be able to fulfil this role they themselves need to be aware that science is socially constructed and is limited. At present, science communicators tend only to communicate with the public about science and not with the science community about the public. This approach is understandable because, generally, science communicators are communicating on behalf of scientific institutions. Furthermore in promoting the use of public participation initiatives the science communication community must be aware of the limitations, as well as the benefits of these initiatives.

For the role of science communicators to be more significant there needs to be greater collaboration with science communication theorists. There is an awareness that this gap needs to be bridged and different initiatives are currently in place to encourage better relations. Greater collaboration with scientists is also needed to include them in the process of learning what the public want from science and what the public can offer science. Dialogue must be stimulated within the scientific community on how these challenges can be met; it should not occur outside the scientific community or even on the peripheries. To assist with this dialogue science communicators need to be aware how scientists interpret other knowledges. I would argue that this interpretation should be an area of further research for the science communication community. Science communicators also need to encourage and motivate lay citizens to become interested in controversies involving science to ensure a strong democracy and an active citizenship.

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Appendices

Appendix A

The Irish Times by Date and Headline

Date	**Headline**
19-Nov-96	Ban on genetically altered food urged
05-Mar-97	EPA query on genetically engineered beet
12-Mar-97	Warning on genetic crops
14-Mar-97	EPA seminar on modified food
17 -Mar-97	EPA demands clear labelling of genetically modified foods
04-Apr-97	New group seeks moratorium on genetically modified crops
05-Apr-97	Greens accuse on genetic crop
08-Apr-97	Genetically modified food to be labelled
16-Apr-97	Environmental concern was not issue, says US firm
02-May-97	EPA allows trials on genetically modified beet
02-May-97	Brave new world of genetic food and crops questioned
10-May-97 '	Less than one acre', eh?
14-May-97	Injunction granted against 'genetic' sugar beet r
17 -May-97	Genetic beet trial defended
28-May-97	Group to seek judicial review of EPA's decision
03-Jun-97	Frankenstein fodder or food for the gods?
12-Jun-97	US expert calls for evaluation of genetic foods
18-Jun-97	Debate sought over plant genetic experiment
20-Jun-97	EU move on genetically modified food dismissed
06-Aug-97	Modified foods to be given more detailed labelling
19-Aug-97	Health food stores seek full-disclosure labelling
30-Sep-97	Self-styled environmental group claims sabotage of genetically modified
01-0ct-97	McKenna praises genetic beet crop sabotage
14-0ct-97	Genetically modified crop growers challenged
20-0ct-97	Eight scientists call for further studies on effects of genetically modified food
21-0ct-97	EPA denies Green Party's claim it is withholding test information
24-0ct-97	Revolution on way in biotechnology
28-0ct-97	Mainstream food 'culture' criticised
31-0ct-97	Information gaps must be filled on genetically altered food, meeting told
11-Nov-97	Fears crop biotechnology could lead to 'superweeds'
11-Nov-97	Ireland advised to invest heavily in technology to maintain job creation
13-Nov-97	European states bullied on genetic maize, says MEP
10-Dec-97	Alliance concerned about safety of food that is genetically engineered
10-Dec-97	US quick to put its faith
11-Dec-97	EPA rejects MEP's charge of 'cosy chat' about crop trials
22-Dec-97	Green MEP calls for moratorium on genetically modified crops
10-Jan-98	Knowledge is power
31-Jan-98	Firm Seeks to expand genetic crops testing
02-Feb-98	Failure over food labelling criticised
04-Feb-98	Openness of genetic crop trials demanded
11-Feb-98	The Food We Eat
11-Feb-98	Cookery Writer opposes more genetic crop trials
11-Feb-98	Culinary foe speaks out on plans to grow modified beet
12-Feb-98	Monsanto offers to meet cookery writer
13-Feb-98	EU expert group backs marketing of 4 genetically modified crops
21-Feb-98	Monsanto project prompts 3423 objections
24-Feb-98	EPA is told crop trial site plan to be scaled down

Date	Headline
25-Feb-98	Genetic fear impels food group to act
26-Feb-98	Genetic crop policy paper is planned
27-Feb-98	Delay urged in 'genetic planting'
28-Feb-98	Genetic food dispute political scientist
02-Mar-98	Genetic engineering harms biodiversity, says expert
02-Mar-98	Monsanto head says case against crops not backed
04-Mar-98	Mixed reaction to planned labelling scheme for genetically-modified food
06-Mar-98	Politicians told of concern over genetically modified foods
11-Mar-98	Tampering with beet is threat to nature, farmers say
14-Mar-98	State is drafting guidelines on genetic research
16-Mar-98	Changes to food, medicine of great benefit to people
16-Mar-98	Ahern calls for hearing on testing genetic plants
16-Mar-98	40 Years of genetics research celebrated
16-Mar-98	Plant biotechnology is no risk to consumer
24-Mar-98	Supermarket group defends claim over banning of genetically modified food
01-Apr-98	Food labelling complaint to be investigated
02-Apr-98	Researchers say they can slow plant's aging process
12-Apr-98	IBEC rejects criticism by genetics group over labelling
23-Apr-98	Four appointments to EPA announced by Dempsey
23-Apr-98	EPA ruling in favour of Monsanto criticised
23-Apr-98	Genetics and Food
23-Apr-98	Modified Foods are here to stay
24-Apr-98	FF U-turn claim on beet trials
09-May-98	New variant CJD rates give 'grounds for optimism'
11-May-98	Moves to patent genes likely to debase our understanding of life
15-May-98	Ireland 'sleepwalking' into military alliance
19-May-98	Battle Lines are drawn over GM foods
20-May-98	Legal Challenge over EPA license set for next month
28-May-98	Court refuses to ban modified beet seed
02-Jun-98	EU regulations on genetic foods criticised
08-Jun-98	A question of perspective
08-Jun-98	Swiss sanction genetic tinkering
09-Jun-98	Genetic modification attacked
13-Jun-98	Genetic Concern to picket foodstores
23-Jun-98	'Hazards' body sought on modified foods
26-Jun-98	Patient guide in new era of food science
30-Jun-98	Challenge to genetic beet trials starts
01-Jul-98	Licence to grow modified beet challenged
02-Jul-98	Escape of genetically modified organisms 'would be disastrous'
03-Jul-98	Scientist says environment safe from beet genetic tests
04-Jul-98	Court told agency took great care in permitting genetic field tests
08-Jul-98	Low-risk beet trials 'breach powers'
09-Jul-98	EPA decision on genetic beet trials fair, court told
10-Jul-98	'Zero risk' in sugar beet trials is unrealistic says Monsanto
11-Jul-98	Modified beet 'not going on market'
13-Jul-98	Scientist says evidence supports case for deferring growing genetic crops
15-Jul-98	EPA was asked to conduct debate on genetic modification, court told
16-Jul-98	Judgment reserved in challenge to EPA's consent to beet trials
21-Jul-98	New case taken on genetic crop trials
22-Jul-98	Store assures customers on GM foods
22-Jul-98	Proponents say new technique safer
22-Jul-98	Judges dismiss organic farmer's appeal to halt GM crop trials
27-Jul-98	Group queries genetic food labelling
31-Jul-98	Farmer to take action against three politicians for damage to Gm crop
31-Jul-98	Action against genetically modified crop trial sites is expected
04-Aug-98	MPs ban modified food
10-Aug-98	Lessons for Ireland as US farms go corporate
11-Aug-98	Minister resists call for ban on GM food
12-Aug-98	Genetically modified organisms

