

SCIENCE  
RESEARCH  
DEVELOPMENT

---

EUROPEAN  
COMMISSION

*Biotechnology*

The Europeans  
and modern  
biotechnology

EUROBAROMETER 46.1

European Commission  
Directorate General XII  
Science, Research and Development

BIOTECHNOLOGY

EUROPEAN OPINIONS ON MODERN BIOTECHNOLOGY

EUROBAROMETER 46.1

Published by the EUROPEAN COMMISSION  
Directorate General XII  
Science, Research and Development  
B - 1049 Brussels

**LEGAL NOTICE**

Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use which might be made of the following information.

Luxembourg: Office for Official Publications of the European Communities, 1997

© ECSC-EC-EAEC, Brussels - Luxembourg, 1997

## FOREWORD

For many years now the life sciences and technologies have been contributing new ideas and understandings that are already changing our lives. These changes will bring many new opportunities, but they will also require that we learn, understand and adapt to the new paradigms they present. For this reason, information, education and a broad discussion of the issues by society must accompany biotechnology's development.

In spite of large quantities of freely-available information, the general public appears insufficiently informed about modern biotechnology. Experts often also seem to fail to understand public concern. In addition to its support for specific biotechnology RTD projects, the Commission encourages activities leading to better informed dialogue, aiming to collect and present information in a way useful to the debate. In its "White Paper on Growth, Competitiveness, Employment - the challenges and ways forward into the 21st Century", the Commission acknowledged the activities of past biotechnology RTD programmes and lent its support to ongoing and future biotechnology programmes sustaining these successful contributions.

Activities to raise the level of biotechnology education by providing information to target audiences, like patients' or consumer organisations or visitors of museums, are designed to deliver quality information to people in situations in which they are receptive to it.

However, it is also important to provide information to experts and decision makers about people's concerns and attitudes. Surveys are a useful gauge of how biotechnology is perceived by the general public. After previous EUROBAROMETER surveys in 1991 and 1993, the Commission has used the EUROBAROMETER for the third time to monitor what Europeans think about biotechnology.

The data was collected during October and November 1996, and this report, a first general overview of the results, was drawn up by INRA<sup>1</sup>, the organisation responsible for carrying out the survey. It already highlights a number of interesting findings: what do Europeans expect from biotechnology, what their information sources are, who they have confidence in, etc. However, by its very nature this report cannot analyze the data in full detail. In particular, it does not represent all the national differences or link socio-demographic features to the actual answers. Despite this, its rapid publication will provide the many interested parties with up-to-date information until a more detailed analysis, currently being undertaken by a group of scientific experts, can be produced.

The Commission supports this forthcoming analysis through Concerted Action contract n° 950043, coordinated by Prof. J. Durant of the Science Museum, London. The different national backgrounds and experience of the Concerted Action participants will allow them to interpret the results more completely, providing a deeper analysis that will be made available to interested parties through publications and conferences.

This publication is not a statement of opinion, but a contribution to transparency in the debate.

As the case with other EUROBAROMETER surveys, the raw data set will be stored at the Zentralarchiv für Empirische Sozialforschung of the University of Köln, where it is available to the general public.

Andreas Klepsch,  
Biotechnology Unit, DG XII

<sup>1</sup> INRA = International Research Associates, European Coordination Office SA/NV, Avenue R. Vandendriesche, 1150 Brussels - Belgium

This opinion poll was conducted at the request of the European Commission (Directorate-General "Science, Research and Development" - Unit XII/E/1: "Biotechnology").

It was carried out in the whole of the European Union from October to November 1996 by fifteen specialist institutes, under the general coordination of INRA (Europe) - European Coordination Office, based in Brussels.

The questionnaire, the names of the institutes involved in the research and various technical details (sampling methods, sample composition, etc.) are given in the Appendix.

This report is in no way binding upon the European Commission.

The original language of the report was French.

## TABLE OF CONTENTS.

<i>Table of contents.....</i>	<i>in</i>
<i>List of figures.....</i>	<i>iv</i>
<i>List of tables.....</i>	<i>v</i>
<i>Overview of the 1996 study.....</i>	<i>vi</i>
<b>1. INTRODUCTION.....</b>	<b>1</b>
<b>2. ANTICIPATED EFFECTS OF SIX NEW TECHNOLOGIES.....</b>	<b>6</b>
<b>3. FAMILIARITY OF THE CONCEPT OF BIOTECHNOLOGY.....</b>	<b>16</b>
3.1 FAMILIARITY OF THE CONCEPT AND INFORMATION SOURCES...	16
3.2 PREVIOUS DISCUSSION OF BIOTECHNOLOGY.....	20
<b>4. OPINIONS ON GENETICS AND "OBJECTIVE" KNOWLEDGE OF BIOTECHNOLOGY.....</b>	<b>22</b>
4.1 OPINIONS ON CERTAIN GENETICS ISSUES.....	22
4.2 KNOWLEDGE OF BIOTECHNOLOGY.....	24
<b>5. ATTITUDES TO DIFFERENT APPLICATIONS OF BIOTECHNOLOGY AND GENETIC ENGINEERING.....</b>	<b>30</b>
5.1 SUPPORT FOR VARIOUS APPLICATIONS.....	31
5.1.1 <i>Benefit of various biotechnology applications to society.....</i>	<i>32</i>
5.1.2 <i>Risks to society associated with certain biotechnology applications.....</i>	<i>37</i>
5.1.3 <i>Morally acceptable applications in biotechnology.....</i>	<i>42</i>
5.1.4 <i>Applications in biotechnology which should be encouraged.....</i>	<i>46</i>
5.2 BENEFITS, RISKS AND THE REGULATION OF BIOTECHNOLOGY.....	49
5.3 AUTHORITIES BEST PLACED TO REGULATE BIOTECHNOLOGY.....	57
5.4 LIKELY DEVELOPMENTS IN BIOTECHNOLOGY.....	61
<b>6. RELIABILITY OF INFORMATION ON BIOTECHNOLOGY.....</b>	<b>69</b>
<b>7. IMPORTANCE ATTACHED TO BIOTECHNOLOGY.....</b>	<b>83</b>
<b>8. BIBLIOGRAPHY.....</b>	<b>86</b>
<b>9. APPENDIXES.....</b>	<b>87</b>
9.1 DATA SHEET	
9.2 FRENCH/ENGLISH QUESTIONNAIRE	
9.3 TECHNICAL SPECIFICATIONS FOR SOCIO-DEMOGRAPHIC AND SOCIO-POLITICAL VARIABLES USED IN THE ANALYSES	
9.3.1 <i>Harmonised income scale</i>	
9.3.2 <i>Opinion leadership</i>	
9.3.3 <i>Political attitudes</i>	

## LIST OF FIGURES

1. Optimism as to the anticipated effects of new technologies (% EU 15, 1996).....	6
2. Global optimism with regard to new technologies (national averages, 1991).....	10
3. Global optimism with regard to new technologies (national averages, 1993).....	11
4. Global optimism with regard to new technologies (national averages, 1996).....	11
5. Anticipated effects of biotechnology/genetic engineering (% "will improve" by country, 1996).....	13
6. Anticipated effects of biotechnology/genetic engineering (% DK by country, 1996).....	14
7. Familiarity with biotechnology (% EU 15, 1996).....	16
8. Discussion of biotechnology with someone (% EU 15, 1996).....	20
9. Index of "objective" knowledge of biotechnology (by country, 1996).....	26
10. Link between "objective" knowledge of biotechnology and "optimism" regarding it (% EU 15, 1996).....	28
11. Benefit of six types of biotechnology research (% EU 15, 1996).....	32
12. Average benefit of 6 biotechnology applications (% by country, 1996) .....	35
13. Risks associated with 6 types of biotechnology research (% EU 15, 1996).....	38
14. Average risk associated with 6 applications in biotechnology (% by country, 1996).....	39
15. Connection between "objective" knowledge of biotechnology and global risk perception (% EU 15, 1996).....	40
16. Moral acceptability of 6 types of research in biotechnology (% EU 15, 1996).....	42
17. Average moral acceptability of 6 types of research in biotechnology (% by country, 1996)....	45
18. Research in biotechnology which should be encouraged (% EU 15, 1996).....	46
19. Average encouragement for 6 types of research in biotechnology (% by country, 1996).....	48
20. Risks and benefits of biotechnology (% EU 15, 1996).....	50
21. Organisation best placed to regulate biotechnology (% EU 15, 1996).....	57
22. Ten things that will take place during the next 20 years (% EU 15, 1996).....	62
23. Average score of positive developments (by country, 1996).....	66
24. Average score of negative or ambivalent developments (by country, 1996).....	66
25. Most trusted source of information on biotechnology (% EU 15, 1996).....	70
26. Most reliable sources regarding biotechnology (% EU 15, 1996).....	74
27. Organisation which inspires the most confidence regarding biotechnology (% EU 15, 1996)	77
28. Organisation that inspires the most confidence regarding genetically modified plants (% EU 15, 1996).....	78
- 29. Organisation that inspires the most confidence regarding transplants (% EU 15, 1996).....	79
30. Average importance attached to biotechnology (% EU 15, 1996).....	83

## LIST OF TABLES

1. Optimism as to the anticipated effects of new technologies (% by country, 1991-1996)...	7
2. Anticipated effects of new technologies (% DK by country, 1996).....	7
3. Familiarity of the concept of biotechnology (% by country, 1996).....	18
4. Discussion of biotechnology with someone (% by country, 1996).....	18
5. Opinions on the nature/nurture issue (%EU 15,1996).....	22
6. "Objective" knowledge of biotechnology (% EU 15 in descending order, 1996).....	25
7. "Objective" knowledge of biotechnology (%EU 15, 1993-1996).....	25
8. Anticipated effects of biotechnology according to "objective" knowledge (% EU 15,1996)...	29
9. Benefit of six types of biotechnology research (% who tend to agree or definitely agree, by country, 1996).....	33
10. Benefit of six types of biotechnology research (% DK by country, 1996).....	33
11. Risks associated with 6 types of biotechnology research (% who tend to agree or definitely agree, by country, 1996).....	33
12. Risks associated with 6 types of biotechnology research (% DK by country, 1996).....	33
13. Moral acceptability of 6 types of research in biotechnology (% tend to agree or definitely agree, by country, 1996) .....	43
14. Moral acceptability of 6 types of research in biotechnology (% DK by country, 1996). .....	43
15. Types of research in biotechnology which should be encouraged (% tend to agree or definitely agree, by country, 1996).....	43
16. Types of research in biotechnology which should be encouraged (% DK by country, 1996)...	43
17. Opinions on the benefits and risks of biotechnology (% "tend to agree", by country, 1996)....	52
18. Opinions on the benefits and risks of biotechnology (% DK, by country, 1996).....	52
19. Organisation best placed to regulate biotechnology (% by country, 1996).....	59
20. Ten things likely to happen over the next 20 years (% "likely" by country, 1996).....	64
21. Ten things likely to happen over the next 20 years (% DK by country, 1996).....	64
22. Most trusted source of information on biotechnology (% by country, 1991-1996).....	71
23. Other sources which can tell the truth regarding biotechnology (% by country, 1991-1996) .	72
24. All of the most reliable sources regarding biotechnology (% A+B by country, 1991 -1996)...	73
25. Organisation in which there is the most confidence regarding modern biotechnology (% by country, 1996).....	81
26. Organisation in which there is me most confidence regarding genetically modified food crops (% by country, 1996).....	81
27. Organisation in which there is the most confidence regarding transplants (%bycountry, 1996).....	82



## OVERVIEW OF THE 1996 SURVEY

### MAIN CONCLUSIONS

All in all, Europeans take an "optimistic" view of the developments they expect from modern biotechnology. However, this is certainly not blind optimism: they may emphasise the benefits of certain areas of research, but they also warn of potential risks. This is the first main conclusion of the survey, the third of its kind commissioned by the European Commission.

A second conclusion is that EU citizens do not take a uniform view of modern biotechnology, since their responses vary greatly from one subject to another. The percentage distribution of respondents not expressing an opinion also confirms that Europeans have a range of different attitudes. These percentages are very high for certain questions or in certain countries and depend greatly on the specific issue and its complexity.

Finally, a third conclusion is that Europeans want their opinions on modern biotechnology to be taken into account even if the field is still unfamiliar to many of them.

### MAIN RESULTS

- On the whole, European public opinion considers the different topics covered by this questionnaire on modern biotechnology to be relatively important. On a scale of 1 ("not at all important") to 10 ("extremely important"), the EU average is 6.45. The figure is highest in Sweden, the Netherlands and Greece.
- A large majority of Europeans expect that telecommunications, information technology, solar energy and new materials will improve our way of life over the next 20 years. The percentages are lower for space exploration and biotechnology/genetic engineering, though this does not mean that the majority of respondents take a "pessimistic" view, i.e. that research will make things worse. In fact, far more of them express no opinion at all.
- As in 1991 and 1993, the worst score goes to genetic engineering, which has a lower percentage of "optimists" than biotechnology.

- Results are very similar to 1991 and 1993, except for space exploration, where the level of optimism increased by 6 points between 1993 and 1996.
- Optimism varies considerably according to the country and the technology in question.
- Just over half of all Europeans had heard about modern biotechnology in the last three months - quite a high percentage compared with other areas of similar complexity.
- As for the source of their information, a third of Europeans say they heard about biotechnology from television. This is followed by newspapers, magazines and radio, in that order, which more or less matches the results of 1991 and 1993.
- The number of people who have heard about modern biotechnology varies greatly from country to country. Austria and Finland head the list.
- Half of all Europeans say they have never discussed modern biotechnology with anyone. People talk about it most in Denmark, Germany and Sweden.
- The Europeans' level of "objective" knowledge of biotechnology is almost exactly average: they score an average of 4.95 out of 10 in a *quiz* designed to test their knowledge of the subject.
- The Dutch score highest, with the lowest scores in Greece and Portugal. Scores increase with the level of education and opinion leadership, and decrease according to the level of religious belief and with age.
- Support for modern biotechnology increases with knowledge of the subject, as do "optimistic" and "pessimistic" attitudes towards it.
- A majority of Europeans think the various applications of modern biotechnology submitted for their opinion will benefit society.
- In all the EU countries, the two uses of modern biotechnology considered the most useful of the six analysed are production of medicines and development of genetic tests to detect certain diseases.

- Conversely, in the Union as a whole, the two applications considered least useful are use in food production and the introduction of human genes into animals to produce organs for human organ transplants.
- Generally speaking, more Europeans think the six applications put to them will be beneficial to society than worry about the associated risks.
- According to Europeans, the two applications posing the greatest risk to society are the introduction of human genes into animals to produce organs for human organ transplants and the use of modern biotechnology in food production.
- Again, of the six applications analysed, those perceived as being the most beneficial are also those considered the least dangerous, and vice versa, logically enough.
- The two applications judged to be morally most acceptable are the use of genetic tests to detect certain diseases and the production of medicines and vaccines through genetic engineering. Conversely, only a minority of respondents consider as morally acceptable genetic manipulation to produce organs for human organ transplants and the development of genetically modified animals for laboratory research.
- The more useful biotechnology applications are considered to be for society, the more they are felt to be morally acceptable. Similarly, those who have heard about biotechnology in the last three months are somewhat more inclined than others to consider these applications morally acceptable.
- As so often in this survey, Austria stands out from the other countries by virtue of its particularly low level of support for modern biotechnology applications.
- Logically enough, then, the more people consider an application to be morally acceptable and/or beneficial for society, the more likely they are to think it should be encouraged.
- Seven out of ten Europeans think that as modern biotechnology develops over the next 20 years we will be able to solve more crimes through genetic fingerprinting, but that we are also likely to create dangerous new diseases. The two

developments Europeans consider least likely are a reduction in the range of available fruits and vegetables and a substantial reduction in world hunger.

- Only three out of ten Europeans think we should accept some degree of risk resulting from modern biotechnology if this would increase economic competitiveness in Europe. Ireland and Britain are the countries most receptive to this idea.
- Only three out of ten Europeans would be willing to buy genetically modified fruit if it tasted better. The British, Portuguese and Dutch head the list of those who claim to be willing to buy such fruit. Those who know more about biotechnology tend to be more receptive to the idea of buying genetically modified fruit.
- The vast majority of Europeans feel genetically modified food products should be clearly labelled. This reflects the preference expressed by Canadians and Australians in surveys carried out in those countries.
- A majority of respondents tend to agree that we should stick to traditional breeding methods rather than change the hereditary characteristics of plants and animals through modern biotechnology.
- Only three out of ten Europeans tend to agree that modern biotechnology is so complex that it is a waste of time consulting the public about it. Those who know more about modern biotechnology tend to agree less with this statement.
- Fewer than one in four Europeans think that current regulations are sufficient to protect people from any risks linked to modern biotechnology. Greece and Italy are even less inclined than the other countries to share this point of view. The Netherlands and Finland seem to be the most confident in this area.

Four out of ten Europeans think that religious organisations should have their say in the regulation of modern biotechnology. Logically, those with firmer religious beliefs are more likely to share this point of view. In contrast to the other EU countries, Italy and Austria have a majority who agree that religious organisations should be consulted on this matter.

- Only two out of ten Europeans think that regulation of modern biotechnology should be left primarily to industry.
- A third of Europeans think that international organisations such as the United Nations and the World Health Organisation are best placed to regulate modern biotechnology, followed by scientific organisations.
- Consumer organisations are the information sources in which Europeans have by far the most confidence regarding modern biotechnology. They were chosen by a third of all respondents. They are followed by environmental protection organisations and, a long way behind, schools and universities.
- Percentage trends between 1991 and 1996 show increasing confidence in consumer organisations, while trends vary for environmental protection organisations and schools and universities.
- Europeans consider that consumer and environmental protection organisations are most likely to tell them the truth about genetically modified food crops grown in fields. On the other hand, they are most likely to believe the medical profession regarding the introduction of human genes into animals to produce organs for human organ transplants.
- In the three areas covered by this survey, Europeans display least confidence in political parties, industry and religious organisations to "tell them the truth about modern biotechnology".

## 1. INTRODUCTION.

In its White Paper on growth, competitiveness and employment (1994), the European Commission underlines the importance it attaches to biotechnology:

*"As a result of intensive scientific research and major discoveries over the past four decades in molecular biology, biotechnology has emerged as one of the most promising and crucial technologies for sustainable development in the next century. Modern biotechnology constitutes a growing range of techniques, procedures and processes, such as cell fusion, r-DNA technology and biocatalysis, that can substitute and complement classical biotechnologies of selective breeding and fermentation. This confluence of classical and modern technologies enables the creation of new products and highly competitive processes in a large number of industrial and agricultural activities as well as the health sector. This would provide the impulse to radically transform the competitiveness and growth potential for a number of activities and open up new possibilities in other sectors such as diagnostics, bioremediation and production of process equipment (biohardware). In terms of the quality of life, we should not underrate the important potential of biotechnology for improving the environment by correcting pollution and for improving health by preventing or remedying illness or other physical problems. "*

It is in this spirit that the European Commission has, since 1982, introduced a series of research and development programmes in this area.

Carried out both within and outside the European Union and driven by programmes supported by the public and private sectors alike, this research has gradually been focused on biotechnological applications, particularly in agriculture, food science, pharmaceuticals and health care.

Concurrently with these developments, more and more political measures have had to be adopted. Some are aimed specifically at biotechnology, such as the setting of limits for experiments (i.e. the highly sensitive debate on *bioethics*, dealing, *inter alia*, with applications or inventions affecting human or animal "identity"), activities intended to ensure

a high level of protection of human health and the environment, the problems raised by biotechnology in respect of intellectual property, etc.

Other measures concern the interpretation or adaptation of existing policies, on agriculture, industry, safety at work, etc.

Discoveries in biotechnology have sparked the curiosity and enthusiasm of many specialists (researchers, manufacturers) in the various biotechnology disciplines. These specialists feel they will be in a position to (help) solve some of the major problems facing the world today - food, health, the environment and population.

This curiosity and enthusiasm are far from being fully shared by all public authorities and politicians, let alone by the population as a whole. For this reason, some research and applications have been delayed, while others have encountered opposition and even refusal.<sup>1</sup>

Surveys carried out by the European Commission<sup>2</sup> and in other countries<sup>3</sup> indicate that many factors can influence attitudes to biotechnology:

- philosophical and religious attitudes, values, and ethics in general;
- expectations concerning science and technology;
- level of information and knowledge regarding biotechnology;
- assessment of the potential benefits and costs of biotechnology;
- nationality;
- various socio-demographic variables such as sex, age, level of education, etc.

The purpose of this report is not to assess the validity of biotechnological research, but merely to analyse the results of an opinion poll carried out simultaneously in the 15 EU

<sup>1</sup> See, for example, the campaign organised, among others, by *Greenpeace* against the European Commission's authorisation to import genetically modified American soya (*Time*, 28 October, 1996, pp. 46-47).

<sup>2</sup> See, on this subject, INRA (1991), Durant (1992) and Marlier (1993).

<sup>3</sup> See, *inter alia*, MORI (1985), *U.S. Congress, Office of Technology Assessment* (1987), Macer (1992a and b), *Decima Research* (1993), Kelley (1995) and CISTA (1997).

Member States between 18 October and 22 November 1996 in the context of Eurobarometer (EB)46.1.

The questions were designed to pin down European thinking on biotechnology. They can be grouped into five broad categories:

1. expectations regarding biotechnology and other new technologies such as data-processing, space exploration, etc.;
2. familiarity of the concept of biotechnology;
3. objective knowledge of genetics and biotechnology;
4. attitudes regarding biotechnology in general and some of its applications in particular;
5. the reliability of information on biotechnology.

In each country, 11 "closed" questions,<sup>4</sup> mostly multiple choice, were put to a representative sample of the national population aged 15 and older.<sup>5</sup> Approximately 15 900 people were interviewed in all. This averaged around 1 000 persons per country, except for Luxembourg (600), Germany (2 000: 1 000 in the West and 1 000 in the East) and the United Kingdom (1 300: 1 000 in Great Britain and 300 in Northern Ireland).<sup>6</sup>

There are various ways of defining biotechnology. For some, the term refers only to modern (post 1974) genetic engineering technologies, i.e. the recombining of DNA segments.

For others the meaning is much broader. It may encompass all life science (the literal meaning of *biotechnology*) applications, or more specifically the fermentation industries, comprising both traditional sectors (using yeasts, milk fermentation agents, etc. for brewing, cheese making, baking, etc.) and more recent sectors (fermentation linked to the production of antibiotics, i.e. pharmaceutical research initiated some 50 years ago). Much confusion surrounds the definition of these new technologies, therefore.

<sup>4</sup> An "open" question, not analysed in this report, was also put.

<sup>5</sup> The questionnaire is reproduced in Appendix 9.2.

<sup>6</sup> Cf. Data Sheet, Appendix 9.1.



To determine whether Europeans perceive the terms "biotechnology" and "genetic engineering" in the same way, i.e. to try to establish any connotations attaching to these terms, two versions were produced of the first question (Q6), one using the term "biotechnology" and the other the term "genetic engineering". The first version was submitted to half the interviewees and the second to the other half (the "*split ballot*" technique). In the light of the findings of the two earlier EUROBAROMETER surveys, the rest of the questionnaire refers only to "modern biotechnology", introduced explicitly by the following statement read by the interviewer:

"Throughout this interview, we shall use the term "modern biotechnology" in the wider sense, in other words including genetic engineering."

The survey was carried out at the request of the Directorate-General for "Science, Research and Development" of the European Commission (Unit XII/E/1: "Biotechnology"), and follows on directly from the two earlier surveys carried out under EB 35.1 (from 28 March to 25 April 1991) and EB 39.1 (from 10 May to 5 June 1993) at the request of the same Directorate-General.<sup>7</sup> Where appropriate, this report will attempt to define major trends in public opinion which may have appeared since 1991. Similarly, it will attempt, where possible, to draw comparisons with other surveys carried out on this subject in other countries.

The figures for the EU as a whole (EU 15) appearing in this report are a weighted mean of national figures. For each country, results are weighted according to the proportion of that nation's population aged 15 or older, within the total Community population of the same age group.<sup>8</sup>

The percentage totals shown in the tables may exceed 100% when respondents have the option of providing more than one answer to the same question. They may also vary slightly from 100% (e.g. 99% or 101%), as figures have been rounded.

In order not to encumber the text and insofar as confidence intervals vary on average between +/- 1.9% and +/- 3.1%,<sup>9</sup> all percentages shown are rounded. Percentages between

<sup>7</sup> The results of the earlier surveys were published in INRA (1991), Durant (1992) and Marlier (1993).

<sup>8</sup> In the same manner, the results of reunified Germany have been calculated from those of East and West Germany.

<sup>9</sup> See Data Sheet (Appendix 9.1).

0.5 and 0.9 are rounded up while those between 0.1 and 0.4 are rounded down. Thus a percentage of 0 does not necessarily mean that no respondent was found for that category, but that it is lower than 0.5%.

It should also be mentioned that the purpose of the figures and tables appearing in this report is to present the main results in the most summarised way possible.

Throughout this report, the abbreviation "DK/NA" will be used. "DK" means "Don't know" (i.e. the interviewee said that he/she was unable to answer the question). "NA" means "No answer" (i.e. the interviewee refused to answer the question).

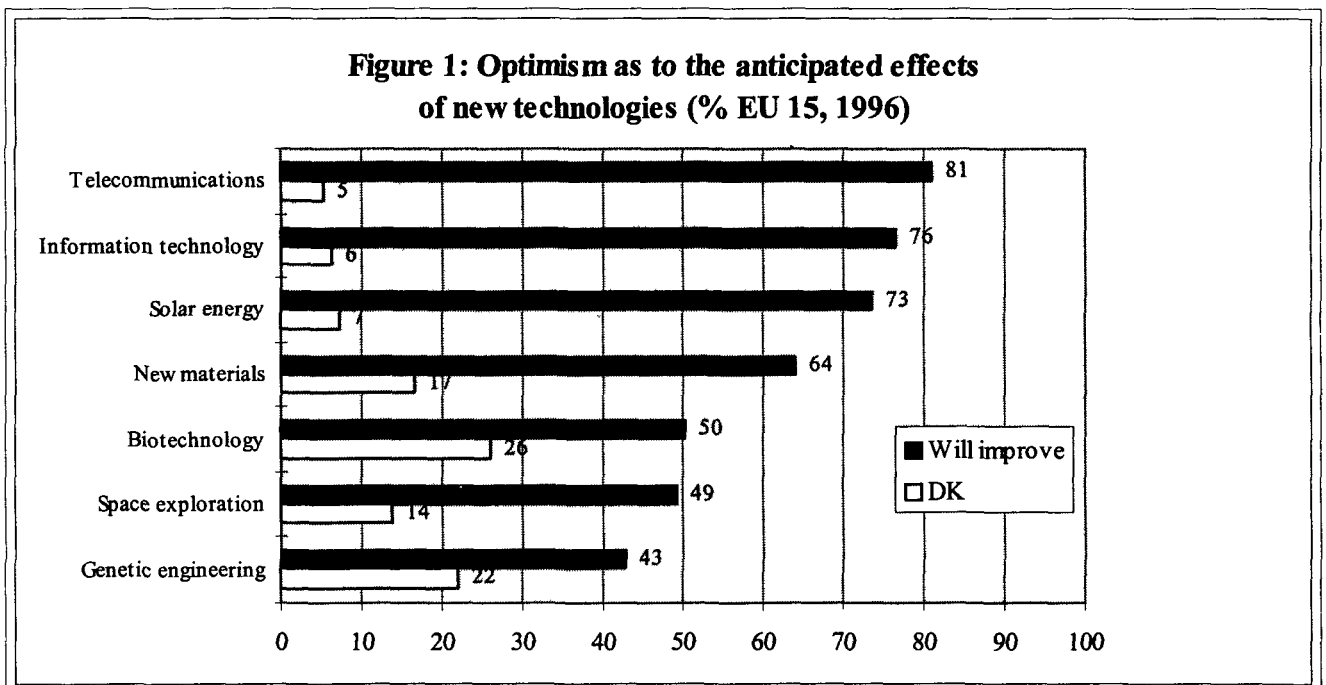
Finally, it is important to note that the order in which the questions will be analysed in this report does not necessarily correspond to the order in which they were asked of the respondents. Greater importance has been placed in the analyses on following a logical sequence, subject by subject, from the general to the specific (inasmuch as questions of a general nature may be assumed to influence opinions on more specific subjects, rather than vice versa).

## 2. ANTICIPATED EFFECTS OF SIX NEW TECHNOLOGIES

Before tackling the subject proper - i.e. European attitudes to biotechnology/genetic engineering,<sup>10</sup> - it seemed useful, as in 1991 and 1993, to contextualise the issue by examining interviewees' opinions on the impact of new technologies in general. Hence the first question:

**Question 6:** Science and technology change the way we live. I am going to read out a list of areas in which new technologies are currently developing. For each of these areas, do you think it will improve our way of life in the next 20 years, that it will have no effect or that it will make things worse?

- a) Solar energy
- b) Computers and information technology
- c) SPLIT BALLOT A: Biotechnology  
SPLIT BALLOT B: Genetic engineering
- d) Telecommunications
- e) New materials or substances
- f) space exploration



<sup>10</sup> N.B. Each interviewee was asked to evaluate either "biotechnology" or "genetic engineering", i.e. a total of six and not seven items (see introduction).

**Table 1: Optimism as to the anticipated effects of new technologies (% by country, 1991-1996)**

	Year	B	DK	WD	D	OD	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK	EC12	EU15
Solar energy	1991	68	81	76	76	76	81	81	71	62	78	73	84	-	67	-	-	75	76	-
	1993	72	83	76	75	72	76	84	76	63	76	67	85	-	71	-	-	80	77	-
	1996	70	82	71	71	74	69	81	64	64	73	74	88	72	73	78	77	77	73	73
Information technology	1991	72	69	63	67	81	76	82	70	79	80	75	75	-	71	-	-	76	74	-
	1993	69	73	60	61	65	71	87	65	75	82	75	75	-	75	-	-	79	73	-
	1996	76	71	66	67	70	75	86	71	84	83	72	78	67	84	82	79	82	77	76
Biotechnology	1991	59	53	40	43	53	41	60	61	50	59	54	55	-	44	-	-	59	54	-
	1993	54	55	39	41	46	41	60	61	50	57	51	46	-	53	-	-	57	53	-
	1996	56	52	39	40	43	33	54	50	47	58	49	56	37	54	63	56	55	51	50
Genetic engineering	1991	39	34	41	44	56	37	56	48	46	53	43	42	-	49	-	-	44	47	-
	1993	39	35	26	26	28	33	61	45	42	54	42	35	-	54	-	-	46	43	-
	1996	45	37	32	32	30	27	59	48	40	55	38	43	18	55	26	41	36	44	43
Telecommunications	1991	80	75	68	71	85	88	84	86	83	81	75	84	-	79	-	-	79	80	-
	1993	77	78	64	66	74	85	88	83	81	82	72	85	-	80	-	-	83	79	-
	1996	76	75	66	69	79	86	89	82	87	86	77	87	62	91	81	84	87	82	81
New materials	1991	73	69	54	56	64	52	59	74	59	58	59	76	-	52	-	-	71	64	-
	1993	68	72	48	49	51	53	58	74	63	59	60	72	-	50	-	-	71	62	-
	1996	70	68	56	56	55	52	60	74	65	60	61	78	46	63	72	71	72	65	64
Space exploration	1991	48	51	37	37	37	49	59	48	35	50	40	50	-	42	-	-	38	45	-
	1993	45	46	34	35	37	48	60	45	37	54	42	47	-	42	-	-	37	44	-
	1996	49	47	44	42	36	56	65	47	41	57	47	52	44	51	44	51	42	50	49

Note: DK included

**Table 2: Anticipated effects of new technologies (% DK, 1996)**

	B	DK	WD	D	OD	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK	EU15
Solar energy	9	4	7	7	6	10	9	7	19	8	9	2	10	12	4	6	6	7
Information technology	5	7	8	8	8	9	7	5	7	6	10	6	11	7	5	5	3	6
Biotechnology	21	19	22	22	22	46	35	28	34	26	21	15	24	33	16	23	24	26
Genetic engineering	23	13	21	22	26	48	25	24	31	19	24	16	21	30	20	24	16	22
Telecommunications	7	5	8	7	5	6	7	3	8	5	8	2	13	5	4	5	4	5
New materials	14	14	17	18	22	25	29	10	21	17	18	8	23	22	11	11	13	17
Space exploration	17	11	16	15	15	19	18	10	22	15	15	9	17	19	11	12	9	14

As Figure 1 shows, Europeans are most optimistic about telecommunications, information technology, solar energy and new materials, and a large majority of them expect these four technologies to improve our way of life over the next 20 years. With regard to the first three technologies, the number of DK is also relatively low (5-7%).

