BIOTECHNOLOGY AND GENETIC ENGINEERING

WHAT EUROPEANS THINK ABOUT IT IN 1993

SURVEY CONDUCTED IN THE CONTEXT OF EUROBAROMETER 39.1

Commission of the European Community

EUROBAROMETER 39.1

BIOTECHNOLOGY AND GENETIC ENGINEERING :

WHAT EUROPEANS THINK ABOUT IT IN 1993

Report written

for

THE EUROPEAN COMMISSION

Directorate-General "Science, Research and Development"

Unit XII/E/1 : "Biotechnologies"

by

INRA (EUROPE)

EUROPEAN COORDINATION OFFICE

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

It was carried out in the whole of the European Community, in May-June 1993, by twelve 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, as well as various technical details (sampling method, composition of the sample, ...) are in the appendix.

This report, written by Eric MARLIER, is in no way binding upon the Commission of the European Community.

This report was originally written in French.

A QUICK GLANCE AT THE STUDY

SOME KEY RESULTS OF THE SPRING 1993 SURVEY

-» A large number of persons interviewed - particularly in Greece, Spain, Ireland and Portugal - were unable or unwilling to answer certain questions. Compared to the previous survey carried out on the same subject (Spring 1991), this proportion has dropped however.

-» As in the 1991 poll, the two main sources of information used by Europeans for what concerns "new developments that affect our way of life" are, in ranking order, television (the supremacy of which has yet again been confirmed) and newspapers.

-» In ranking order, the most reliable sources of information on biotechnology/genetic engineering are considered to be environmental organisations, consumer organisations and schools/universities.
In 1991, consumer organisations slightly supplanted environmental organisations.
If consumer organisations have lost their predominance as "the most reliable source" it is not because they have become less popular than in 1991 but because environmental organisations have themselves made considerable progress.

-» Less than one respondent in five believes that Public Authorities provide a reliable source of information regarding biotechnology/genetic engineering. In Denmark, however, this percentage is nearer one in two.
In 1991, the situation was similar but not as pronounced : the Danish result was weaker and the European average slightly higher.

-» Each of the seven new technologies analysed is perceived by a large majority of persons interviewed as "improving our way of life in the next 20 years".
The only two technologies for which this majority is not absolute but relative are genetic engineering (as opposed to biotechnology) and space exploration. As in 1991 these find, overall, less favour.
The level of "optimism" regarding genetic engineering has lessened considerably since the last survey. This drop is very pronounced in Germany and particularly in the five new Länder.

—» 48% of interviewees believe that biotechnology/genetic engineering "will improve our way of life in the next 20 years" ; 15% think the opposite. In 1991, "optimism" was at 50% and "pessimism" at 11%.

—» In general, when there exists a significant difference, the term "genetic engineering" is less well known and has a more negative connotation than the term "biotechnology". This was already the case in 1991.

—» Support for biotechnology/genetic engineering, as well as "optimism" regarding it, is a positive function of what is known on the subject.
As in the survey two years ago it depends to a great extent on the type of application and is linked to the risk associated with it ; a risk which is considered to be neither negligible nor dramatic, regardless of the application analysed.

—» Except for research on farm animals and, to a lesser extent, food research, where opinions are mixed, those interviewed "tend to agree" that the various kinds of research into biotechnology/genetic engineering discussed in the questionnaire are "worthwhile and should be encouraged". It was already the case in 1991.

—» Regardless of the nationality and the application of biotechnology/ genetic engineering in question, demand for governmental control of the various applications is massive. This was even clearer in 1991.

—» The classification of the different types of research according to the degree of support given to them is identical in 1991 and 1993. It is the same for the classifications linked to the associated risk or related to the level of "demand for control".

—» Since the last survey, support for the different applications analysed has, overall, slightly dropped. In Germany and especially in the five new Lander this drop in "global support" is particularly pronounced.
The "global risk" associated with these applications has remained stationary whereas the level of "global demand for control" has somewhat dropped.

—» Whereas the perception of risk is particularly high in Denmark (it is the highest in the Twelve), the support recorded here is around the European average.
Although weaker than that registered in Denmark, the perception of risk is also very high in West Germany (it is the second highest in the Community). On the other hand, support here is a great deal lower than the Community average (it is the weakest in the Twelve).
This divergence in attitudes has increased in comparison to 1991.
One plausible explanation of this result is that the Danes (see above), even more now than two years ago, are proportionally many more than the West Germans to trust Public Authorities "to tell the truth about biotechnology/genetic engineering".

—» In Luxembourg, global support, perception of risk as well as global demand for control have noticeably increased since the previous survey.
In Portugal, on the other hand, we observe a considerable rise in the global perception of risk, accompanied by a significant drop in global support and global demand for control.

—» As for research into biotechnology/genetic engineering involving human beings as well as animals and plants, at least three out of four interviewees declare that "there should be clear ethical rules" indicating when research "may not in any way" be undertaken.

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INTRODUCTION

In just a few decades, our understanding of the ways in which living things function has progressed greatly. This progress has stimulated - and in turn has been stimulated and made possible by - the development of new technologies allowing us to use and modify living systems and organisms with ever increasing precision, as well as to control them more effectively.

The media have responded rapidly to the scientific revolution that biotechnology represents. Certain media have praised the great innovations made possible by this science. Others have denounced the risks it poses, which some regard as serious, while highlighting the most alarming speculationsmade.

Aware of the importance of these new technologies, the Commission of the European Community began, in 1982, a series of research and development programmes in the biotechnology field.

Gradually, this research (conducted both within and outside the European Community and driven by programmes supported by the public and private sectors) has begun to address the question of the **applications** of biotechnology, in particular in the areas of agriculture, food, pharmaceuticals and health care.

In parallel with these developments, an increasing number of political measures has had to be taken. Some of these address biotechnology specifically : the definition of limits beyond which experimentation should not go, such as the particularly delicate "bio-ethics" debate (in areas such as applications or inventions on the "identity" of man or animals) ; the problems of intellectual property that biotechnology raises, and so on.

Others touch on the interpretation or the adaptation of existing policies, whether this be in the field of agriculture, industry or safety at work.

Discoveries in biotechnology arouse the curiosity and inflame the enthusiasm of a large number of specialists from the various biological disciplines (both researchers and industry). These specialists imagine - underestimating sometimes, perhaps, some of the practical difficulties with which they could be confronted - that they will be capable of (contributing towards) solving some of the major problems facing humanity nowadays - such as food, health, environment and population.

This curiosity and enthusiasm are far from being shared by the population as a whole. Neither are they shared by the Public Authorities and the political world. For this reason, some research efforts have been delayed, whilst others have faced opposition, or have even been refused.