Date	Headline
12-Aug-98	Food safety authority moves to reassure public over GM foods
12-Aug-98	IBEC happy with test procedures
13-Aug-98	Scientist in food safety controversy suspended
13-Aug-98	Scientist suspended over misleading information on genetically modified food
15-Aug-98	Public loses as scientists argue over GM food
24-Aug-98	Ireland's major stake in biotechnology
24-Aug-98	Plotting the future of GM here
24-Aug-98	Report to call GM labelling inadequate
24-Aug-98	Dempsey backs full labelling of genetically modified food
25-Aug-98	Genetic engineering report 'ambiguous'
26-Aug-98	Genetic engineering
27-Aug-98	Consumer watchdog critical of policy on GM foods
01-Sep-98	Monsanto rejects uncontrolled test claim
11-Sep-98	Superweed findings prompt call for moratorium on genetic crops
18-Sep-98	Leaflet on genetically modified foods contains misleading information
19-5ep-98	Greens counter Government emphasis on benefits of GM food
22-Sep-98	Group claims genetically modified crops put farmers at disadvantage
23-Sep-98	Irish aid groups say GM foods no answer
29-Sep-98	Genetic engineering not suited to agriculture here, meeting is told
01-Oct-98	Biotechnology industry denies health risk
06-Oct-98	Court judgment likely to decide future of GM foods
07-Oct-98	High Court rejects grounds of challenge to beet trials
07-Oct-98	Decision will boost GM food
07-Oct-98	Case not seen as a total waste
12-Oct-98	Britain may ban genetic crops for research on possible health impact
16-Oct-98	Battle between profit and biodiversity
16-Oct-98	Who are the real beneficiaries of GM foods?
17-Oct-98	EU committee wants new GM crops stalled
23-Oct-98	Pressure on EU may result in temporary restrictions on genetically modified
23-Oct-98	Selling testing services around the world
28-Oct-98	Woman faces £400000 bill in case over genetically modified crop
28-Oct-98	Genetic campaigner looks to appeal
02-Nov-98	Food for Thought
13-Nov-98	Consumer victory as EU broadens rules on the labelling of GM foods
19-Nov-98	Group's 'wake-up' call on GM foods
20-Nov-98	US likely to force it's hand on genetically modified food
26-Nov-98	Biotechnology industry supports objections to GM food programme
07-Dec-98	Food labelling claims rejected
15-Dec-98	Greens concerned by new report on 'risks' of genetically modified crops
16-Dec-98	'Impressive' genetic research causes concern
17-Dec-98	Developing states worry about expertise
17-Dec-98	US company says scepticism of GM food is compounded by EU rules
29-Dec-98	Genetic crop giants begin to feel the frost in Europe
02-Jan-99	The Irish palate comes of age
08-Jan-99	Seven for court over alleged damage to GM crop site
15-Jan-99	Monsanto criticised for not taking part in Cork conference
18-Jan-99	Call for ban on GM food because of safety fears
18-Jan-99	Modified beet 'needs 60% less herbicide
22-Jan-99	Benefits of GM foods outweigh dangers, says report
26-Jan-99	TV chef leads campaign against GM foods
26-Jan-99	GM foods debates dismissed as 'inadequate'
27-Jan-99	Leading food writers seek GM produce ban
29-Jan-99	Genetically engineered bugs to degrade waste is way to go, Macra told
03-Feb-99	Prominent campaigners are charged with damaging crops
04-Feb-99	An Irishman's Diary
06-Feb-99	Monsanto accused of misleading consumers
09-Feb-99	Seven environmentalists face charges today
09-Feb-99	Irish among European environmental groups fighting GM cotton application
10-Feb-99	Environmentalists to show evidence of 'lawful excuse' in crop sabotage case

Date	Headline
11-Feb-99	Biotech lobby accused of weakening GM rules
12-Feb-99	Report's safe passage boosts prospects for GM foods
13-Feb-99	Green MEP's renew attack on GM foods
13-Feb-99	Rats fed GM potatoes in experiment less resistant to infection scientist
13-Feb-99	Scientist who exposed possible dangers of GM foods gets support
15-Feb-99	New attacks on food research policy
16-Feb-99	Food for thought
16-Feb-99	GM foods of no benefit to the public says food safety chief
16-Feb-99	Scientists back moratorium
16-Feb-99	Revolution or just plain revolting
16-Feb-99	Blair defends genetically modified food
17-Feb-99	Greens urge Dail genetic foods debate
17-Feb-99	Countries to draft new law
17-Feb-99	Plants made boring might live longer
17-Feb-99	Scientists and supermarketeer shake GM industry
17-Feb-99	Reports on the effects of foods on test animals
17-Feb-99	Cabinet closes ranks on food safety policy
17-Feb-99	How stores stand on GM foods
18-Feb-99	Monsanto fined for breach of field trial safety rules
18-Feb-99	Irish group calls for strong international GM foods protocol
18-Feb-99	Dail debate on GM foods agreed
19-Feb-99	Setback for State's GM food policy
22-Feb-99	The buyer should beware of miracles of biotechnology
25-Feb-99	Opponents of GM food welcome call for 5-year ban
25-Feb-99	Talks on GM food transport deal fail
25-Feb-99	Consumer body criticises 'scare tactics' on GM foods
01-Mar-99	Monsanto pushes benefits of GM foods to the environment
01-Mar-99	Green MEP says greed has won out over safety in GM debate
02-Mar-99	Food safety authority to issue its verdict on GM food risks
02-Mar-99	GM-foods risk is 'vanishing small'
08-Mar-99	GM food advocates playing dumb on root causes of famine, environmentalist
09-Mar-99	Scientist tells MPs he backs calls for Gm safety screen
11-Mar-99	Voter concern with GM foods prods politicians into late debate
12-Mar-99	Expert's GM food claim to be reviewed
13-Mar-99	Cold comfort
15-Mar-99	GM foods project at UCD may benefit consumers
16-Mar-99	Marks and Spencer says no to GM food
18-Mar-99	Good food choices
18-Mar-99	Irish stores in move to ease GM food fears
18-Mar-99	Seeds of discontent were sown by lack of information on GM foods
19-Mar-99	US official warns on European delays in approving GM foods
19-Mar-99	Chefs agree with British regulations on detailing GM foods
20-Mar-99	Dempsey to speak on GM foods Dail debate
22-Mar-99	US may change approach on GM food promotion
25-Mar-99	Quinn calls for informed debate about genetically modified foods
26-Mar-99	FF accused of breaking promise on GMO moratorium
26-Mar-99	At sixes and sevens on GM food policy
26-Mar-99	Website guide to GM debate
27-Mar-99	Organisations to reconsider position on GM debate
29-Mar-99	Logic goes out the window when assessing hazards of technology and
30-Mar-99	Case of alleged GM crop sabotage today
31-Mar-99	Seven on GM crop charges part of group of up to 70
31-Mar-99	'To mess with God's creation is a mortal sin'
01-Apr-99	Saboteurs with 'honestly held beliefs' cheered
01-Apr-99	Probation Act applied to six GM food protesters
03-Apr-99	All booked up
05-Apr-99	Anti-GM foods campaigners undaunted
08-Apr-99	Doctors to debate motion on GM foods
14-Apr-99	Authority calls for informed debate on GM foods

Date	Headline
16-Apr-99	Dempsey moves to include GM opponents in debate
28-Apr-99	Study reveals ethical concerns among public over GM foods
28-Apr-99	Public 'confused' over GM foods
28-Apr-99	What's that you're eating
29-Apr-99	Consumers not receiving accurate information
30-Apr-99	Genetically modified food faces difficulties
30-Apr-99	Food seminar is told of shoppers' concern for animals
30-Apr-99	Scientist calls for public to have input on policy in science issues
03-May-99	Euro poll aspirant calls for GM food labelling
04-May-99	Anti-GM groups opt to join Dempsey debate
04-May-99	Monsanto claims organic lobby stirs GM fears to protect market
08-May-99	Monsanto-Gm foods will benefit consumers
08-May-99	Latest GM foods 'to benefit the consumer'
12-May-99	GM foods on sale are not a health risk, says report
13-May-99	GM foods as safe as conventional counterparts, food safety report says
13-May-99	GM foods report puts reason back in debate
14-May-99	An Irishman's Diary
17-May-99	Scientist rallies behind Genetic Concern in Build-up to GM debate
18-May-99	Biotechnology -nothing to be afraid of?
18-May-99	BMA wants moratorium on GM crops while potential risks are examined
19-May-99	Two expert groups in Britain rebut scientist's criticism of GM foods
20-May-99	Study finds GM maize pollen can harm insects
21-May-99	European Commission to postpone approval procedure for GM maize
21-May-99	Consumers have a right to clear labels
22-May-99	'No evidence' that Gm food is harmful
25-May-99	Focus on environment as GM debate intensifies
26-May-99	Improved yields are a myth, activist claims
26-May-99	Irish abstention in EU vote to ban approval of new GM crops criticised
26-May-99	Ethics and safety set to dominate consultation debate
26-May-99	Biotech industry 'key sector of economy'
26-May-99	All sides to GM argument debate the issue
27-May-99	Dismissed GM scientist speaks in Dublin today
28-May-99	Seeking the right to have GM research published
28-May-99	Food writer calls for 'GM-free' Ireland
31-May-99	Report on GM food leaked
31-May-99	Suspended scientist defends GM data
01-Jun-99	Prince questions GM food safety
01-Jun-99	Independent groups to consider boycott of GM debate
01-Jun-99	Scientists urge less use of germ-killing agents as resistance to drugs
02-Jun-99	Ministers try to avoid clash with prince over GM foods
02-Jun-99	Groups may opt out of GM food debate
03-Jun-99	Opponents of GM foods walk out of consultation talks with Government
03-Jun-99	Failed GM food debate has done nothing to calm public fears or inform
04-Jun-99	Organic farming 'less productive'
04-Jun-99	Academic calls for new expert group
04-Jun-99	Debating GM food
04-Jun-99	Debate format defended after protest boycott by opponents
07-Jun-99	Blair moves to dampen NATO post rumours on Portillo
10-Jun-99	Genetic Warrior
19-Jun-99	Warning on GM crop 'pollution'
21-Jun-99	Health farms to boycott GM foods
24-Jun-99	EU tries to turn conflict over GM food into policy
24-Jun-99	EU conflict on GM foods moratorium is likely
25-Jun-99	EU to bring in moratorium on the approval of new GM foods
26-Jun-99	Irish abstention in EU vote to ban approval of new GM crop criticised
28-Jun-99	End of political limbo on GM foods in sight
28-Jun-99	Modified food
08-Jul-99	Farmers warned of liability for defective or contaminated food
09-Jul-99	Claims on GM crop yields rejected