Fewer people expect benefits from biotechnology, space exploration and genetic engineering, though this does not mean they are pessimistic, i.e. that they think things will get worse. In fact, as Figure 1 clearly shows, more Europeans have no opinion regarding these three new technologies, particularly biotechnology (26%) and genetic engineering (22%).

As in 1991 and 1993, the worst results go to genetic engineering, which draws a lower percentage of optimists than biotechnology.

The results broadly reflect those of 1991 and 1993 (Table 1, % EC 12),<sup>11</sup> except for space exploration where the percentage of optimists increased by six points between 1993 and 1996.

Optimism varies considerably according to the country and the technology involved. In other words, respondents from different countries make clear distinctions between the various technologies. Thus we must not expect to find the respondents of one country appearing systematically more optimistic than others regarding the six new technologies offered them and the respondents of another systematically more pessimistic. It depends on the technology in question.

To illustrate, in 1996 (Table 1) the Dutch are the most optimistic about solar energy (88% think it will improve their way of life over the next 20 years) and new materials (78%), the Spanish about information technology (86%), genetic engineering (59%) and space exploration (65%), the Finnish about biotechnology (63%)<sup>12</sup> and the Portuguese about telecommunications (91%).

<sup>11</sup> N.B. In the case of a series of independent surveys, the confidence interval is larger than with a simple random survey. Hence the decision to consider that there is stability when percentage differences are less than 5 points.

<sup>12</sup> Note that the most optimists, or pessimists, about biotechnology and genetic engineering do not come from the same country.

On the other hand, Ireland and France have the lowest percentage of optimists with regard to solar energy (64%).<sup>13</sup> The Germans and Austrians are the least optimistic about information technology (67%), the Irish about space exploration (41%) and the Greeks about biotechnology (33%). Finally, the lowest percentages for genetic engineering (18%), telecommunications (62%) and new materials or substances (46%) are found in Austria.

"DK" percentages (Table 2), also vary greatly according to both country and technology considered.

It is difficult to identify national trends between 1991 and 1996 as there are marked variations according to the technology involved. Sometimes there is no significant trend, sometimes a decrease in the number of optimists, sometimes an increase, sometimes a U relationship, sometimes an inverse U relationship. We are only interested here in statistically significant trends concerning biotechnology and genetic engineering.<sup>14</sup>

In East Germany, the level of optimism about genetic engineering fell by 26 percentage points (from 56% in 1991 to 30% in 1996) and about biotechnology by 10 points (from 53% to 43%). In Greece, optimism about genetic engineering fell by 10 points (from 37% to 27%) and about biotechnology by 8 points (from 41% to 33%).

There was a similar trend in France, but this time only for biotechnology (11 points down). There was also a significant reduction in optimism in the United Kingdom, but this time for genetic engineering, especially between 1993 and 1996 (down from 46% to 36%).

On the other hand, the Dutch results for both biotechnology and genetic engineering take the form of a U relationship: after a noticeable slump between 1991 and 1993, the percentage of optimists rose again between 1993 and 1996, returning to the 1991 level.

The same happened in Germany for genetic engineering, except that the 1996 percentage is lower than that of 1991.

<sup>13</sup> Again this does not necessarily mean they have the highest number of pessimists.

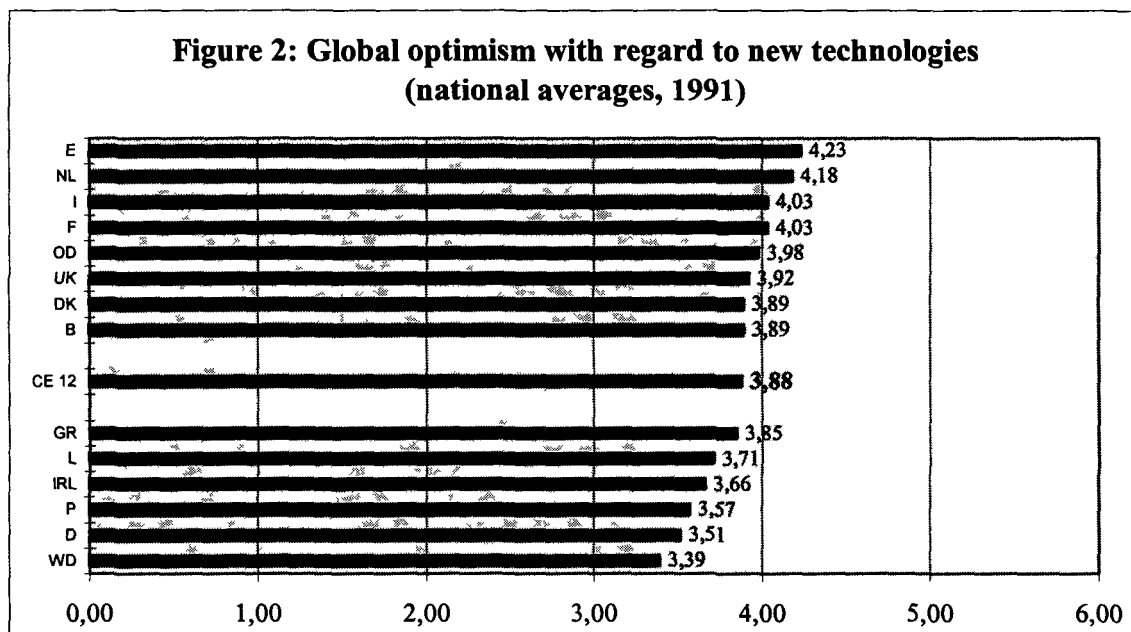
<sup>14</sup> This being a split ballot, i.e. the item was submitted to only half the sample, the confidence interval is even higher. Thus a minimal percentage difference of seven points has been taken as being statistically significant.

Finally, the percentage of Portuguese who think that biotechnology will improve our way of life increased by 9 points between 1991 and 1993 (from 44% to 53%) and has since levelled out.

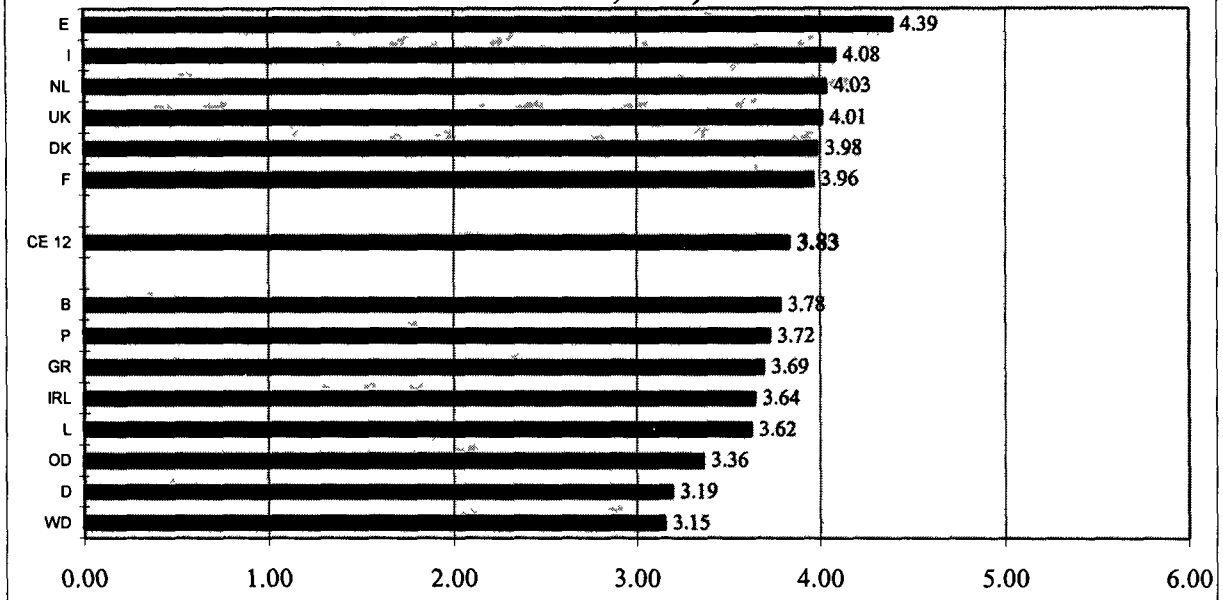
An optimism index has been devised to measure the general optimism of Europeans with regard to new technologies. The index is obtained by adding up the number of "will improve..." answers supplied by each individual, and ranges from 0 to 6. Figures 2, 3 and 4 show the national averages for 1991, 1993 and 1996 respectively.

In 1996, the EU average was 3.91/6 (3.94/6 for EC 12). This represents an increase on the 1991 and 1993 figures, which for EC 12 were 3.88 and 3.83 respectively.

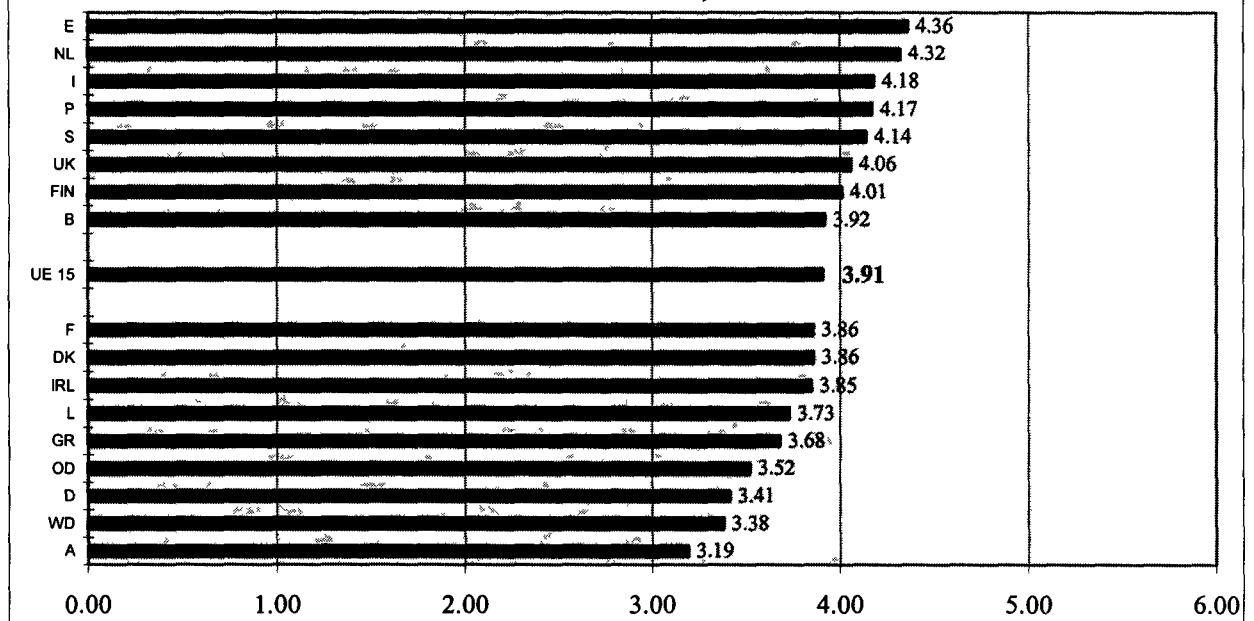
Pessimism ("things will get worse"), status quo ("no effect") and indecision ("DK") indexes were obtained in the same way as the optimism index, and give 0.49, 0.84 and 0.73 respectively for 1996 (and 0.49, 0.84 and 0.73 for EC 12). In 1993, these figures were 0.39, 0.90 and 0.87 while in 1991 they were 0.32, 0.80 and 0.98. Thus compared with 1991, the number of negative and neutral opinions in EC 12 has increased (from 0.32 to 0.49 and from 0.80 and 0.84 respectively), while the number of "DK" responses has fallen markedly (from 0.98 to 0.73).



**Figure 3: Global optimism with regard to new technologies (national means, 1993)**



**Figure 4: Global optimism with regard to new technologies (national means, 1996)**





An earlier comment needs to be repeated here which is important for a proper understanding of this study: when analysing "optimism" or another similar variable, no attempt should be made to draw conclusions regarding "pessimism", despite the temptation to define one as complementary to the other.

Throughout the period studied, the Spanish are the most optimistic (4.36 in 1996), followed by the Dutch and the Italians.

The 1996 figures show the Austrians to be least optimistic about new technologies (3.19), followed by the Germans (particularly those in West Germany), who were themselves the least optimistic in 1991 and 1993.

Regarding the impact of socio-demographic variables:<sup>15</sup>

- General optimism towards new technologies increases with income: the index ranges from 3.41 for respondents with the lowest incomes ("–" on a harmonised incomes scale) to 4.31 for those with the highest incomes ("++").<sup>16</sup>
- Opinion leaders ("++") are much more likely to be optimistic than non-leaders ("–") (4.26 as opposed to 3.32).<sup>17</sup>
- Optimism decreases with age, especially after the age 55, down from a mean of 4.25 in those aged 15 to 24 to 3.44 in those aged 55 or older. The index is 4.14 in those aged 25 to 39 and 4.01 in those aged 40 to 54.
- Men are more inclined than women to be optimistic about the expected effects of new technologies (4.16 as opposed to 3.68).
- Optimism increases with the level of education: it rises from a mean of 3.44 for those who left school before the age of 15 to 4.27 for those who finished after the age of 20. Those still receiving some form of education - whatever their age - have the highest rating (4.42). This is hardly surprising, as this category combines two

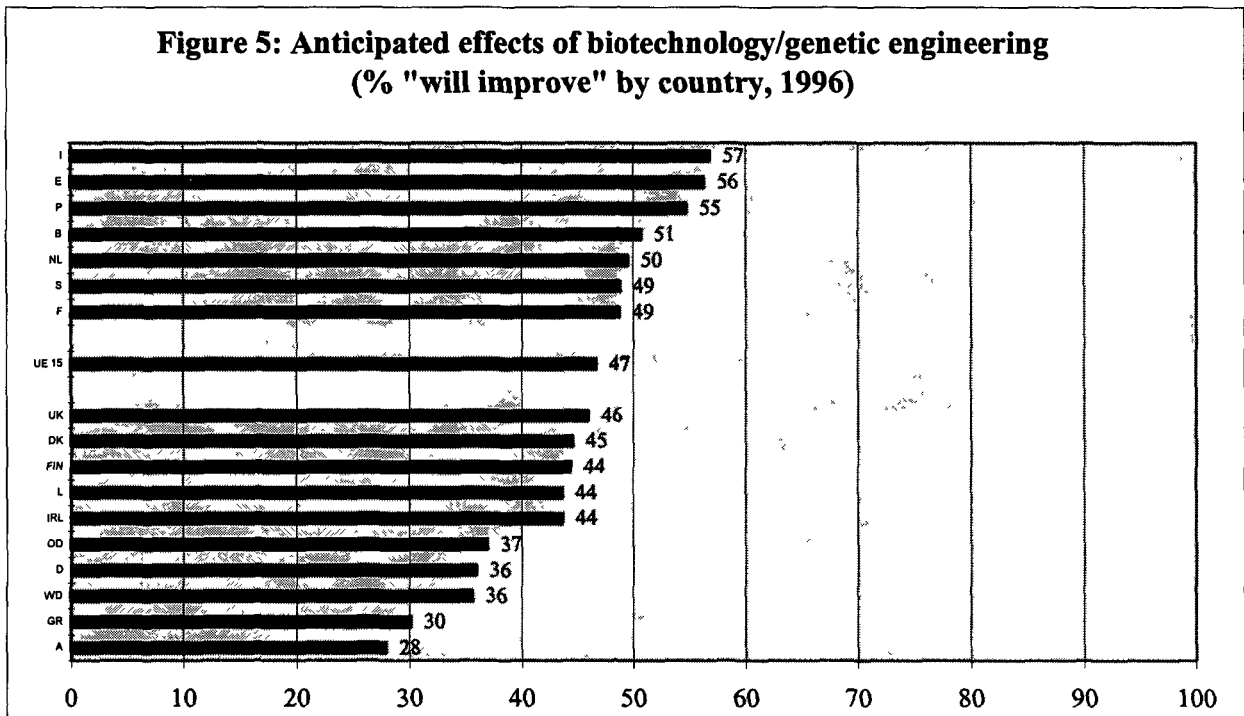
<sup>15</sup> These are classified in descending order, i.e. after having checked for the effect of the other variables, using ordinary regression analysis. Since the different variables, with the exception of the dependent variable, are only measured at ordinal level at best, the results are given only as a guide.

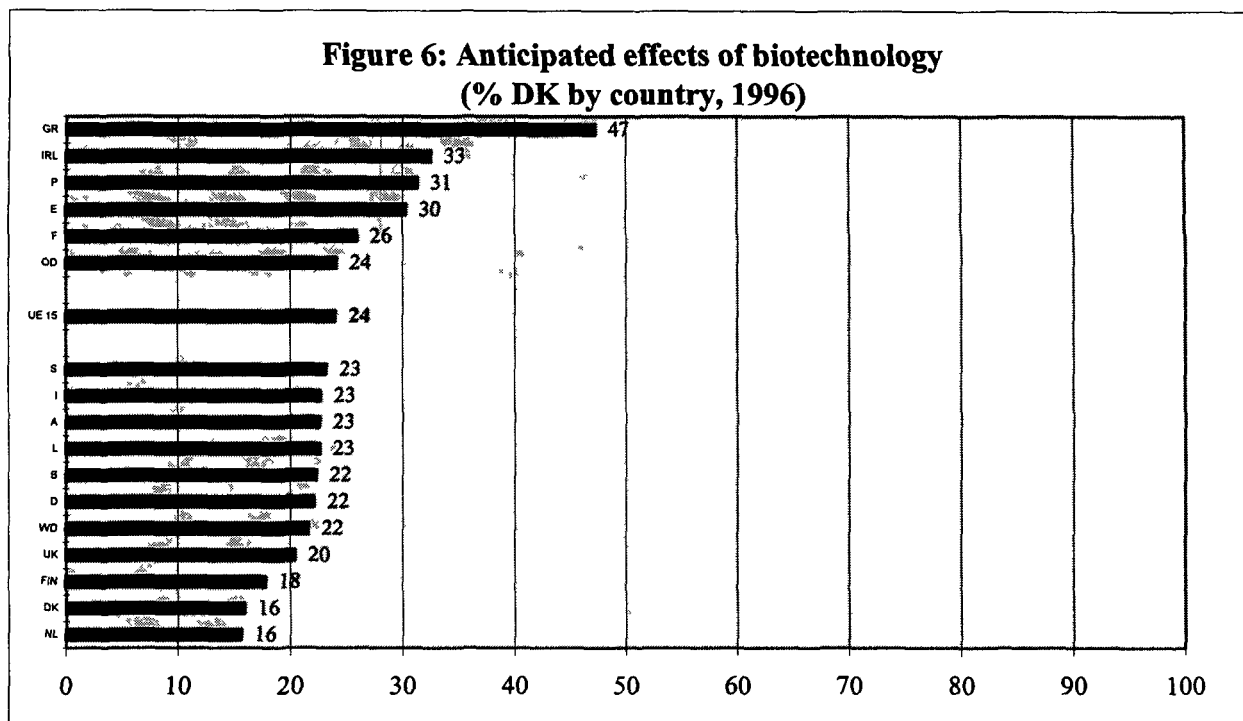
<sup>16</sup> Appendix 9.3.1. explains how this variable is constructed.

<sup>17</sup> Appendix 9.3.2. explains how this variable is constructed.

factors which have a positive impact on general optimism: youth and education (since the category obviously includes students of 15 and thus in the lowest age group, as well as those at university who are still in education beyond the age of 20) Global DK responses decrease as the level of education rises .

- Those who are less religious are more likely to be optimistic (although the relationship is not perfectly linear; furthermore, if the other variables are taken into account, the partial standardised regression coefficient is no longer statistically significant). The optimism index is 3.65 for those who are extremely religious as opposed to 4.13 for agnostics or atheists.





Focusing on biotechnology/genetic engineering<sup>18</sup> in particular (Figures 5 and 6), results show that Italians, Spanish and Portuguese are the greatest optimists: respectively, 57%, 56% and 55% of the respondents consider that this new technology will improve our way of life in the next 20 years (Figure 5).

Conversely, the Austrians appear to be the least inclined towards optimism, with only 28% considering that these new technologies will improve our way of life. Undoubtedly, this result is related to the moratorium on the marketing of genetically modified organisms imposed by the Austrian Ministry of Health in May 1996. This followed numerous protests by environmental protection organisations and wide public debate, which is still going on.<sup>19</sup>

In Greece and Germany, too, far fewer people than in other countries think biotechnology will improve our way of life (30% and 36% respectively).

The percentage of those with no opinion also varies markedly from one country to another (Figure 6), from a high of 47% in Greece (one of the countries with the lowest levels

<sup>18</sup> In the following analyses the A and B *split ballot* results have been added together.

<sup>19</sup> See, for example, *AGBIOTECHNews and Info*, Vol. 8, No. 8 of August 1996.

of optimism) to a low of 16% in the Netherlands and Denmark. In Finland, too, the percentage of "DK" answers (18%) is well below the European average.

On the whole, there are the same variations according to different independent variables as with the general optimism index:

- Optimism regarding biotechnology/genetic engineering increases with the level of education: only 38% of those who left school before the age of 15 think biotechnology/genetic engineering will improve our way of life in the next 20 years as opposed to 56% of those who finished school after the age of 20;
- Of those who finished their education after the age of 19 or who are still receiving some form of education,<sup>20</sup> those studying natural sciences proved to be the most optimistic regarding biotechnology/genetic engineering (60% as opposed to those studying exact sciences - 57% - and social sciences - 52%).<sup>21</sup>
- optimism increases with income: the percentage ranges from 37% for those with the lowest incomes to 53% for those with the highest incomes;
- those over 55 are much less inclined to be optimistic than others (40% as opposed to 50% in the other age groups);
- more men than women think that biotechnology/genetic engineering will improve our way of life (51% as opposed to 43%);
- optimism decreases with religious belief, from 53% in agnostics and atheists to 42% in those who claim to be extremely religious;

optimism increases with the opinion leadership index from 37% in non-leaders to 55% in opinion leaders.

<sup>20</sup> This question was only put to these persons.

<sup>21</sup> For the purposes of this survey, the exact sciences are defined as sciences/physical engineering, chemistry, physics and mathematics. The natural sciences include life sciences, medicine, biology, botany, ecology, anatomy and physiology. The social sciences include human and social sciences.

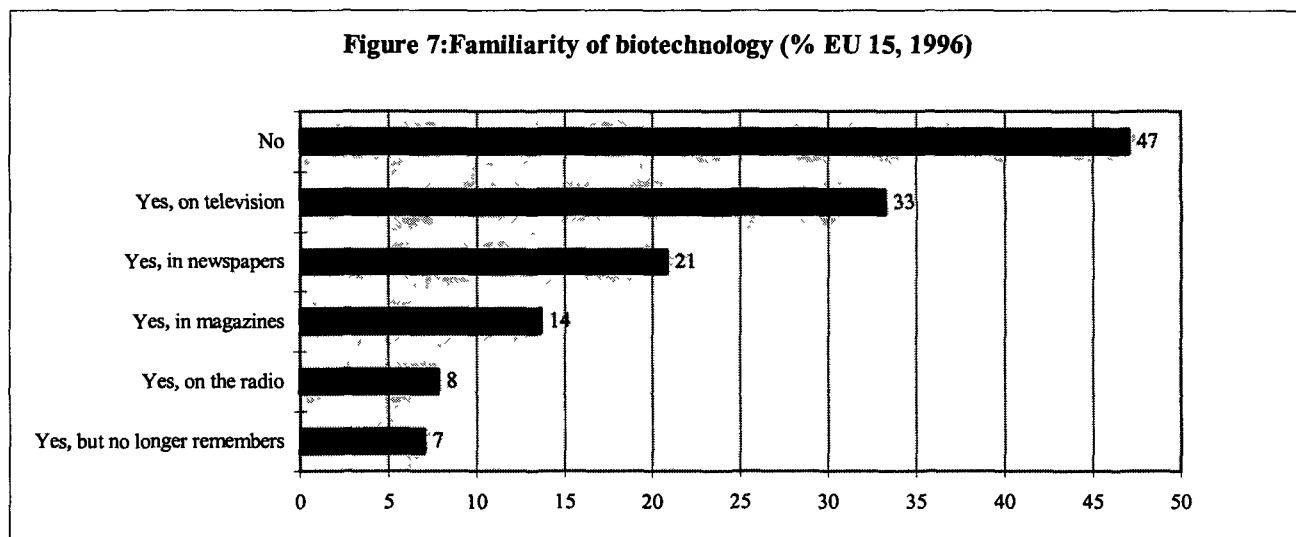
### 3. FAMILIARITY OF THE CONCEPT OF BIOTECHNOLOGY

Before analysing how knowledgeable Europeans are about biotechnology and looking at their opinions on the subject, it seemed worthwhile finding out to what extent they had already heard about modern biotechnology and whether they had ever discussed it with anyone. Hence the following two questions:

#### 3.1 FAMILIARITY OF THE CONCEPT AND INFORMATION SOURCES

Question 16: Over the last three months, have you heard anything about issues involving modern biotechnology? (IF YES) Was it from newspapers, magazines, television or radio? (SEVERAL ANSWERS POSSIBLE)?

- No
- Yes, in newspapers
- Yes, in magazines
- Yes, on television
- Yes, on the radio
- Yes, but no longer remembers (SPONTANEOUS)



As Figure 7 shows, a little less than half (47%) had heard nothing about modern biotechnology during the previous three months, which means, by implication, that just over half (53%) had heard something about it. This relatively high percentage for a subject that is, after all, rather specialised is perhaps explained by the controversy in the media about the

importation of genetically modified American soya. In fact, the campaign, organised by *Greenpeace* among others, coincided with the interviews.<sup>22</sup>

Regarding information sources, a third of Europeans say they heard about biotechnology on television, followed by newspapers (21%), magazines (14%) and radio (8%).

This follows the order recorded in 1991 and 1993. At that time, respondents were asked to give their main source of information on "new developments affecting your way of life". Even then television headed the list, followed by newspapers, magazines and radio. This is hardly surprising, being characteristic of nearly all fields of knowledge, as borne out by numerous EUROBAROMETER and other surveys.

Familiarity with the concept of modern biotechnology varies greatly according to country (Table 3). In the following countries, the numbers who have not heard anything about biotechnology during the last three months are significantly higher than the European mean: Greece (70%), Ireland (63%), Portugal (61%), Spain (60%) and Belgium (55%). Austria<sup>23</sup> and Finland, on the other hand, have the highest numbers who have heard about biotechnology (74% and 72% respectively).

In all countries, television is the most frequently cited source of information on biotechnology. Ireland is the exception, where television and newspapers are both given as primary sources. Percentages range from 53% (Finland) to 18% (Ireland).

Newspapers are in second place in all countries. Magazines are the third most important information source in 11 of the 15 countries. In the remaining four (Denmark, Finland, Sweden and the United Kingdom), radio is in third place, ahead of magazines.

<sup>22</sup> See, for example, *Time* (28 October, 1996, pp. 46-7). Nevertheless, knowledge of biotechnology is unquestionably lower than in Australia, where, when asked if they had ever heard anything about genetic engineering, 68% of respondents answered certainly or probably in 1995 (see 1995b). However, the two questions are not strictly comparable because the time frame for the Australian question was much wider than that for the EUROBAROMETER question (heard about **during the last three months**).

<sup>23</sup> This is no doubt explained by the current debate in Austria (see above).

**Table 3: Familiarity of the concept of biotechnology (% by country, 1996)**

	B	DK	WD	D	OD	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK	EU 15
No	55	39	41	40	35	70	60	46	63	49	40	48	26	61	28	39	45	47
Yes, newspapers	14	28	23	23	23	10	14	17	18	16	28	35	34	12	30	27	28	21
Yes, magazines	11	10	19	19	20	6	10	14	5	16	21	13	18	8	12	7	10	14
Yes, TV	24	38	33	35	42	19	24	36	18	30	41	38	45	27	53	38	38	33
Yes, radio	4	16	6	7	8	2	5	9	6	3	14	13	17	2	15	13	12	8
Yes, no longer knows	8	9	7	8	9	5	5	7	5	7	5	1	10	6	5	9	5	7

**Table 4: Discussion of biotechnology with someone (% by country, 1996)**

	B	DK	WD	D	OD	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK	EU 15
No, never	59	24	31	33	40	72	66	53	63	58	48	56	39	68	45	41	52	51
Yes, once or twice	16	21	21	21	18	11	10	15	17	12	14	10	15	12	10	25	12	15
Yes, occasionally	20	41	33	33	32	13	20	25	14	25	31	25	25	15	38	29	28	26
Yes, frequently	3	12	8	7	5	4	3	6	3	4	7	9	14	4	6	5	8	6
DK	1	2	5	5	5	0	1	2	3	2	1	0	7	1	1	1	0	2

The effect of the main socio-demographic differences can be summed up as follows:

- Not surprisingly, the better educated are more likely to have heard about modern biotechnology: 71% of Europeans who finished their education after the age of 20 come into this category as opposed to only 37% of those who left school before 15. Of those still receiving some form of education, 57% had heard of biotechnology during the previous three months.
- Of those who finished their education after the age of 19 or who are still studying, it seems to make little difference whether they are studying the exact, natural or social sciences: in those groups, the percentages of those who have heard about biotechnology are 76%, 74% and 72%, respectively.
- Considering the results in greater detail, of those who finished their education after the age of 19 or who are still in education, those who have studied ecology (463) include the highest number of persons who had heard about modern biotechnology in the last three months (79%). On the other hand, those who have studied mathematics account for the lowest number in this category (69%). There are no significant differences for the other disciplines, the percentages fluctuating between 71% and 77%.
- The probability of having heard about biotechnology increases with the level of income: only 41% of those on the lowest incomes have heard about biotechnology as opposed to 68% of those on the highest incomes.
- There is an inverse U relationship with respect to age: percentages are lowest at the two extremes and greatest among individuals between 25 and 54 years of age. This partially explains the relatively low level of familiarity among those still receiving education.
- The percentage of men who have heard about biotechnology is somewhat higher than that of women (56% versus 50%).
- Those who are more religious are less likely to have heard about modern biotechnology in the last three months: only 42% of those claiming to be extremely religious came into this category, compared with 69% of those professing atheism.



- Far more opinion leaders than non-leaders are aware of this subject (71% versus 32%).

### 3.2 PREVIOUS DISCUSSION OF BIOTECHNOLOGY WITH SOMEONE.

Question 17: Before today, have you ever discussed modern biotechnology with anyone? (IF YES) Have you discussed it frequently, occasionally or only once or twice?