There are several factors that are likely to influence **attitudes regarding** biotechnology :

- questions of philosophy, values or ethics in general ;
- lack of information on the subject, misunderstanding ;
- distrust of the objectives and capabilities of those promoting these innovations (for example their ability to control the possible risks/ accidents which, some believe, are far from being negligible) ;
- nationality ;
- diverse socio-demographic variables such as sex, age and educational level, etc.

In the present study, there is no question of attempting to evaluate the soundness of the basis of biotechnological research. The objective is simply to analyse the results of an opinion survey conducted in the context of EUROBAROMETER (EB) [1] N° 39.1, between 10 May and 5 June 1993. simultaneously in the 12 countries of the European Community.

This survey is aimed at a better understanding of European opinion on biotechnology. It focuses on seven different themes :

1) expectations regarding biotechnology and other new technologies such as computer science, space exploration... ;

2) knowledge (both "objective" and "subjective" ; see Chapter 2) of biotechnology ;

3) attitudes and opinions on diverse applications of biotechnology ;

4) information sources that people use to draw their knowledge on "the new developments which affect our way of life" ;

5) information sources on biotechnology that people trust ;

6) biotechnology and questions of ethics ;

7) influence that persons or groups concerned about the potential risks associated with advances in biotechnology and its diverse applications, can actually have on this development.

' EUROBAROMETER polls ("standard EUROBAROMETER poll") have been undertaken each Spring and Autumn since September 1973 (EB N°0), on behalf of the Directorate-General (DG) for "Audiovisual, Information, Communication and Culture" of the Commission of the European Community. They have included Greece since Autumn 1980, Portugal and Spain since Autumn 1985, and the ex-GDR since Autumn 1990.

In each country, these questions were asked of a representative sample of the national population aged at least 15 years old. In total 12,800 people were interviewed, in other words 1000 per country with the exception of Luxembourg (500), Germany (2000 : 1000 in West Germany and 1000 in East Germany) and the United Kingdom (1300 : 1000 in Great Britain and 300 in Northern Ireland).

There are several different ways to define "biotechnology". For some people it only includes modern (post-1974) techniques of genetic engineering ; in other words methods of recombining segments of DNA.

For others, biotechnology has a far wider scope including either all applications of the life sciences (which is the literal sense of the term) or, more specifically, fermentation industries, including both traditional sectors (yeasts, milk fermentation products, ... in other words brewing, cheese production, baking, ...) and more recent applications (such as fermentation for the production of antibiotics, i.e. pharmaceutical research started some 50 years ago). A great deal of confusion therefore surrounds the definition of these new technologies.

In order to determine whether Europeans perceive the terms "biotechnology" (the same term in all nine official languages of the Community : see Appendix 3) and "genetic engineering" (a term which varies considerably from one language to the next : see Appendix 3) in the same way, i.e. in order to attempt to understand the different connotations attached to these terms, two versions of the **same** questionnaire were drawn up, one using the term "biotechnology" and the other, the term "genetic engineering".

The "biotechnology" questionnaire was used with half of those interviewed, and the "genetic engineering" questionnaire with the other half.

This survey was undertaken at the request of the Directorate-General for "Science. Research and Development" of the Commission of the European Community (Unit XII/E/1 : "Biotechnologies"), and is directly linked to one carried out in the context of EB 35.1 (between 28 March and 25 April 1991) at the request of the same Directorate-General [2].

The only differences between these two polls (see above) are found with theme 2 (as a result of the 1991 survey, both the "objective" knowledge and "subjective" knowledge of biotechnology have been set out differently in the 1993 survey), as well as with themes 6 and 7, which were dealt with for the first time in the last poll. With themes 1, 3, 4 and 5, it is possible therefore to define the major trends in public opinion which may have appeared since 1991.

The Community results (i.e. "EC12" figures) which appear 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 of 15 year olds and over, within the total Community population of 15 year olds and above [3].

The sum of the percentages presented in the tables of this study can exceed 100% when interviewees have the possibility of providing multiple answers to the same question. They can also vary slightly from 100% (e.g. 99% or 101%) due to rounding. The same logic also applies to the different means and the different indices calculated.

Throughout this report, the abbreviation "DK/NA" will be used. "DK" means "Don't know" (i.e. the person interviewed confirmed **not knowing** how to answer the question) and "NA", "No Answer" (i.e. the person interviewed refused to answer the question).

[2] The report relating to this study has been published in the •following volume : Durant, J. (editor). *Biotechnology in Public-A review of recent research,* (London: Science Museum, 1992).

[3] It is by following an identical reasoning that the results of unified Germany ("D-GESAMT") have been calculated from those of East ("D-OST") and West Germany ("D-WEST").

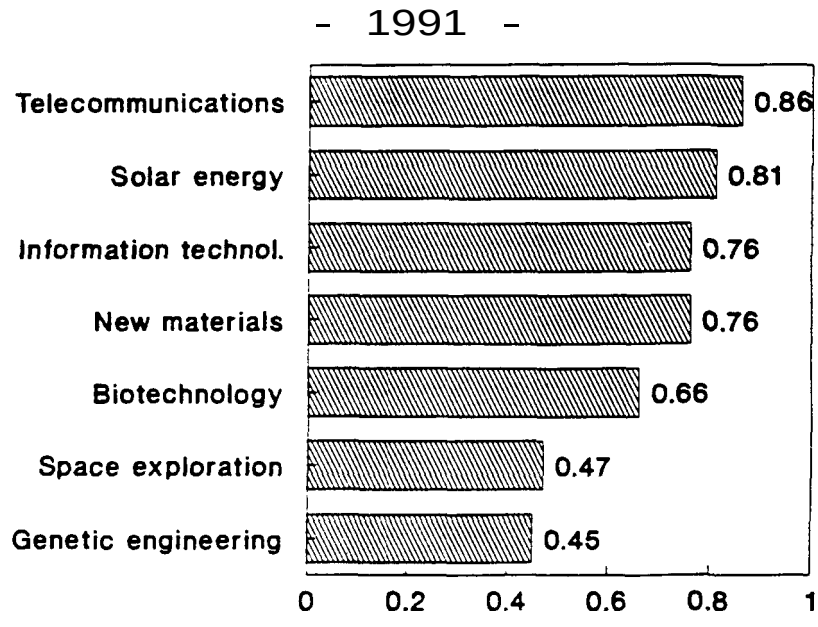
It is important to point out that the results of the sub-samples "biotechnology" and "genetic engineering" are only indicated when they differ in a statistically significant way and when they present a real interest. Everywhere else the results shown refer to the global sample ("biotechnology/genetic engineering").