Date	Headline
10-Jul-99	Monsanto Man launches media charm offensive
10-Jul-99	Food safety moving up the ladder of importance
15-Jul-99	Study of GM foods planned
16-Jul-99	Director's chair -Dr Jim Ryan, chief executive, BioResearch Ireland
17 -Jul-99	Tracing the seeds of discontent in GMO row
19-Jul-99	American's are 'more positive' about GM foods than Europeans
21-Jul-99	Radiation used to develop varieties of plants
31-Jul-99	Superquinn to allow guided GM food tour
05-Aug-99	Anti-GM crusade enters supermarket
05-Aug-99	Church debates GM crop request
06-Aug-99	Monsanto beet trial site damaged by chemical
09-Aug-99	GM food protesters call for debate
16-Aug-99	CD-ROM on biotechnology now available
17-Aug-99	Activists destroy Monsanto GMO beet
18-Aug-99	Science needs a chance
18-Aug-99	Monsanto has no plans to move crop trials abroad
19-Aug-99	Inquiry into GM crop attack continues
19-Aug-99	An Irishman's diary
20-Aug-99	The Director's chair -Declan O'Brien, director APHA
20-Aug-99	Scientific progress is blighted by GM crops
24-Aug-99	Call for Ireland to become a GM-free zone
03-Sep-99	MEPs expected to query Byrne on food safety
04-Sep-99	man with 'no political past' shows deft touch in food safety maze
08-Sep-99	Church in Ireland 'not supportive of science'
10-Sep-99	Scientist insists EU backs funding on GM food research
13-Sep-99	Safer new screen for GM crops
14-Sep-99	GMO lobbyists say supermarket promise can't be kept
16-Sep-99	Irish scientists do not favour GM food ban
17 -Sep-99	Finding the recipe to remove consumer uncertainty about the safety of our
18-Sep-99	Walsh calls for national debate on GM foods
24-Sep-99	GM firms criticised
27-Sep-99	Ahern queried on GM crop lobbying
29-Sep-99	Teagasc calls for research on GM foods
29-Sep-99	Expert's warning on 'vilification' of GM foods
30-Sep-99	Farmers share concerns about effects of GM crops
01-0ct-99	Bruton urges truce on US trade wars
02-0ct-99	Junk food gets its marching orders
05-0ct-99	Anti-GM food scientist may yet have reputation saved
06-0ct-99	An Irishman's Diary
06-0ct-99	EU values safety above free trade
06-0ct-99	MEPs unite in seeking higher standards of food safety
07-0ct-99	Safer Food
09-0ct-99	No reasons found to ban GM foods, report says
09-0ct-99	Monsanto comes clean at a forum of its foes
11-0ct-99	Food writer challenges Government to justify endorsement of GM foods
11-0ct-99	Biologists warns against unscientific 'pseudo ban' on GM foods in Europe
11-0ct-99	GM report food thought
11-0ct-99	Main recommendation of report
12-0ct-99	EU advisers back GM tomato
15-0ct-99	'Lancet' report raises new GM fears
16-0ct-99	Monsanto denies weed killer poses risk
22-0ct-99	Government support for GM foods out of date, says groups
23-0ct-99	Greens say EU rulings on GM labelling are too weak
23-0ct-99	Monsanto gloom as GM labelling approved
01-Nov-99	US warns EU of danger of full-scale trade war
01-Nov-99	Starring role for meteors in Science Weeks
04-Nov-99	Scientists criticised for failing to get GM message over
06-Nov-99	Tighter EU food safety laws vital, Byrne says
08-Nov-99	Trying to get past the dinosaur era in science awareness

Date	Headline
11-Nov-99	GM report food for thought
22-Nov-99	Reports of monarch's death greatly exaggerated
27-Nov-99	Food worth paying for
08-Dec-99	Farmers' brave new world
08-Dec-99	US academic presses case for GM foods
11-Dec-99	Commission beginning to grapple with GM foods issue, says Byrne
14-Dec-99	EU food authority to replace advisory groups
16-Dec-99	Monsanto to be sued again
08-Jan-OO	Fare and fowl
08-Jan-OO	Tesco to ask growers to avoid fields used in GM crop trials
10-Jan-OO	EU food authority to attempt to restore confidence
12-Jan-OO	EU proposals on food safety
12-Jan-OO	Food safety
13-Jan-OO	Byrne warns funds may be withheld for food breaches
14-Jan-OO	Byrne promises tighter rules on GMOs
17 -Jan-OO	More Malnutrition with genetic farming forecast
18-Jan-OO	Strict new EPA rules hit GM crop growers
28-Jan-OO	Study offers glimpse of robotic future
31-Jan-OO	US gives way on complex trade rules for genetically modified products
01-Feb-OO	The ethics of science
03-Feb-OO	Greens welcome GM food trade safety protocol
09-Feb-OO	Irish firm to playa key role in GM labelling
09-Feb-OO	US agency denies clamping down on food biotechnology
14-Feb-OO	Misplaced GM fears are 'holding up' technology
18-Feb-OO	US criticised over GM food safety
28-Feb-OO	Farmers warned of legal minefield
29-Feb-OO	Mowlam urges GM caution
01-Mar-OO	£25m biotechnology centres to study GMOs
01-Mar-OO	Investment a response to global competition
09-Mar-OO	McKenna warns EU about to approve three GM crop varieties
11-Mar-OO	GM planting in UK to go ahead
13-Mar-OO	GM crops 'will not make poor poorer if people have control'
24-Mar-OO	Netherlands and Republic join forces on biobusiness
31-Mar-OO	Farmers told food safety their business
06-Apr-OO	4m plan for food safety training announced
13-Apr-OO	MEPs fail to hold GM food makers liable for damage to environment
13-Apr-OO	Anti-GM foods pressure group announces decision to disband
14-Apr-OO	Friday Interview -Maurice Pratt, managing director, Tesco
20-Apr-OO	Allen criticises investment in GM research
02-May-OO	McKenna says GM label rules have not been implemented
03-May-OO	Biotechnology investment needs big boost to sustain growth, says report
16-May-OO	Prizes for teen whiz-kids
17 -May-OO	EU accused of lax approach to GM foods
18-May-OO	Prince praised for warning on ethics of biotechnology
19-May-OO	EPA asked to check rapeseed oil after GM contamination
22-May-OO	Tomorrow belongs to GMF
26-May-OO	Contamination of non-GM crops widespread in Britain, says TO
26-May-OO	Teenagers see monitored GM foods as part of their future
31-May-OO	Unapproved Gm-contaminated rape sown here
01-Jun-OO	Food for thought
01-Jun-OO	Rape planting challenged
02-Jun-OO	Urgent need for biotech research in farming
02-Jun-OO	Expert suggests national dialogue
02-Jun-OO	GM food research ongoing, Harney says
03-Jun-OO	EU food hygiene laws overhauled
07-Jun-OO	Princely joust on GM foods
10-Jun-OO	Sceptical of science
15-Jun-OO	Supermarket group goes organic to promote more 'responsible farming'
17-Jun-OO	Britain's green grocer started out on a Welsh roadside

Date	Headline
17-Jun-OO	The greening of Iceland
21-Jun-OO	Scientists urged to cooperate more on food safety research
24-Jun-OO	Consumer overlooks food-label advice, says scientists
01-Jul-OO	Gemone discovery fails to hide scientific tensions
01-Jul-OO	Reasonable debate on biotechnology urged
04-Jul-OO	Chinese scientists start decoding pig genome to produce better pork for 1.3
14-Jul-OO	EU plan to lift moratorium on GM crops draws sharp criticism
15-Jul-OO	Beating boil-in-the-bag
17-Jul-OO	GMOs on menu
21-Jul-OO	Healthy lifestyle promoters will have a hard job countering slide into slobdom
24-Jul-OO	EU workshop debates the future of biotechnology
31-Jul-OO	Town renewal scheme and rising house prices show light and dark in
02-Aug-OO	Teagasc criticised by Greens
07-Aug-OO	Anti-GM message is writ large by artists
08-Aug-OO	Teagasc looks to play part in global research into GMOs
04-Sep-OO	Ploughing in GM crops has risks, says McKenna
04-Sep-OO	Public unease about biotechnology -survey
05-Sep-OO	Public 'entitled' to organic food option
08-Sep-OO	Public must have a say in what science is doing
16-Sep-OO	Walsh says agri-food sector holds key to future of farming
21-Sep-OO	Group cleared of GM crop damage
22-Sep-OO	Withering setback for genetically modified crop trials in Britain
29-Sep-OO	Author paints grim portrait of tech world
30-Sep-OO	Taking the fight to the streets
09-0ct-OO	Britain admits GM testing
10-0ct-OO	Firm claims weed-control benefits of GM sugar beet
16-0ct-OO	Plenty of food in the wrong place
09-Nov-OO	Byrne puts plan for EU authority to oversee food safety
22-Nov-OO	Dismay at official backing for GM crop trials