No, never  
 Yes, frequently  
 Yes, occasionally  
 Yes, only once or twice  
 DK

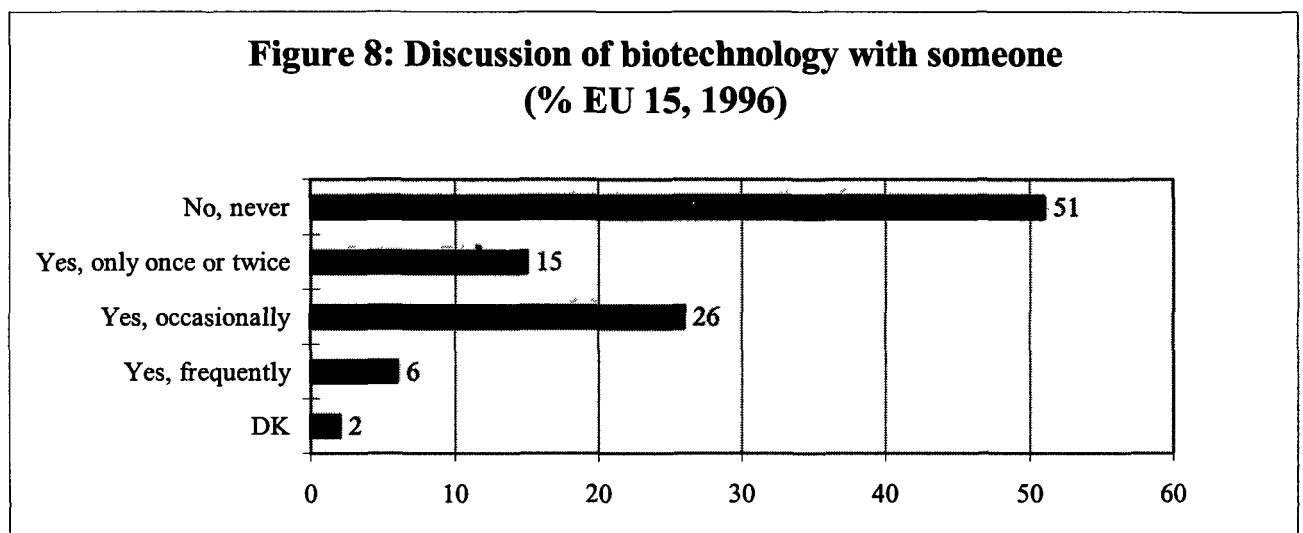


Figure 8 shows that one in two Europeans has never discussed modern biotechnology with anyone. Only 6% of respondents say they have frequently discussed this subject with other people, 26% claim to have discussed it occasionally and 15% only once or twice.

People discuss biotechnology most frequently in Denmark (74%), Germany (61%) and Sweden (59%) (Table 4), where three out of five, or more, persons claim to have discussed it at least once or twice. Greece (72%), Portugal (68%), Spain (66%) and Ireland (63%) have the highest percentages of individuals who have never discussed biotechnology.

Obviously, those who have heard nothing about modern biotechnology in the last three months are less likely to have discussed it with anyone (22% versus 69%).

The socio-demographic variations are the same as for the previous question:

- There is a strong positive correlation between the level of education and the tendency to discuss modern biotechnology: 68% of those who finished their education after the age of 20 years have discussed the subject before, as opposed to only 27% of those who left school before the age of 15;
- Of those who finished their education after the age of 19 or who are still studying, there is a slightly higher number who studied the natural sciences, as compared with other students, who have discussed biotechnology with someone (75% versus 70% for those who studied the exact sciences and social sciences);
- The higher the income, the greater the tendency to discuss this subject (65% in the "+" group as opposed to 34% in the "-" group);
- There are more people in the 25-54 age group who have discussed this subject with someone (54% versus 48% in the 15-24 age group and 35% in the over 55s);
- Men discuss biotechnology more than women (50% versus 44%);
- The less religious tend to discuss the subject more (68% of agnostics and 62% of atheists have discussed the subject before, compared with 32% of those who are extremely religious);
- Biotechnology is discussed far more by opinion leaders than non-leaders (68% versus 22%). This is perfectly understandable insofar as, for the purpose of this survey, opinion leadership is defined as discussing politics with others and attempting to change their opinions.

#### 4. OPINIONS ON GENETICS AND OBJECTIVE KNOWLEDGE OF BIOTECHNOLOGY

What do Europeans think about certain genetics issues, and what do they know about biotechnology? This is what Questions 8 and 9 attempt to assess. As EB 39.1 had already asked a question about knowledge of biotechnology (Question 8) - albeit in a different form - this survey now seeks to determine whether the level of knowledge has increased in the meantime.

##### 4.1 OPINIONS ON CERTAIN GENETICS ISSUES

Question 9: There are differing views about whether people inherit particular characteristics from their parents ("nature") or acquire them mainly from their upbringing or environment ("nurture"). For each of the following items, can you tell me whether you think it is primarily something you inherit or something you acquire?

- a) Size or build
- b) Intelligence
- c) Homosexual tendencies
- d) Eye colour
- e) Tendency to be happy
- f) Criminal tendencies
- g) Attitude to work
- h) Athletic ability
- i) Susceptibility to mental illness
- j) Musical abilities

**Table 5: Opinions on the nature/nurture issue (% EU 15,1996)**

	Inherited	Acquired	DK
Size or build	85	13	3
Intelligence	59	36	5
Homosexual tendencies	24	54	22
Eye colour	94	4	2
Tendency to be happy	21	72	7
Criminal tendencies	17	74	9
Attitude to work	16	78	5
Athletic ability	44	50	6
Mental illness	61	29	10
Musical ability	56	37	6

Science has already provided the answer to some of these questions; on others, scientific opinion is still divided. However, the purpose of this question is not to gauge the level of understanding, but solely to get a better idea of how Europeans perceive genetics, and more specifically, its frontiers.

On the subject of eye colour and body size, 94% and 85% of Europeans respectively think that these characteristics are mainly inherited (Table 5), and only 2% and 3% have no opinion. Conversely, more than seven out of ten consider that attitude to work, criminal tendencies and tendency to be happy are primarily acquired characteristics. For the other items, opinions are more divided and/or the number of "DK" answers is higher. For example, 22% of respondents have no opinion regarding the supposed origin of homosexual tendencies.

In some cases there are significant differences from country to country. Thus, in France only 39% consider intelligence to be an inherited trait, compared with 78% in Ireland, 77% in the Netherlands, 76% in Finland and 70% in Germany and Denmark. The picture is similar as regards homosexual tendencies: the numbers who think this is mainly an inherited tendency are distinctly higher in the Netherlands (39%) and Germany (34%) than in the other countries, particularly France (13%). In Austria, 43%, i.e. more than double the European mean (21%), think that the tendency to be happy is inherited. Similarly, 32% in Ireland (European mean: 16%) say that attitude to work is mainly an inherited characteristic.

Other significant findings were that:

- The better educated are less inclined to think that intelligence is primarily inherited: 64% of those who left school before 15 think it is, compared with 59% of those who finished their education after the age of 20;
- There is a quite marked positive correlation between age and the tendency to think that intelligence is mainly an inherited characteristic: only 49% in the 15-24 age group consider intelligence to be mainly inherited compared with 68% of the over-55s;
- This also applies to the tendency to be happy. 16% of young people aged 15 to 24 think that it is mainly inherited, as opposed to 28% of those over 55.

## 4.2 KNOWLEDGE OF BIOTECHNOLOGY

The following question was asked in a bid to measure the Europeans' understanding of biotechnology "objectively":

Question 8: Here are some statements. For each of them, please tell me whether you think it is true or false. If you don't know, say so, and we will go on to the next statement.

- a) There are bacteria that live from waste water (TRUE).
- b) Ordinary tomatoes do not contain genes, whereas genetically engineered tomatoes do (FALSE).
- c) Cloning living things produces exactly identical offspring (TRUE).
- d) If people eat genetically modified fruit, their genes could also become modified (FALSE).
- e) Viruses can be contaminated by bacteria (FALSE).
- f) Yeast for brewing beer contains living organisms (TRUE).
- g) During the first few months of pregnancy, it is possible to detect whether a child will have [Down's syndrome, trisomy, mongolism - CHOOSE THE ONE OR TWO TERMS APPROPRIATE TO THE COUNTRY] (TRUE).
- h) Genetically modified animals are always larger than ordinary animals (FALSE).
- i) More than half of human genes are identical to those of chimpanzees (TRUE).
- j) It is impossible to transfer animal genes to plants (FALSE).

The aim was to use a series of statements on the complex subject of biotechnology to arrive at an index of knowledge.<sup>24</sup> One of the advantages of using indexes based on answers to several statements on the same subject is that it reduces the likelihood of an erroneous result. Using a single statement inevitably results in statistical inaccuracy because of the arbitrary nature of the statement selected.

However, before looking at this index, it is worth examining the answers to the ten statements put to the respondents. Table 6 shows results for the European Union as a whole.<sup>25</sup>

<sup>24</sup> This index was obtained by adding together the number of correct answers given by each individual, giving a range of 0 (all wrong) to 10 (all right).

<sup>25</sup> As indicated in the Table's title, the items are arranged in descending order according to the value of an EU 15 index. This index is calculated for each item by dividing the percentage of correct answers by the total of the percentages of incorrect and "DK" answers, thus taking into account the different types of answers possible.

**Table 6: "Objective" knowledge of biotechnology (% EU 15 in descending order, 1996)**

	<b>Correct</b>	<b>Incorrect</b>	<b>DK</b>	<b>Index</b>
	<b>A</b>	<b>B</b>	<b>C</b>	<b>A/(B+C)</b>
Bacteria	83	4	13	5.02
Down's syndrome	81	7	12	4.20
Yeast	68	12	19	2.16
Chimpanzees	51	14	35	1.04
Fruit	48	23	29	0.93
Cloning	46	19	35	0.86
Animals	36	35	30	0.55
Tomatoes	35	30	35	0.54
Gene transfer	27	29	44	0.37
Viruses	19	48	33	0.24

Clearly, the percentage of correct answers varies greatly from one statement to another. While 83% of respondents correctly answered "true" to statement "a": "There are bacteria that live from waste water", only 19% correctly answered "false" to statement "e": "Viruses can be contaminated by bacteria".

This mirrors 1993, when these two statements drew 82% and 15% of correct answers respectively (Table 7).<sup>26</sup> Overall, results have remained broadly the same, except for the statement on cloning, where knowledge improved between 1993 and 1996 (from 32% correct answers to 46%, with the number of "DK" answers down by an equivalent amount).

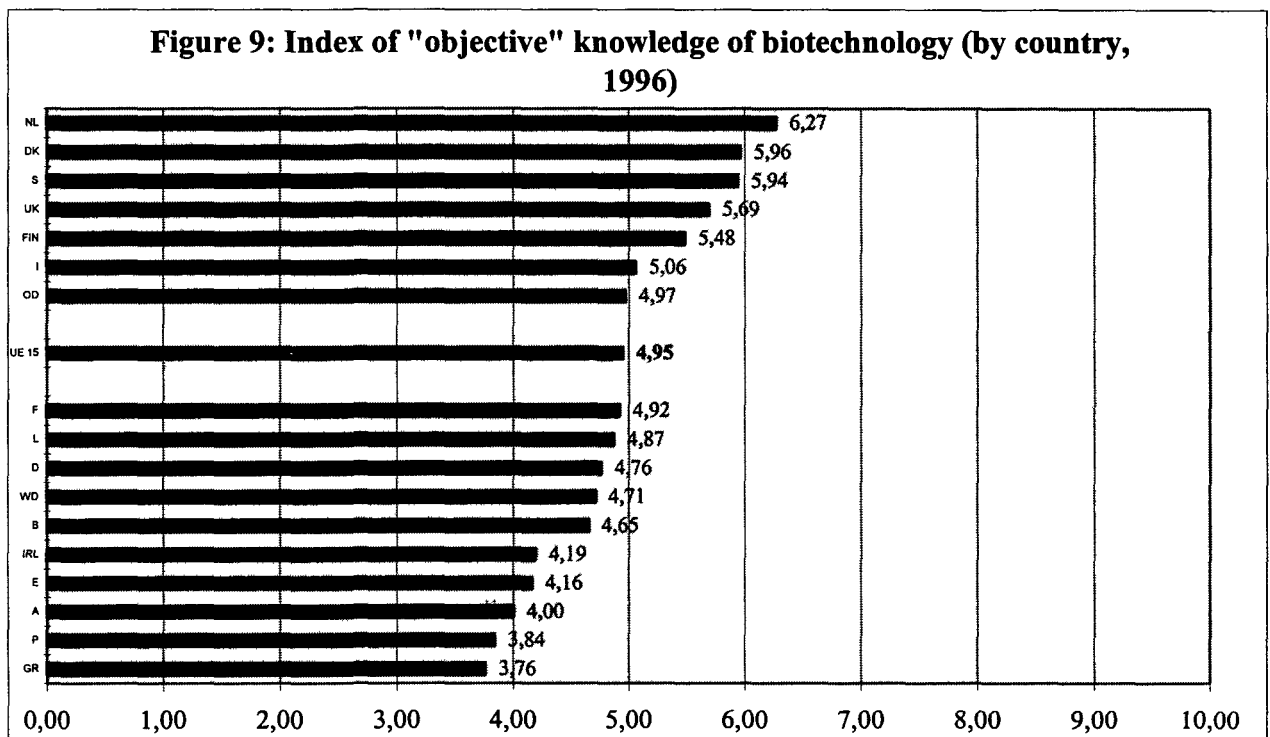
**Table 7: "Objective" knowledge of biotechnology (% EU 15, 1993-1996)**

	<b>Year</b>	<b>Correct</b>	<b>Incorrect</b>	<b>DK</b>	<b>Index</b>
		<b>A</b>	<b>B</b>	<b>C</b>	<b>A/(B + C)</b>
Bacteria	1993	82	3	15	4.55
	1996	83	4	13	5.02
Cloning	1993	32	18	50	0.47
	1996	46	19	35	0.86
Viruses	1993	15	43	42	0.17
	1996	19	48	33	0.24
Yeast	1993	67	9	24	2.03
	1996	68	12	19	2.16
Down's syndrome	1993	75	7	17	3.12
	1996	81	7	12	4.20

<sup>26</sup> This table shows percentages obtained in 1993 and 1996 for the five common items. The wording for the statement on the detection of Down's syndrome has been changed very slightly. In 1993, the statement was as follows: "It is possible to detect whether a child will have mongolism (Down's syndrome) as early as the first few months of pregnancy."

As with the correct answers, the percentage range of incorrect and "DK" answers in 1996 is very broad (4%-48% and 12%-44% respectively).

It is noticeable that there are far more incorrect answers for statements where the correct response is "false".<sup>27</sup> This is most probably what is known in opinion surveys as the *agreement tendency*, i.e. a natural tendency on average to give more positive answers ("true", "yes", "I agree" and so forth) than negative ones.<sup>28</sup>



As Figure 9 shows, Europeans score an average of 4.95/10 on the index of "objective" knowledge of biotechnology, exactly in the middle of the range. This "objective" knowledge index not only directly useful in that it reveals a lack of knowledge of modern biotechnology; it is also extremely useful indirectly, as an invaluable explanatory variable in the analysis of European opinions and conclusions regarding modern biotechnology.

<sup>27</sup> This is confirmed by a factorial analysis of the ten statements. After VARIMAX (SPSSX) rotation, two factors emerge, one combining all statements where the correct answer is "true", and the other all statements where the correct answer is "false".

<sup>28</sup> See, for example, Schuman and Presser (1996).

The Dutch have the highest index of knowledge (6.27), while the Greeks and Portuguese have the lowest (3.76 and 3.84 respectively).

The following trends describe the effect of socio-demographic variables on this "objective" knowledge.

- The index increases according to the age when studies are finished, from 3.96 for those who left school before 15 to 5.97 for those who finished after the age of 20;
- Of those who finished their education after the age of 19 or who are still studying, the index is higher for those who studied natural sciences (6.46) than for those who studied social sciences (6.03) and exact sciences (5.98);
- There is a positive correlation between income and the index of knowledge: it is 4.37 for those with the lowest incomes and 5.80 for those with the highest;
- "Objective" knowledge is higher in men (5.16) than in women (4.75);
- The index decreases according to the age of the respondent, falling from 5.34 in the 15-24 age group to 4.24 in the over 55s;
- It is higher for those claiming to be "non-religious" than for those claiming to be "religious" (4.00, or the minimum, for those professing to be extremely religious);
- The index increases as a function of opinion leadership (3.99 for "non-leaders" versus 5.66 for "leaders").

In terms of multivariate analysis, an examination of the effects of the different independent variables on each other shows that, of the variables described above, those which account for the most variation in the dependent variable are, in order of importance:<sup>29</sup>

1. level of education
2. opinion leadership
3. religious beliefs

<sup>29</sup> This multivariate analysis once again uses linear regression analysis.

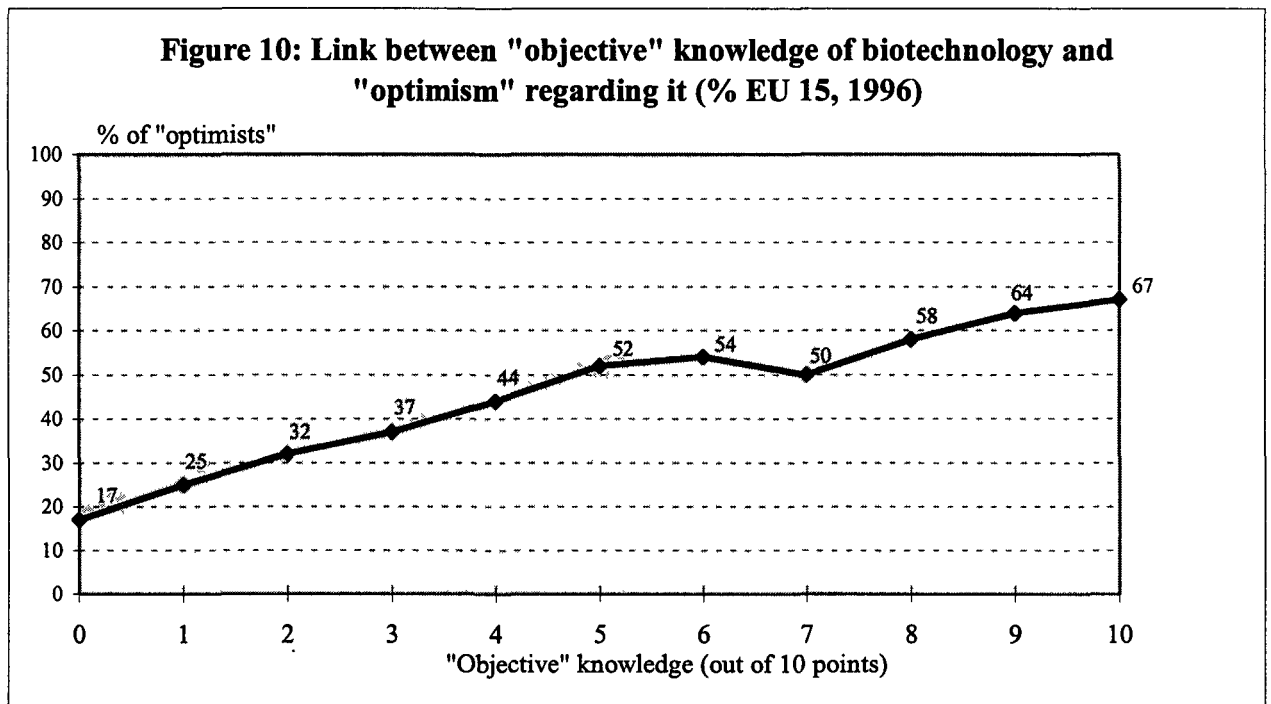


4. age

5. sex

The net effect of income proved to be statistically insignificant after checking for the effect of the other variables, in particular level of education.

Before concluding this section, it is worth emphasising two particularly interesting results in terms of the study's objectives.



The first result, as shown by Figure 10 and Table 8, is that "optimism" about biotechnology/genetic engineering is a positive function of "objective" knowledge of the subject. However, this also applies to pessimism, although to a lesser extent (see Section 2).

For the 1% of persons interviewed who answered the 10 items correctly, the optimism rating is as high as 67%, while it is only 17% for the 3% who gave no correct answers.

**Table 8: Anticipated effects of biotechnology according to "objective" knowledge (% EU 15,1996)**

<b>Knowledge</b>	<b>Optimists</b>	<b>Pessimists</b>	<b>DK</b>	<b>Total</b>
0	17	9	69	3
1	25	11	55	4
2	32	16	44	7
3	37	16	34	12
4	44	18	25	16
5	52	19	19	18
6	54	22	16	16
7	50	25	16	11
8	58	22	12	8
9	64	20	9	4
10	67	20	7	1

However, Table 8 shows that the relationship is not always so simple: percentages of both "optimists" and "pessimists" increase with the level of knowledge. In other words, greater knowledge does not necessarily imply greater optimism about the anticipated effects of modern biotechnology. On the other hand, the Table clearly shows that viewpoints crystallise as knowledge increases: The percentage of "DK" or no opinion answers decreases greatly as the index of "objective" knowledge rises, ranging from 69% for those who gave no correct response to only 7% for those who scored 10/10.

Not surprisingly, the second result is that "objective" knowledge is clearly linked to whether or not the individual has heard about biotechnology during the last three months and has discussed it with anyone.

- Of those who gave no correct answers, 84% had not heard about biotechnology during the last three months. This percentage was for only 19% for those who answered the 10 statements correctly.
- 86% of those who scored 0/10 in the "objective" understanding test had never discussed modern biotechnology with anyone, as opposed to only 15% of those who scored 10/10.

## **5. ATTITUDES TO DIFFERENT APPLICATIONS OF BIOTECHNOLOGY AND GENETIC ENGINEERING**

This chapter considers various issues bound up with modern biotechnology:

- Which types of research benefit society, which are morally acceptable, and which should be encouraged?
- Which types of research could involve risks for society?
- What do Europeans think about regulating modern biotechnology in view of its risks and benefits?
- Finally, which authorities are best placed to regulate biotechnology?

As for the previous question, in order better to measure these complex and abstract concepts, the study used "multi-item indicators", asking respondents their opinions on a series of real applications. The answers were then used to produce more comprehensive indexes. The advantage of this method is that respondents can answer without necessarily having heard of or knowing about the various developments in modern biotechnology. They only need to give their opinion on the applications put to them, which is much easier. It has already been explained that this method also reduces measuring error.

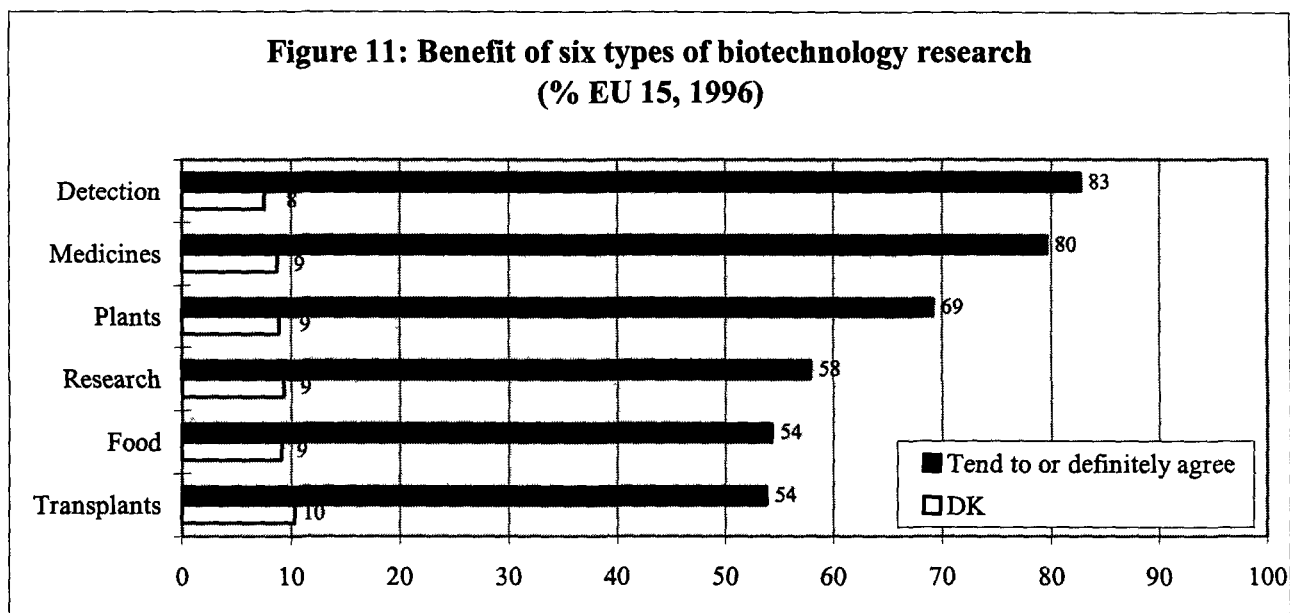
## 5.1 SUPPORT FOR VARIOUS APPLICATIONS.

Question 10: And now, here are some statements concerning various applications of modern biotechnology. To what extent do you agree or disagree that...?

- a) This application benefits society?
  - b) This application involves risks for society?
  - c) This application is morally acceptable?
  - d) This application should be encouraged?
- 
- a) Using modern biotechnology in the production of foods, for example to make them higher in protein, keep longer or change the taste (FOOD).
  - b) Taking genes from plant species and transferring them into crop plants to make them more resistant to insect pests (PLANTS).
  - c) Introducing human genes into bacteria to produce medicines or vaccines, for example to produce insulin for diabetics (MEDICINES).
  - d) Developing genetically modified animals for laboratory research studies, such as a mouse that has cancer-causing genes (RESEARCH).
  - e) Introducing human genes into animals to produce organs for human transplants, such as into pigs for human heart transplants (TRANSPLANTS).

Using genetic testing to detect diseases we might have inherited from our parents, such as cystic fibrosis, mucoviscidosis, thalassemia (USE THE EXAMPLE BEST KNOWN IN EACH COUNTRY) (DETECTION).

### 5.1.1 BENEFIT OF VARIOUS BIOTECHNOLOGY APPLICATIONS TO SOCIETY.



The first finding to emerge from Figure 11 is that a majority of Europeans consider the various applications mentioned to be beneficial to society. They believe the most useful to be the use of genetic tests to detect hereditary diseases: 83% of respondents tend to agree, or definitely agree, that this is beneficial to society. The second most useful application is the production of medicines or vaccines: eight out of ten Europeans think the introduction of human genes into bacteria to produce these medicines or vaccines benefits society.

Of the six applications put to respondents, the two considered least beneficial to society (by 54% if respondents in each case) are the use of modern biotechnology in food production and the introduction of human genes into animals to produce organs for human transplants.

**Table 9: Benefit of six types of biotechnology research (% who tend to agree or definitely agree, by country, 1996)**

	B	DK	WD	D	OD	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK	EU 15
Food	53	49	49	51	61	48	62	48	58	53	46	70	31	62	69	40	62	54
Plants	71	70	60	62	69	68	66	71	66	76	57	80	36	76	80	61	74	69
Medicines	81	87	74	75	80	76	76	84	74	79	77	89	60	85	81	81	85	80
Research	58	75	45	46	52	60	63	68	54	64	53	57	38	76	63	46	56	58
Transplants	57	57	47	47	48	56	69	59	41	52	51	51	32	62	48	48	53	54
Detection	82	83	73	75	81	90	78	88	79	88	74	88	51	90	84	80	88	83

**Table 10: Benefit of six types of biotechnology research (% DK by country, 1996)**

	B	DK	WD	D	OD	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK	EU 15
Food	16	4	12	11	8	11	13	8	16	4	12	4	16	9	7	4	10	9
Plants	13	4	11	11	8	11	15	5	17	5	12	3	16	10	7	6	11	9
Medicines	9	4	11	10	7	13	14	5	15	7	11	3	16	7	8	6	9	9
Research	11	4	11	10	8	16	16	6	17	6	14	2	16	8	10	5	10	9
Transplants	10	6	11	11	10	16	15	9	19	8	13	3	16	11	11	7	10	10
Detection	10	5	9	9	8	6	15	4	13	5	12	3	20	5	9	7	7	8

**Table 11: Risks associated with six types of biotechnology research (% who tend to agree or definitely agree, by country, 1996)**

	B	DK	WD	D	OD	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK	EU 15
Food	49	67	62	60	53	60	49	66	55	61	53	74	51	61	40	69	63	61
Plants	39	62	45	44	41	38	43	52	45	44	48	64	49	47	31	55	54	48
Medicines	42	41	44	42	37	31	45	53	45	44	34	72	39	54	29	45	52	47
Research	52	47	52	51	48	42	49	56	47	58	39	67	42	60	40	55	60	54
Transplants	58	58	56	55	51	50	53	63	57	64	44	74	46	66	52	57	70	61
Detection	38	39	37	36	30	15	38	38	42	39	32	62	38	51	21	43	43	40

**Table 12: Risks associated with six types of biotechnology research (% DK by country, 1996)**

	B	DK	WD	D	OD	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK	EU 15
Food	16	6	11	11	10	14	19	8	17	11	12	4	20	17	11	5	11	12
Plants	18	7	13	12	11	19	22	13	20	13	16	5	19	20	10	8	13	14
Medicines	18	10	13	13	9	23	20	14	18	18	16	6	20	20	14	10	15	15
Research	14	6	13	12	9	20	20	11	20	12	16	3	18	17	11	7	10	12
Transplants	15	9	13	12	12	21	19	12	20	13	17	4	19	18	12	9	8	13
Detection	13	6	11	11	11	10	17	6	19	6	15	5	19	8	12	6	11	10

In all the EU countries (Table 9), the two applications respondents find most beneficial are the use of modern biotechnology to produce medicines and the development of genetic tests to detect certain diseases.

Conversely, in 9 of the 15 countries, the two applications considered least beneficial are the use of modern biotechnology for food production and organ transplants. In Germany, Ireland, the Netherlands and the United Kingdom, transplants and the development of genetically modified animals for laboratory research have the lowest rating. Finally, in Spain and Sweden the lowest ratings are given to the development of genetically modified animals and food production.