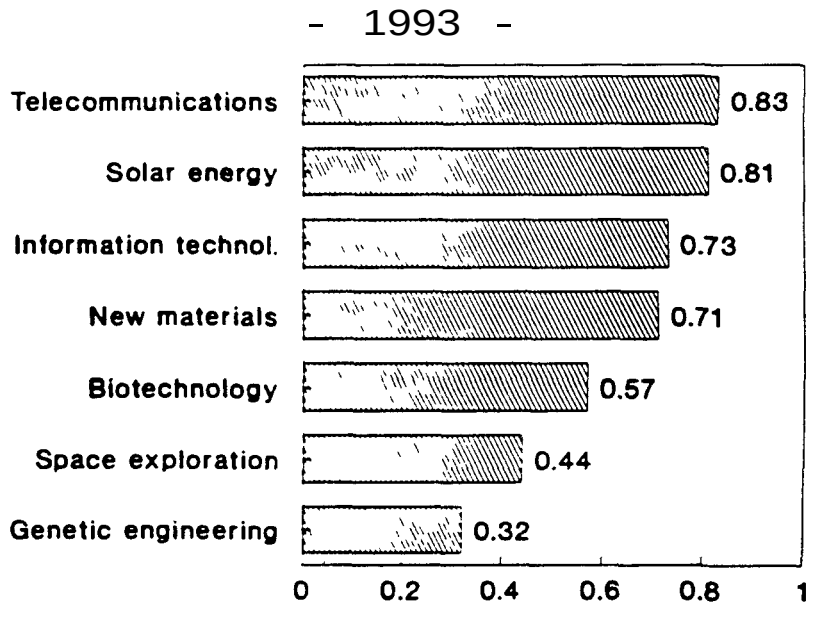
It is also worth pointing out that this report has chosen a largely graphical approach to the study in order to emphasize the key results of the 1993 survey and the comparison of these with those of 1991. This choice allows us to analyse the issue more thoroughly, without having to complicate the text. The latter thus playing a role often akin to that of "Ariana's thread".

CHAPTER 1

Figure 11 : Anticipated effects of 7 new technologies

For each technology, EC12 mean varying from +1 ("will improve our way of life") to -1 ("will make things worse") ; 1991 and 1993 figures ; Tables 11 and 12





ANTICIPATED EFFECTS OF SEVEN NEW TECHNOLOGIES

Before going to the heart of the matter - attitudes of Europeans regarding biotechnology/genetic engineering -. it is useful to place this within its context by examining the opinions of those interviewed on the effects of new technologies in general (i.e. biotechnology and genetic engineering, as well as computer science, space exploration, ...) : will they improve our way of life in the next 20 years, will they have any effect at all, or will they in fact make things worse ?

As Tables 1.1 a and 1.1 b as well as Figure 1.1 show, replies to this question remain optimistic without attaining however the level registered in the previous poll (1991).

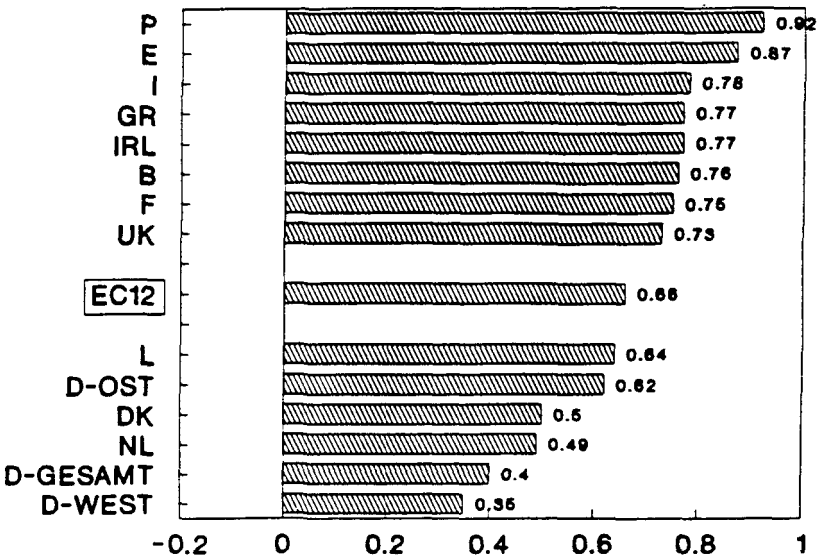
At Community level, the results can be summarised as follows :

a) The attitude towards the diverse technologies presented - measured by means varying from -1 to +1 (see definition in tables 1.1 A and 1.1 B) - varies between 0.32 (genetic engineering) and 0.83 (telecommunications), signifying that those interviewed generally expect the new technologies presented to have an effect, and for this effect to improve their way of life.
   Compared to 1991 figures, a marked drop in averages relating to biotechnology and especially genetic engineering should nevertheless be noted.

b) "DK/NA" ("Don't know/No answer") percentages are very high, particularly with respect to "genetic engineering" and "biotechnology"; they are lower, however, than in 1991.

Figure 1.2.1 : Anticipated effects of biotechnology and genetic engineering (1991 figures : Tables 1.1 and 1.2)

A. BIOTECHNOLOGY - National and EC12 means varying from +1 ("will improve our way of life") to -1 ("will make things worse")



B. GENETIC ENGINEERING - National and EC12 means varying from +1 ("will improve our way of life") to -1 ("will make things worse")