Appendix B

The Irish Times Letters by Date and Headline

Date	Headline	Author's Name
13-Feb-97	Genetically modified food	Gerry Boland, environmental spokesperson
20-Mar-97	Genetically engineered foods	Dorothy Gallagher Council member of the 11-
May-97	Genetically modified food	Dr Philip J Dix
12-May-97	Genetically modified food	Brian White
17-May-97	Genetically Modified Beet	Jill Bell
08-0ct-97	Green party and science	Dr Conor Long, Dean of Research
15-0ct-97	Genetic engineering	Quentin Gargan, spokesman Genetic
21-0ct-97	Genetic engineering	Conor Long, Dean of Research Dublin City
22-0ct-97	Genetically engineered food	Nuala Ahern MEP
30-0ct-97	Genetic engineering	Paul O'Brien
J3-Nov-97	Genetic engineering	Conor Long Dean of Research Dublin City
19-Feb-98	Darina Allen on food safety	Tom Raftery
20-Feb-98	Political Genes	Ray Monahan
24-Feb-98	Genetically modified food	Quentin Gargan
24-Feb-98	Genetically modified food	(Dr)Ted Hood
13-Mar-98	A view from the north	Philip Allen
14-Mar-98	Genetics and society	Dr Brian McEnery (Natural Law Party)
19-Mar-98	Failures in genetic engineering	Mary-Anne Bartlett, Director, Compassion in
23-Mar-98	Symposium on genetics	Ruarc Gahan
23-Mar-98	Symposium on genetics	Dr Brian Larsen,
25-Mar-98	Genetic symposium	John Seymour
31-Mar-98	Symposium on genetics	Prof Peter Whittaker, Head of Biology,
11-May-98	The Amsterdam treaty	Susan Philips (Member of Wicklow County
17-Jun-98	Bio-patenting and gender	Shane Morris Post-Graduate Researcher
J1-Sep-98	Genetic modification	Conor Fitzgerald
J2-Sep-98	Genetic engineering	John Seymour
J3-Sep-98	Genetic modification	Paraic Kenny
J8-Sep-98	Genetic modification	Bill Sheeran
25-Sep-98	Genetically modified food	Eoin Ryan TD
29-Sep-98	Genetically modified food	Prof Tom Raftery
01-0ct-98	Genetically modified food	Mary White, Green party spokesperson for
19-Dec-98	Public health monitor	Elizabeth Cullen (Dr)
21-Dec-98	Genetically modified crops	Dr Norman McMillan,Lecturer
26-Jan-99	Experiments on animals	Yvonne Smalley, Anti-vivisection Society
27-Feb-99	Genetically modified food	Christopher Bowring-Carr
09-Apr-99	Science and the Millennium	James Fryar
12-May-99	Genetically modified foods	Tom Raftery (Professor Emeritus and former
19-May-99	Genetically modified foods	Tom Campbell
27-May-99	Genetically modified foods	Michael Hickey
29-May-99	Mobile phone safety	John Kevany
08-Jun-99	Where are the issues?	Michael Purser
16-Jun-99	Genetically modified foods	Jim O'Connor
21-Jun-99	Genetically modified foods	Kevin Mannerings
23-Jun-99	Genetically modified food	Fintan M Clancy
26-Jun-99	Genetically modified foods	Con O'Rourke
02-Jul-99	Genetically Modified foods	Rose Mary Logue
27-Jul-99	Attitudes to GM food	Harriet O'Donovan Sheehy
12-Aug-99	Genetically Modified food	Jim Ryan, director of BioResearch Ireland
23-Aug-99	Genetically modified food	Dr Peter Marsh, Director of science and
23-Aug-99	Genetically modified food	Damian McKeon
24-Aug-99	Genetically modified foods	David Philip
25-Aug-99	Genetically modified food	Justin Kilcullen, Director of Trocaire

Date	Headline	Author's Name
26-Aug-99	Genetically modified food	Adrienne Murphy
18-0ct-99	Genetically modified food	John Seymour
J2-Nov-99	Genetically modified food	Prof Philip J Dix, NUI Maynooth
J8-Dec-99	Healthy eating	Feidhllm Harty
27-Apr-OO	Genetically modified foods	Damian Byrne
)2-May-OO	Genetically modified foods	Myles Crowe
)3-May-OO	Genetically modified foods	Ciaran McKenna
17 -May-OO	Genetically modified food	Damian Byrne
29-May-OO	Genetically modified foods	Paul O'Brien
31-May-OO	Genetically modified food	Fergal MacAlister
02-Jun-OO	GM foods	John Enright
12-Jun-OO	Genetically modified foods	Declan O'Brien, director, Animal and Plant
23-Jun-OO	Gm foods and world hunger	Damien Flinter
22-Nov-OO	Approach to biotechnology	Patricia McKenna MEP

Appendix C

Original Research Questionnaire

Biotechnology Questionnaire

1. Name ______________________

   Contact Details ______________________

   ______________________ Ph: __________

2. Are you answering this questionnaire in an individual capacity or as a representative of an organisation? ***(please tick the appropriate box)***

   ☐ Representative ☐Individual

   → Who are you representing, and what is your position within this organisation?

   Position ______________________

   Organisation ______________________

3. What areas of biotechnology or issues arising from its application are you interested in?

   ____

   ____

4. Have you produced any documentation on biotechnology or issues arising from its application? If so, what types? ***(e.g. media releases, newsletters, statements)***

   ____

   ____

5. Have you disseminated this information? If so, to whom? ***(e.g. outside of the organisation, to the public, to the media)***

   ____

   ____

6. What sources do you use to obtain your information on biotechnology?

   ____

   ____

Thank you for time and assistance.

Please send this completed form to – Fiona Barbagallo, School of Communications, DCU, Dublin 9
(Self Addressed Envelope supplied)

Appendix D

Fluoridation Communication Strategy

proposal for the Department of Health and Children

The Department of Health and Children must earn the trust of the consumer. To enable this to happen it is proposed that the wider public and interest groups be consulted prior to the development of the communication strategy. This proposal is divided into two stages:

A consultation and homework
B communication campaign

A – Consultation and Homework

Addressing Wider Issues

The DoHC must decide that they are willing to communicate the social and moral issues of fluoridation. Such issues will arise whether the DoHC initially addresses them or not. It is important the DoHC be aware of and recognise that the general public may have broader issues than scientific elements. For example the fluoride health scheme or 'mass medication' of the population will raise the social issue of limited consumer choice.

Dialogue with the Anti-Fluoride Campaign

VOICE will be invited to discuss the fluoridation issue with members of the DoHC. It is vital that the DoHC listen and recognise their concerns. It is a form of consultation that is non-confrontational, with an independent moderator present, where both parties can ask questions. The discussion will also allow the DoHC to represent their views.

Involvement of Other Interested Parties

There needs to be a dialogue between other interested parties. The DoHC should invite representatives from consumer groups, other NGOs, dentists and other oral health workers to a roundtable discussion where opinions can be expressed in a non-confrontational atmosphere. Again an independent moderator will be present to guide this discussion.

The reasoning behind this discussion is to gather a range of issues surrounding fluoridation that are relevant to the wider public.

Consultation with the Wider Public

Two types of information will be obtained from consulting the wider public:

i) level of public awareness, and ii) public opinions of the fluoridation scheme.

Determining the level of public awareness will provide the starting point for the communication campaign. This can be achieved using telephone surveys or focus groups.

As fluoridation affects all members of society it is important to determine their opinions of fluoridation. The use of focus groups will provide an insight into how people negotiate meanings, form attitudes and make decisions, for example how they arrived at a certain opinion. This research will provide information that will be used to communicate the safety of, benefits of and issues surrounding fluoridation to the general public.

B – Communication Campaign

The communication campaign should not just inform the public, but give the audience a chance to inform themselves. The challenge is to persuade the public to consider the provided information.

Deciding on the Messages

The issues raised during the consultation stages will be analysed to determine the messages to be communicated with the wider public. The messages should not just be the positive aspects of fluoridation but the wide range of issues that are relevant to the general public.

Disseminating Messages

When the scientific and broader messages have been finalised it has to be determined how the messages will be communicated. The PR company which the DoHC uses for health campaigns will be given the task of developing a strategy to communicate the messages. The in-house press office will need to be involved in the early stages of this project so they are aware of why and how the communication campaign has been decided.

The DoHC's allocated budget and time frame for the communication of fluoridation will determine the type of campaign.

Allowing Dialogue

Once the messages are sent, it will be essential that the DoHC allow dialogue to occur between them, interested parties and the wider community.

Fiona Barbagallo
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704 5233
13/03/2000

Appendix E

Fluoridation Communication Protocol

The Dental Health Foundation needs to facilitate effective communication, involving a wide variety of social actors (individuals, news media, NGOs, detail health officers, dentists etc), and provide the means for continuing dialogue.

To be effective the communication must be posited as the initiation of dialogue, a sharing of information and opinions. The communication strategy will allow for, but also encourage, discussion.