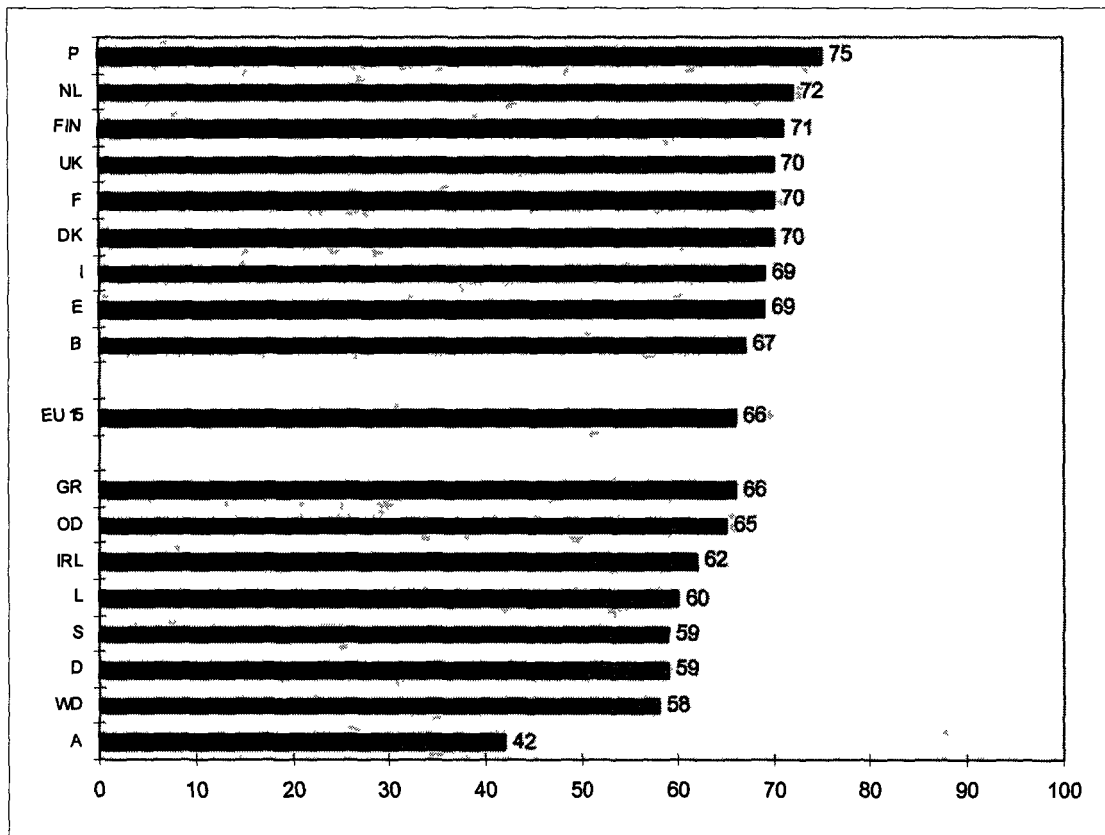
Consistently with observations made in the previous sections, there are markedly lower percentages in Austria for all applications considered: except for the development of medicines (60%) and disease detection tests (51%), no other application is considered useful by more than half of the Austrian population. For example, only 31% definitely agree or tend to agree that using modern biotechnology for food production is beneficial to society.

The 'no opinion' percentages (Table 10) vary greatly from country to country, but hardly at all according to the type of application. This category is lowest in Denmark and the Netherlands and highest in Austria and Ireland.

As Figure 12 shows, Portugal has the highest overall index of those considering research in modern biotechnology beneficial:<sup>30</sup> the average percentage is 75% for those who definitely agree or tend to agree that the six applications mentioned benefit society. Conversely, Austria is the most sceptical country when it comes to the benefits of biotechnology (42%). For the European Union as a whole, the index is 66%.

<sup>30</sup> These indexes are in fact the average of percentages who "definitely agree" and "tend to agree" for the six applications analysed. In order to verify that they are indeed one-dimensional scales, factorial analyses on these different items were carried out beforehand. In the four cases, these analyses produced only a single factor, thereby confirming the one-dimensional nature of these indexes.

**Figure 12: Average benefit of six biotechnology applications  
(% by country, 1996)**



There is a positive correlation between the index of benefit and the index of "objective" knowledge of biotechnology: Pearson's correlation coefficient is 0.26. In other words, the greater the knowledge of the various applications of biotechnology, the greater the tendency to consider the six applications beneficial.

Other surveys<sup>31</sup> have shown a similarly marked correlation between attitudes to biotechnology and attitudes to new technologies and science in general. In this connection, it is hardly surprising that the correlation coefficient between the general optimism index for the anticipated effects of six new technologies and the benefit index is fairly high ( $r = 0.32$ ).

<sup>31</sup> See, for example, Kelley (1995b).



Quite logically, many more of those who think biotechnology/genetic engineering will improve our way of life in the next 20 years think that the six applications mentioned benefit society (75%, compared with 58% of those considered pessimists).

The benefit index is also higher among those who have heard about biotechnology during the last three months (70% versus 63% for those who have not) and those who have already discussed the subject with someone (70%, versus 63% for those who have not).

There are the usual variations in the socio-demographic variables:

- The benefit index increases with the level of education: it rises from 60% for those who left school before the age of 15 to 73% for those who finished their studies after the age of 20;
- Of those who finished their education after the age of 19 or who are still studying, the index is higher for those studying social sciences (75%) and natural sciences (73%) than for those studying the exact sciences (68%);
- The higher the income level, the higher the benefit index: it rises from 59% for those with the lowest incomes to 74% for those with the highest;
- The index decreases according to the age of the respondent: it is 70% in the 15-24 age group and 61% for the over 55s;
- It is somewhat higher in men than women (70% compared with 64%);
- The index tends to fall (though not altogether uniformly) as religious belief strengthens; it is lowest for persons claiming to be very religious (54%) and highest for agnostics (75%);
- Far more opinion leaders than non-leaders think the six modern biotechnology applications benefit society (71% compared with 56%);
- In terms of political attitudes, those on the right of the political spectrum have the highest rating (71% compared with 67% for those at the centre and left).<sup>32</sup>

<sup>32</sup> Appendix 9.3.3. explains how this variable is constructed.

When linear regression analysis is used to check the effect of the other variables, the only two variables which have a marked effect on the overall benefit index are, in order of importance:<sup>33</sup>

- General "optimism" index regarding the six new technologies: this is the variable with by far the greatest impact ( $\beta = 0.24$ );
- "Objective" knowledge index ( $\beta = 0.13$ ).

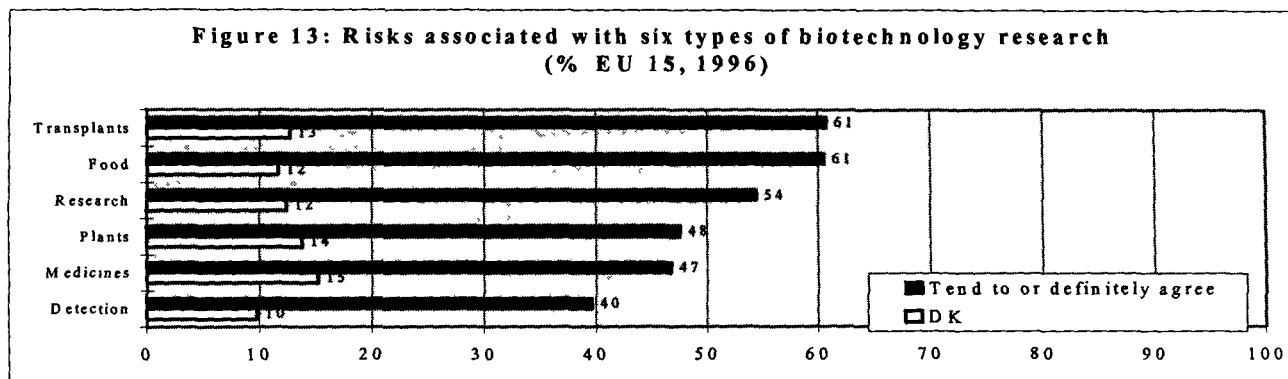
### **5.1.2 RISKS TO SOCIETY ASSOCIATED WITH CERTAIN BIOTECHNOLOGY APPLICATIONS**

A question on the risks associated with modern biotechnology was asked in 1991 and 1993, though in a very different form. Nevertheless, as three of the items used in 1991 and 1993 have been used again - albeit slightly differently - in this survey,<sup>34</sup> we shall attempt to analyse possible trends, with all the reservations about using this type of comparison.

Figures 11 and 13 show that fewer Europeans worry about the risks associated with the six biotechnology applications put to them than think these applications benefit society. In fact, the percentages who definitely agree or tend to agree are always lower for the first category. Even so, Figure 14 shows that the risk index is greater than 50% (52%) for the European Union as a whole.

<sup>33</sup> As mentioned in note 15, p. 14, the results of these analyses are given for information only.

<sup>34</sup> In the two earlier surveys, the three applications were expressed as follows: i) "These new methods of biotechnology/genetic engineering are also used in the production and processing of food products. For example, scientists say that the quality of food and drink can be improved by making it higher in protein, lower in fat, or making it keep longer or taste better"; ii) "Another application of biotechnology/genetic engineering is the development and production of new medicines and vaccines for humans, for example the production of human insulin for the treatment of diabetes"; iii) "Science also tries to apply certain new methods of biotechnology/genetic engineering to human beings or human cells and tissues, for various purposes such as detecting or curing diseases and possible hereditary characteristics". The question was: "Please indicate if you definitely agree, tend to agree, tend to disagree or definitely disagree with the following statement: This type of research on (APPLICATION) can involve risks for human health or the environment."



Europeans consider that the two applications presenting the greatest risk to society are the introduction of human genes into animals to produce organs for human transplants and the use of modern biotechnology in food production: 61% of the respondents definitely agree or tend to agree that these present a risk. Conversely, the application involving least risk is the use of genetic tests to detect disease: only four out of ten Europeans definitely agree or tend to agree that this involves a risk for society.

Comparing Figures 11 and 13 again, we see that the order of importance is exactly the reverse. In other words, the applications considered the most beneficial are also those considered the least hazardous, and vice versa, which *a priori* is very consistent.<sup>35</sup> Also, the percentages of "DK" answers, which range from 10% to 15%, are slightly higher than those for the question on benefit.<sup>36</sup> This undoubtedly indicates some difficulty in assessing the risk posed by the various applications suggested.

Of the applications copied - after (slight) modifications - from the 1991 and 1993 opinion surveys, there are no significant percentage differences for the three periods for genetically modified food (1991 and 1993: 62%; 1996: 61%) and medicines (1991: 48%; 1993: 51%; 1996: 47%). On the other hand, regarding the use of biotechnology to detect disease, the percentage difference is very high (1991: 58%; 1993: 61%; 1996: 40%). This last result is probably explained partly by the fact that, unlike the two preceding applications, the wording differed in content as well as form.

<sup>35</sup> This also applied to the 1991 and 1993 surveys, even though the items were not the same and the question was put differently. See INRA (1991: 53) and Marlier (1993:54).

<sup>36</sup> Even though the question was put differently and the applications chosen were not the same, the percentages of "DK" answers were still of the same order of magnitude as in 1991 and 1993.

In 12 of the 15 countries, the two applications considered most hazardous are the same as for the entire European Union, namely the introduction of human genes into animals and the use of modern biotechnology in food production (Table 11). In Denmark and Austria, the two applications most often cited as hazardous are the use of modern biotechnology in food production and the transfer of genes of certain plants to crop plants to make them more resistant to pests. In Belgium, the use of biotechnology for the introduction of human genes into animals and the development of genetically modified animals for laboratory research are thought to involve the greatest risk.

As with the previous question, there are significantly lower percentages (Table 12) of persons with no opinion in the Netherlands, Denmark and Sweden.

As Figure 14 shows, the overall risk index varies greatly from country to country. The Netherlands has the highest index (69%), while the lowest are found in Finland (35%) and Greece (39%). This index is the average of the six percentages representing those who "definitely agree" or "tend to agree" that the application involves risks to society.

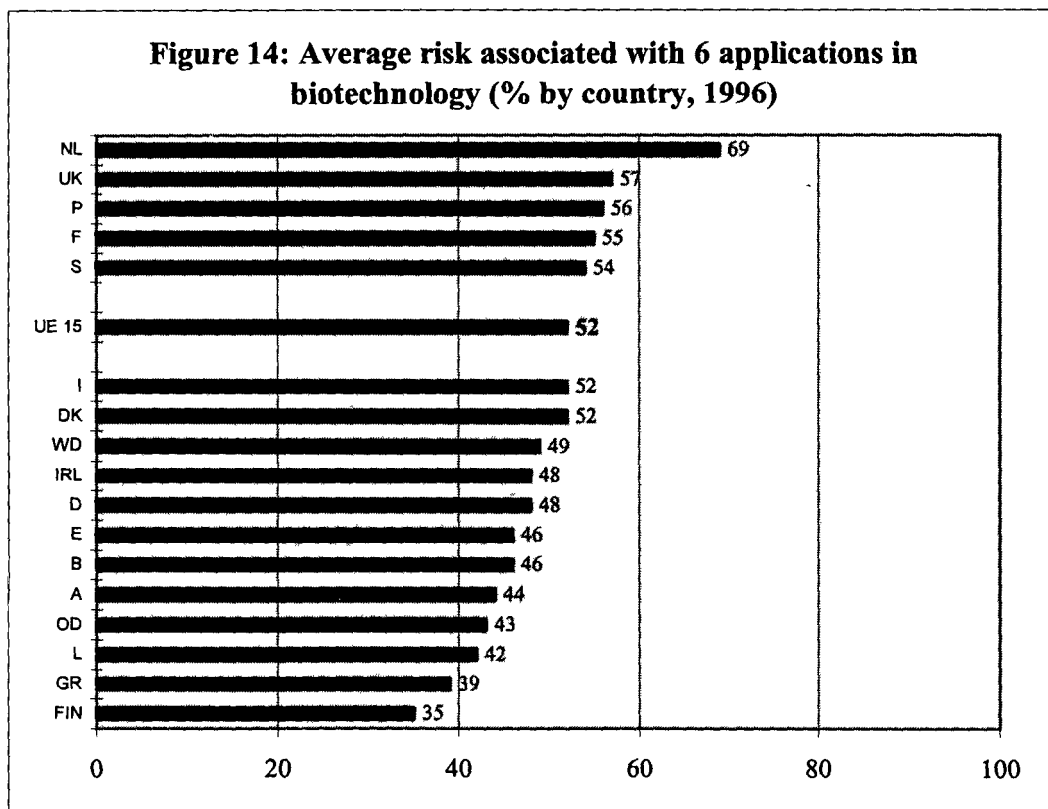
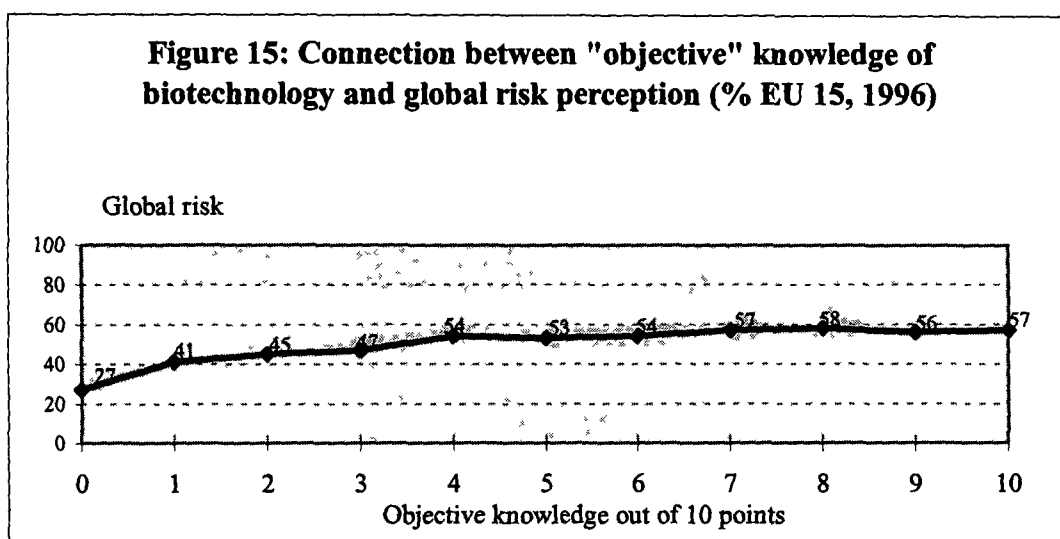


Figure 15 shows that the overall risk index is slightly influenced by "objective" knowledge of biotechnology: those who know more about it are more likely to have a keen perception of the risks associated with biotechnology. However, this is not a linear relationship and applies particularly when average knowledge is lower than 4/10. Above that level, there is no longer a significant increase in concern.<sup>37</sup>



At the same time, significantly more of those who have heard about biotechnology during the last three months are concerned about the applications of biotechnology: the overall risk index is 54% for those who have already heard about biotechnology compared with 49% for those who have not. The same applies to those who have discussed modern biotechnology with others: those who discuss the subject more are more likely to be concerned about it. In fact, the overall risk index ranges from 49% for those who never discuss biotechnology to 56% for those who discuss it frequently.

These observations are very significant because they emphasise the fact that fear of biotechnology is not necessarily the result of ignorance on the subject. On the contrary, it is rather the case that those who are the most ignorant on the subject tend to be less concerned. In other words, being more informed does not necessarily mean being less worried. However, more informed does not always mean better informed. These questions deal only with the sources and amount of information, not its scientific character or objective.

<sup>37</sup> The two previous surveys also showed a slight link between these two variables, but tending in the opposite direction.

The correlation between the overall risk index and the benefit index is absolutely negligible, even if it is statistically significant because of the size of the sample ( $r = 0.06$ ).

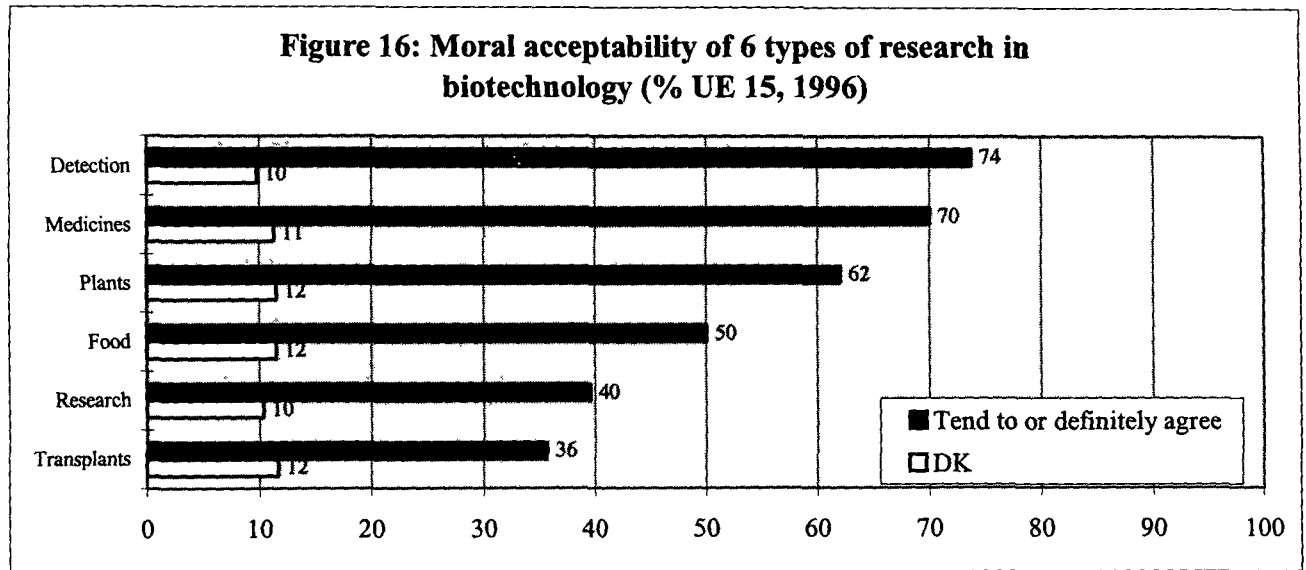
Those who are optimistic about the anticipated effects of biotechnology/genetic engineering have an overall risk perception index somewhat lower than that of pessimists (52% versus 59%).

On the whole, the effect of socio-demographic variables on overall risk perception is relatively low for the various applications studied. The main points are:

- The risk index increases with level of education: it rises from 48% for those who left school before 15 to 54% for those who finished their education after the age of 20;
- Of those who finished their studies after the age of 19 or who are still studying, it is higher for those studying social sciences (57%) than for those studying natural sciences (54%) or exact sciences (52%);
- The curve is lowest (49%) at both ends (below 24 and over 55) and highest (54%) for the 25 - 54 age group;
- There is no difference between men and women as regards the evaluation of risk;
- More opinion leaders than non-leaders think the six modern biotechnology applications involve risks to society (54% compared with 47%).

Regression analysis shows that the different socio-demographic variables have no statistically significant impact on the risk index. Only three variables have a standardised (beta) regression coefficient which is statistically significant: whether the respondent has heard about biotechnology during the last three months, whether the respondent has discussed the subject with someone, and the index of "objective" knowledge. However, these partial coefficients are very low (less than 0.1).

### 5.1.3 MORALLY ACCEPTABLE APPLICATIONS IN BIOTECHNOLOGY



As Figure 16 shows, the two applications most often considered morally acceptable are the use of genetic tests to detect certain diseases and the production of medicines and vaccines using genetic engineering: 74% and 70% of Europeans respectively definitely agree or tend to agree that these are morally acceptable. Conversely, only a minority of respondents (36% and 40% respectively) consider genetic engineering morally acceptable if its purpose is to produce organs for human organ transplants or develop genetically modified animals for laboratory research.

**Table 13: Moral acceptability of 6 types of research in biotechnology (% tend to agree or definitely agree, by country, 1996)**

	B	DK	WD	D	OD	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK	EU 15
Food	54	40	41	43	50	40	54	51	50	55	45	67	26	58	58	42	53	50
Plants	68	54	53	55	62	59	59	65	57	70	53	73	28	73	70	59	64	62
Medicines	74	78	64	66	73	65	64	74	64	71	67	81	47	75	71	77	74	70
Research	38	44	26	28	37	44	45	47	36	43	40	51	30	57	44	39	36	40
Transplants	39	37	28	28	32	34	47	39	24	35	39	45	27	43	32	41	33	36
Detection	73	73	62	64	73	85	66	80	67	81	64	80	45	81	75	74	80	74

**Table 14: Moral acceptability of 6 types of research in biotechnology (% DK by country, 1996)**

	B	DK	WD	D	OD	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK	EU 15
Food	16	7	14	13	11	15	17	9	19	7	16	4	18	13	10	4	12	12
Plants	15	6	13	12	10	17	18	8	20	7	15	4	18	13	9	5	14	12
Medicines	12	5	12	12	9	19	17	8	18	9	14	4	18	10	10	6	14	11
Research	13	4	11	11	9	19	19	7	21	8	17	3	16	11	8	4	10	10
Transplants	12	6	12	12	11	22	19	10	24	9	15	4	17	13	10	5	12	12
Detection	13	6	11	11	11	10	17	6	19	6	15	5	19	8	12	6	11	10

**Table 15: Types of research in biotechnology which should be encouraged (% tend to agree or definitely agree, by country, 1996)**

	B	DK	WD	D	OD	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK	EU 15
Food	47	30	38	41	49	43	53	39	45	47	34	56	18	56	59	33	45	44
Plants	62	48	48	50	60	60	56	57	53	69	44	66	23	72	72	53	59	58
Medicines	74	76	65	67	74	69	67	76	65	73	66	78	45	78	73	73	75	71
Research	40	45	29	31	39	51	49	52	39	51	38	47	29	66	48	37	38	43
Transplants	42	37	31	32	36	41	53	44	28	41	37	44	26	52	37	39	35	39
Detection	72	69	61	64	76	87	68	83	69	83	64	78	46	85	77	71	80	75

**Table 16: Types of research in biotechnology which should be encouraged (% DK by country, 1996)**

	B	DK	WD	D	OD	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK	EU 15
Food	18	9	14	13	11	13	20	10	21	8	23	4	18	11	10	4	14	13
Plants	17	8	15	14	10	14	20	10	20	8	21	3	18	13	9	6	14	12
Medicines	13	8	13	12	9	16	18	8	18	9	19	4	19	10	10	6	12	11
Research	14	10	13	12	10	19	21	11	21	9	23	3	18	11	12	5	12	12
Transplants	14	11	14	13	12	22	22	12	24	10	20	3	18	14	11	8	14	14
Detection	13	10	13	13	10	8	18	6	18	6	18	4	19	8	11	8	11	10



In all the EU countries (Table 13), the use of genetic tests to detect certain diseases and the production of medicines and vaccines using genetic manipulation are the two applications of biotechnology most often considered morally acceptable. In addition, in 12 of the 15 countries, the bottom two positions (occasionally in reverse order) go to genetic engineering to produce organs for human organ transplants and the development of genetically modified animals for laboratory research. Conversely, in Denmark, Greece and Austria, the two applications on which there is least agreement are the use of genetic engineering to produce organs for human organ transplants and genetically manipulated food.

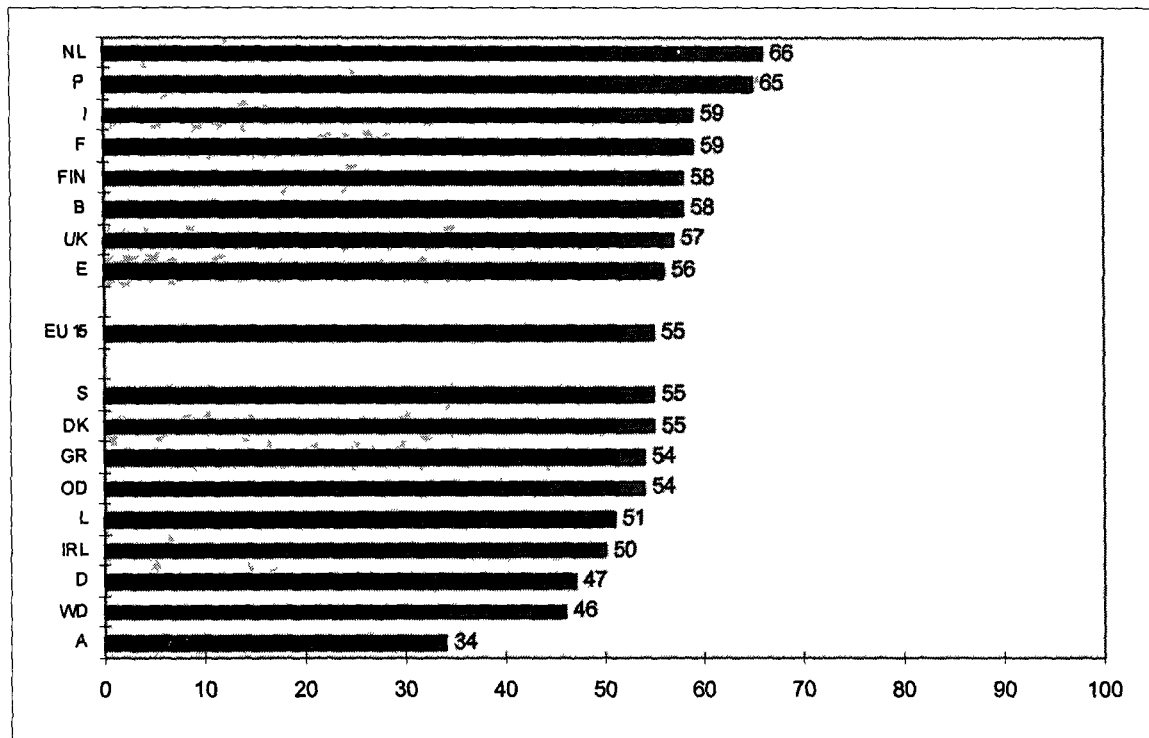
The particular position of Austria should be noted again: here, the percentages of people who definitely agree or tend to agree that the various applications mentioned are morally acceptable are distinctly lower than those of other countries. This is illustrated clearly in Figure 17.

As in the preceding questions. Table 14 shows the Netherlands and Denmark to have significantly lower percentages of persons with no opinion. Sweden also displays a very low rate in this context. Conversely, the number of "DK" answers is particularly high in Ireland as well as in Greece, Spain and Austria.

From Figure 17, it is apparent that in 12 out of 15 countries, an absolute majority of respondents consider that, overall, the six applications mentioned are morally acceptable. In Ireland, the global acceptability index is exactly 50%, while in Germany<sup>38</sup> and Austria it stands at 47% and 34% respectively.

<sup>38</sup> As Figure 17 illustrates, it is particularly in the West of Germany that there is a tendency to think these various applications are not morally acceptable: there, the moral acceptability index is in fact only 46% as opposed to 54% in the East.

**Figure 17: Average moral acceptability of 6 types of research in biotechnology (% by country, 1996)**



The more the various applications of biotechnology are considered beneficial to society, the more they are deemed morally acceptable: Pearson's correlation coefficient is very high (0.71). On the other hand, the correlation between the global risk index and the moral acceptability index is entirely insignificant.

The moral acceptability index is positively correlated to the index of optimism regarding new technologies ( $r = 0.3$ ) and the "objective" knowledge index (0.24).

Far more of those who think that biotechnology/genetic engineering will improve our way of life in the next 20 years than of those who think the opposite consider the various applications of biotechnology to be morally acceptable (global index: 64% versus 46%).

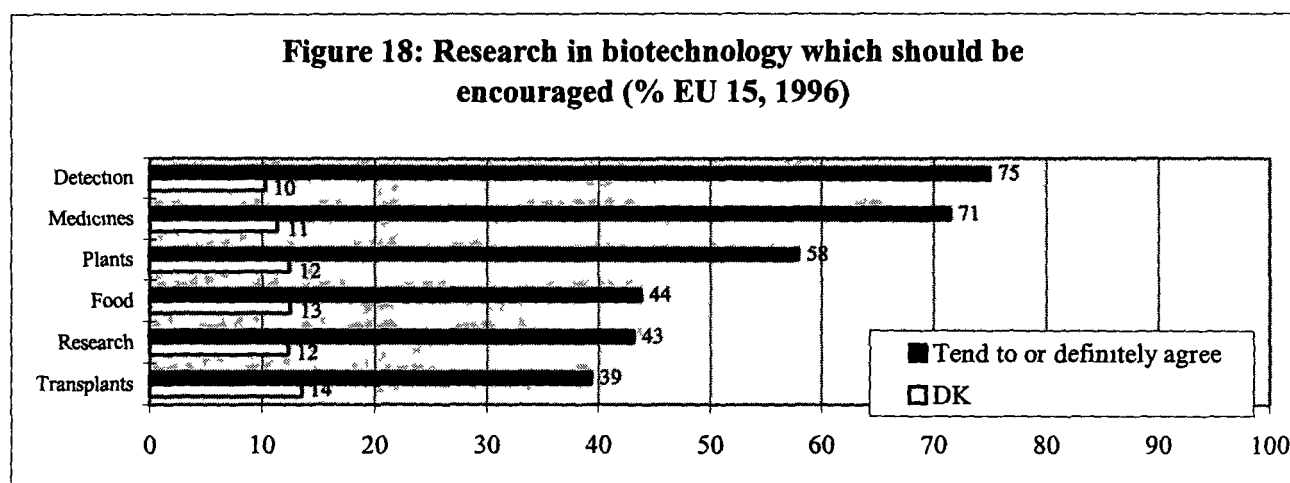
Those who have heard about biotechnology during the last three months are somewhat more inclined than others to find these various applications morally acceptable (58% versus 52%).

The usual relationships are observed concerning the influence of socio-demographic variables. Only the most notable percentage differences will be cited, as follows:

- The better educated people are, the more they tend to find the various applications of biotechnology morally acceptable: the index rises from 50% among those who left school before the age of 15 to 61% among those who finished their education after the age of 20;
- Acceptability rises with income: the average index rises from 49% for those with the lowest incomes to 60% for those with the highest;
- Many more opinion leaders than non-leaders find the various applications in biotechnology morally acceptable (61% versus 46%).

#### 5.1.4 APPLICATIONS IN BIOTECHNOLOGY WHICH SHOULD BE ENCOURAGED.

Comparing Figures 16 (morally acceptable applications) and 18 (applications which should be encouraged), we find that the rankings are exactly the same and the percentages fairly similar. Moreover, the ranking for support is virtually the same as the benefit ranking (Figure 11), and thus practically the reverse of that for risks (Figure 13).



Thus Europeans would most like to see encouragement for the use of genetic tests to detect certain diseases (75%) and the production of medicines and vaccines by means of genetic engineering (71%). Conversely, only 39% of Europeans definitely agree or tend to agree that it would be appropriate to encourage genetic engineering to produce organs for human organ transplants.