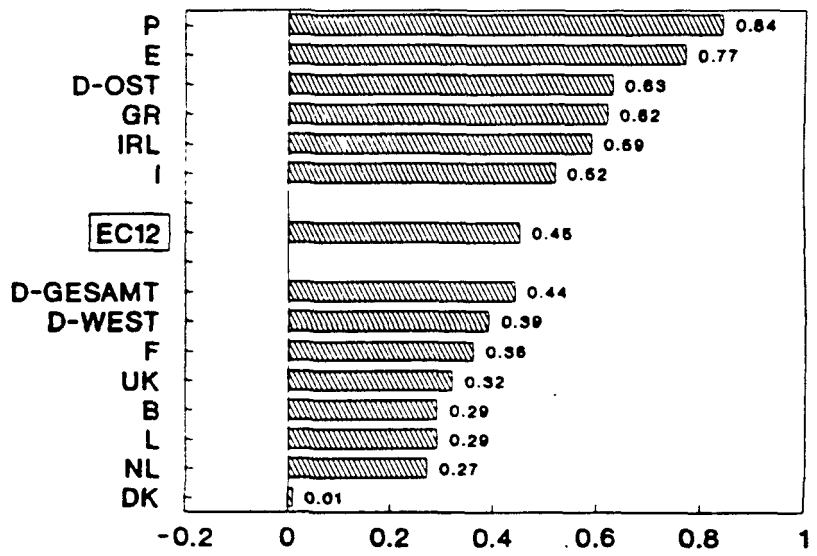
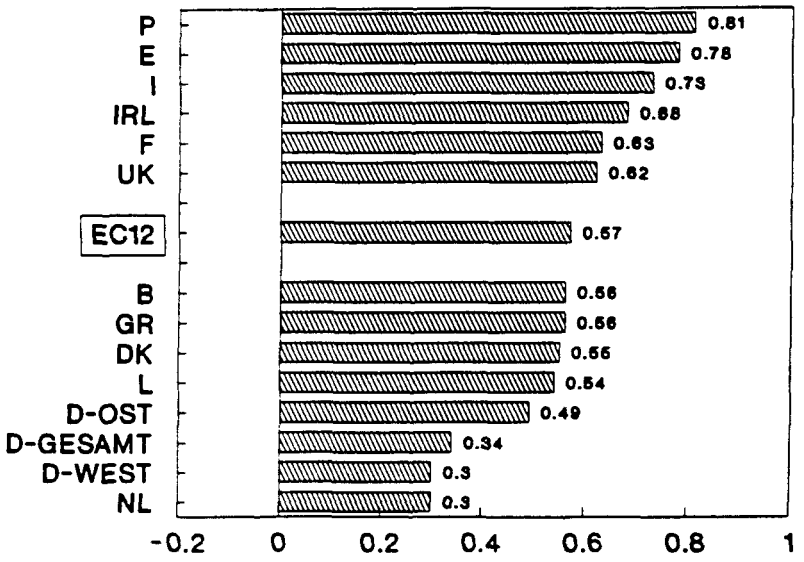
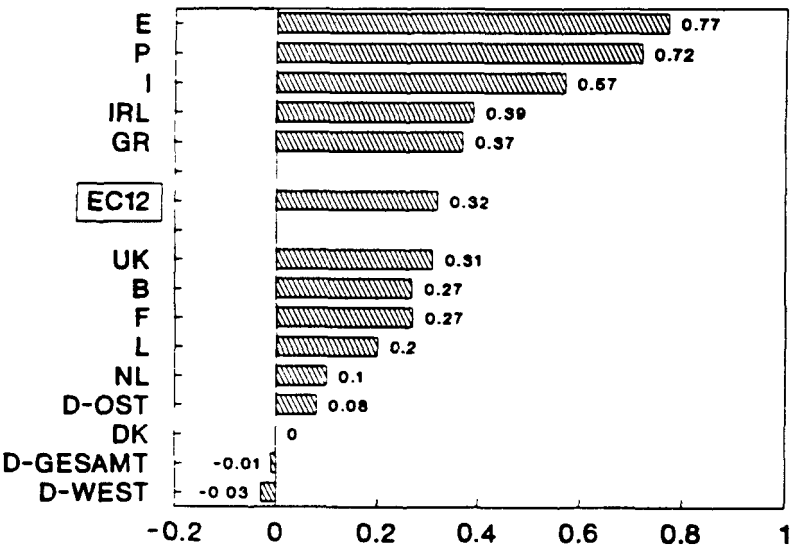


Figure 1.2.2 : Anticipated effects of biotechnology and genetic engineering (1993 figures : Tables 1.1 and 1.2)

A. BIOTECHNOLOGY - National and EC12 means varying from +1 ('will improve our way of life') to -1 ('will make things worse')



B. GENETIC ENGINEERING - National and EC12 means varying from +1 ("will improve our way of life") to -1 ("will make things worse")



c) As in 1991, the least favourable judgements are reserved for genetic engineering (which as in 1991 draws a noticeably less positive result than biotechnology) and for space exploration.

d) Europeans' "global optimism" with regard to the seven [1] new technologies presented, can be defined as follows :

firstly, by calculating for each individual, the number of "will improve..." replies (a number varying between 0 and 6 ; see note (1) above); and

secondly, by establishing on the basis of these some 12.800 replies, an EC12 average.

This Community mean at present is 3.83/6, versus 0.90. 0.39 and 0.87 respectively for responses "no effect", "will make things worse" and for DK/NA. In 1991, these figures were 3.88/6, 0.80. 0.32 and 0.98 respectively.

If we look at the overall results, the fairly general drop mentioned above does not correspond so much to a decline in favourable opinions as to an increase in neutral and negative ones. This increase has also been accompanied by a fall in DK/NA.

This leads us on to making a general comment, necessary for a clear understanding of the study : when we analyse "global optimism" (or another index of this type), it is impossible to draw ("infer") conclusions regarding "global pessimism" ... even if we were tempted to define the latter as the opposite of the former.

Prom the viewpoint we have chosen, the notion of optimism excludes not only "pessimism" ("will make things worse"), but also indifference ("no effect") and DK/NA.

' Remember that each person interviewed was asked to evaluate **EITHER** biotechnology OR genetic engineering, in other words to evaluate a total of six - not seven - items.

At national level, responses to the question can be synthesized in the following way (see Tables 1.1 A and 1.1B ; Figs 1.2.1-1.4) :

a) Optimism (quite relative, in certain cases) about new technologies is present throughout the Community : the lowest means, found in West Germany (-0.03 for genetic engineering, versus 0.39 in 1991) and in Denmark (0.00 for genetic engineering ; unchanged when compared to 1991 (0.01)), are around zero i.e. around the reply "no effect".
For the rest, means oscillate between 0.08 (for genetic engineering in East Germany ; in 1991: 0.63) and 0.96 (for telecommunications in Spain).
In 1991, averages were between 0.01 (in Denmark, for genetic engineering) and 0.97 (in Spain, for telecommunications).

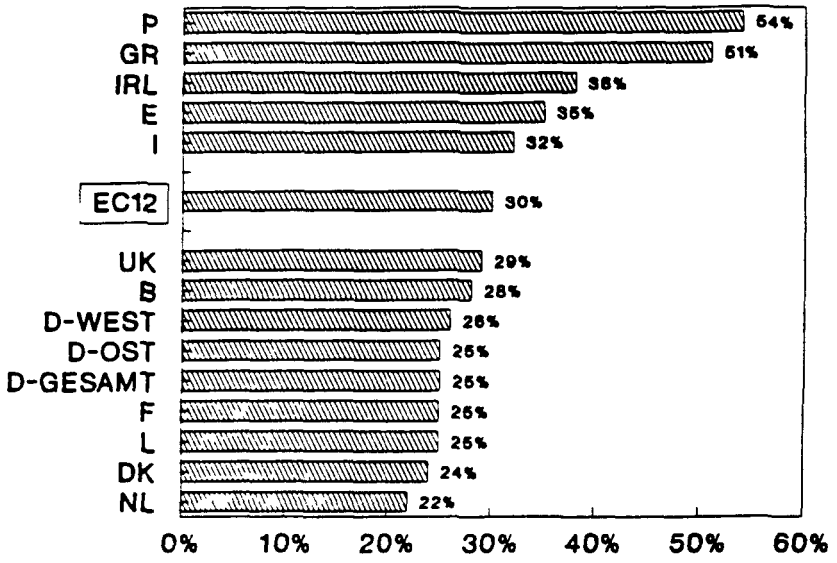
b) Considering all Member States, the least favourable judgements are those levelled at genetic engineering (out of 13 means [2], 10 are less than 0.4), space exploration (10 means are less than or equal to 0.5) and biotechnology (3 means inferior or equal to 0.5).

c) Throughout the Community, biotechnology is judged more favourably than genetic engineering. It was already the case in 1991, with the exception of East and West Germany where the differences were barely noticeable.
If we compare results related to biotechnology in 1991 and 1993, we see that averages have declined everywhere, with the exception of Denmark where we note a very slight increase (+0.05). The most outstanding falls are seen in Greece (-0.21), Belgium (-0.2) and the Netherlands (-0.19).
For genetic engineering, means everywhere have either remained stationary (Belgium, Spain. Italy, Denmark and the United Kingdom ; change compared to 1991 : from -0.02 to +0.05), or come down.
Out of the list of fallen averages, we note in particular those registered in East (-.0.55) and West Germany (-0.42).