The Dental Health Foundation and Department of Health and Children need to be committed to this approach for the strategy to be effective. There needs to be people committed to deal with comments from the wider and active publics and build relationships with journalists.

Five stages:

1. public opinions on fluoridation and dental health

to determine public opinions and attitudes of fluoridation and its relationship with dental health, and the public's behaviour towards fluoride in water and toothpaste

> awareness of perceived benefits/drawbacks of fluoridation
> awareness of connection between dental health and fluoride
> behaviour towards fluoride levels and supervision of children's brushing
> determine level of trust of DoHC, DHF, Fluoride-Free Water Campaign (FFWC) and VOICE
> which sources of information are credible
> type of sources that are credible
> how public come to their own decision

reason:	to quickly determine the level of awareness; provide a benchmark; will enable the DHF/DoHC to inform the public of active research; will provide information which will be used to tailor the larger public survey and eventually the communication strategy
method:	8 focus groups – consisting of a range of ages, backgrounds
cost:	£12 000
timeline:	4 weeks

2. survey of wider public

to determine levels of public awareness of fluoridation

> awareness of fluoride presence
> reasons why it is present
> reasons why it should not be present
> sources of information

reason:	to determine what the wider public know/think they know about fluoride; easy to communicate survey results to media; will provide information which will be used to tailor the communication strategy
method:	will depend on the findings from the focus groups: if only a few questions – omnibus style, if more detailed – tailored survey

cost: £5 000 -10 000
timeline: 6-8 weeks (after the focus groups)

3. dialogue with anti-fluoride campaign and other key social actors (scientists, dentists, health workers etc)

> this is crucial – to provide a forum that the NGOs/FFWC want to partake in dialogue with DHF/DoHC and other active publics
> a form of 'public' consultation, where the public are 'active publics'
> provide a way for active publics to have a voice and be listened to
> avenue for DHF to communicate

reason: to provide confidence in DHF/DoHC; to increase level of public consultation, public debate and public involvement; provide a forum for national dialogue
method: will be determined by the relationship established with FFWC/NGOs e.g. may be done individually; a roundtable discussion/workshop; a regular forum
a facilitator to be present
cost: £1 000 (£500/workshop)
timeline: can occur while focus group and survey research is happening

4. media assistance

> have a person who will be the key spokesperson for fluoridation and let the media know – give journalists their name, position, mobile phone number
> media briefings
> media articles need to provide mobilising information* – therefore all press releases need to have names, addresses, phone numbers and websites of those with responsibility or expertise for follow-up information, such as DHF/DoHC, FFWC
> messages should indicate that each individual scientific view does not represent the 'truth', but is an ongoing process of scientific discovery
> journalists should be made aware of research on public awareness

[*Mobilising information: info included in e.g. a news article that provides audience members with a means to take a variety of actions in response to message. These actions might be attempts to follow up information contained in a story, or ways to access various government agencies.]

reason: media friendly i.e. have more of a presence for journalists so they know who to contact; putting your messages forward so the wider public see that you are considering the issues and not ignoring them
method: Paddy Hughes is the best person to devise this strategy
cost: your time and resources
timeline: ASAP

5. DHF communication strategy

I would like to discuss the points below. This is a new strategy for any government body in Ireland. You need to be committed to this by having people within DHF or/and DoHC who are prepared to deal with the public on fluoridation.

The desired outcome should be to persuade the targeted public to fully consider the provided information, not to compel people to believe and then act on a particular 'truth'.

DoHC/DHF need to:

> build trust by:
  - providing a variety of communication channels
  - improving openness
  - facilitating dialogue
> not think of the anti-fluoride campaign as being irrational – they have a valid point of view, e.g. worried about children's health
> communicate:
  - what the assessment of fluoridation is
  - how the assessment was made
  - considered social elements
> remember that the public:
  - are not irrational
  - have the ability to think, and work out what is and is not acceptable
  - when faced with a difficult (scientific) problem, have the tendency is to turn it into a practical and moral problem
> make the original source of information available to both the public and to journalists
> be proactive within your own organisation – let all know what is going on
> be proactive in sending out media releases
> have mobilising information in all communications
> evaluate whether the messages have been understood

method:	information from public research and dialogue with social actors will determine the messages, which in turn determine the medium – Paddy Hughes' expertise
cost:	considerable
timeline:	frame of mind to begin immediately, media friendly person to be decided upon ASAP, different parts of the PR campaign to begin once initial public research is conducted

New forum on water fluoridation

" The forum will eventually invite submissions from the public."

> the communication strategy must give public a chance to comment, say what they think and have views taken into consideration

Will the invited submissions be part of a public consultation process? How will the public submissions be included in the overall decision-making process? What type of public consultation will it be?
This new forum, if it will involve public consultation, needs to be considered when designing the communication strategy.

Fiona Barbagallo 19/05/00
DCU ph 704 5233

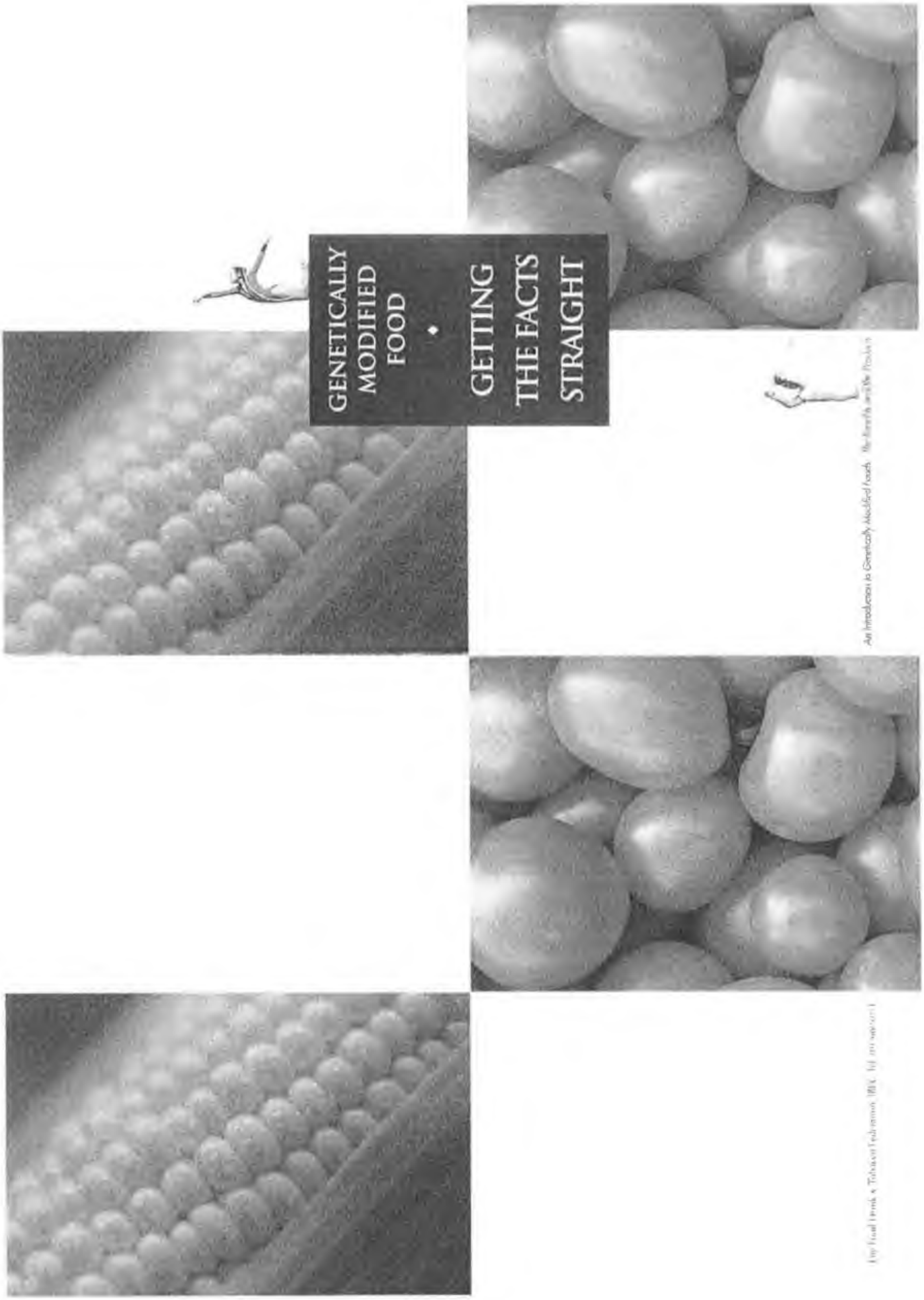
Appendix F

Focus Group Discussion Outline – Dental Health Foundation

1. Introduction and warm-up
2. Backgrounds to dental hygiene, frequency of tooth brushing, oral hygiene products used
3. Awareness of factors contributing to healthy teeth and gums
4. Actions taken to ensure healthy teeth and gums, e.g. diet, oral hygiene, toothpaste with fluoride etc
5. Probe awareness of and associations for fluoride i.e. each person writes down spontaneous association s for fluoride and then group discusses
6. Explore the relationship, if any, perceived between fluoride and healthy teeth. Probe the importance attributed to fluoride versus other means of maintaining healthy teeth
7. Probe awareness of and attitudes to the presence of fluoride in the water supply and rationale for its presence. Explore negative and positives associated with that
8. Explore sources of information regarding fluoridation and what has shaped their opinions negatively or positively. What sources are to be trusted and who are credible suppliers of information in this area?
9. Probe the key concerns that exist and whether they are perceived to personal health, public health, environmental concerns or a combination of theses
10. Using a card sort exercise, rank concerns about fluoridation in the context of other issues that people may be concerned about. Probe reasons for the particular ranking that emerges
11. Detail any other issues that have not arisen or questions that people may have
12. Thank you and close.