Like the question on risks, the question of support for various applications of modern biotechnology had already been asked, although in a different form, in the 1991 and 1993 surveys.<sup>39</sup> As mentioned in section 5.1.2., three items from 1991 and 1993 were used again in a (slightly) modified way for the present survey.

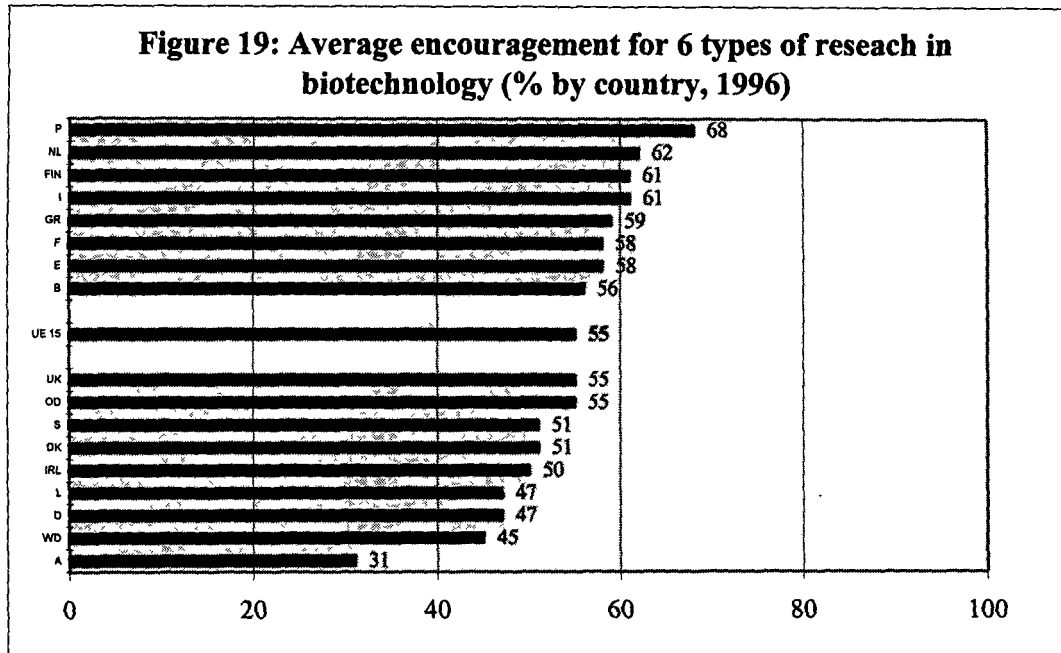
Always bearing these modifications in mind, we find that support for two of these applications falls significantly between 1991 and 1996: for food, the rate falls from 58% for "definitely agree" and "tend to agree" in 1991 and 1993 to 44% in 1996, while for medicines and vaccines it moves from 88% to 89% to 71% for the same dates. It is of course impossible to determine to what extent this decline reflects reality or results from the change in wording. Concerning the third application (the use of biotechnology to detect disease), no statistically significant percentage difference is observed between 1991 (74%), 1993 (73%) and 1996 (75%), this despite the fact that, unlike the two preceding applications, the wording here was very different, and not just in form.

As with the preceding question, in all the EU countries, the two applications of modern biotechnology that rank first are the use of genetic tests to detect certain diseases and the production of medicines and vaccines by means of genetic engineering (Table 15).

Austria again stands out from the other countries by virtue of particularly low support for the different applications.

As with the preceding questions, a low percentage of persons in both the Netherlands and Sweden have no opinion (Table 16), while the percentages are high in Ireland, Spain, Luxembourg and Austria.

<sup>39</sup> In 1991 and 1993, the question was worded as follows: "Please indicate if you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement: this type of research on (APPLICATION) is worth being conducted and should be supported."



In 11 out of 15 countries (Figure 19), an absolute majority of respondents state that the six applications mentioned should be encouraged. In Ireland, the global index of encouragement is exactly 50%. In Luxembourg, Germany (particularly in the West) and Austria, these ratings are 47%, 45% and 31%, respectively.

The index of encouragement is very strongly correlated to the index of moral acceptability and the index of social benefit ( $r = 0.79$  and  $0.75$ , respectively). In other words, the more an application is considered morally acceptable or beneficial to society, the greater the opinion that it should be encouraged. This is hardly surprising. On the other hand, there is no statistically significant relationship between the risk and support indexes.

Just as in the case of the moral acceptability index and in the same proportions, the support index is positively correlated to the index of optimism regarding new technologies ( $r = 0.32$ ) and the "objective" knowledge index ( $0.22$ ).

Inasmuch as the variations according to the different independent variables are of the same type for this index as for the preceding ones, we shall not dwell on them.

To conclude this section, it is clear that, on the whole, Europeans are aware of the potential risks and benefits of modern biotechnology. In fact, this rather mixed stance is not specific to biotechnology, but is applied to science and technology in general, as was shown by a EUROBAROMETER survey carried out by DG XII in 1993.<sup>40</sup> It is also worth noting that opinion surveys carried out in Canada and Australia produced similar findings.<sup>41</sup>

## 5.2 BENEFITS, RISKS AND THE REGULATION OF BIOTECHNOLOGY

Question 11: People have different views about the benefits and risks of modern biotechnology and about how it should be regulated and controlled. I am going to read you a number of statements. Please tell me whether you tend to agree or tend to disagree with each one.

- a) Current regulations are sufficient to protect people from any risks linked to modern biotechnology.
- b) Irrespective of the regulations, biotechnologists will do whatever they like.
- c) Only traditional breeding methods should be used, rather than changing the hereditary characteristics of plants and animals through modern biotechnology.
- d) The regulation of modern biotechnology should be left mainly to industry.
- e) Modern biotechnology is so complex that public consultation about it is a waste of time.
- f) It is not worth putting special labels on genetically modified foods.
- g) I would buy genetically modified fruit if it tasted better.
- h) Religious organisations should have a say in how modern biotechnology is regulated.
- i) We should accept some degree of risk from modern biotechnology if it enhances economic competitiveness in Europe.
- j) Traditional breeding methods can be as effective as modern biotechnology in changing the hereditary characteristics of plants and animals.

Only 18% of Europeans tend to agree that it is not worth putting special labels on genetically modified foods (Figure 20), and only 8%, the lowest percentage of this series of

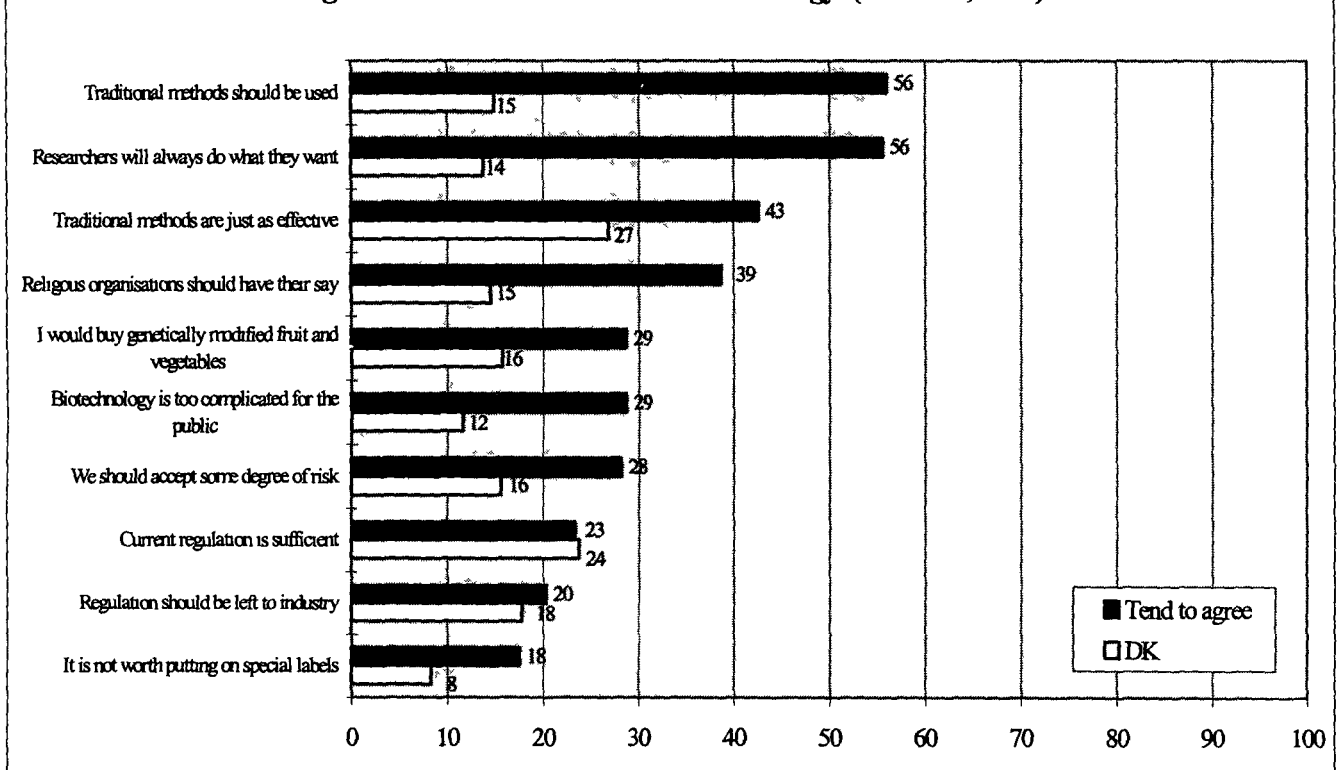
<sup>40</sup> See INRA (1993).

<sup>41</sup> See Decima Research (1993) and Kelley (1995b).

statements, have no opinion. In other words, a large majority of respondents (74%) think these products should be clearly labelled.<sup>42</sup>

Still on this point, the European public expresses the same general preference as the public of other, non-European countries concerning the labelling of genetically modified products and consumer choice<sup>43</sup>: without such labelling, the majority of people are opposed to genetically modified products.

**Figure 20: Risks and benefits of biotechnology (% EU 15, 1996)**



hi all the EU countries (Table 17), only a minority of respondents feel "it is not worth" labelling genetically modified products. The number ranges from 26% in Luxembourg to

<sup>42</sup> The European Parliament and Council Directive on novel foods and novel food ingredients, adopted by the European Parliament in January 1997, provides, *inter alia*, for the labelling of genetically modified products and is in thus in line with European public thinking.

<sup>43</sup> On this subject, see, among others, Kelley (1995b) for Australia; Optima (1994) for Canada and Hoban and Kendall (1992) for the United States.

10% in Greece. Conversely, the strongest opposition to the absence of labelling is recorded in Greece (81%).

The numbers of those with no opinion on this subject (Table 18) are markedly higher in Ireland (21%), Portugal (20%) and Spain (17%). As is often the case, the Netherlands and Denmark have the smallest numbers expressing no opinion (3%).

Since only a small minority of respondents consider it unnecessary to label genetically modified products, it is not surprising that there are hardly any variations between the different socio-demographic groups.

Two out of ten Europeans think the regulation of modern biotechnology should be left mainly to industry (Figure 20). With 18% having no opinion, this means that 62% do not trust industry to regulate modern biotechnology.

The greatest proportions supporting industry are found in Britain and Ireland: 27% think that regulation should be left to industry. Conversely, the lowest ratings are found in Sweden (12%), Belgium (14%), Greece (14%) and the Netherlands (15%) (Table 17).

The percentage of "DK" answers is considerably more varied from country to country than is the case for labelling. These percentages are very high in Portugal (35%), Spain (33%), Greece (31%) and Ireland (28%). In the Netherlands (4%) and Denmark (5%) on the other hand, they are again particularly low (Table 18).



**Table 17: Opinions on the benefits and risks of biotechnology (% "tend to agree", by country, 1996)**

	B	DK	WD	D	OD	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK	EU 15
Traditional methods should be used	46	59	60	60	61	69	46	54	59	58	56	41	70	49	55	58	60	56
Researchers will always do what they want	58	71	61	60	54	41	46	60	56	53	60	56	52	37	50	56	59	56
Traditional methods are as effective	35	49	44	46	54	41	38	38	50	32	33	41	48	51	54	46	55	43
Religious organisations should have their say	23	15	36	35	30	37	33	25	39	59	36	35	50	46	24	35	45	39
Biotechnology is too complicated for the public	25	42	22	21	17	26	27	31	32	37	37	20	30	27	20	23	34	29
I would buy genetically modified fruit	29	26	25	25	28	20	28	30	29	27	19	33	17	37	30	22	37	29
We should accept some degree of risk	27	30	29	28	24	32	32	18	42	23	26	36	27	26	32	23	40	28
Current regulation is sufficient	23	24	27	27	25	18	22	22	23	18	26	36	21	23	33	22	24	23
Regulation should be left to industry	14	19	17	17	16	14	24	22	27	19	18	15	19	20	18	12	27	20
It is not worth putting on special labels	17	12	21	22	24	10	14	16	18	23	26	18	19	18	13	14	12	18

**Table 18: Opinions on the benefits and risks of biotechnology (% "DK", by country, 1996)**

	B	DK	WD	D	OD	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK	EU 15
Traditional methods are as effective	35	14	25	25	23	26	35	32	32	31	32	19	23	31	13	26	19	27
Current regulation is sufficient	22	15	15	15	16	30	34	18	38	35	19	16	12	38	18	29	22	24
Regulation should be left to industry	19	5	16	16	17	31	33	17	28	18	13	4	22	35	9	14	11	18
I would buy genetically modified fruit	20	8	17	17	19	14	22	17	27	14	12	10	14	17	9	11	13	16
We should accept some degree of risk	19	7	12	13	15	25	32	12	23	16	17	8	16	26	10	10	12	16
Traditional methods should be used	22	6	15	14	13	13	24	16	23	13	16	11	14	24	9	12	10	15
Religious organisations should have their say	16	8	17	17	17	24	25	13	22	10	13	5	20	17	10	16	10	15
Researchers will always do what they want	11	3	12	14	18	23	23	9	25	16	10	5	16	25	13	13	9	14
Biotechnology is too complicated for the public	12	5	14	14	15	13	19	7	23	11	8	3	23	18	6	8	9	12
It is not worth putting on special labels	9	3	6	6	8	9	17	6	21	10	7	3	8	20	5	5	6	8

Opinions also differ notably depending on a number of socio-demographic variables:

- The higher the level of education, the lower the inclination to let industry take charge of regulation: while 25% of those who left school before the age of 15 are broadly in favour of letting industry regulate modern biotechnology, this falls to only 14% of those who completed their education after the age of 20. Moreover, the higher the level of education, the greater the tendency to have an opinion: the percentage of those with no opinion rises from 9% for the most educated to 29% for the least educated.
- Opposition to self-regulation by industry increases according to income level: 51% of those with the lowest incomes are against it, compared with 77% of those with the highest. The number of people with no opinion decreases as income rises.
- Similarly, and surprisingly perhaps, it is managers, employees and the self-employed who are least favourable to industry laying down regulations: the percentages for these categories are 14%, 16% and 19%, respectively. Conversely, workers and the unemployed are the groups most in favour (24% and 25%), though this relationship is explained largely by the level of education.
- Those located on the left of the political spectrum are slightly less in favour of industry-led regulation: 18%, compared with 23% of those placing themselves on the right.
- Opinion leaders are also less in favour of the idea of regulation by industry (74% not in favour, compared with 45% of non-leaders).

At the other end of the scale (Figure 20), 56% of Europeans tend to agree that only traditional breeding methods should be used rather than modifying the hereditary characteristics of plants and animals through modern biotechnology. Fifteen percent of respondents have no opinion on the subject. Moreover, 43% of Europeans think traditional breeding methods can be as effective as modern biotechnology for modifying the hereditary characteristics of plants or animals. A significant number of respondents (27%, i.e. the highest rate) have no opinion.

Opinions on these two subjects differ quite markedly from country to country (Table 17), Austria and Greece are most in favour of the preferential use of traditional breeding methods (70% and 69% respectively), while the Netherlands (41%), Belgium (46%) and Spain (46%) favour it least. The proportion of persons who think that traditional breeding methods can be as effective as modern biotechnology exceeds 50% in the United Kingdom, Finland, East Germany and Portugal, but turns around 30% in Italy, Luxembourg and Belgium.

Those who think traditional breeding methods should be used instead and that these methods are as effective as modern biotechnology have a lower "objective" knowledge index than those who think the opposite. They also tend to be less educated and older.

A majority of Europeans (56%) think that, irrespective of regulations, researchers in biotechnology will do whatever they want (Figure 20). This opinion is most prevalent in Denmark (71%), while in Portugal it only represents 37%. Both Portugal and Ireland have a large number of respondents with no opinion (25%).

Still regarding regulation, only 23% of Europeans consider that current regulations are sufficient to protect people from any risks associated with modern biotechnology. Insofar as 24% have no opinion on this question, this indicates that 53% of respondents think the current regulations are insufficient.

Greece and Italy show lower ratings than the other countries in considering current regulations to be sufficient (18%). Conversely, the Netherlands (36%) and Finland (33%) seem the most confident in this area. It should be noted (Table 18) that the percentages of "DK" answers are particularly high in Ireland, Portugal, Italy and Spain (34% - 38%).

Continuing with the subject of regulation, 39% of Europeans (Figure 20) consider that religious organisations should have their say regarding the regulation of modern biotechnology. Clearly, the more religious people are, the more they are likely to share this point of view: the percentage ranges from 62% of those who claim to be extremely religious to only 17% of those who call themselves atheists. The greater the level of education and the lower the age of the respondent, the less likely they are to share this view.

Particularly high percentages (Table 17) of Italians and Austrians believe religious organisations should have input regarding the regulation of modern biotechnology (59% and

50%, respectively), while particularly low percentages are recorded in Denmark (15%), Belgium (23%), Finland (24%) and France (25%).

Still on the subject of regulation, only three out of ten Europeans tend to agree that modern biotechnology is so complex that it is a waste of time asking the public about it.

Denmark (42%), Italy (37%) and Luxembourg (37%) have the highest percentages of persons thinking this way. Conversely, in the Netherlands (20%), Finland (20%) and Germany (21%; 17% for the East), these percentages are the lowest.

The index of "objective" knowledge is 5.4 for persons who think the public should be consulted, compared with 4.8 for those who think that it too complex a subject for the public.

Not even three out of ten Europeans would be willing to buy genetically modified fruit if it tasted better.<sup>44</sup> Britain, Portugal and the Netherlands have the highest numbers of those claiming to be willing to buy genetically modified fruit (37%, 37% and 33% respectively). Austria, Luxembourg and Greece have the lowest numbers for this point (17%, 19% and 20% respectively). The highest percentage of "DK" answers is in Ireland (27%).

Those who know more about biotechnology tend to be more receptive to the idea of buying genetically modified fruit: the index of objective knowledge is 5.5 for those prepared to buy genetically modified fruit, compared with 4.9 for those who are not. Along the same lines, the global risk index associated with biotechnology is higher for those not willing to buy than for those who are (56%, compared with 48%).

The younger and more educated people are, the more willing they are to buy genetically modified fruit if it tasted better: the figure ranges from 25% for those with the lowest level of education to 33% for those with the highest (and 37% for those still receiving some form of education), and from 25% for those aged 55 and older to 35% for those aged 15 to 24. The same applies regarding income levels: only 26% of those in the lowest income bracket would be willing to buy such fruit, compared with 36% in the higher income groups.

<sup>44</sup> This is apparently far less than in Australia. It emerged from the survey already cited (Kelley, 1995b) that 61% of respondents were entirely or probably willing to eat genetically modified tomatoes.

Also, significantly more men than women would consider buying genetically modified fruit (33% versus 25%). The same is true of opinion leaders (30%, versus 24% of non-leaders).

The last item in this series dealt with the acceptance of certain risks: only 28% of Europeans think that some degree of risk resulting from modern biotechnology should be accepted if it would enhance economic competitiveness in Europe. Fifty-six percent have the opposite opinion and 16% have no opinion.

The Irish (42%) and British (40%) are most willing to accept some degree of risk regarding biotechnology if that would increase economic competitiveness, while the French are least willing (18%). The number of persons with no opinion on this subject is especially high in Spain (32%), Portugal (26%), Greece (25%) and Ireland (23%).

It follows, then, that the global risk index is higher for those who do not want to take risks in the name of competitiveness than for the others (56% versus 50%). On the other hand, there is no statistically significant relationship between the index of objective knowledge and this item.

The better educated are neither more nor less likely than anyone else to feel that risks should be taken. On the other hand, a distinctly higher number in this group has an opposing opinion (64%, compared with 47% of those with a lower level of education). They are also far less likely to have no opinion (8%, compared with 25%).

Income level has a similar effect in this regard: 52% of those in the lowest income groups are opposed to taking risks, compared with 64% of those with higher incomes. Moreover, there is hardly any difference among those who are in favour of it. Here again, this is explained by the percentage of "DK" answers, which decreases according to income level.

More men than women are willing to take risks (32% versus 25%). The same is true for those who claim to be on the right of the political spectrum (33%, compared with 25% for those claiming to be on the left),

### 5.3 AUTHORITIES BEST PLACED TO REGULATE BIOTECHNOLOGY

Having considered the problem of the regulation of modern biotechnology in general, we need to see which authority Europeans believe is best placed to carry out such regulation.

**Question 12:** Which one of the following bodies do you think is best placed to regulate modern biotechnology? (ONE ANSWER ONLY).

International organisations such as the United Nations (UN) or the World Health Organisation (WHO)

Public authorities in (OUR COUNTRY)

Ethics committees

Our national parliament

The European Union, public bodies in the European Union

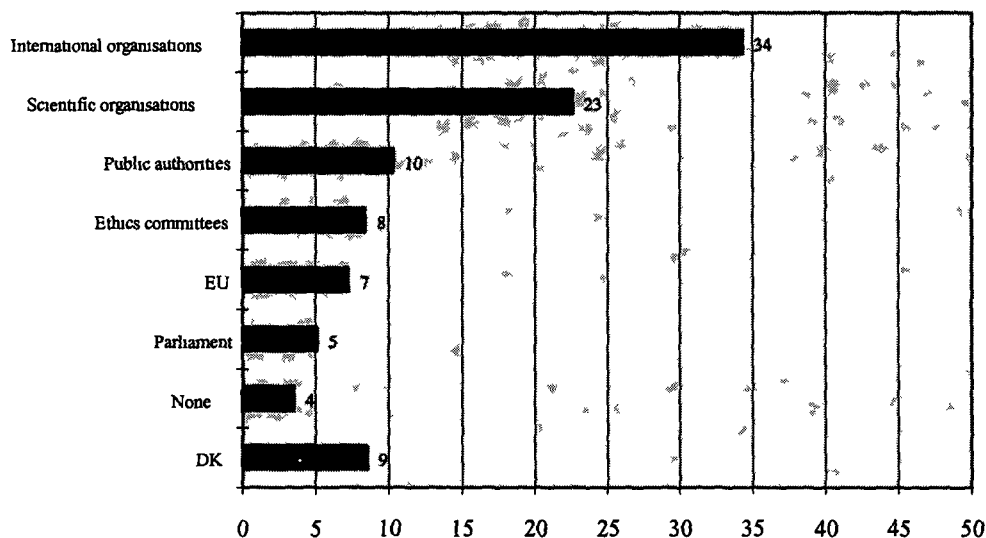
Scientific organisations

None of these (SPONTANEOUS)

DK

As Figure 21 shows, the interviewees consider that international organisations such as the United Nations and the World Health Organisation are best placed to regulate modern biotechnology. Next come scientific organisations and, far behind, national public authorities, ethics committees, the European Union and national parliaments.

**Figure 21: Organisation best placed to regulate biotechnology (% EU 15, 1996)**



In all the EU countries (Table 19) - except Ireland, where the national public authorities come first - international organisations such as the WHO are cited most often. This is particularly true of the Netherlands, where half of all respondents approve such organisations.

Scientific organisations are also among those most often cited: except for Denmark, Ireland and Austria they occupy second place in all countries, but are often far behind the international organisations. In Denmark, ethics committees rank second. In Ireland, second place is taken by international organisations and in Austria by the national public authorities. The other organisations are mentioned far less frequently in all the EU countries.

As for the impact of socio-demographic variables, the same two organisations came first every time regardless of level of education, age, sex, index of opinion leadership, political or religious viewpoint. That said,

- The better educated people are, the more likely they are to choose international organisations and the less likely they are to have no opinion;
- Younger respondents tend to have more confidence in scientific organisations;
- The percentage of "DK" answers decreases greatly with the index of opinion leadership, while the number of persons choosing international and scientific organisations increases;
- Far lower numbers of persons claiming to be extremely religious express confidence in international and scientific organisations than those who do not claim to be so; on the other hand, they are slightly more inclined to trust in ethics committees.

**Table 19: Organisation best placed to regulate biotechnology (% by country, 1996)**

	B	DK	WD	D	OD	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK	EU 15
International organisations	36	30	27	29	38	32	35	29	25	39	38	50	29	30	41	34	39	34
Public authorities	9	10	14	13	12	14	15	12	28	3	7	5	17	11	4	8	9	10
Ethics committees	9	25	11	10	7	5	3	16	10	5	5	8	12	3	5	10	5	8
Parliament	2	6	6	5	4	6	3	3	3	4	5	4	10	7	4	6	9	5
EU	6	2	7	6	6	7	8	8	6	7	9	10	6	6	10	2	9	7
Scientific organisations	24	20	18	18	20	26	24	25	12	30	15	19	12	27	30	32	17	23
None	5	3	7	7	5	3	2	3	2	3	7	1	5	1	1	2	3	4
DK	10	4	11	10	8	8	12	6	15	9	14	2	8	14	4	6	8	9



As for the impact of socio-demographic variables, the same two organisations came first every time regardless of level of education, age, sex, index of opinion leadership, political or religious viewpoint. That said,

- The better educated people are, the more likely they are to choose international organisations and the less likely they are to have no opinion;
- Younger respondents tend to have more confidence in scientific organisations;
- The percentage of "DK" answers decreases greatly with the index of opinion leadership, while the number of persons choosing international and scientific organisations increases;
- Far lower numbers of persons claiming to be extremely religious express confidence in international and scientific organisations than those who do not claim to be so; on the other hand, they are slightly more inclined to trust in ethics committees.

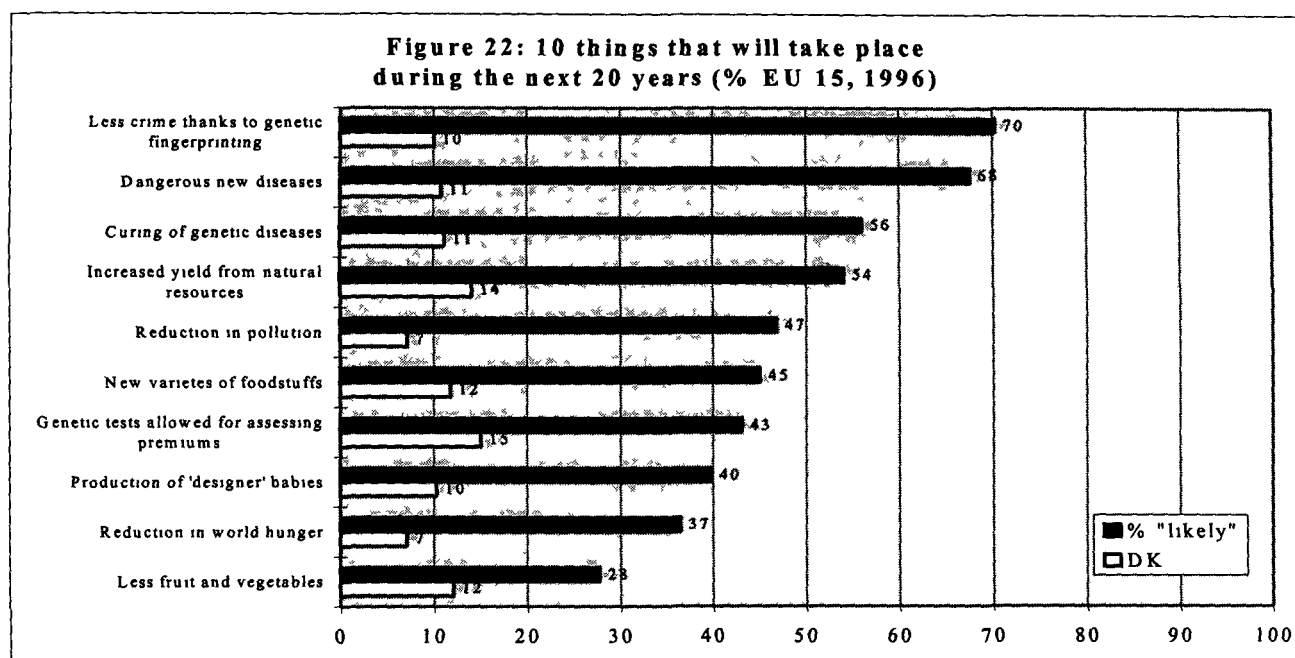
## 5.4 LIKELY DEVELOPMENTS IN BIOTECHNOLOGY

Modern biotechnology is developing rapidly. What developments are Europeans expecting and, more precisely, which do they consider likely to take place over the next 20 years? This is what the following question attempts to assess.

Question 13: I am going to read you a list of 10 things that might happen in the next 20 years as a result of developments in modern biotechnology. For each one, please tell me whether you think it is likely or unlikely to happen within the next 20 years?

- Substantially reducing environmental pollution
- Allowing insurance companies to ask for a genetic test before they set a person's premium
- Substantially reducing world hunger
- Creating dangerous new diseases
- Solving more crimes through genetic fingerprinting
- Reducing the range of fruit and vegetables available
- Curing most genetic diseases
- Getting more out of natural resources in Third World countries
- Producing 'designer' babies
- Replacing most existing food products with new varieties.

Seven out of ten Europeans think it probable that over the next 20 years more crimes will be solved through genetic fingerprinting and that dangerous new diseases will be created. At the other extreme of Figure 22, the two developments Europeans consider least likely are a reduction in the range of fruits and vegetables available (only 28% of respondents think this likely over the next 20 years) and a substantial reduction in world hunger (37%). The rate of "DK" answers ranges from 7% to 15%.



If we look beyond this mere statement of results to the structure of the responses, we find that the respondents seem to make a fairly clear distinction between two types of development: those which could be described as "obviously positive" and those which are negative or ambivalent. This is shown by a factorial analysis carried out on these 10 items.<sup>45</sup> The items which make up the two factors are, in descending order of saturation:<sup>46</sup>

**Developments perceived as positive;**

- substantially reducing world hunger
- getting more out of natural resources in Third World countries
- substantially reducing environmental pollution
- curing most genetic diseases
- solving more crimes through genetic fingerprinting.<sup>47</sup>

<sup>45</sup> The two factors isolated by the factorial analysis and presented here were analysed according to a VARIMAX type rotation. "DK" answers were excluded from this analysis.

<sup>46</sup> Saturation is a weighting coefficient indicating to what extent the item is related to the factor. In a way it is a correlation coefficient between the item and the factor. The higher the coefficient, the more significant the variable in the factor definition.

<sup>47</sup> However, the saturation of this item is only 0.35, i.e. clearly less than the other saturations, indicating that this item is only related somewhat weakly to this factor. Saturation varies between -1 and +1.

**Developments perceived as negative or ambivalent:**

- producing 'designer' babies
- replacing most existing food products with new varieties
- reducing the range of fruits and vegetables available
- allowing insurance companies to ask for a genetic test before they set a person's premium
- creating dangerous new diseases.

Figure 22 shows that Europeans see the future of modern biotechnology not in terms of good or bad, but as a mixture of the two.