[2] 13 and not 12, as the results of West and East Germany are considered separately.

Figure 1.3.1 : Anticipated effects of biotechnology and genetic engineering (1991 figures : Tables 11 and 1.2)

A. BIOTECHNOLOGY - National and EC12 % of DK/NA



B. GENETIC ENGINEERING - National and EC12 % of DK/NA

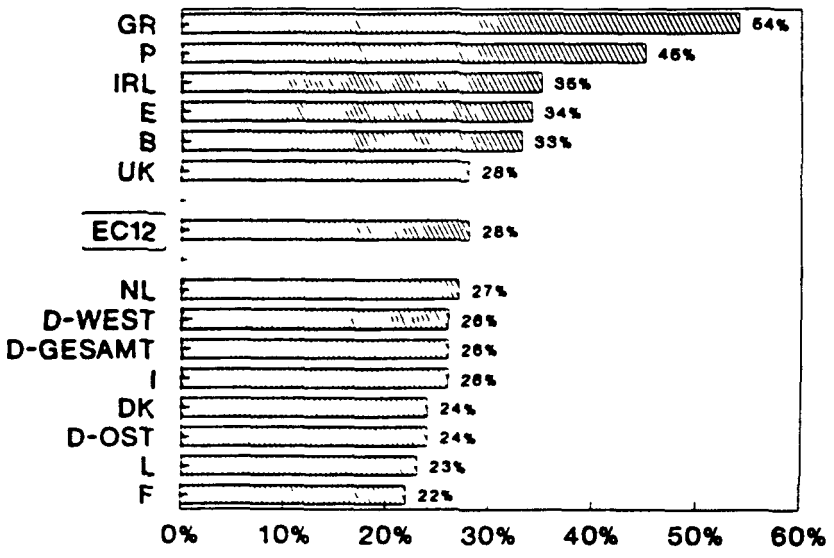
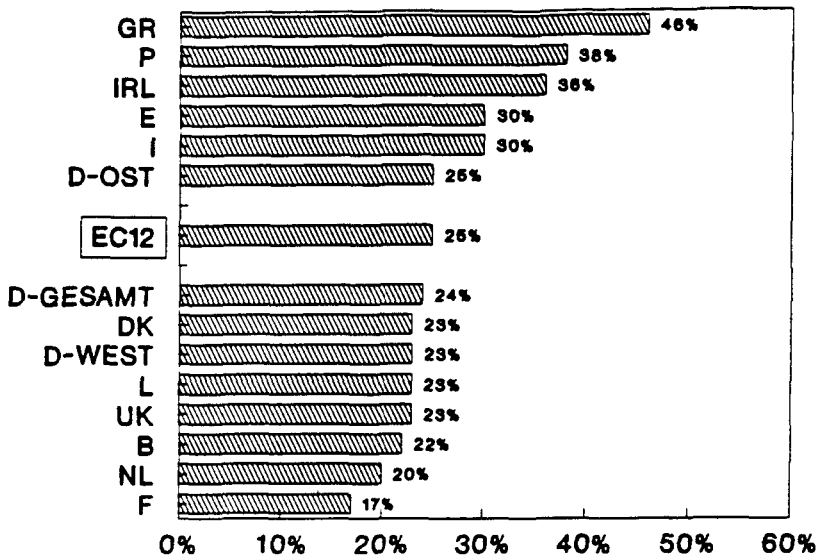


Figure 1.3.2 : Anticipated effects of biotechnology and genetic engineering (1993 figures : Tables 1.1 and 1.2)

A. BIOTECHNOLOGY - National and EC12 % of DK/NA



B. GENETIC ENGINEERING - National and EC12 % of DK/NA

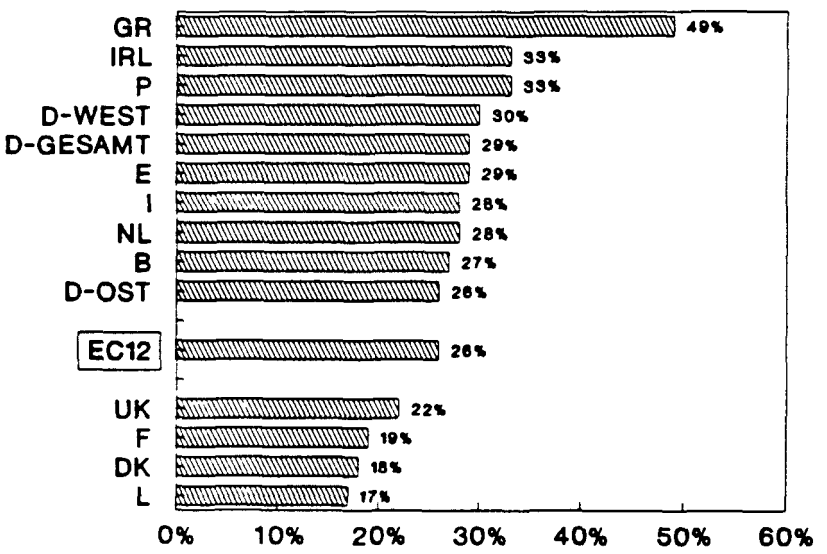
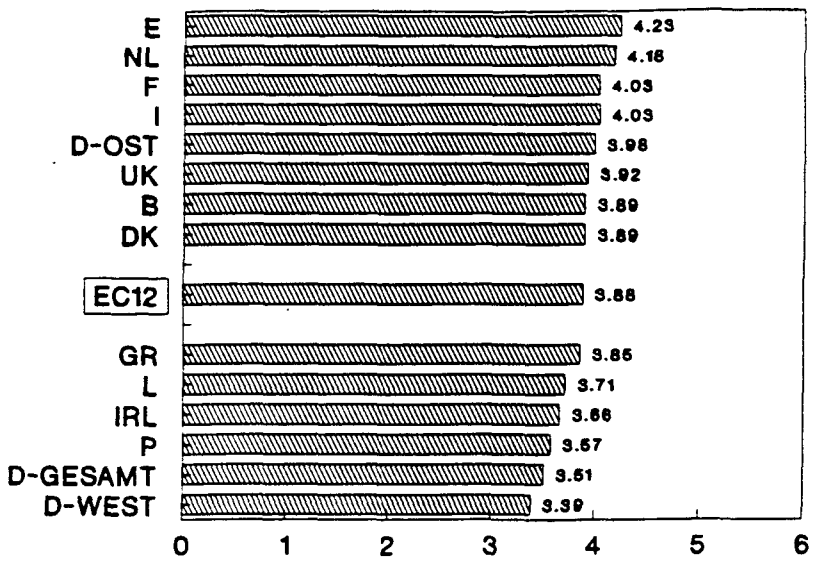
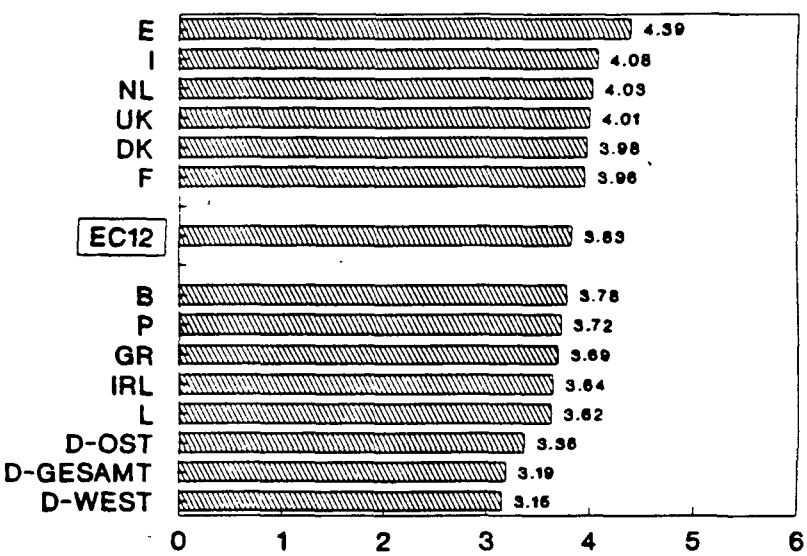