Appendix G

Food Drink & Tobacco Federation, IBEC GM Food Pamphlet



XIX

GENETICALLY MODIFIED FOOD WHAT IS IT AND HOW DOES IT AFFECT YOU

Getting the facts straight

Everybody eats modified or altered food. Alterations are made for a number of reasons ranging from resistance to disease, size factors, increased production, taste and food safety among others.

Examples include frost resistant lettuce varieties and vegetables that last longer. All of the foods we enjoy have been [illegible] and have been subject to the most [illegible] safety regulations before they reach our plate.

This leaflet aims to explain in straight forward language why genetically modified food exists and its role in our lives.

What is modified food ?

Modified food is a fact of life and has been with us for sometime. Modified food is found in most every day food. It is food that has been altered using either natural or biotechnological means. An example of naturally modified food is the use of yeast in bread to make it rise or fermentation for cheese making. Cows bred to produce more milk or animals bred to produce more meat with less fat are examples of where biotechnology is used. Genetically modified food is simply an extension of a process that has been happening throughout history.

What is genetically modified food ?

Genetically modified food takes these processes a step further. By selecting a gene which has a particular trait from one species

and transferring it onto another species of plant, animal or micro-organism, it can give the desired characteristics more safely and accurately than was previously achieved by the other methods.
It can also switch off undesired traits such as the gene that makes tomatoes soften.

Is it safe ?

Foods produced using genetic modification are among the most tested foods ever.
Safety and risk assessment for genetically modified foods is in fact much more severe than for conventional foods.
Genetic modification eliminates the trial and error used in conventional plant and animal breeding.
In Ireland all aspects of food production and importation are covered by hygiene and safety regulations.

Manufacturers and importers ensure that the food products comply with the specific hygiene and safety standards. The Environmental Protection Agency is responsible for regulation of genetically modified organisms.
In addition, the Food Safety Advisory Board has established an independent committee to advise on new genetically modified foods in Ireland.

The future for genetically modified foods?

Although there are only a few genetically modified foods available today we will be seeing much more of them in the shops in the future.
Benefits from genetic modifications include disease resistant crops, crops that can use more environmentally friendly herbicides, longer lasting fruits, vegetables capable of surviving droughts and frosts which are therefore available all year round, and foods with higher vitamins, minerals and proteins and lower fat content.

Appendix G

XX

MEMBERSHIP APPLICATION

Return to Genetic Concern,
7 Upper Camden Street, Dublin 2
Phone: 01 4760360

I would like to become an annual member of Genetic Concern and receive a quarterly newsletter.

I enclose a cheque/postal order for £20 ☐
£10 unwaged ☐

I enclose an additional donation of
£10 ☐ £15 ☐ £20 ☐ £50 ☐
£ ________________(other)

Name (block capitals) ____________________

____

Address (block capitals) ____________________

____

GENETWORK NEWS - daily e-mail updates

I would like to receive regular e-mail information updates and news of campaign activities in both Ireland and abroad ☐

My e-mail address is ____________________

Where did you pick up this form? ____________________

____

genetic
concern !

Appendix H

Genetic Concern Pamphlet

CONCERNED ABOUT WHAT YOU EAT?
WORRIED ABOUT GENETIC ENGINEERING?
WANT TO FIND OUT MORE?

JOIN GENETIC CONCERN!

genetic
concern !

THE FACTS

- Up to 60% of processed food on our shop shelves could be genetically engineered
- 90% of GE ingredients do not need to be labelled under current EU regulations
- 88% of informed people are concerned about the potential risks of genetic engineering (Genetic Concern Survey: Feb. 1999)

WHAT IS GENETIC ENGINEERING?

Genetic engineering (GE) involves splicing a gene from one living creature into the DNA of another plant or animal to produce a new characteristic e.g. In the US, a gene from the Artic Flounder fish was spliced into a tomato to make the tomato frost - resistant. In the process, genes from bacteria and viruses are also used.

Unlike traditional breeding which has gone on for centuries, genetic engineering is a new technology which crosses the species barrier. Many scientists believe that we do not know enough about how genes work to be releasing GE organisms into the environment and onto our plates.

WHAT ARE THE RISKS?

Human Health

Meddling with genes could create unexpected toxins in our food, resulting in new diseases or allergies. In 1989, In the U.S., genetically engineered bacteria was used to produce a food supplement called tryptophane. A new toxin emerged resulting in 37 deaths and 1,500 injuries. Where did this toxin come from?

The use of antibiotic resistant genes could mean that our bodies will become immune to useful antibiotics.

In spite of the risk, food safety tests are carried out by the GE companies themselves, not by independent scientists. Engineered soybeans were launched after just 10 weeks feeding trials on animals. The human tests are now being carried out on all of us.

Environmental Impact

Once released into the environment, plants produced by genetic engineering can never be recalled or contained GE crops can cross-pollinate with other crops. Genes may also escape horizontally into soil micro-organisms or other plants. Will it be possible to guarantee GE-free supplies of food?

Many conservationists are concerned about the effects GE crops and their associated weedkillers could have on plants and wildlife.

WHO BENEFITS?

The huge multi-national corporations who control this technology, and whose main priority is profit.
They include Monsanto, Zeneca, Novartis, Du Pont and AgroEvo. Monsanto is currently conducting 5 field trials of genetically engineered sugar beet in Ireland. Many more could be on their way
Consumers do not stand to benefit from genetic engineering. We are being used as human guinea pigs.

"This is a huge experiment on mankind, to which we are being subjected, absolutely without out consent." (Darina Allen, Director of Ballymaloe Cookery School) January 1999

CONSUMER POWER!

You, the consumer, have a right to make an informed choice about the food you and your family eat. You have the power to stop shops stocking genetically engineered foods.
Supermarkets and food processing companies are already responding to consumer pressure. Superquinn, Marks & Spencers, Tesco's and Iceland have already pledged to phase out GE ingredients from their own brand products. Unilever, Nestle and Cadbury's have also gone partially GE-free
Experts told us BSE was safe. They are now telling us the genetic engineering of food is safe. Do we trust them?

WHAT YOU CAN DO!

- Join Genetic Concern and support our campaign!
- Avoid buying processed foods - they are likely to contain GE ingredients. Buy organic produce instead - it is GE-free
- Ask your supermarket/shops to label all genetically engineered ingredients and derivatives (e.g. oils, starches, fats) in the food products they stock
- Write to your favourite brand companies and shops asking them to go GE free
- Lobby your local TD's and MEP's

Voice your concerns to:
The Taiseach, Dail Eireann, Kildare St., Dublin 2

Genetic Concern is a voluntary organisation, established in April 1997, to highlight the potential risks of genetic engineering in food and agriculture.

We are calling for

- a freeze on the planting of GE crops, and the use of genetic engineering in any part of the food chain, until independent research has been carried out to prove it is safe
- balanced and informed public debate on the issue, covering consumer, health, environmental and ethical issues
- full segregation of GE crops, and clear, accurate labelling, so that consumers can choose to avoid GE foods if they wish

We supply info. packs or speakers on request.

Appendix I

List of Specialist Journalists that Reported on GMOs.