**Table 20: The following 10 things are likely to happen over the next 20 years (% “likely” by country, 1996)**

	B	DK	WD	D	OD	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK	EU15
Reduction in pollution	53	61	35	37	44	39	55	54	59	46	52	41	33	57	38	52	49	47
Genetic test for premiums	36	49	44	41	33	37	38	41	48	41	35	46	28	42	26	34	60	43
Reduction in world hunger	36	32	29	28	24	34	42	44	44	47	43	21	30	49	17	16	35	37
Dangerous new diseases	60	76	61	60	59	87	74	71	63	65	69	80	60	75	67	74	67	68
Genetic fingerprinting in enquiries	59	90	70	71	75	55	73	74	81	54	57	64	50	77	79	75	84	70
Less fruit and vegetables	26	25	22	20	16	46	28	40	24	27	31	18	25	38	18	30	26	28
Curing of genetic diseases	54	57	41	42	45	75	70	66	52	68	53	41	38	70	68	42	48	56
Increase in yield	45	64	48	48	46	51	55	54	55	56	47	60	39	50	67	65	60	54
Production of ‘designer’ babies	33	31	45	42	29	57	48	41	38	38	34	18	29	41	27	17	43	40
New varieties of foodstuffs	46	38	42	40	34	70	45	51	48	50	36	32	32	53	31	31	44	45

**Table 21: The following 10 things are likely to happen over the next 20 years (% “DK” by country, 1996)**

	B	DK	WD	D	OD	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK	EU15
Reduction in pollution	8	3	9	8	7	15	9	5	12	8	9	3	11	7	2	5	5	7
Genetic test for premiums	15	4	15	15	14	32	33	7	21	19	13	3	20	22	7	6	8	15
Reduction in world hunger	9	3	10	9	8	12	8	5	12	9	8	2	14	5	3	5	4	7
Dangerous new diseases	15	6	14	14	14	6	13	11	17	11	12	5	17	7	5	9	7	11
Genetic fingerprinting in enquiries	13	3	12	11	10	23	15	7	11	13	12	4	19	12	6	9	3	10
Less fruit and vegetables	15	7	12	12	12	15	21	11	20	12	12	3	19	15	7	12	9	12
Curing of genetic diseases	13	6	16	16	15	14	15	9	18	11	12	6	23	11	5	9	5	11
Increase in yield	16	7	16	16	17	25	19	13	20	14	16	5	24	16	8	11	9	14
Production of ‘designer’ babies	13	4	14	13	12	22	17	6	18	8	10	2	22	13	4	5	7	10
New varieties of foodstuffs	14	4	16	16	15	15	21	8	18	10	11	4	17	12	6	7	7	12

The number of "DK" answers varies quite appreciable by country and by item (Table 21). The percentage of persons with no opinion is particularly high in Spain (33%) and Greece (32%) as to whether insurance companies should be allowed to ask for a genetic test before setting a client's premium.

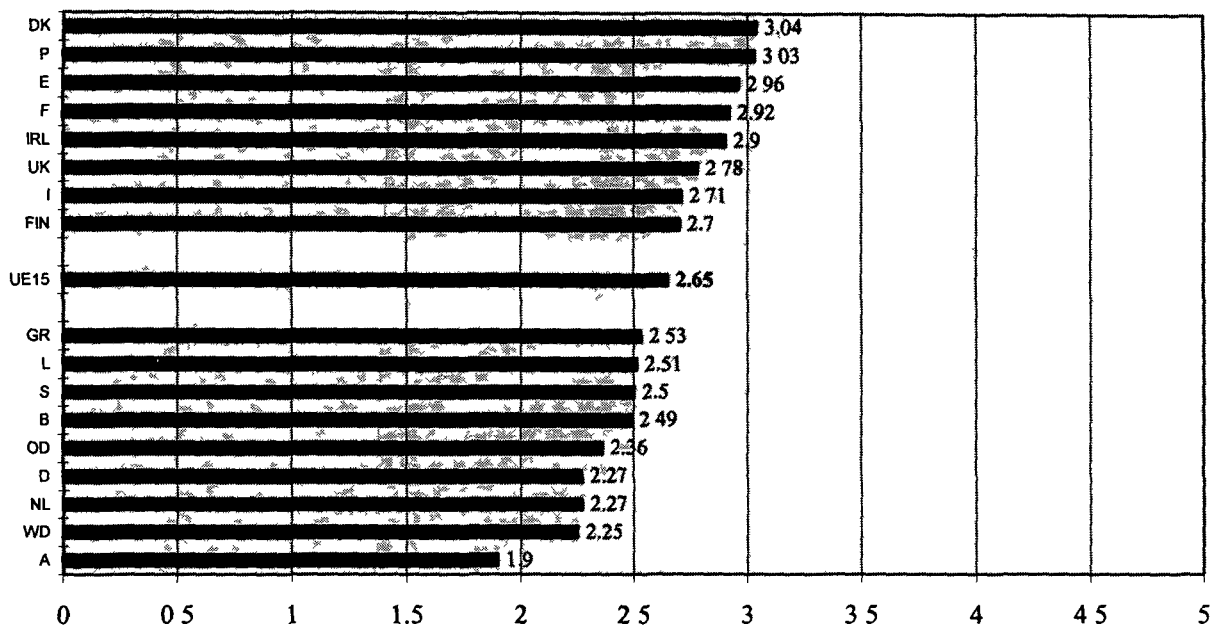
A reduction in the range of available fruit and vegetables is the development considered least likely, except in Greece, Sweden and Finland, where it is the reduction of world hunger (Table 20). In the Netherlands, the reduction of available fruit and vegetables receives the same percentage as the production of 'designer' babies. However, it is important to note that these percentages vary greatly from one country to the next. Thus, in France and Portugal distinctly more people than elsewhere think a reduction in the range of available fruits and vegetables is likely to occur (40% and 38% respectively).

In the majority of countries, the two developments most often perceived as likely to occur are the solution of more crimes through genetic fingerprinting and the appearance of dangerous new diseases. Again, there are significant variations according to country. For example, in Denmark and Britain, 90% and 84% respectively think it will be possible to solve more crimes through genetic fingerprinting. In Greece and the Netherlands, 87% and 80% respectively fear the appearance of dangerous new diseases.

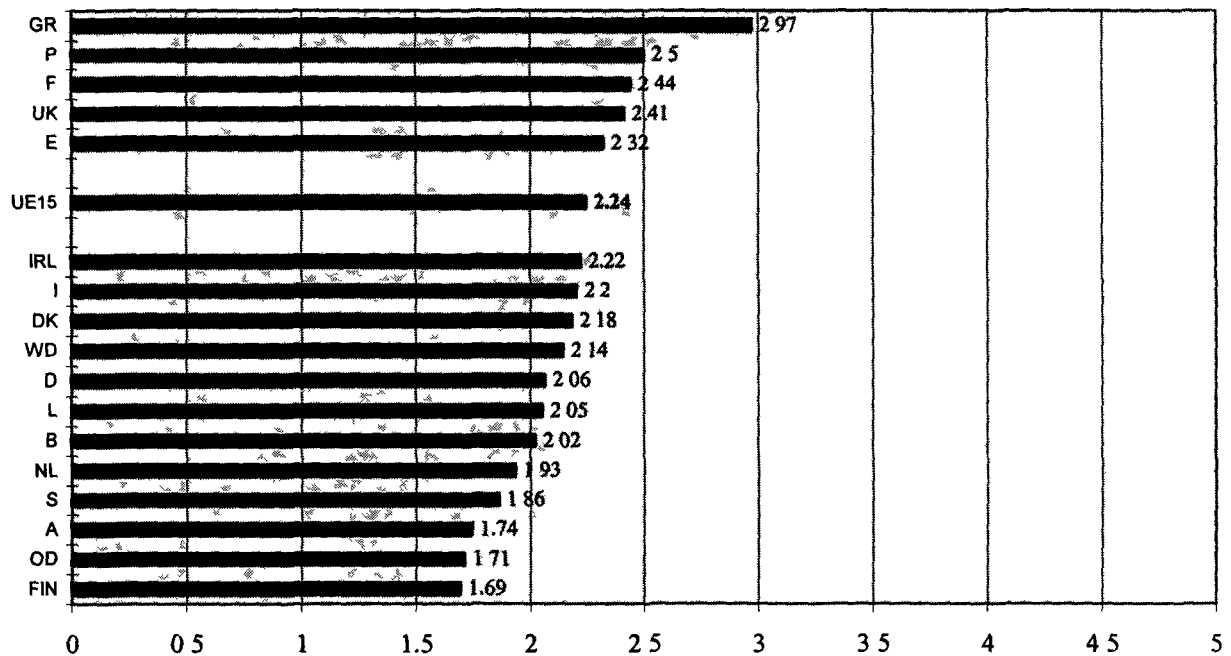
Indexes were again used to present a more summarised analysis of the results according to the different socio-demographic variables. Two scores were thus calculated for each respondent, one for each factor. Insofar as the two factors comprise five items each, these scores range from 0 to 5 depending on the number of developments the person considers likely to take place. Figures 23 and 24 show the national averages.

Denmark and Portugal have the highest number of respondents who think that developments considered positive are likely to take place over the next 20 years: on average, they mention 3.04 and 3.03 developments out of the five concerned. Conversely, Austrians only cite 1.9. The European average is 2.65 (Figure 23).

**Figure 23: Average score of positive developments (by country, 1996)**



**Figure 24: Average score of negative or ambivalent developments (by country, 1996)**



Developments described as negative or ambivalent (Figure 24) are generally considered slightly less likely: the average score for the European Union is 2.24. Average scores range from 2.97 amongst the Greeks (the most pessimistic in this respect) to 1.69 in Finland. In Austria (1.74) and the new German *Länder* (1.71), average scores are also appreciably lower than those of other countries.

The two sets of rankings are not mirror images of each other; a country which rates one item high will not necessarily rate another low. On an individual basis the exact opposite occurs, inasmuch as Pearson's correlation coefficient between the two indices is positive, though low (0.18). Once again, this emphasises that Europeans do not see developments in modern biotechnology as purely good or purely bad.

The impact of the socio-demographic variables is generally slight, and not always linear.<sup>48</sup> Thus, only the most notable differences are mentioned below.

- The index of positive developments **and** of negative/ambivalent developments tends to be somewhat higher among those who left school between 16 and 19 years of age and lower for those who finished before the age of 15; however, the differences are slight;
- Among persons who finished their education after the age of 19 or who are still receiving some form of education, those with training in natural sciences tend to consider a greater number of positive **and** negative/ambivalent developments as likely to occur than the other groups;
- On average, persons older than 55 cite fewer negative or ambivalent developments as likely to occur than others. With respect to the other index, however, no real significant differences are noticeable;
- Contrary to the impact of age and level of education, the effect of income *is* linear: both indices increase with income (though less so for the second);

<sup>48</sup> Inasmuch as the effect of such variables as age, level of education, etc. is not linear, a linear regression analysis such as carried out on the other indices makes no sense here.



- Significantly more men than women tend to think that the five positive developments are likely to happen. On the other hand, there is no statistically significant difference regarding negative/ambivalent developments;
- On average, persons claiming to be extremely religious mention fewer positive developments than the other groups. With respect to negative developments, there is no notable difference;
- The farther to the right on the political spectrum, the greater the tendency to consider both positive and negative/ambivalent developments likely;
- Both indices are positively correlated to the index of opinion leadership;
- The more optimistic people are about the impact of new technologies, or the higher the level of "objective" knowledge of biotechnology, or the more useful the various applications of biotechnology are held to be, or the more people think these applications should be encouraged, then the more likely they are to think the five positive developments will actually occur, but also, albeit to a lesser extent, the five negative/ambivalent developments.
- Finally, the more the negative/ambivalent developments are considered likely to occur over the next 20 years, the more the different applications of biotechnology mentioned in the survey are considered to involve risks to society. Concerning the positive developments, Pearson's correlation coefficient is not statistically significant.

## 6. RELIABILITY OF INFORMATION ON BIOTECHNOLOGY

Which sources of information on biotechnology do Europeans trust? This is clearly a matter of outstanding importance, given that one of the main aims of this study is to work towards better public information on modern biotechnology, and consequently a better understanding of the nature of this research, its potential, and the possible risks.

We therefore used the *split ballot* technique once again to better assess the reliability of the various information sources and better define their different aspects: two different versions were formulated of one question on this subject, and each submitted to one half of the sample. One of these versions was used in the two earlier surveys; the other is new. The results from these two questions will thus be analysed separately.

We shall begin with the *trend* version, which was asked in the same form in 1991 and 1993. However, before analysing the responses, a methodological comment is necessary: since the bases on which the national percentages were calculated were relatively narrow in 1996 (the question was put to only half the sample, i.e. around 500 persons per country), care should be taken in interpreting possible national differences as the margins of error are wider.

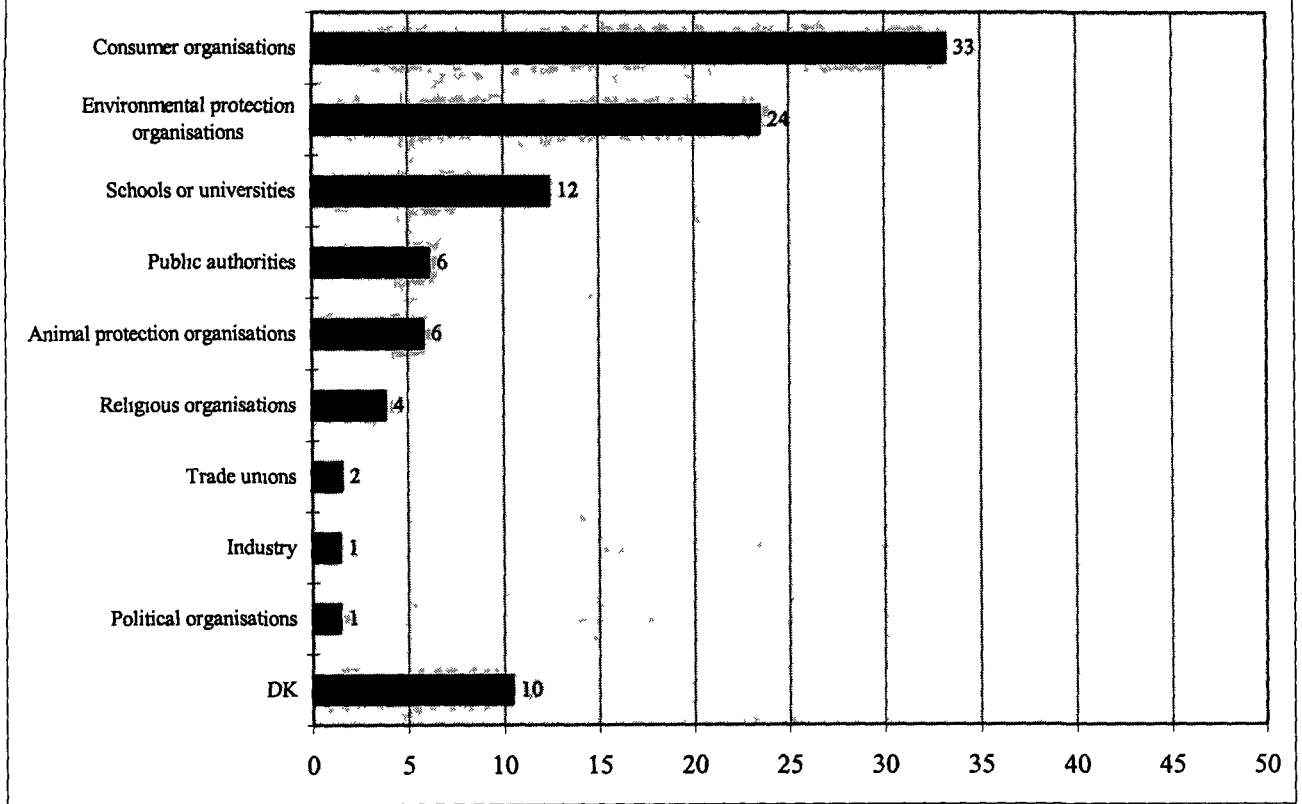
### Question 14: SPLIT BALLOT A

Now, I would like to know which of the following sources of information you have confidence in to tell you the truth about modern biotechnology.

- a) Please choose from this list the source of information you trust most (ONE ANSWER ONLY).
- b) Indicate also which other sources you would trust to tell you the truth about modern biotechnology (SEVERAL ANSWERS POSSIBLE).

Consumer organisations  
 Environmental protection organisations  
 Animal welfare organisations  
 Political organisations  
 Trade unions  
 Religious organisations  
 Public authorities  
 Industry  
 Schools or universities  
 DK

**Figure 25: Most trusted source of information on biotechnology  
(% EU 15, 1996)**



As Figure 25 shows, consumer organisations are by far the source of information in which Europeans have the most confidence with regard to biotechnology. These are followed by environmental protection organisations and, significantly further back, schools and universities. All other sources of information receive less than 10%.

**Table 22: Most trusted source of information on biotechnology (% by country, 1991-1996)**

		B	DK	WD	D	OD	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK	EC12
Consumer organisations	91	29	34	32	32	30	12	24	41	16	19	24	33	-	15	-	-	21	27
	93	24	30	27	29	37	14	21	39	17	19	21	33	-	17	-	-	20	26
	96	34	36	41	40	37	21	26	46	24	25	32	39	38	30	24	25	27	34
Environmental protection organisations	91	20	16	26	27	34	20	17	19	29	25	22	19	-	19	-	-	23	23
	93	23	17	37	36	31	27	25	24	31	36	28	20	-	26	-	-	29	30
	96	25	18	24	26	31	23	25	20	23	26	23	22	27	21	16	24	23	23
Animal welfare organisations	91	4	7	4	5	6	2	6	5	4	4	7	5	-	4	-	-	6	5
	93	6	7	7	7	6	2	4	5	6	6	9	8	-	5	-	-	8	6
	96	5	8	7	8	8	3	4	6	8	7	5	4	6	2	2	6	6	6
Political organisations	91	1	0	2	2	1	1	1	1	1	1	3	2	-	1	-	-	1	1
	93	1	0	1	1	1	1	0	0	2	0	1	1	-	1	-	-	1	1
	96	1	0	2	2	1	2	1	2	2	1	4	1	3	1	1	0	1	1
Trade unions	91	1	1	1	1	1	1	2	1	1	1	1	1	-	1	-	-	1	1
	93	1	1	1	1	1	1	1	1	1	1	2	1	-	2	-	-	2	1
	96	1	1	1	1	1	2	1	2	2	2	4	2	1	2	1	1	2	2
Religious organisations	91	2	1	4	3	2	3	3	2	4	4	3	2	-	4	-	-	4	3
	93	1	1	2	2	2	2	1	2	5	3	0	1	-	7	-	-	3	2
	96	1	0	2	3	4	5	2	3	7	7	3	3	5	4	1	2	6	4
Public authorities	91	5	16	8	8	7	11	6	5	6	5	9	9	-	6	-	-	8	7
	93	3	18	4	5	6	5	6	5	6	2	7	10	-	4	-	-	6	5
	96	3	6	3	3	3	13	12	6	7	4	5	6	6	6	16	10	5	6
Industry	91	1	2	1	1	0	0	2	2	1	1	2	1	-	0	-	-	2	1
	93	1	1	1	1	0	1	2	1	2	1	1	1	-	1	-	-	2	1
	96	1	1	1	1	0	3	1	1	1	2	0	2	1	1	1	2	2	1
Universities	91	24	15	11	11	12	31	17	12	21	20	14	17	-	12	-	-	23	17
	93	27	21	9	9	7	27	19	14	17	17	18	17	-	16	-	-	20	16
	96	17	24	8	8	8	20	12	6	12	14	13	16	6	13	34	23	17	12
DK	91	14	7	12	11	7	18	22	13	15	17	15	10	-	37	-	-	12	15
	93	13	5	11	10	10	21	21	10	14	14	13	10	-	21	-	-	11	13
	96	10	7	9	9	7	8	16	8	14	13	11	6	8	21	6	5	10	11

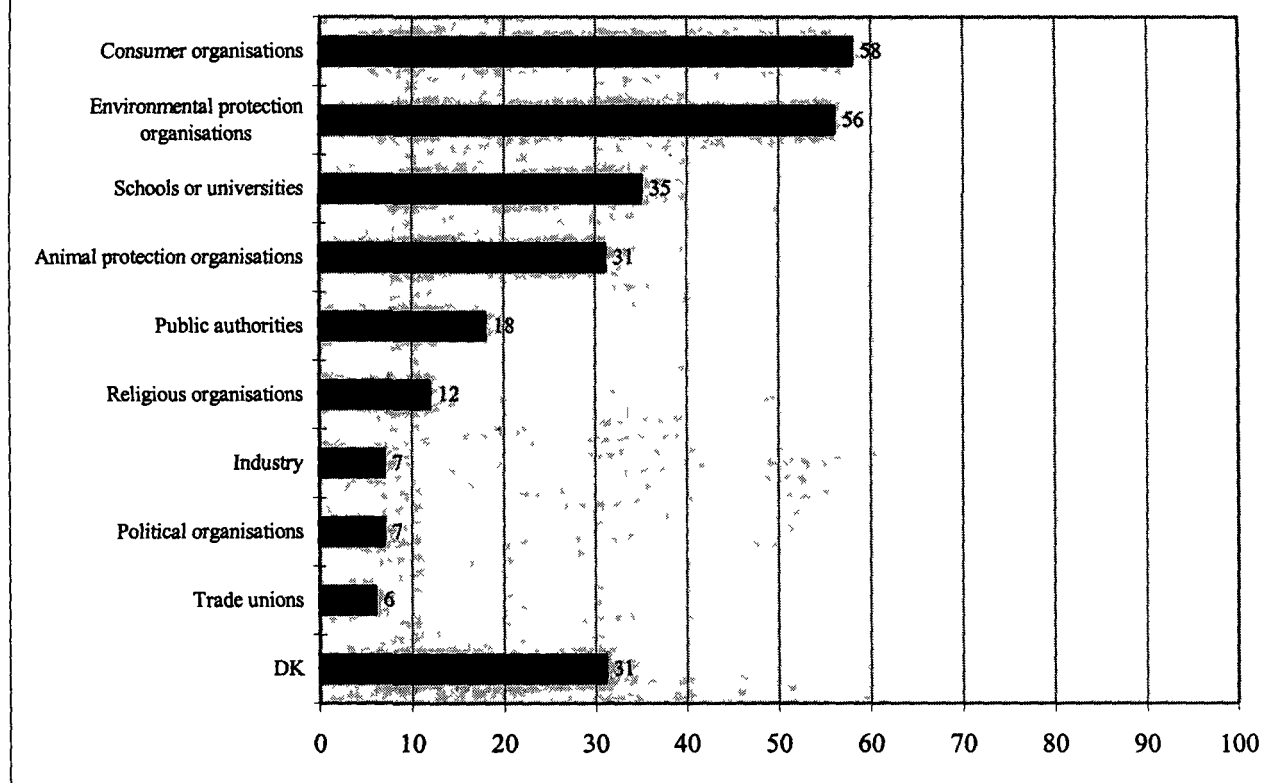
**Table 23: Other sources which can tell the truth regarding biotechnology (% by country, 1991-1996)**

		B	DK	WD	D	OD	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK	EC 12
Consumer organisations	91	24	30	32	32	32	24	20	23	25	21	19	30	-	16	-	-	24	25
	93	28	30	44	42	35	25	23	30	31	26	25	28	-	30	-	-	23	30
	96	25	28	29	30	31	24	26	20	28	21	22	31	30	23	31	29	24	24
Environmental protection organisations	91	30	31	36	37	42	28	25	33	26	26	24	30	-	23	-	-	27	30
	93	28	28	35	36	40	30	30	35	30	27	26	29	-	31	-	-	27	31
	96	31	29	42	42	41	38	28	35	32	29	28	40	39	29	26	30	25	33
Animal welfare organisations	91	22	18	30	31	37	14	18	28	17	27	16	22	-	22	-	-	15	24
	93	24	15	34	34	31	20	20	26	21	29	23	26	-	32	-	-	18	26
	96	28	17	32	34	40	25	19	24	22	29	17	31	30	22	15	23	18	25
Political organisations	91	3	3	6	6	4	3	3	2	6	4	4	5	-	4	-	-	3	4
	93	3	3	4	4	3	3	3	3	6	2	5	6	-	9	-	-	3	3
	96	7	2	8	7	4	5	4	5	3	4	5	8	10	4	1	3	4	5
Trade unions	91	4	3	5	5	5	3	4	3	5	4	6	5	-	4	-	-	4	4
	93	3	4	6	6	5	3	3	4	7	3	6	7	-	5	-	-	3	4
	96	5	3	7	6	4	6	5	4	6	4	5	5	10	3	4	3	4	5
Religious organisations	91	5	1	10	9	6	4	3	6	7	8	5	5	-	10	-	-	6	7
	93	3	1	10	9	5	4	4	3	9	6	5	5	-	13	-	-	6	6
	96	4	1	11	10	6	9	5	6	12	10	7	9	13	7	4	2	9	8
Public authorities	91	15	23	21	21	21	12	8	9	15	9	11	20	-	13	-	-	14	14
	93	9	27	11	12	14	11	9	13	11	8	11	20	-	14	-	-	14	12
	96	10	18	11	11	12	16	13	10	11	9	9	21	25	11	23	16	12	11
Industry	91	5	4	6	5	2	1	3	5	7	5	3	5	-	5	-	-	5	5
	93	6	4	4	3	2	4	5	5	6	5	5	6	-	7	-	-	5	5
	96	7	5	3	3	2	4	6	7	6	8	4	8	8	5	10	8	5	6
Universities	91	25	23	23	23	22	21	15	19	21	20	19	24	-	20	-	-	20	20
	93	25	27	23	23	20	26	20	23	23	22	27	25	-	26	-	-	22	23
	96	24	23	23	22	15	23	19	20	21	22	20	33	22	20	32	29	26	23
DK	91	15	13	13	12	9	29	9	25	21	28	17	18	-	7	-	-	26	20
	93	22	13	11	11	11	31	31	18	19	11	6	18	-	6	-	-	18	17
	96	22	18	14	14	14	15	29	21	20	25	23	11	12	31	13	19	21	21

**Table 24: All of the most reliable sources regarding biotechnology (% A+B by country, 1991-1996)**

		B	DK	WD	D	OD	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK	EC 12
Consumer organisations	91	52	64	64	64	63	36	45	64	42	40	43	63	-	31	-	-	45	52
	93	52	60	71	71	71	39	44	69	48	45	46	61	-	47	-	-	43	55
	96	59	64	70	70	68	45	52	66	52	46	55	70	68	53	56	54	51	58
Environmental protection organisations	91	50	47	61	64	76	48	42	52	56	52	46	48	-	42	-	-	49	53
	93	51	45	72	72	71	57	55	59	61	62	54	49	-	57	-	-	55	61
	96	55	47	66	67	72	61	53	55	55	54	51	62	65	50	42	54	48	56
Animal welfare organisations	91	26	26	34	36	43	16	23	32	21	32	23	27	-	27	-	-	22	29
	93	30	22	42	41	37	22	24	31	27	36	32	33	-	38	-	-	25	32
	96	33	25	39	41	48	27	22	30	30	36	22	35	36	23	18	28	23	31
Political organisations	91	3	3	8	7	4	5	3	3	7	5	7	7	-	6	-	-	4	5
	93	3	3	6	5	4	4	4	3	8	2	6	6	-	10	-	-	4	4
	96	8	2	10	9	5	7	5	7	5	5	9	9	13	5	2	3	5	7
Trade unions	91	5	4	6	6	6	4	6	4	7	6	7	6	-	6	-	-	5	4
	93	5	5	7	7	6	4	4	4	8	5	8	8	-	6	-	-	5	5
	96	6	3	8	7	5	7	6	6	7	6	9	7	11	4	4	4	6	6
Religious organisations	91	6	2	13	12	8	6	6	8	12	12	8	7	-	14	-	-	10	10
	93	4	2	12	11	7	6	6	5	14	9	5	6	-	20	-	-	8	8
	96	5	2	14	13	10	14	7	9	19	17	10	12	18	12	5	4	15	12
Public authorities	91	20	39	28	28	28	24	15	13	22	15	20	29	-	18	-	-	21	20
	93	12	45	16	16	19	16	15	18	17	10	19	30	-	17	-	-	20	17
	96	13	24	14	14	15	29	25	17	19	13	14	27	30	17	39	25	17	17
Industry	91	6	6	7	3	3	2	5	7	8	6	5	6	-	5	-	-	7	6
	93	7	5	5	4	2	5	6	6	7	6	5	7	-	8	-	-	7	6
	96	8	6	4	3	2	8	7	8	7	11	4	10	9	6	11	9	7	7
Universities	91	48	38	34	34	34	52	32	31	41	41	33	41	-	31	-	-	42	37
	93	51	48	32	31	27	53	39	37	40	40	44	42	-	42	-	-	42	39
	96	42	47	31	30	23	43	32	26	33	36	33	49	29	33	66	52	42	35
DK	91	20	15	15	11	11	29	31	26	22	29	32	18	-	45	-	-	27	24
	93	23	14	14	14	14	31	32	18	19	25	18	18	-	27	-	-	21	21
	96	32	24	23	23	22	23	46	30	34	37	34	17	21	51	19	24	31	32

**Figure 26: Most reliable sources regarding biotechnology  
(% UE 15, 1996)**



The same broad order is observed when we look at all the sources considered reliable and not just the single most reliable source (Figure 26). Thus, industry, political organisations and trade unions are thought to be least reliable in terms of information on modern biotechnology. Similarly, religious organisations and public authorities also receive very low ratings. The most pronounced differences between the two Figures concern animal welfare organisations and, to a lesser extent, schools and universities.

In 1996, in all the EU countries except Finland and Denmark (Table 22), consumer organisations and environmental protection organisations had the two highest ratings. In Finland, schools or universities are the organisations considered most reliable (34%). In Denmark, schools or universities come second after consumer organisations.

While the national rankings of these two sources are very similar, the corresponding national percentages are not. Thus, in 1996, only 21% of Greeks cited consumer organisations as the most trustworthy source of information, compared with 46% in France.

Regarding environmental protection organisations, the absolute percentage differences are somewhat less significant. This is hardly surprising as these percentages are generally lower than those for consumer organisations. This figure ranges from 16% in Finland to 31% in East Germany (26% in Germany).

In Finland, Greece and Spain, significantly more respondents than in other countries named the public authorities as the information source they trust most.

Regarding percentage trends between 1991 and 1996, it should be kept in mind that this question was only put to half the sample in the last opinion survey (*split ballot*). Taking this into consideration, the following points can be observed:

- A strong rise, virtually across the board, of confidence in consumer organisations;
- Divergent national trends in respect of environmental protection organisations. The EC 12 mean percentage fell back to exactly its 1991 level, having jumped 7 points between 1991 and 1993;
- In Denmark, less confidence in the public authorities. Denmark stood out from the 11 other Member States in 1991 and 1993 by virtue of its high level of confidence in the public authorities, but is now in line with the European mean.

Looking at the most reliable sources in general (Figure 26 and Table 24) rather than the single most reliable source, we again observe the gains made by consumer organisations and the inverted U relation for environmental protection organisations.

In terms of socio-demographic variables, it emerges that for the European Union as a whole and regarding the source inspiring the most confidence:

- Persons with the highest level of education or still receiving some form of education are twice as likely as other groups to place confidence in schools and universities (19% and 23% respectively, compared with only 9% among those with a lower level of education).