Figure 1.4 : Global optimism with regard to 7 new technologies - Out of 6 points (Tables 1.1 and 1.2)
(National and EC12 results for 1991 and 1993)

- 1991 -



- 1993 -



d) As in 1991, it is in Spain and Portugal that we note the highest means for biotechnology and for genetic engineering.

e) "DK/NA" percentages vary considerably from one country to the next: very high in Portugal (mean : 26%), Greece (24%) and Ireland (21 %), and lower (even if remaining high) in France and the United Kingdom (10%), as well as in Denmark, Luxembourg and the Netherlands (11%). These rates fluctuate within a band of 16 points.
In 1991, this band was distinctly wider (24 points), the limits being Portugal (35%) and the Netherlands (11%).
In most of the countries, the highest percentages of "DK/NA" are for biotechnology and genetic engineering ; in Greece, this rate almost reaches 50% for genetic engineering (49%, i.e. a drop of five points compared to 1991). Percentages related to "new materials" and, in Portugal especially, to space exploration, are also high.

f) As in 1991, the highest rates of DK/NA for biotechnology as well as for genetic engineering are found in Greece, Ireland and Portugal.

g) As for the development of global optimism (see Pig 1.4), we note the outstanding though not surprising (given previous results) drop in East Germany : with a global optimism greater than the European average in 1991. it now joins West Germany at the bottom of the list.

h) The example of Portugal allows us to illustrate the comment made above.
Regardless of the type of new technology analysed, Portugal in fact shows averages equal to or above those of the EC12. On the other hand, global optimism registered there is lower than the EC12 average (even though it has increased since the last poll).
This is explained entirely by the fact that Portugal has a very high level of "DK/NA" (mean : 26%, versus 15% for the Twelve).

As for the influence of the socio-demographic variables (see Table 1.2), we highlight the following results :

a) All averages shown in the table are largely positive : they vary between 0.22 and 0.89.

b) Regardless of the "new technology" in question, means are higher among men than among women.
Men show a greater "global optimism" and are more likely to express themselves on the issue (the DK/NA are overall much less numerous).

c) Influence of age is particularly marked between "15-54 year olds" on the one hand (global optimism : between 3.91 and 4.09) and, on the other hand, "55 year olds and over" (global optimism : 3.41).
We see that the highest mean for biotechnology is found with the 40-54 year olds.
As for "global DK/NA" it is distinctly higher among the "55 year olds and over" than among the "15-54 year olds".

d) Global optimism increases with educational level.
Global optimism is (marginally) highest among those still studying, regardless of age. This is hardly surprising since this category combines two factors which influence positively global optimism : youth and education (if it includes students aged 15 whose educational level falls into the lowest category, it also includes university-level students in the "20 years and over" category).
It should be made clear that averages related to genetic engineering are practically the same among those with a "-16" educational level as among those with a "20+" educational level.
Global DK/NA decreases with educational level.

e) Global optimism is a positive function of "level of income", and global DK/NA a negative function.
The influence of income on global optimism and global DK/NA should be understood by bearing in mind the influence that **sex** and "age at end of studies" have on these two indices, on the one hand and, on the other, the correlation which exists between these different variables (see Table 1.3). This does not mean, however, that some kind of relationship between cause and effect necessarily exists here : to draw such a conclusion, one should go much further with the analysis and calculate the respective effects of the different variables. This would be outside the scope of this report.

f) Averages observed among people who call themselves "religious" (independently of whether they actually practise their religion or not ; 59% of our sample), on the one hand. and among those who think of themselves as "non-religious", "agnostic" or "atheist" (37%), on the other, do not significantly differ from each other (as is also the case for the global optimism they manifest), with the exception of biotechnology and genetic engineering, where differences nevertheless remain small. We observe that the average for "biotechnology" is higher among the "non-religious", whereas the reverse situation is true for "genetic engineering". For these two items, the DK/NA percentage given by "religious" individuals is higher than that given by the "non-religious". More generally global DK/NA is higher among "religious" individuals.

As for the influence of "opinion leadership" (for definition : see Annex 1), we would point out that :

* "Global optimism" is a positive function of this variable. It is in fact 3.48 among leaders --, 3.68 among leaders -, 4.01 among leaders + and 4.15 among leaders + +.
  In general therefore, opinion leaders are more optimistic regarding the potential effects of new technologies [3] ; they are also proportionally more numerous to express themselves on the subject ("global DK/NA" are 1.23, 0.93, 0.73 and 0.59 respectively).

* As for biotechnology, it is among leaders + + that the average is the highest - though marginally so : 0.55 among leaders --, 0.53 among leaders -, 0.59 among leaders + and 0.63 among leaders + +.
  With regard to genetic engineering on the other hand, it is among leaders " that the average is the highest, albeit still marginally (0.38, 0.25. 0.33 and 0.30 respectively).