Description	Specialist Reporter	Newspaper
Science	Science correspondent Science editor	*Daily Mail; The Guardian; The Independent; The Independent on Sunday; The Irish Times; The Sunday Times; The Times*
Food	Food Science	*The Irish Times*
Health	Health correspondent	*Irish Independent*
Environment	Environment correspondent Environment editor	*Irish Independent; The Daily Telegraph; The Express; The Guardian; The Sunday Times; The Times*
Agriculture	Agriculture editor Agriculture correspondent Countryside editor	*The Daily Telegraph; The Irish Times; The Times*
Consumer	Consumer Affairs correspondent Consumer correspondent	*Daily Mail; Irish Independent; The Mail on Sunday; The Observer*
Political	Political correspondent Political staff Westminster correspondent Chief Political correspondent	*Daily Mail; The Daily Telegraph; The Guardian; The Independent; The Times*
Finance	City [London's business area] correspondent	*The Daily Telegraph*
Social	Home Affairs editor Public Affairs editor	*The Guardian; The Observer*

Appendix J

The Irish Times Themes and Sub-Themes

Health

Public Safety

In response to controversy over genetically modified foods, the Food Safety Authority has asked its new scientific committee to consider the safety of such products from the perspective of consumer health.
25 February 1998 p 7 *The Irish Times*

Human health risk has been repeatedly cited by campaigners as grounds for a moratorium on GM foods.
12 May 1999 p 1 *The Irish Times*

Benefits

Commercial production of a soya bean with reduced cholesterol is to begin in the US this year. It is the first of a new generation of GM foods with direct benefits to the consumer, according to the biotech multinational, Monsanto.
8 May 1999 p 6 *The Irish Times*

Environment

Benefits

Irish crop trials on genetically modified sugar beet have shown that pesticide usage could be reduced by 40 per cent on the GM variety because of its week control benefits, according to the biotechnology company, Monsanto.
10 October 2000 p ? *The Irish Times*

Contamination

Ms McKenna maintained, however, this method [of ploughing GM trial crops into soil] was totally unsatisfactory as it did not guarantee that GM contamination of nearby crops would not occur in the long term. "The risks of contamination from GM crops to non-GM crops have not been fully evaluated," Ms McKenna said.
4 September 2000 p 4 *The Irish Times*

Social and Moral

World Hunger

The US company [Monsanto] would continue its plans because they represented a scientifically based attempt to provide solutions to food supply issues. ... Dr Philip Dix, of NUI Maynooth, agreed that people must "face up to the fact that we cannot turn the clock back and use technologies that were adequate for a much smaller world population".
2 March 1998 p 11 *The Irish Times*

The insistence by multinationals that they can feed the world with the introduction of genetically modified (GM) foods should be dismissed a "dangerous marketing hype", according to a group of Irish Third World groups and research institutions.

23 September 1998 p 3 *The Irish Times*

Industry Involvement

It would be foolish to underestimate the power of large multinational corporations to subvert such a democratic agenda. They have enormous power and can get national governments and the European Union to dance to their tune.

11 May 1998 p 10 *The Irish Times*

Researchers at the US Department of Agriculture, in partnership with Delta & Pine Land Company, a commercial seed breeder, have developed a gene modification that sterilises the plant so that no viable seeds are produced. The food crop is produced but all seeds are sterile so the farmer cannot rely on traditional seed saving for the next season's crop. It was introduced as a way to protect the patent controls on seed varieties and Delta & Pine is reportedly ready to make the technology available to other seed breeders.

16 October 1998 p 2 *The Irish Times*

Trade and Employment

The livelihood of 70000 farmers in Madagascar depends on vanilla. The price of naturally-produced vanilla is $1200 per pound. Genetically engineered vanilla can be produced at a fraction of the cost.

11 May 1998 p 10 *The Irish Times*

He is a "progressive farmer" and has invested in high-tech machinery, runs a contracting business and is well known in beet grower and Irish Farmers' Association circles. … Another beet grower asked him if he would participate in the trials. He knew little about the new strains resistant to Monsanto's herbicide RoundUp … "Obviously I have an interest myself, to see how it goes … " he said. … "If we are to compete in Europe we have to go with it, provided it is not at the price of human health or the environment."

11 March 1998 p 2 *The Irish Times*

The US has been forced to make concessions in tough negotiations for new rules on trade in genetically modified products but has succeeded in putting off a decision on labelling shipments of them. … "Protocol or no protocol, if the European Union, for example, continues to block imports of North American products, we won't avoid a trade war," said Mr Willy de Greef, a risk assessment official for the Swiss pharmaceutical giant, Novartis, which also makes genetically altered seeds.

31 January 2000 p 14 *The Irish Times*

Nature

The ethical values which underpin this judgment are contrary to those enshrined in many religions and cultures.

11 May 1998 p 10 *The Irish Times*

Genetic engineering was "using nature's ways", according to Dr Borge Diderichsen, director of corporate research affairs with the Danish biotechnology company, Novo Nordisk.

16 March 1998 p 8 *The Irish Times*

In a Reith lecture broadcast on BBC Radio 4 last night, Prince Charles argued that humanity's inability or refusal to accept the existence of "a guided hand" meant nature had some to be regarded as "a system that can be engineered for our own convenience … and in which anything that happens can be fixed by technology and human ingenuity".

18 May 2000 p 12 *The Irish Times*

Science

The trials were being pursued with too much speed and undue secrecy, [Darina Allen] said yesterday. … "I'm terribly worried about the speed this is happening. Not enough is known about the whole process and the repercussions of fiddling around with genes, especially the impact on the food chain."

11 February 1998 p 3 *The Irish Times*

"Scientists like myself are extremely concerned that the biotech industry has been allowed to go too far too fast before a scientific basis for a safe technology and proper risk assessment has been established," said Dr MacWan Ilo (sic), of the Open University of the UK.

27 February 1998 p 5 *The Irish Times*

The potential from the application of genetics to food production through the use of the remarkable processes of biotechnology was dramatically underlined by the US company, Monsanto, in its 1997 annual report. "Today, the ability to identify and use genetic information is doubling every 12 to 24 months. The exponential growth in biological knowledge is transforming agriculture, nutrition and healthcare in the emerging life sciences industry." Monsanto's chairman and chief executive, Mr Bob Shapiro, says all industries based on biological science are in the early stages of "an extremely powerful and probably inexorable process".

24 April 1998 p 17 *The Irish Times*

The last often forgotten loser, left cowering in a laboratory, is the scientific truth. The two lobbies attempt to use science to prove their own arguments are correct. But how can the science support these two opposite poles, that modified foods are find and modified foods are dangerous? The answer can be found in the use, or abuse, of the scientific information.

15 August 1998 p 6 *The Irish Times*

Politics

Industry had invested so much in biotechnology that it wanted to believe that it works, Mr Gargan said. But this smacked of the British government attitude to BSE, when "it wanted to believe indications from its scientists that it did not represent a risk to humans". It was [Genetic Concern's] view that regulatory authorities in the US were speaking on a united front with industry on this biotechnology as they wanted to beak into the European market.

14 October 1997 p 4 *The Irish Times*

Mr Byrne, speaking to journalists at the publication of a report by three independent scientists on the shape of [a new European] authority, stressed the critical issues of transparency and independence to build confidence in any institutional response to the recent food crises.

14 December 1999 p 5 *The Irish Times*

But Mr Druker [a public interest attorney] obtained internal documents by court discovery which indicated disagreement among the [US] FDA's own experts in 1992, when the first GM food was due to come on the market. … Mr Druker has alleged in court briefs that the FDA's position amounted to deception …

17 May 2000 p 2 *The Irish Times*

Consumer

The Consumers' Association of Ireland has said, nonetheless, that people "should not be force-fed these products" facilitated by way of unlabelled products on supermarket shelves.

25 February 1999 p 1 *The Irish Times*

While Mr Dargan welcomed the publication this week of a genetic engineering policy report by the Minster for the Environment, Mr Dempsey, he said the Government was coming late to the issue and its policy shoed little evidence of being consumer-driven.

27 August 1998 p 6 *The Irish Times*

Attention must now become focussed on ensuring that consumers receive a balanced, clear and consistent message about GM foods – only then can they make an informed choice. If this message is to be balanced, Government bodies, the food industry and environmental lobby groups will all have a role to play in the dissemination of such information.

29 April 1999 p 14 *The Irish Times*

The Irish supermarket group SuperQuinn is to form an alliance with leading European supermarkets and remove genetically modified ingredients from all its own-brand ranges. The unprecedented move is in response to customer unease about GM foods.

18 March 1999 p 1 *The Irish Times*

Policy and Regulation

The "vested interests of US trade" and the biotechnology business have won out, Green MEP Ms Patricia McKenna has claimed in the wake of failure to secure a world biosafety protocol on genetically modified organisms (GMOs).

1 March 1999 p 3 *The Irish Times*

(primary theme policy/regulation, secondary theme is social and moral)

Finna Fáil did not act on a pre-election promise to introduce a moratorium on the development of genetically modified organisms (GMOs) because EU legislation prevented any member-state acting unilaterally to ban them, the Dáil has been told.

26 March 1999 p 19 *The Irish Times*

Research Findings

Genetically engineered crops may destroy useful insects through the release of modified crop pollen, according to new research published today.

20 May 1999 p 2 *The Irish Times*

Plants as well as humans may soon be engaged in hormone replacement therapy, particularly those on greengrocer shelves, if research at NUI Maynooth is applied to commercial produce.

2 April 1998 p 7*The Irish Times*

Protests and Campaigns

A group calling itself the Gaelic Earth Liberation Front has sabotaged the first genetically modified crop grown in this country.

30 September 1997 p 1 *The Irish Times*

A challenge to the Environmental Protection Agency's decision to allow field trials of genetically engineered sugar beet in Co Carlow will be heard in the High Court today.

30 June 1998 p 5 *The Irish Times*

The Irish cookery writer and broadcaster Ms Darina Allen is to lead an international campaign seeking a ban on genetically modified foods. The campaign will be launched in London today by Greenpeace and 100 of Europe's top restaurateurs, chefs and food writers.