- Confidence in consumer organisations increases with income: from 32% for persons with the lowest incomes to 40% among those with the highest.
- Young people aged 15 to 24 are somewhat less inclined than the rest to place their trust in consumer organisations (28%). Persons aged 40-54 place the most trust in such organisations (37%). Schools and universities attract most trust from the youngest age group (19%).
- Not surprisingly, considerably more persons claiming to be extremely or very religious place their trust in religious organisations than do the others (11% versus 0% among atheists, agnostics and persons claiming to be extremely, very or fairly anti-religious).
- Similarly, those who say that protection of nature and the environment and the reduction of pollution will be the topics most likely to influence the way they vote in the next general election express most confidence in environmental protection organisations (29% versus 21%).
- Finally, a higher level of "objective" knowledge means a higher level of optimism regarding new technologies, or a greater awareness of the risks they entail and so a greater tendency to trust consumer organisations more than anything else.

Version B of the *split ballot* differs noticeably from Version A:

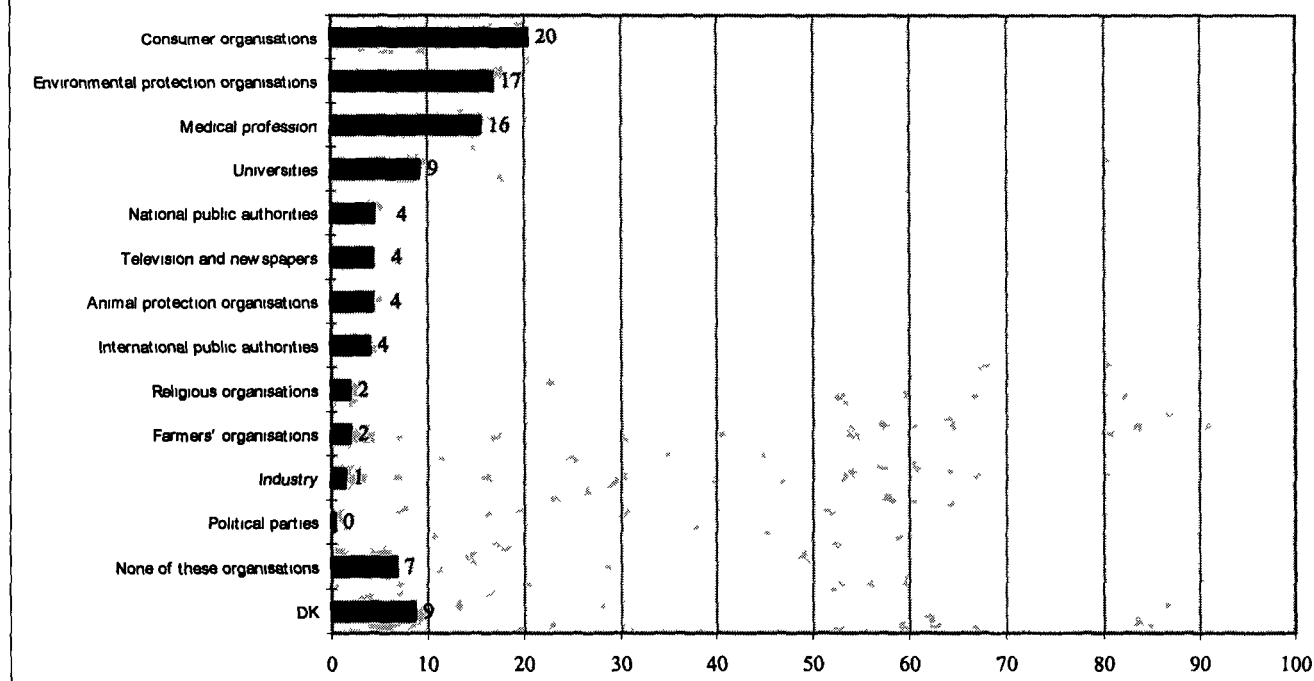
1. Reference is made not only to modem biotechnology in general, but also to two particular applications, one relating to agriculture and the other to human beings.
2. A different list of organisations is proposed.
3. Only the most reliable organisation is asked for.

Question 14: SPLIT BALLOT B

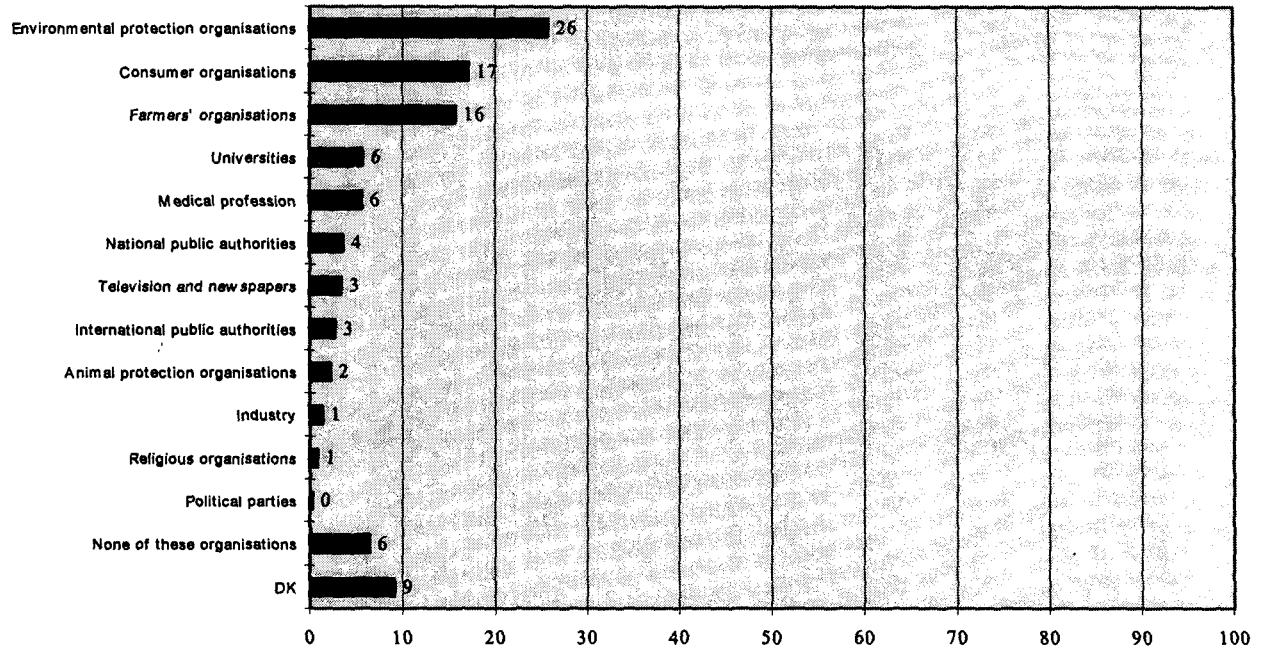
- a) Now, I would like to know which one of the following organisations you have confidence in to tell you the truth about modern biotechnology (ONE ANSWER ONLY).
- b) And to tell you the truth about new genetically modified food crops grown in fields? (ONE ANSWER ONLY).
- c) And to tell you the truth about introducing human genes into animals to produce organs for human organ transplants? (ONE ANSWER ONLY).

Consumer organisations  
 Environmental protection organisations  
 Animal welfare organisations  
 The medical profession  
 Farmers' organisations  
 Religious organisations  
 National public bodies  
 International public bodies  
 Industry  
 Universities  
 Political parties  
 Television and newspapers  
 None of these organisations (SPONTANEOUS)  
 DK

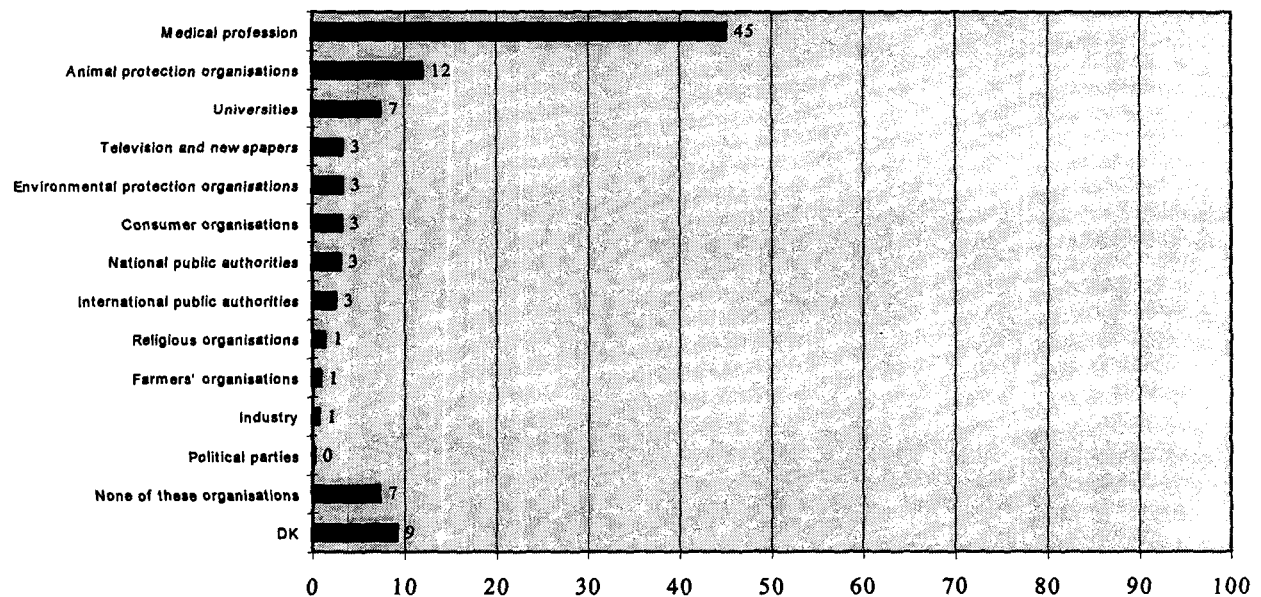
**Figure 27: Organisation which inspires the most confidence regarding biotechnology (% EU 15, 1996)**



**Figure 28: Organisation which inspires the most confidence regarding genetically modified plants (% UE 15, 1996)**



**Figure 29: Organisation which inspires the most confidence regarding transplants (% UE 15, 1996)**



In comparing Figures 25 and 27 we find that, whichever version is used, consumer organisations and environmental protection organisations head the ranking. However, in the second version, these groups are joined by the medical profession (an authority not included in the first version), which statistically has an "equal score" with the other two.

When it comes to telling the truth about genetically modified food crops grown in fields (Figure 28), environmental protection organisations and consumer organisations again head the list. However, this time the latter is in second place and is followed not by the medical profession but by fanners' organisations. On the other hand (Figure 29), when it comes to introducing human genes into animals to produce organs for human organ transplants, it is the medical profession in which Europeans place by far the most trust. This is followed by animal welfare organisations and universities, in that order.

Once again, respondents have detailed opinions: depending on the area of expertise concerned, they place their trust in the organisations which appear most competent in that particular field.

N.B. In the three areas studied in this opinion survey, Europeans placed least confidence in political parties, industry and religious organisations to "tell them the truth" (Figures 27 to 29).

The results for the entire European Union again emphasise that however the question is worded and whatever the area concerned, universities seem to inspire a certain confidence regarding information about modern biotechnology. The impact of the socio-demographic variables is the same in both versions of the question (see above).

The following can be observed regarding national differences (Tables 25 to 27):

- Generally speaking, the percentage of "DK" answers is markedly higher in Portugal, Spain and, to a lesser extent, Ireland.
- Regarding transplants, the medical profession clearly leads the field in all countries. The percentage of respondents naming physicians as those in whom they have most confidence ranges from 36% in Germany and Sweden to 53% in Spain and Italy (Table 27).

- Regarding genetically modified food crops (Table 26), respondents place the most trust in environmental protection organisations in 10 out of 15 countries. In France, Luxembourg and the Netherlands, consumer organisations obtain the most votes. On the other hand, the Danes place most trust in farmers' organisations, and the Finns in universities. Generally speaking, however, no organisation stands out so distinctly in these rankings as the medical profession in respect of transplants.
- Finally, regarding modern biotechnology in general (Table 25), for the majority of countries, consumer organisations and/or environmental protection organisations are those most often mentioned as being reliable.

**Table 25: Organisation in which there is the most confidence regarding modern biotechnology (% by country, 1996)**

	B	DK	WD	D	OD	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK	EU 15
Consumer organisations	19	28	24	25	29	15	13	29	15	14	18	26	22	20	12	12	18	20
Environmental protection organisations	18	15	21	22	22	17	15	12	16	14	16	15	19	14	10	25	18	17
Animal welfare organisations	4	8	5	5	8	3	4	3	4	5	2	4	2	2	1	5	5	4
The medical profession	11	10	8	8	7	13	18	23	22	21	16	12	10	11	23	11	16	16
Farmers' organisations	2	0	2	3	3	1	1	3	1	3	3	1	2	2	2	1	1	2
Religious organisations	1	1	1	1	1	3	1	1	4	5	2	1	4	2	0	1	1	2
National public bodies	3	6	7	7	7	4	4	3	3	2	3	2	7	4	4	5	5	4
International public bodies	3	2	4	4	5	3	8	3	5	8	3	5	7	1	6	3	1	4
Industry	2	1	2	1	1	2	2	3	1	1	2	0	1	2	2	1	1	1
Universities	16	16	7	7	6	12	7	5	7	8	12	17	7	7	22	18	13	9
Political parties	0	1	0	0	0	0	1	0	0	1	1	1	1	0	0	0	0	0
Television and newspapers	7	2	5	4	2	9	3	3	3	3	6	7	1	7	8	3	7	4
None of these organisations	6	6	8	8	8	7	5	7	4	6	8	8	9	5	5	4	7	7
DK	8	4	8	7	3	10	20	5	14	10	8	4	9	23	6	6	5	9

**Table 26: Organisation in which there is the most confidence regarding genetically modified food crops (% by country, 1996)**

	B	DK	WD	D	OD	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK	EU 15
Consumer organisations	14	18	15	14	12	14	13	25	17	20	33	27	7	13	12	11	16	17
Environmental protection organisations	22	17	34	34	36	22	19	23	25	25	17	20	25	21	17	28	27	26
Animal welfare organisations	2	1	4	3	2	3	3	2	4	2	2	1	2	2	1	2	0	2
The medical profession	10	4	3	3	4	7	8	9	7	7	5	2	9	4	12	2	3	6
Farmers' organisations	13	22	14	15	21	16	15	13	13	17	10	10	14	17	15	22	19	16
Religious organisations	1	1	2	2	1	1	0	0	2	1	1	1	2	2	0	0	0	1
National public bodies	3	6	5	5	6	4	4	3	3	1	3	5	8	3	4	3	3	4
International public bodies	2	3	2	2	3	3	4	3	2	3	2	4	6	1	4	5	1	3
Industry	0	1	1	1	0	1	2	2	1	2	1	1	1	1	1	0	1	1
Universities	12	10	4	5	7	8	4	3	6	5	5	12	7	5	20	12	7	6
Political parties	0	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0	1	0
Television and newspapers	5	3	2	2	1	5	3	4	3	2	5	4	1	5	5	3	6	3
None of these organisations	5	7	8	7	6	6	4	6	5	6	7	6	8	4	4	3	8	6
DK	9	6	7	6	3	10	20	6	14	9	8	7	11	23	6	5	7	9

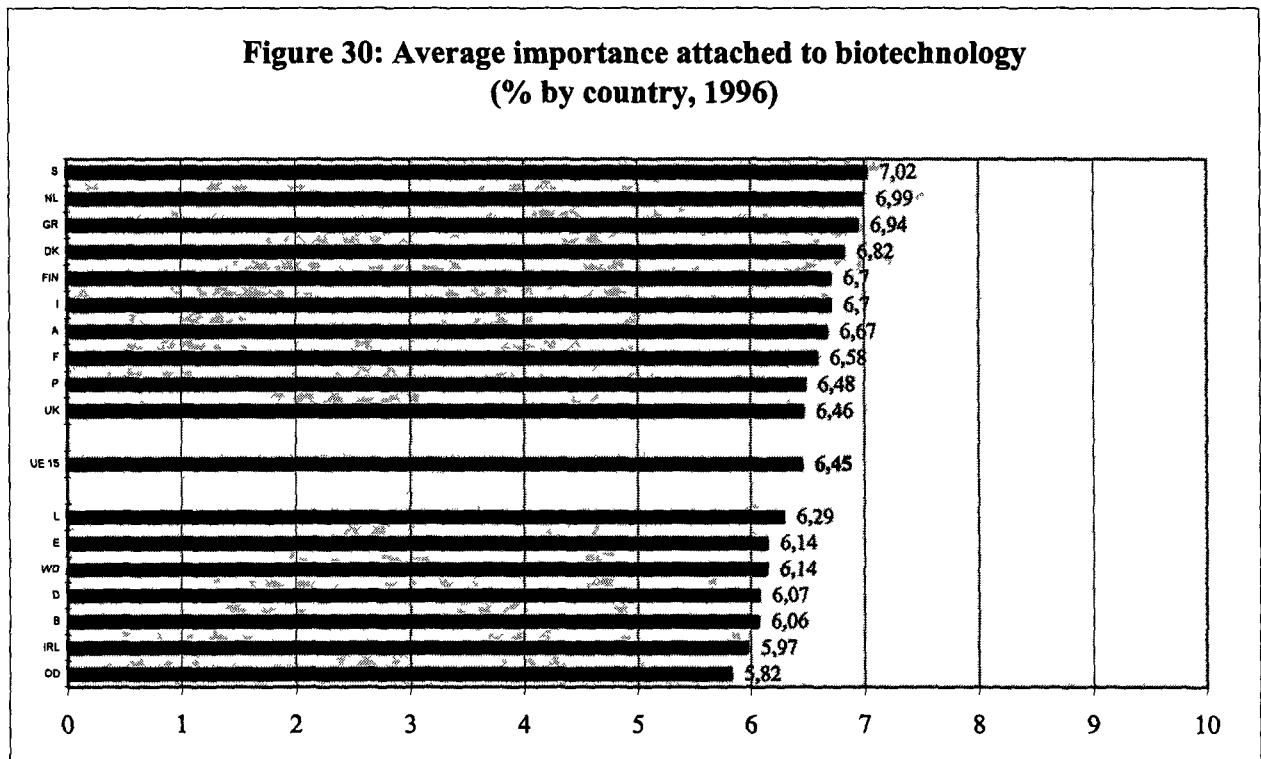
**Table 27: Organisation in which there is the most confidence regarding transplants (% by country, 1996)**

	B	DK	WD	D	OD	GR	E	F	IRL	I	L	NL	A	P	FIN	S	UK	EU 15
Consumer organisations	3	4	6	6	4	2	2	4	4	1	2	5	3	1	2	1	3	3
Environmental protection organisations	2	3	7	6	3	3	2	3	5	2	2	3	3	1	0	6	3	3
Animal welfare organisations	11	11	13	14	15	10	6	10	12	12	9	14	7	9	6	19	17	12
The medical profession	43	41	34	36	46	48	53	51	42	53	47	40	37	52	52	36	41	45
Farmers' organisations	2	0	2	1	1	1	1	1	0	0	2	0	2	0	0	1	1	1
Religious organisations	2	1	2	2	2	2	0	1	3	2	2	1	4	2	1	1	1	1
National public bodies	2	6	5	5	3	4	2	3	2	1	0	2	5	2	2	3	4	3
International public bodies	2	2	3	3	4	4	4	2	3	2	1	2	5	2	4	4	0	3
Industry	1	0	1	1	0	1	1	1	1	0	1	0	2	0	0	0	0	1
Universities	13	10	7	7	8	7	7	3	5	9	12	14	7	3	13	11	8	7
Political parties	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Television and newspapers	5	3	2	2	1	5	3	4	3	1	2	6	2	6	7	3	6	3
None of these organisations	5	8	10	10	8	6	4	9	5	6	9	7	10	2	4	6	8	7
DK	8	11	8	7	5	9	16	8	15	10	11	6	12	20	8	5	7	9

## 7. IMPORTANCE ATTACHED TO BIOTECHNOLOGY

To conclude this report, the last question to be analysed concerns the importance Europeans attach to the modern biotechnology debate.

**Question 15:** We've been discussing several issues to do with modern biotechnology. Some people think these issues are very important while others do not. How important are these issues to you personally? If you think they are not at all important, give a score of 1. If you think they are extremely important, give a score of 10. Scores from 2 to 9 allow you to indicate how far you lean one way or another.



As Figure 30 shows, Europeans think the various modern biotechnology issues investigated in the questionnaire are relatively important: the average score for the EU 15 is 6.45/10 (on a scale of 1 to 10 the mean value is 5.5). National average scores are highest in Sweden, the Netherlands and Greece and lowest in the East of Germany and Ireland.

One percent of Europeans (4% in Germany) refused to answer this question and 4% had no opinion. In Portugal, Ireland and Austria, however, the percentage of 'DK' answers is considerably greater than the European average (15%, 11% and 8% respectively).



The more "objective" knowledge respondents have of modern biotechnology, the more likely they are to think that the associated issues are important ( $r = 0.23$ ). Similarly, but to a lesser extent (correlation coefficients were lower than 0.2), the importance attached to modern biotechnology issues tends to increase with the following (in descending order):

- optimism regarding new technologies,
- index of average usefulness of six applications of modern biotechnology,
- index of average support for these applications,
- index of average acceptability,
- index of average risk.

Those who think that developments in modern biotechnology/genetic engineering will not affect our way of life over the next 20 years attach the least importance to the related issues (5.62). Conversely, both those who think that this will improve our way of life **and** those who think that things will get worse tend to attach much more importance to these issues (6.79 and 6.72 respectively).

Those who had heard about modern biotechnology during the last three months tend to attach more importance to the related issues (average importance of 6.97 versus 5.83 for others). Along the same lines, those who had already discussed modern biotechnology with someone were significantly more likely to consider these issues to be important (7.07 versus 5.86).

Regarding the socio-demographic variables we can observe the following:

- The higher the level of education, the greater the tendency to attach importance to biotechnology: the average score rises from a low of 5.91 to a high of 7.07;
- Importance attached to biotechnology increases with income: from 6.13 among those with the lowest incomes to 6.84 among those with the highest;

- Persons aged 55 or older attach the least importance to the issues associated with modern biotechnology (6.15); those aged between 40 and 54 attach the most importance to them (6.64);
- Average importance increases markedly with the index of opinion leadership: from 5.71 among non-leaders to 7.22 in leaders;
- Managers and employees attach most importance to modern biotechnology (7.09 and 6.91 respectively), while persons who have never engaged in paid professional activity give it the least importance (6.11). However, this correlation is explained in part by the level of education.

Using linear regression analysis to check how these different variables affect one other, we find that the two variables with the highest net effect on the average importance attached to modern biotechnology issues are:

- the index of "objective" knowledge (beta = 0.12)
- the level of education (beta = 0.1)

All other partial standardised regression coefficients are lower than 0.1, even if they are generally statistically significant given the size of the sample.

## 8. BIBLIOGRAPHY

- International Centre for Science and Agricultural Technology (ICSAT) (1997), The willingness of the public to eat apples that have undergone genetic engineering using biotechnology. Report available in 1997.*
- European Commission (1994), *Growth, competitiveness, employment: the challenges and ways forward into the 21<sup>st</sup> century. White Paper.* Luxembourg: Office of Official Publications of the European Communities.
- DA VIES, D. (ed.)(1986). *Industrial Biotechnology in Europe: Issues for Public Policy.* Brussels: CEPS and Commission of the European Communities.
- Decima Research (1993), Final Report to the Canadian Institute of Biotechnology on Public Attitudes Towards Biotechnology.* Ottawa: Canadian Institute of Biotechnology.
- Durant, J. (ed.)(1992), *Biotechnology in Public: A Review of Recent Research.* London: Science Museum).
- European Foundation for the Improvement of Living and Working Conditions (1987), *The Impact of Biotechnology on Living and Working Conditions.* Luxembourg: Office of Official Publications of the European Communities.
- HOBAN, T.J. et P.A. KENDALL (1992), *Consumer Attitudes About the Use of Biotechnology in Agriculture and Food Production.* Report to the U.S. Department of Agriculture - Extension Service.
- INRA (1991), *The opinion of Europeans regarding biotechnology in 1991.* Brussels: CEC, 76 pp. + appendices.
- INRA (1993), *Europeans, Science and Technology: Public Understanding and Attitudes.* Brussels: CEC, 215 pp.
- Kelley, J. (1995a), "Australians' evaluation of genetic engineering", pp. 1-8 in *Worldwide Attitudes.*
- Kelley, J. (1995b), *Public Perceptions of Genetic Engineering: Australia, 1994. International Social Science Survey.* Department of Industry, Sciences and Technology.
- Macer, D.R.J. (1992), *Attitudes to Genetic Engineering: Japanese and International Comparisons.* Christchurch: Eubios Ethics Institute.
- Market and Opinion Research International (MORI)(1985), *Public Attitudes to New Technology.* London: MORI
- Marlier (1993), *Biotechnology and genetic engineering: what Europeans think about it in 1993.* Brussels: INRA.
- Optima Consultants (1994), *Understanding the Consumer Interest in New Biotechnology Industry.* Ottawa: Distribution Services, Communications Branch, Industry Canada.
- SCHUMAN, H. et S. PRESSER (1996), *Questions and Answers in Attitude Surveys: Experiments on Question Form, and Context.* London: Sage.
- U.S. Congress, Office of Technology Assessment (1987), *New Developments in Biotechnology: Public Perceptions of Biotechnology.* Washington, D.C.: U.S. Government Printing Office.

**9. APPENDICES**

**9.1 DATA SHEET**

**9.2 FRENCH/ENGLISH QUESTIONNAIRE.**

**9.3 TECHNICAL SPECIFICATIONS FOR SOCIO-DEMOGRAPHIC AND SOCIO-POLITICAL VARIABLES USED IN THE ANALYSES.**

**9.3.1 HARMONISED INCOME SCALE.**

**9.3.2 OPINION LEADERSHIP.**

**9.3.3 POLITICAL ATTITUDES**

## **TECHNICAL SPECIFICATIONS**

## EUROBAROMETER STANDARD 46.1

### TECHNICAL SPECIFICATIONS

Between 18 October and 22 November 1996, INRA (EUROPE), a European network of market and public opinion research agencies, carried out series 46.1 of the STANDARD EUROBAROMETER at the request of the EUROPEAN COMMISSION

EUROBAROMETER 46.1 covers nationals of the EU Member States, aged 15 years and over, residing in the Member States of the European Union. The sampling principle applied in all Member States is a multi-stage, random (probability) one. In each EU country, a number of sampling points were drawn with probability proportional to population size (to cover the entire country) and population density.

To this end, the points were drawn systematically from all "administrative regional units", after stratification by individual unit and type of region. They thus represent the entire territory of the Member States, according to the EUROSTAT-NUTS II and according to the distribution of the national resident population in terms of metropolitan, urban and rural areas. In each of these selected sampling points, a starting address was drawn at random. Further addresses were selected as every Nth address by "random route" procedures from the initial address. In each household, the respondent was drawn at random. All interviews were carried out face-to-face in the respondent's home and in the appropriate national language.

COUNTRIES	INSTITUTES	No INTERVIEWS	FIELDWORK DATES	POPULATION
Belgium	MARKETING UNIT	1006	04/11 - 17/11	8,356
Denmark	GFK DENMARK	1000	01/11 - 19/11	4,087
Germany (East)	(NRA GERMANY (EAST)	1008	20/10 - 17/11	13,608
Germany (West)	INRA GERMANY (WEST)	1024	25/10 - 14/11	52,083
Greece	KEME	1012	01/11 - 14/11	7,474
Spain	CIMEI	1000	04/11 - 17/11	28,075
France	TMO	1003	26/10 - 17/11	43,590
Ireland	LANSDOWNE Market Research	1003	30/10 - 20/11	2,549
Italy	PRAGMA	1059	03/11 - 15/11	44,495
Luxembourg	ILRES	610	18/10 - 17/11	372
Netherlands	NIPO	1070	28/10 - 19/11	11,232
Portugal	METRIS	1003	30/10 - 14/11	7,338
Great Britain	NOP Corporate and Financial	1067	24/10 - 15/11	44,225
Northern Ireland	ULSTER MARKETING SURVEYS	324	03/11 - 17/11	1,159
Austria	SPECTRA	1009	04/11 - 17/11	6,044
Sweden	TEMO	1008	02/11 - 22/11	7,808
Finland	MARK DEVELOPMENT CENTER	1040	01/11 - 19/11	4,017
	TOTAL NUMBER OF INTERVIEWS	16246		

For each country, the sample was compared with the universe. The universe description was derived from EUROSTAT population data. For all EU Member States, national weighting was applied (using marginal and intercellular weighting), based on this universe description. In all countries, the minimum variables of sex, age, NUTS II regions and the size of locality were introduced in the iteration procedure. For international weighting (i.e. EU averages), INRA (EUROPE) uses the official population figures published by EUROSTAT in the Regional Statistics Yearbook of 1989. The total population figures introduced in this post-weighting procedure are given above.

The results of the EUROBAROMETER studies are analysed and reported in the form of tables, data files and analyses. For each question, a table of results is provided, with the full question text (English and French) at the head of the page. The results are expressed 1) as a percentage on total base and 2) as a percentage on the number of "valid" responses (i.e. "Don't know" and "No answer" are excluded). All EUROBAROMETER data files are stored at the Zentral Archiv (Universitat Koln, Bachemer Strasse 40, D-50869 Koln-Lindenthal). They are available to all member institutes of the European Consortium for Political Research (Essex), the Inter-University Consortium for Political and Social Research (Michigan) and anyone interested in social science research. The results of the EUROBAROMETER surveys are analysed by the Public Opinion Surveys and Analyses Unit (EUROBAROMETER) of DG X/A of the European Commission, Rue de la Loi 200, B-1049 Brussels. They can be obtained from this address.

Readers are reminded that the survey results are estimations, the accuracy of which, all things being equal, depends on the sample size and the observed percentage. With samples of about 1,000 interviews, real percentages vary within the following confidence intervals:

Observed percentages	10% or 90%	20% or 80%	30% or 70%	40% or 60%	50%
Confidence intervals	± 1.9%	± 2.5%	± 2.7%	± 3.0%	± 3.1%

## **ENGLISH/FRENCH QUESTIONNAIRE**

- Q.6. La science et la technologie changent notre vie. Je vais vous citer une série de domaines où de nouvelles technologies sont actuellement développées. Pour chacun de ces domaines, pensez-vous que cela améliorera notre mode de vie dans les 20 prochaines années, que cela n'aura pas d'effet ou que les choses iront plus mal ?  
(MONTRER CARTE)

LIRE	AMELIORERA	PAS D'EFFET	IRA PLUS MAL	NSP
a) Energie solaire	11 1	2	3	4
b) Informatique	12 1	2	3	4
c) SPLIT BALLOT A : Biotechnologie SPLIT BALLOT B : génie génétique	13 1	2	3	4
d) Télécommunications	14 1	2	3	4
e) Nouveaux matériaux	15 1	2	3	4
f) Exploration spatiale	16 1	2	3	4

EB39.1 - Q.40 - TREND

- Q.7. Vous venez de ne dire dans quelle mesure vous pensiez que diverses nouvelles technologies allaient changer notre mode de vie. A présent, je voudrais vous demander ce qui vous vient à l'esprit quand vous pensez à La biotechnologie moderne au sens large, c'est-à-dire incluant le génie génétique.  
(INT. : NOTER COMPLETEMENT LES REPONSES, RELANCER PAR "QUOI D'AUTRE ?", APRES CHAQUE MOT OU PHRASE)

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

EB/4.1 - NOUVEAU

ENQ. LIRE : "Dans la suite de cet entretien, nous utiliserons le mot de "biotechnologie moderne" au sens large, c'est-à-dire incluant le génie génétique."



Q.6. Science and Technology change the way we live.