Before concluding this chapter, it would be useful to examine the link between global optimism and information. Firstly, by considering the global media consumption ("media use" ; for definition : see Annex 1) and secondly, the main sources of information.

The impact of "media use" on global optimism is small : as we pass successively from use ---, to use --", + + and + + +, global optimism passes successively from 3.68 to 3.70, 3.91 and 3.86 . On the other hand, its impact on global DK/NA is pronounced, changing here from 1.19 to 1.16, 0.84 and 0.72 successively.

[3] *A priori,* this is not without consequences, an "opinion leader" being someone whose opinion is "dominant", i.e. someone who in the context of certain social functions, exercises more influence on the opinions of others than others do on his.

If we now turn to the main **SOURCE** which the interviewee uses to obtain his/her information on "the new developments which affect our way of life" [4], we reach the following results :

MAIN SOURCE	GLOBAL OPTIMISM (out of 6)	GLOBAL DK/NA (out of 6)
Courses and lectures	4.42	0.25
Specialist press	4.31	0.37
Company brochures, advertisements (*)	4.30	0.33
Books	4.20	0.58
Newspapers	3.91	0.72
Magazines	3.88	0.74
Radio	3.81	0.90
Shopkeepers when buying sthg. (*)	3.80	0.53
Television	3.78	0.96
Discussions with friends, family, colleagues	3.77	0.86
One's doctor (*)	3.23	1.05

(*) These indices are calculated from a very small base and are shown for purely indicative purposes.

As we see the link becomes much clearer now.

Not surprisingly, we also remark the predominance of "specialist" sources over more "general" ones. Similarly, attention should be drawn to the particularly striking effect of "Company Communication" on global optimism and DK/NA.

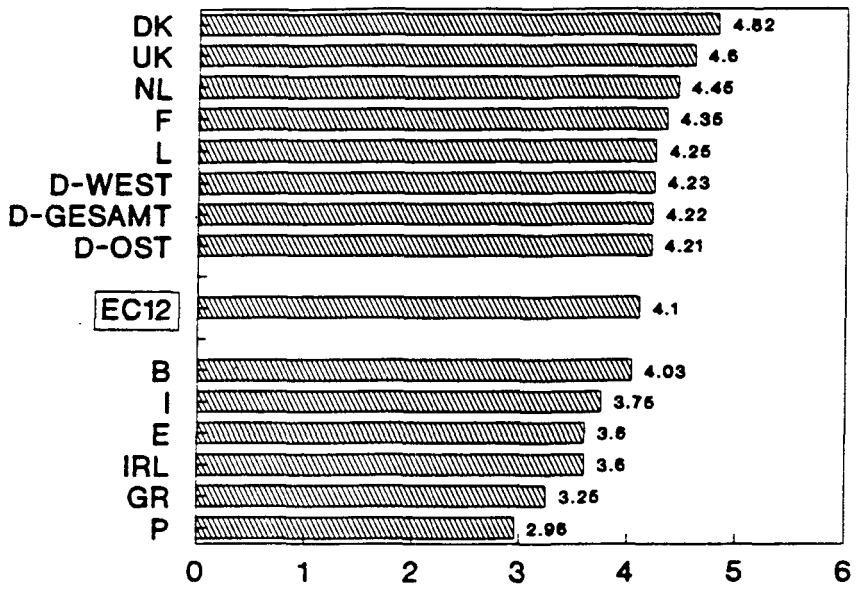
[4] In chapter 4, the reader will find all figures related to the use of these different sources.

Finally, we should specify that in the link highlighted here, the two variables doubtlessly exert a mutual influence. Henceforth any attempt to distinguish the dependent variable from the independent variable would constitute at the very least a perilous exercise.

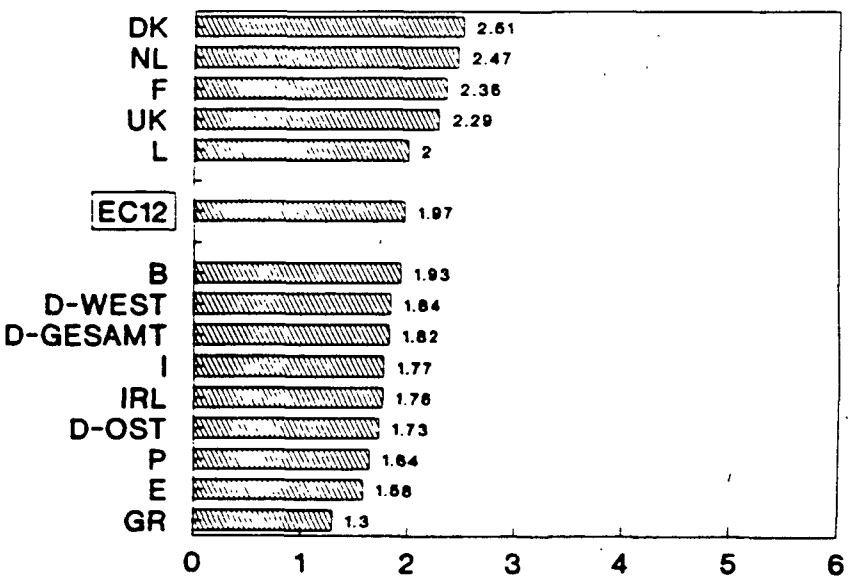
CHAPTER 2

Figure 2.1 : "Objective' knowledge of biotech./genetic engineering - 'Elementary" and 'thorough' knowledge (National and EC12 results for 1993 : Tables 2.1-2.3)

A. "Elementary" knowledge (out of 6 points)



B. "Thorough" knowledge (out of 6 points)



•OBJECTIVE" AND "SUBJECTIVE" KNOWLEDGE OF BIOTECHNOLOGY/GENETIC ENGINEERING

A. "OBJECTIVE" KNOWLEDGE

In order to measure "objectively" the knowledge that EC citizens have of biotechnology/genetic engineering, they were asked the following question:

> "Here are some statements (for a list of these, see table 2.1). 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."

As shown in table 2.1 \ the percentage of correct answers varies enormously from one item to the next : whereas it is 82% for item 1, ("there are bacteria which live from waste Water" ; correct answer : true). it is only 15% for item 12 ("viruses can be contaminated by bacteria"; correct answer : false).

' As specified in the sub-title of this table, the order in which the items are presented in table 2.1 is not the same as that used with interviewees (see Annex 4). In table 2.1 items are in fact classified by decreasing order, according to the value of the EC12 index, which is calculated by dividing for each item, the percentage of correct answers by the total of the percentages of incorrect answers and of "DK/NA" ; this index therefore takes into account the different types of possible answers.

The margins in which the percentages of incorrect answers (3%-50%) [2] and "DK/NA" (15%-63%) vary are also very wide.