26 January 1999 p 5 *The Irish Times*

Public Awareness

In [the Irish BioIndustry Association's] submission to the Minister for the Environment, Mr Dempsey, IBIA underlines it support for the development of a responsible biotechnology sector …

1 October 1998 p 4 *The Irish Times*

Genetic engineering came to Irish fields in early 1997, when Monsanto applied to the Environmental Protection Agency for a licence to test genetically engineered sugar beet. The notice of the application was published in newspapers local to the three proposed sites. No effort was made by either the industry or Government to provide information on the issues involved.

18 March 1999 p 14 *The Irish Times*

All sides of the argument were under the one roof in a process designed by the Department of the Environment to allow the public to participate in "balanced and robust policy-making".

26 May 1999 p 4 *The Irish Times*

Appendix K

Timeline of Government Science Policy

1731	Royal Dublin Society
1785	Royal Irish Academy
1946	The Institute for Industrial Research and Standards
1958	White Paper on Industrial Policy
1961	The Industrial Research and Standards Act of 1961
1967	National Science Council (1967 – 1978)
1973	National Science Council Report on Science and Irish Economic Development
1978	National Board for Science and Technology (1978 – 1987)
1979	The Industrial Research and Standards Act of 1979
1987	Science and Technology Act of 1987
1988	Eolas – Irish Science and Technology Board (1988 – 1993) Office of Science and Technology
1992	Culliton Report - Government Review of Irish Industrial Policy
1994	Forfás – National Policy and Advisory Board for Enterprise, Trade, Science, Technology and Innovation Forbairt (Enterprise Ireland) Industrial Development Agency
1994	STIAC – Science, Technology and Innovation Advisory Council
1995	STIAC release the Tierney Report
1996	White Paper on Science and Technology
1996	STIAP – Science, Technology and Innovation Awareness Programme
1997	ICSTI – Irish Council for Science, Technology and Innovation
2000	Report of Inter-Departmental Group on Modern Biotechnology

Appendix L

DoELG Consultation Paper Submissions: themes and definitions

Theme	Frequency	Definition
Environment	63	Biodiversity Pesticides Superweeds Cross pollination General benefits and disadvantages
Health	39	Food safety e.g. toxins, allergies, viruses Antibiotic resistance Potential benefits
Consumer	58	Labelling Consumer choice Consumer concerns Want or need or benefit
Agriculture	41	Effect on soil Organic farming Traditional farming practices General benefits and disadvantages
Economic	59	International trade Biotechnology jobs Investment Tourism Competitive agriculture
Policy and Regulation	59	Limits of democracy (due to EU and democracy itself) Politics (abstaining from EU votes, reneging on pre-election promises) Bias of government Framing as scientific issue Precautionary principle (substantially equivalent) Regulatory framework (clear/precise, transparent, objective, mandatory monitoring)
Evidence	54	Current knowledge (gene transfer not precise) Scientific evidence Speed Uncertainty
Public Awareness	36	Calls for a forum, open discussion or consultation Public information Public awareness Public education
Social and Moral	75	World hunger - 12 Industry involvement - 43 Animal welfare – 5 Process of science - 6 Nature (nature's course, movement of genes)

Appendix M

Agenda for BioDivulga Workshop

Wednesday 12th April 2000

Hibernian Hotel, Percy Place, Dublin 4

10.00 a.m.	**Welcome Coffee and Introductions**
10.15 a.m.	**Agenda for day, Questions and Answers**
10.30 a.m.	**Session One Group Brainstorm** Discussion of the wider public awareness of the use of biotechnology in food and agriculture, specifically public perception and prior communication events
11.00 a.m.	Identify the issues surrounding use of biotechnology in food and agriculture Classify the issues into substantive and communication issues
11.50 a.m.	Agree on the key substantive issues that need to be communicated to the wider public
12.05 p.m.	**Breakout Session One (3 sub-groups)** What are the key communication issues affecting the public awareness of the use of biotechnology in food and agriculture?
12.30 p.m.	**Groups Report Back to Main Group**
12.45 p.m.	Lunch Break
1.45 p.m.	**Discussion and Prioritisation of Communication Issues in Main Group**
2.20 p.m.	**Breakout Session Two (3 sub-groups)** What key actions does the group recommend to enhance public awareness, considering the above prioritised communication issues?
2.50 p.m.	**Groups Report Back to Main Group**
3.10 p.m.	**Discussion, Prioritisation and Ranking of Key Recommendations in Main Group**
3.50 p.m.	**Overall Ranking of Issues to be Addressed Post Workshop** Prioritisation of actions to address key issues Consensus on top six actions that could enhance public awareness of biotechnology
4.30 p.m.	**Close**

Note: Dress code is casual

Objective for Workshop

We intend to not lose sight of the overall aims of the workshop, which are:

- to determine the key communication issues affecting public awareness of biotechnology in food and agriculture and

- to prioritise the key actions to enhance public awareness.

Workshop Preparation

- You are not expected to prepare a formal presentation.

- We would like you to consider the four points below. You may want to discuss these with your colleagues, collect information from your organisation and read additional material.

1. **wider public perceptions** of the application of biotechnology in food and agriculture
   (see attached summaries of the various surveys conducted in Ireland)

2. **prior actions** used in Ireland to improve public awareness of the use of biotechnology
   (see attached summaries of events held in Ireland)

3. **substantive issues** surrounding biotechnology in food and agriculture that need communicating with the wider public, such as human health, environment, moral and economic issues

4. **communication issues** affecting the public's awareness and understanding of biotechnology in food and agriculture

5. consider ways, such as **events and actions**, which will enhance public awareness

Workshop Participation

- You have been selected because you represent a valid viewpoint on the issues surrounding biotechnology in food and agriculture.

- The views of participants will be deemed to be validly held views and we want to encourage you to participate fully in the workshop at all times feeling free to express those views.

- We will aim to maintain balance and encourage active participation by all, not a dominant few, whilst maintaining a positive working atmosphere.

Outcomes of the Workshop

- The six key actions decided upon at the Irish workshop, along with key actions from four other European countries, will be discussed at a European Day of Debate in Brussels. The European Debate will be organised in close collaboration with the European Commission and attended by some of the participants in each of the five previous workshops.

- At the European Debate the key actions from each country will be analysed and prioritised.

- The six new prioritised actions will then be announced to the Commission.

- In Ireland, recommendations will be made to Government bodies involved in issues surrounding the use of biotechnology in food and agriculture.

6. I/my family/my children regularly use toothpaste containing fluoride. Yes ☐ / No ☐

7. I have the following additional remarks to make to the Forum:

....

....

....

....

....

....

....

....

....

....

8. I live at/in..

......................................and my name is

....

Signature..

NOTES

1. Please use an original form, *not a photocopy*.
2. If you would like to make more extensive comments please do so on a separate sheet *and return it along with this form.*
3. Please be sure to sign the form and indicate the general location where you reside. Your complete address is not required.
4. Completed forms should reach the Forum by **31 March 2001 at the latest.**

THANK YOU FOR YOUR PARTICIPATION IN THIS IMPORTANT CONSULTATION

Please send the completed form to
Forum on Fluoridation Secretariat
c/o Department of Health and Children
Hawkins House
Hawkins Street
FREEPOST
DUBLIN 2.

The Forum Website is:
www.fluoridationforum.ie

5300

Appendix N

Forum on Fluoridation Questionnaire

The poor quality of this image is a reflection of the quality of the photocopied questionnaire sent to me by the Department of Health and Children.

THE

FORUM

ON

FLUORIDATION

**Appointed by the Minister for Heal
and Children,
Mr Micheál Martin, TD**

***Seeking the Views of
Consumers on***

***THE
FLUORIDATION O
PUBLIC
WATER
SUPPLIES***

THE FORUM ON FLUORIDATION

Appointed by Mr Micheál Martin TD
Minister for Health and Children, 2000

Seeking the Views of Consumers on the Fluoridation of Public Water Supplies

A very important task given to the Forum by the Minister is the matter of public consultation. It is essential to the work of the Forum that the views of the public at large, who are the consumers of public water supplies, on any or all aspects of the fluoridation of drinking water should be ascertained and taken into account in the preparation of the Final Report of the Forum which is due for submission to the Minister in September 2001.

This public consultation will take place in different ways and there is an open invitation to members of the public to submit their views to the Forum in such manner as they may wish. However, the Forum realises that some consumers may neither have the time nor wish to make a submission with any degree of formality, perhaps because they feel they are not qualified or they lack the information to do so. The Forum is anxious to stress that all views of consumers are both welcome and of value, and has devised the present form to enable consumers to express such views in an informal and straightforward manner.

Please read the notes overleaf before entering your comments on this form

MY COMMENTS ARE AS FOLLOWS:

1. I approve/do not approve[1] of the fluoridation of drinking water supplies.

2. I would approve/not approve of an alternative method of providing fluoride to the public.

3. I consider the benefits of fluoridation to be as follows:

....

....

....

....

....

[1] Please delete as appropriate under all headings.

4. I consider the ill-effects of fluoridation to be as follows:

....

....

....

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....

5. My concerns/views about the addition of fluoride to drinking water are:

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(Continued overleaf)