I am going to read out a list of areas in which new technologies are currently developing.  
For each of these areas, do you think it will improve our way of life in the next 20 years, it will have no effect, or it will make things worse ? (SHOW CARD)

READ OUT	WILL IMPROVE	NO EFFECT	WILL MAKE THINGS WORSE	DK
a) Solar Energy	11 1	2	3	4
b) Computers & information technology	12 1	2	3	4
c) SPLIT BALLOT A : Biotechnology SPLIT BALLOT B : genetic engineering	13 1	2	3	4
d) Telecommunications	14 1	2	3	4
e) New materials or substances	15 1	2	3	4
f) Space exploration	16 1	2	3	4

EB39.1 - Q.40 - TREND

"7. You've just indicated to what degree you think various new technologies will change the way we live.  
Now, I would like to ask you what comes to mind when you think about modern biotechnology in a broad sense, that is including genetic engineering.  
(INT. : WRITE VERBATIMS IN FULL, PROMPT "ANYTHING ELSE ?", AFTER EACH WORD OR PHRASE)

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

EBA6.1 - NEW

INT. READ OUT : "For the rest of the interview we are using the term "modern biotechnology" in a broad sense, that is including genetic engineering."

Q.8. Voici quelques affirmations. Pour chacune d'elles, j'aimerais que vous me disiez si vous pensez qu'elle est vraie ou fausse. Si vous ne le savez pas, dites-le et nous passerons à l'affirmation suivante.

LIRE ALTERNATIVEMENT DE HAUT EN BAS ET DE BAS EN HAUT	VRAI	FAUX	NSP
a) Il existe des bactéries qui vivent d'eaux usées	17 1	2	3
b) Les tomates ordinaires ne contiennent pas de gènes, alors que les tomates modifiées génétiquement en contiennent (N)	18 1	2	3
c) Le clonage d'êtres vivants donne naissance à des descendants parfaitement identiques	19 1	2	3
d) Si une personne mange un fruit génétiquement modifié, ses gènes pourraient aussi en être modifiés (N)	20 1	2	3
e) Des virus peuvent être contaminés par des bactéries	21 1	2	3
f) La levure utilisée pour faire de la bière est constituée d'organismes vivants	22 1	2	3
g) Il est possible de découvrir, dès les tous premiers mois de la grossesse, si un enfant sera atteint (du syndrome de Down, de trisomie, de mongolisme - CHOISIR LE OU LES DEUX TERMES APPROPRIES SELON LE PAYS) (M)	23 1	2	3
h) Les animaux génétiquement modifiés sont toujours plus gros que les animaux ordinaires (N)	24 1	2	3
i) Plus de la moitié des gènes des êtres humains sont identiques à ceux des chimpanzés (N)	25 1	2	3
j) Il est impossible de transférer des gènes d'animaux à des plantes (N)	26 1	2	3

#### EB39.1 - Q.41 - TREND MODIFIE

Q.9. On entend dire des choses différentes à propos des caractéristiques que l'on hérite de ses parents, c'est-à-dire de ce qu'on a de naissance, et de ce qu'on acquiert par l'éducation ou par les conditions de vie. Pour chacune des choses suivantes, pouvez-vous me dire si vous pensez qu'elle est surtout quelque chose d'hérité ou surtout quelque chose que l'on acquiert ?

LIRE ALTERNATIVEMENT DE HAUT EN BAS ET DE BAS EN HAUT	SURTOUT HERITE	SURTOUT ACQUIS	NSP
a) La taille ou la corpulence	27 1	2	3
b) L'intelligence	28 1	2	3
c) Les tendances homosexuelles	29 1	2	3
d) La couleur des yeux	30 1	2	3
e) La tendance à être heureux	31 1	2	3
f) La tendance à commettre des crimes ou des délits	32 1	2	3
g) L'attitude à l'égard du travail	33 1	2	3
h) Les capacités athlétiques	34 1	2	3
i) La fragilité mentale	35 1	2	3
j) Les aptitudes dans le domaine musical	36 1	2	3

#### EB46.1 - NOUVEAU

Q 8 Here are some statements. For each of them, please tell me whether you think it is true or false.  
If you don't know, say so and we will skip to the next statement.

READ OUT TOP/BOTTOM AND BOTTOM/TOP ALTERNATELY	TRUE	FALSE	DK
a) There are bacteria which live from waste water	17 1	2	3
b) Ordinary tomatoes do not contain genes while genetically modified tomatoes do (N)	18 1	2	3
c) The cloning of living things produces exactly identical offspring	19 1	2	3
d) By eating a genetically modified fruit, a person's genes could also become modified (N)	20 1	2	3
e) Viruses can be contaminated by bacteria	21 1	2	3
f) Yeast for brewing beer consists of living organisms	22 1	2	3
g) It is possible to find out in the first few months of pregnancy whether a child will have (Down's Syndrome, trisomy, Mongolism - USE THE ONE OR TWO APPROPRIATE TERMS ACCORDING TO LOCAL LANGUAGE) (N)	23 1	2	3
h) Genetically modified animals are always bigger than ordinary ones (N)	24 1	2	3
i) More than half of the human genes are identical to those of chimpanzees (N)	25 1	2	3
j) It is impossible to transfer animal genes into plants (N)	26 1	2	3

EB39 1 - Q.41 - TREND MODIFIED

Q 9 There are differing views about whether people inherit particular characteristics, that is whether people are born with these characteristics, or whether they acquire them mainly from their upbringing, or the conditions in which they lived. Please tell me whether you think each of the following characteristics is mainly inherited or mainly the result of upbringing and living conditions :

READ OUT TOP/BOTTOM AND BOTTOM/TOP ALTERNATELY	MAINLY INHERITED	MAINLY LIVING CONDITIONS	DK
a) Body size	27 1	2	3
b) Intelligence	28 1	2	3
c) Homosexual tendencies	29 1	2	3
d) Eye colour	30 1	2	3
e) Tendency to be happy	31 1	2	3
f) Criminal tendencies	32 1	2	3
g) Attitude to work	33 1	2	3
h) Athletic abilities	34 1	2	3
i) Susceptibility to mental illness	35 1	2	3
j) Musical abilities	36 1	2	3

EB46 1 - NEW

Q.10. Et maintenant, voici quelques questions à propos de diverses applications de la biotechnologie moderne.  
(MONTRER CARTE AVEC ITEM 1, 4 DIMENSIONS ET ECHELLE : POSER a, PUIS b, PUIS c, PUIS d)  
(ENQ. CODER "1" SI REpondant DIT "TOUT A FAIT D'ACCORD", CODER "2" SI "PLUTOT D'ACCORD", CODER "3" SI "PLUTOT PAS D'ACCORD", CODER "4" SI "PAS DU TOUT D'ACCORD" ET CODER "5" SI "NSP")

- a) Tout d'abord, veuillez ne dire si vous êtes tout à fait d'accord, plutôt d'accord, plutôt pas d'accord ou pas du tout d'accord avec l'idée qu'il est utile pour la société de ... ?
- b) Et dans quelle mesure êtes-vous d'accord ou pas d'accord avec l'idée que cette application est comporte des risques pour la société ?
- c) Et dans quelle mesure êtes-vous d'accord ou pas d'accord avec l'idée que cette application est moralement acceptable ?
- d) Et dans quelle mesure êtes-vous d'accord ou pas d'accord avec l'idée que cette application devrait être encouragée ?

(MONTRER CARTE AVEC ITEM 2, QUATRE DIMENSIONS ET ECHELLE : POSER a, PUIS b, PUIS c, PUIS d;  
ENSUITE PASSER A L'ITEM 3, ETC.)

Et que pensez-vous de ... ?

Dans quelle mesure êtes-vous d'accord ou pas d'accord que ... ?

- a) Cette application est utile pour la société ?
- b) Cette application comporte des risques pour la société ?
- c) Cette application est moralement acceptable ?
- d) Cette application devrait être encouragée ?

LIRE	a) UTILE	b) COMPORTE DES RISQUES	c) MORALEMENT ACCEPTABLE	d) ENCOURAGEE
A. Utiliser la biotechnologie moderne dans la production de nourritures, par exemple pour augmenter leur teneur en protéines, pour qu'elles se conservent plus longtemps ou pour en changer le goût	37 —	38 —	39 —	40 —
B. Prendre des gènes de certaines plantes et les transférer à des plants de cultures pour les rendre plus résistants aux insectes nuisibles	41 —	42 —	43 —	44 —
C. Introduire des gènes humains dans des bactéries pour produire des médicaments ou des vaccins, comme par exemple de l'insuline pour les diabétiques	45 —	46 —	47 —	48 —
D. Développer des animaux génétiquement modifiés pour les recherches de laboratoire, par exemple des souris qui ont des gènes porteurs d'un cancer	49 —	50 —	51 —	52 —
E. Introduire des gènes humains dans des animaux pour produire des organes pour les transplantations d'organes humains, comme par exemple dans des cochons pour des greffes de coeur humain	53 —	54 —	55 —	56 —
F. Utiliser des tests génétiques pour détecter des maladies que nous pourrions avoir héritées de nos parents, comme la fibrose kystique, la mucoviscidose, la thalassémie (UTILISER L'EXEMPLE LE PLUS CONNU DANS CHAQUE PAYS)	57 —	58 —	59 —	60 —

EB46.1 - NOUVEAU

1.10. And now, *some* questions about various applications which are coming out of modern biotechnology.

(SHOW CARD WITH ITEM 1, 4 DIMENSIONS AND SCALE : ASK a, THEN b, THEN c, THEN d)  
(INT. CODE "1" IF RESPONDENT SAYS "DEFINITELY AGREE", CODE "2" IF "TEND TO AGREE", CODE "3" IF "TEND TO DISAGREE", CODE "4" IF "DEFINITELY DISAGREE" AND CODE "5" IF "DK")

- First of all, could you please tell me whether you definitely agree, tend to agree, tend to disagree *or* definitely disagree that it is useful for society to ...
- And to what extent do you tend to agree or tend to disagree that this application is risky for society ?
- And to what extent do you tend to agree or tend to disagree that this application is morally acceptable ?**
- And to what extent do you tend to agree or tend to disagree that this application should be encouraged ?

(SHOW CARD WITH ITEM 2, FOUR DIMENSIONS AND SCALE : ASK a, THEN b, THEN c, THEN d; THEN GO TO ITEM 3, ETC.)

And what do you think of ... ?

To what extent do you agree or disagree that ... ?

- This application is useful for society ?
- This application is risky for society ?
- This application is morally acceptable ?
- This application should be encouraged ?

READ OUT	a) USEFUL	b) RISKY	c) MORALLY ACCEPTABLE	d) ENCOURAGED
A. Use modern biotechnology in the production of foods, for example to make them higher in protein, keep longer or change the taste	37 —	38 —	39 —	40 —
B. Taking genes from plant species and transferring them into crop plants, to make them more resistant to insect pests	41 —	42 —	43 —	44 —
C. Introducing human genes into bacteria to produce medicines or vaccines, for example to produce insulin for diabetics	45 —	46 —	47 —	48 —
D. Developing genetically modified animals for laboratory research studies, such as a mouse that has genes which causes it to develop cancer	49 —	50 —	51 —	52 —
E. Introducing human genes into animals to produce organs for human transplants, such as into pigs for human heart transplants	53 —	54 —	55 —	56 —
F. Using genetic testing to detect diseases we might have inherited from our parents such as cystic fibrosis, mucoviscidosis, thalassaemia (USE THE BEST KNOWN EXAMPLE IN EACH COUNTRY)	57 —	58 —	59 —	60 —

EB46.1 - NEW

Q.11. Les gens ont des avis différents sur les avantages et les risques de la biotechnologie moderne, et sur la façon dont elle devrait être réglementée et contrôlée. Je vais vous lire une série d'affirmations. Pour chacune d'elles, veuillez me dire si vous êtes plutôt d'accord ou plutôt pas d'accord.(MONTRER CARTE)

LIRE ALTERNATIVEMENT DE HAUT EN BAS ET DE BAS EN HAUT	PLUTOT D'ACCORD	PLUTOT PAS D'ACCORD	NSP
a) La réglementation actuelle est suffisante pour protéger les gens de tout risque lié à la biotechnologie moderne	61 1	2	3
b) Quelle que soit la réglementation, les chercheurs en biotechnologie feront toujours ce qu'ils veulent	62 1	2	3
c) On devrait utiliser exclusivement des méthodes traditionnelles de croisement plutôt que de modifier les caractéristiques héréditaires de plantes ou d'animaux par la biotechnologie moderne	63 1	2	3
d) La réglementation de la biotechnologie moderne devrait être laissée avant tout à l'industrie	64 1	2	3
e) La biotechnologie moderne est si compliquée que c'est une perte de temps de consulter le public à son sujet	65 1	2	3
f) Il ne sert à rien de mettre des étiquettes spéciales sur les produits alimentaires modifiés génétiquement	66 1	2	3
g) J'achèterais des fruits génétiquement modifiés s'ils avaient un meilleur goût	67 1	2	3
h) Les organisations religieuses doivent avoir leur mot à dire en ce qui concerne la réglementation de la biotechnologie moderne	68 1	2	3
i) Nous devrions accepter certains risques résultant de la biotechnologie moderne si cela augmente la compétitivité économique en Europe	69 1	2	3
j) Les méthodes traditionnelles de croisement peuvent être aussi précises que la biotechnologie moderne pour modifier les caractéristiques héréditaires de plantes ou d'animaux	70 1	2	3

EB46.1 - NOUVEAU

Q.12. Parmi les organisations suivantes, laquelle vous paraît la mieux placée pour réglementer la biotechnologie moderne ? (MONTRER CARTE - LIRE - UNE SEULE REPONSE)

Les organisations internationales comme les Nations Unies (l'ONU), l'Organisation Mondiale de la Santé (l'OMS),.....	71 1
Les pouvoirs publics en (NOTRE PAYS).....	2
Des comités d'éthique.....	3
Notre parlement national.....	4
L'Union européenne, les pouvoirs publics dans l'Union européenne.....	5
Des organisations scientifiques.....	6
Aucune de ces organisations (SPONTANE).....	7
NSP.....	8

EB46.1 - NOUVEAU

- Q.11. People have different views about the benefits and risks of modern biotechnology and about how it should be regulated and controlled. I am going to read you a number of statements. For each one, please tell me whether you tend to agree or tend to disagree. (SHOW CARD)

READ OUT TOP/BOTTOM/TOP ALTERNATELY	TEND TO AGREE	TEND TO DISAGREE	DK
a) Current regulations are sufficient to protect people from any risks linked to modern biotechnology	61 1	2	3
b) Irrespective of the regulations, biotechnologists will do whatever they like	62 1	2	3
c) Only traditional breeding methods should be used, rather than changing the hereditary characteristics of plants and animals through modern biotechnology	63 1	2	3
d) The regulation of modern biotechnology should be left mainly to industry	64 1	2	3
e) Modern biotechnology is so complex that public consultation about it is a waste of time	65 1	2	3
f) It is not worth putting special labels on genetically modified foods	66 1	2	3
g) I would buy genetically modified fruits if they tasted better	67 1	2	3
h) Religious organisations need to have their say in how modern biotechnology is regulated	68 1	2	3
i) We have to accept some degree of risk from modern biotechnology if it enhances economic competitiveness in Europe	69 1	2	3
j) Traditional breeding methods can be as effective as modern biotechnology, in changing the hereditary characteristics of plants and animals	70 1	2	3

EB46.1 - NEW

- Q.12. Which one of the following bodies do you think is best placed to regulate modern biotechnology ? (SHOW CARD - READ OUT - ONE ANSWER ONLY)

International organisations such as the United Nations (UN), the World Health Organisation (WHO), .....	71 1
Public bodies in (OUR COUNTRY).....	2
Ethics committees.....	3
Our national Parliament.....	4
The European Union, public bodies in the European Union.....	5
Scientific organisations.....	6
None of these (SPONTANEOUS).....	7
DK.....	8

EB46.1 - NEW

Q.13. Je vais vous lire une liste de dix choses qui pourraient arriver au cours des vingt prochaines années en raison du développement de la biotechnologie moderne. Pour chacune de ces choses, voulez-vous me dire s'il vous paraît probable ou improbable qu'elle se produise au cours des vingt prochaines années ?  
(MONTRER CARTE AVEC "RESULTATS DE LA BIOTECHNOLOGIE MODERNE - PROBABLE - IMPROBABLE")

LIRE ALTERNATIVEMENT DE HAUT EN BAS ET DE BAS EN HAUT	PROBABLE	IMPROBABLE	NSP
Réduire fortement la pollution de l'environnement	72 1	2	3
Autoriser les compagnies d'assurance à demander un test génétique à un client avant de fixer ses primes	73 1	2	3
Réduire fortement la faim dans le monde	74 1	2	3
Créer de nouvelles maladies dangereuses	75 1	2	3
Résoudre plus de crimes et de délits grâce aux empreintes génétiques	76 1	2	3
Réduire la variété de fruits et de légumes disponibles	77 1	2	3
Guérir la plupart des maladies génétiques	78 1	2	3
Augmenter le rendement des ressources naturelles des pays du tiers-monde	79 1	2	3
Produire des bébés sur mesure	80 1	2	3
Remplacer la plupart des produits alimentaires d'aujourd'hui par de nouvelles variétés	81 1	2	3

EB46.1 - NOUVEAU

Q.14. SPLIT BALLOT A

A présent, je voudrais vous demander quelles sources d'information, à votre avis, vous disent la vérité en ce qui concerne la biotechnologie moderne.

a) Veuillez choisir dans cette liste la source en laquelle vous avez le plus confiance.

(MONTRER CARTE - UNE SEULE REPONSE)

b) Veuillez également indiquer quelles autres sources, selon vous, peuvent vous donner la vérité à propos de la biotechnologie moderne. (MONTRER MEME CARTE - PLUSIEURS REPONSES POSSIBLES)

LIRE	a) LE PLUS CONFIANCE	b) AUTRES SOURCES
Les organisations de consommateurs	82 1	83 1,
Les organisations de protection de l'environnement	2	2,
Les organisations de protection des animaux	3	3,
Les organisations politiques	4	4,
Les syndicats	5	5,
Les organisations religieuses	6	6,
Les autorités publiques	7	7,
L'industrie	8	8,
L'école ou l'université	9	9,
NSP	10	10,

EB39.1 - Q.52 - TREND LEGEREMENT MODIFIE



- Q.13. I am going to read you a list of ten things that might happen within the next 20 years as a result of developments in modern biotechnology. For each one, please tell me whether you think it is likely or unlikely to happen within the next 20 years.  
(SHOW CARD WITH "RESULTS FROM MODERN BIOTECHNOLOGY - LIKELY - UNLIKELY")

READ OUT - TOP/BOTTOM AND BOTTOM/TOP ALTERNATELY	LIKELY	UNLIKELY	DK
Substantially reducing environmental pollution	72 1	2	3
Allowing insurance companies to ask for a genetic test before they set a person's premium	73 1	2	3
Substantially reducing world hunger	74 1	2	3
Creating dangerous new diseases	75 1	2	3
Solving more crimes through genetic fingerprinting	76 1	2	3
Reducing the range of fruit and vegetables we can get	77 1	2	3
Curing most genetic diseases	78 1	2	3
Getting more out of natural resources in Third World countries	79 1	2	3
Producing designer babies	80 1	2	3
Replacing most existing food products with new varieties	81 1	2	3

EB46.1 - NEW

- Q.14. SPLIT BALLOT A

Now, I would like to know which of the following sources of information you have confidence in, to tell you the truth about modern biotechnology.

- a) Please choose from the following list, the source of information you trust most.

(SHOW CARD - ONE ANSWER ONLY)

- b) Indicate also which other sources you would trust to tell you the truth about modern biotechnology.

(SHOW SAME CARD - MULTIPLE ANSWERS POSSIBLE)

READ OUT	a) TRUST MOST	b) OTHER SOURCES
Consumer organisations	82 1	83 1,
Environmental organisations	2	2,
Animal welfare organisations	3	3,
Political organisations	4	4,
Trade unions	5	5,
Religious organisations	6	6,
Public authorities	7	7,
Industry	8	8,
School or university	9	9,
DK	10	10,

EB39.1 - Q.52 - TREND SLIGHTLY MODIFIED

SPLIT BALLOT B

- a) A présent, je voudrais vous demander en laquelle des organisations suivantes vous avez le plus confiance quand il s'agit de vous dire la vérité en ce qui concerne la biotechnologie moderne.  
(MONTRER CARTE - UNE SEULE REPONSE).
- b) Et quand il s'agit de vous dire la vérité à propos de plantations alimentaires modifiées génétiquement et cultivées en plein air ?  
(MONTRER MEME CARTE - UNE SEULE REPONSE).
- c) Et quand il s'agit de vous dire la vérité à propos de l'introduction de gènes humains dans des animaux pour produire des organes pour les transplantations d'organes humains ?  
(MONTRER MEME CARTE - UNE SEULE REPONSE).

LIRE ALTERNATIVEMENT DE HAUT EN BAS ET DE BAS EN HAUT	a) BIOTECHNOLOGIE MODERNE	b) PLANTATIONS ALIMENTAIRES MODIFIEES GENETIQUEMENT	c) TRANSPLANTA- TIONS
Les organisations de consommateurs	84 1	85 1	86 1
Les organisations de protection de l'environnement	2	2	2
Les organisations de protection des animaux	3	3	3
La profession médicale	4	4	4
Les organisations professionnelles d'agriculteurs	5	5	5
Les organisations religieuses	6	6	6
Les autorités publiques nationales	7	7	7
Les autorités publiques internationales	8	8	8
L'industrie	9	9	9
Les universités	10	10	10
Les partis politiques	11	11	11
La télévision et les journaux	12	12	12
Aucune de ces organisations (SPONTANE)	13	13	13
NSP	14	14	14

ES39.1 - Q.52 - TREND FORTEMENT MODIFIE

- Q.15. Nous avons discuté de différentes questions liées à la biotechnologie moderne. Certaines personnes trouvent que ces questions sont très importantes, d'autres pensent que non. Vous personnellement, quelle importance accordez-vous à ces sujets ? (MONTRER CARTE - LIRE)  
Si vous estimez que ce n'est pas du tout important, vous donnez un score de 1. Si vous estimez que c'est extrêmement important, vous donnez un score de 10. Les scores compris entre 1 et 10 vous permettent de dire dans quelle mesure vous vous rapprochez d'un côté ou de l'autre.

	pas du tout important										extrêmement important
	87 1	2	3	4	5	6	7	8	9	10	

Refus..... 88 1  
NSP..... 2

EB46.1 - NOUVEAU

- Q 16. Au cours des trois derniers mois, avez-vous entendu parler de la biotechnologie moderne ?  
(SI OUI) Etait-ce dans les journaux, dans les magazines, à la télévision ou à la radio ? (PLUSIEURS REPONSES POSSIBLES)
- Non..... 89 1,  
Oui, dans les journaux..... 2,  
Oui, dans les magazines..... 3,  
Oui, à la télévision..... 4,  
Oui, à la radio..... 5,  
Oui, mais ne se souvient plus (SPONTANE)..... 6,

EB46.1 - NOUVEAU

SPLIT BALLOT B

- a) Now, I would like to know which one of the following organisations you have confidence in, to tell you the truth about modern biotechnology.  
(SHOW CARD - ONE ANSWER ONLY).
- b) And to tell you the truth about new genetically modified food crops grown in fields ?  
(SHOU SAME CARD - ONE ANSUEER ONLY)
- c) And to tell you the truth about introducing human genes into animals to produce organs for human transplants ?  
(SHOU SAME CARD - ONE ANSUEER ONLY)

READ OUT TOP/BOTTOM & BOTTOM/TOP ALTERNATELY	a) MODERN BIOTECHNOLOGY	b) GENETICALLY MODIFIED FOOD CROPS	c) TRANSPLANTS
Consumer organisations	84 1	85 1	86 1
Environmental organisations	2	2	2
Animal welfare organisations	3	3	3
The medical profession	4	4	4
Farmer's organisations	5	5	5
Religious organisations	6	6	6
National Public bodies	7	7	7
International Public bodies	8	8	8
Industry	9	9	9
Universities	10	10	10
Political parties	11	11	11
Television and newspapers	12	12	12
None of these (SPONTANEOUS)	13	13	13
DK	14	14	14

EB39.1 - Q.52 - TREND LARGELY MOOIFIEO

- 1.15. we've been discussing several issues to do with modern biotechnology. Some people think these issues are very important whilst others don't. How important are these issues to you personally ?  
(SHOW CARD - READ OUT)  
If you think this is not at all important, you give a score of 1. If you think it is extremely important, you give a score of 10. The scores between 1 and 10 allow you to say how close to either side you are.

	not at all important										extremely important
	87 1	2	3	4	5	6	7	8	9	10	

Refusal..... 88 1  
DK..... 2

EB46.1 - NEW

- 1.16. Over the last three months, have you heard anything about issues involving modern biotechnology ?  
(IF YES) Was it in newspapers, in magazines, on television, or on the radio ? (SEVERAL ANSWERS POSSIBLE)
- No..... 89 1,  
Yes, in newspapers..... 2,  
Yes, in magazines..... 3,  
Yes, on television..... 4,  
Yes, on radio..... 5,  
Yes, does not remember (SPONTANEOUS)..... 6,

EB46.1 - NEW

- 0.17. Avant aujourd'hui, aviez-vous déjà parlé de la biotechnologie moderne avec quelqu'un?  
 (SI OUI) En aviez-vous parlé fréquemment, occasionnellement ou seulement une ou deux fois ?
- |  |    |   |
|--|----|---|
| Non, <b>jamais</b> .....                     | 90 | 1 |
| Oui, - <b>fréquemment</b> .....              |    | 2 |
| Oui, <b>occasionnellement</b> .....          |    | 3 |
| Oui, seulement une ou deux <b>fois</b> ..... |    | 4 |
| <b>NSP</b> .....                             |    | 5 |

EB46.1 - NOUVEAU

- Q.18. Selon vous, quel sera le thème susceptible d'avoir le plus d'influence sur votre vote aux prochaines élections nationales législatives ? (MONTRER CARTE - LIRE ALTERNATIVEMENT DE HAUT EN BAS ET DE BAS EN HAUT - QUATRE REPONSES MAXIMUM)
- |   |    |     |
|---|----|-----|
| La protection de l'environnement et de la nature, la réduction de la pollution..... | 91 | 1,  |
| La défense des droits des <b>travailleurs</b> .....                                 |    | 2,  |
| La défense des avantages sociaux et des soins de santé.....                         |    | 3,  |
| <b>L'enseignement</b> .....   |    | 4,  |
| La lutte contre le <b>racisme</b> .....   |    | 5,  |
| La défense des droits des retraités.....  |    | 6,  |
| La lutte contre le chômage.....   |    | 7,  |
| La situation des sans-abris et des <b>pauvres</b> .....                             |    | 8,  |
| La lutte contre la criminalité et la <b>délinquance</b> .....                       |    | 9,  |
| Les impôts, <b>la fiscalité</b> .....   |    | 10, |
| <b>NSP</b> .....  |    | 11, |

E841 - Q.39 - TREND FORTEMENT MODIFIE

- Q.19. Quels sont les journaux ou magazines, s'il y en a, que vous lisez au moins une fois par semaine ?  
 (ENQ. : encoder le nom des journaux ou magazines - VERBATIMS)

1 AUCUN

2 \_\_\_\_\_

3 \_\_\_\_\_

4 \_\_\_\_\_

5 \_\_\_\_\_

EB46.1 - NOUVEAU

Q.17. Before today, had you ever talked about modern biotechnology with someone ?  
 (IF YES) Had you talked about -it frequently, occasionally or only once or twice ?

No, <b>never</b> .....	90	1
<b>Yes, -frequently</b> .....		2
<b>Yes, occasionally</b> .....		3
Yes, only once or <b>twice</b> .....		4
<b>OK</b> .....		5

EB46.1 - NEW

Q.18. Which issue, do you think, will most influence your vote at the next general elections ? (SHOW CARD - READ OUT TOP/BOTTOM AND BOTTOM/TOP ALTERNATELY - FOUR ANSWERS MAXIMUM)

Protection of the environment and nature, cutting down <b>pollution</b> .....	91	1,
Fight for worker's <b>rights</b> .....		2,
Protection of social benefits and health <b>care</b> .....		3,
<b>Education</b> .....		4,
Fight against <b>racism</b> .....		5,
Protection of pensioners' <b>rights</b> .....		6,
Fight against <b>unemployment</b> .....		7,
Fight against homelessness and <b>poverty</b> .....		8,
Fight against crime and <b>delinquency</b> .....		9,
<b>Taxation</b> .....		10,
<b>DK</b> .....		11,

EB41 - Q.39 - TREND STRONGLY MODIFIED

Q.19. Which newspapers or magazines, if any, do you read at Least once a week ?  
 (INTERVIEWER : record name of newspapers or magazines - VERBATIMS)

1 **NONE**

2 \_\_\_\_\_

3 \_\_\_\_\_

4 \_\_\_\_\_

5 \_\_\_\_\_

EB46.1 - NEW

**TECHNICAL SPECIFICATIONS FOR THE  
SOCIO-DEMOGRAPHIC AND SOCIO-POLITICAL  
VARIABLES USED IN THE ANALYSES**

SPECIAL CLASSIFICATIONS IN EUROBAROMETER SURVEYS

SCALE OF INCOME

This variable is established according to the answers to the following question:

*"We would like to have more information regarding your family income to analyse the results of this study according to the different types. Here is a series of monthly incomes (SHOW CARD D29). You should take into account the total monthly earnings and wages of all family members, including all pensions and social security and family benefits, as well as any other income such as rent and so forth.  
Your response, like all the others in this interview, will of course be treated confidentially and no reference whatsoever will be made to you or your household. Please indicate the letter corresponding to your family income before any taxes or deductions.*

B	T	P	F	E	H	L	N	R	M	S	K
---	---	---	---	---	---	---	---	---	---	---	---

*Refusals*

*DK*

*The respondents are grouped in quartiles for each country. They are then brought together to establish the community distribution.*

POLITICAL STANCE

This variable is established according to the responses to the following question:

*"People talk about "right" and "left " in politics. Where would you say you stand on this scale? "  
(Interview instructions: Do not prompt, the respondent must select one box; if respondent hesitates, insist that he/she select one):*

LEFT					RIGHT				
1	2	3	4	5	6	7	8	9	10

*Refusals*

*DK*

In this report, respondents are grouped in tertiles for each country: those farthest to the left, those farthest to the right, and the remaining third comprising those at the centre. The usual weighting is then used to establish community distribution.

## LEADERSHIP INDEX

In analysing the results of surveys of representative samples of the entire population, it is useful to single out within this group those individuals who show certain traits generally characteristic of "leadership", i.e. interest in certain issues, level of activity in group life, etc.

Analysis of the results accumulated during previous EUROBAROMETER surveys has shown that it is statistically significant to construct an index from the answers given by all interviewees to two questions. The index comprises four grades, the highest corresponding to those we shall call opinion leaders (around 10% of the European population) and the lowest to non-leaders (about 22%). The two middle grades correspond to individuals with slightly more or slightly less "leader" quality than the public average.

### QUESTIONS:

- A. *"When you hold a strong opinion, do you ever find yourself persuading your friends, your fellow workers or your relatives to share your views? Does this happen often, occasionally, rarely, never, or DK? "*
- B. *"When you get together with friends, would you say you discuss political matters frequently, occasionally or never? "*

### CONSTRUCTION:

The following table shows how the index of "opinion leadership" has been constructed.

A.	often	occasionally	rarely	never	
B.					
often .....	++	++	+	+	+
occasionally.....	+	+			
never.....					
no answer.....					