At the time of preparing the questionnaire, we worked at achieving this marked variation, the aim of this question being in fact to extract **TWO** types of "objective" knowledge of biotechnology/genetic engineering : an "elementary" knowledge (referring to the first six items of the classification shown in table 2.1) and a "thorough" knowledge (referring to the last six items). All this, in order to be able to analyse more carefully the "knowledge" variable.

As indicated in Table 2.2 and Figure 2.1, the national distributions of these two "knowledge" indices are organised in a fairly similar way around respective EC12 means (the EC12 average relating to "elementary" knowledge is 4.1/6 and that relating to "thorough" knowledge, 1.97/6) [3]. Here we would highlight Denmark's leading position in these two types of knowledge.

As for the impact of the socio-demographic and socio-political variables on this "objective" knowledge (see Table 2.3), the main points are the following :

a) The "objective" knowledge of biotechnology/genetic engineering - "elementary" as well as "thorough" knowledge - is higher among men than among women (in contrast to average numbers of DK/NA).
It should be noted that sex barely influences the average number of incorrect answers.

[2] We note that incorrect answers are particularly numerous for items 8, 9 and 12, for which the correct answer for all three is : "false". A possible explanation of this result is linked to a natural tendency of the interviewee to answer "positively" ("true", "yes", "alright",....) rather than negatively. This is known in opinion studies as the "tendency towards agreement".

[3] Let us specify that if 22% of interviewees have an "elementary" knowledge of 6/6, this figure, on the other hand, is only 1 % for "thorough knowledge". Less than 1 % of those interviewed (0.9%) have a global knowledge of 12/12, i.e. made "no mistakes".

b) It is among the "25-39 year olds" that the two "knowledge" indices are highest and that average numbers of DK/NA are weakest.
It is among the "55 year olds and over" that the two knowledge indices are lowest and that average numbers of DK/NA are greatest.
It should be pointed out here that, as often is the case in this study (see below), it is between the "55 year olds and over" on the one hand, and their juniors on the other that the difference in opinion is the most pronounced.

c) Both knowledge indices increase with "age at end of studies", whereas the average numbers of DK/NA decrease.

d) It is among those who place themselves to the left of the political spectrum that both knowledge indices are highest.
On average, it is also in this group that incorrect answers **and** DK/NA replies are the least numerous.

e) The two knowledge indices increase with "opinion leadership" and "level of income", while average DK/NA numbers decrease.

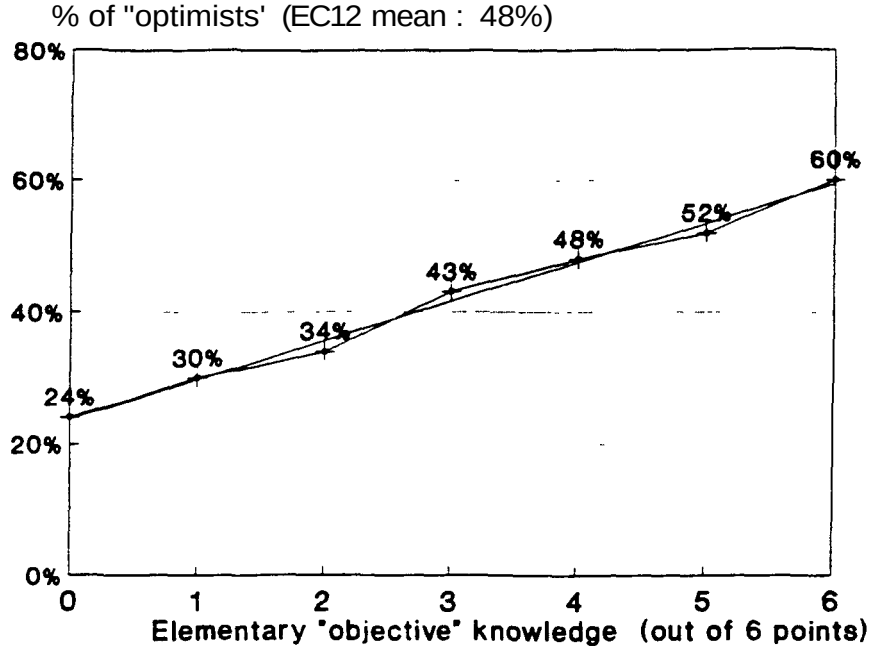
f) The two knowledge indices are higher among the "non religious" than among the "religious".
We see the reverse situation for average numbers of incorrect answers, and even more so for DK/NA.

Before concluding this section, it would be appropriate to underline two results of particular interest within the framework of objectives that have been assigned to this study (see Introduction).

The first result is that "optimism" with regard to biotechnology/genetic engineering ("biotechnology/genetic engineering will improve our way of life in the next twenty years" ; see Chapter 1) is a positive function of the "objective" knowledge one has of it (see Figs 2.2.1 and 2.2.2).

Figure 2.2.1 : Relationship between "objective" knowledge of biotech./genetic engin. and 'optimism' with regard to them

(EC12 results for 1993 : Tables 1.1, 1.2 and 2.1-2.3)



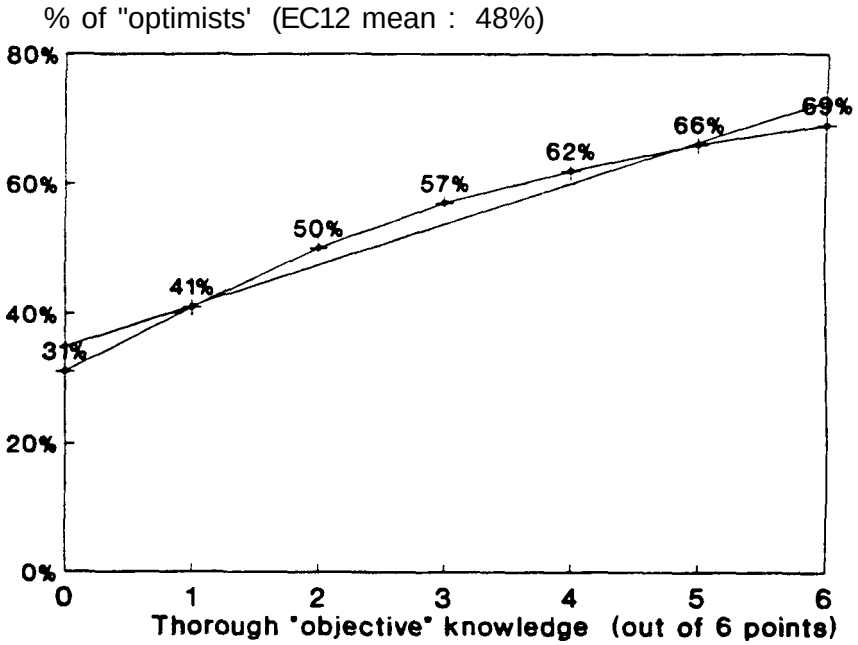
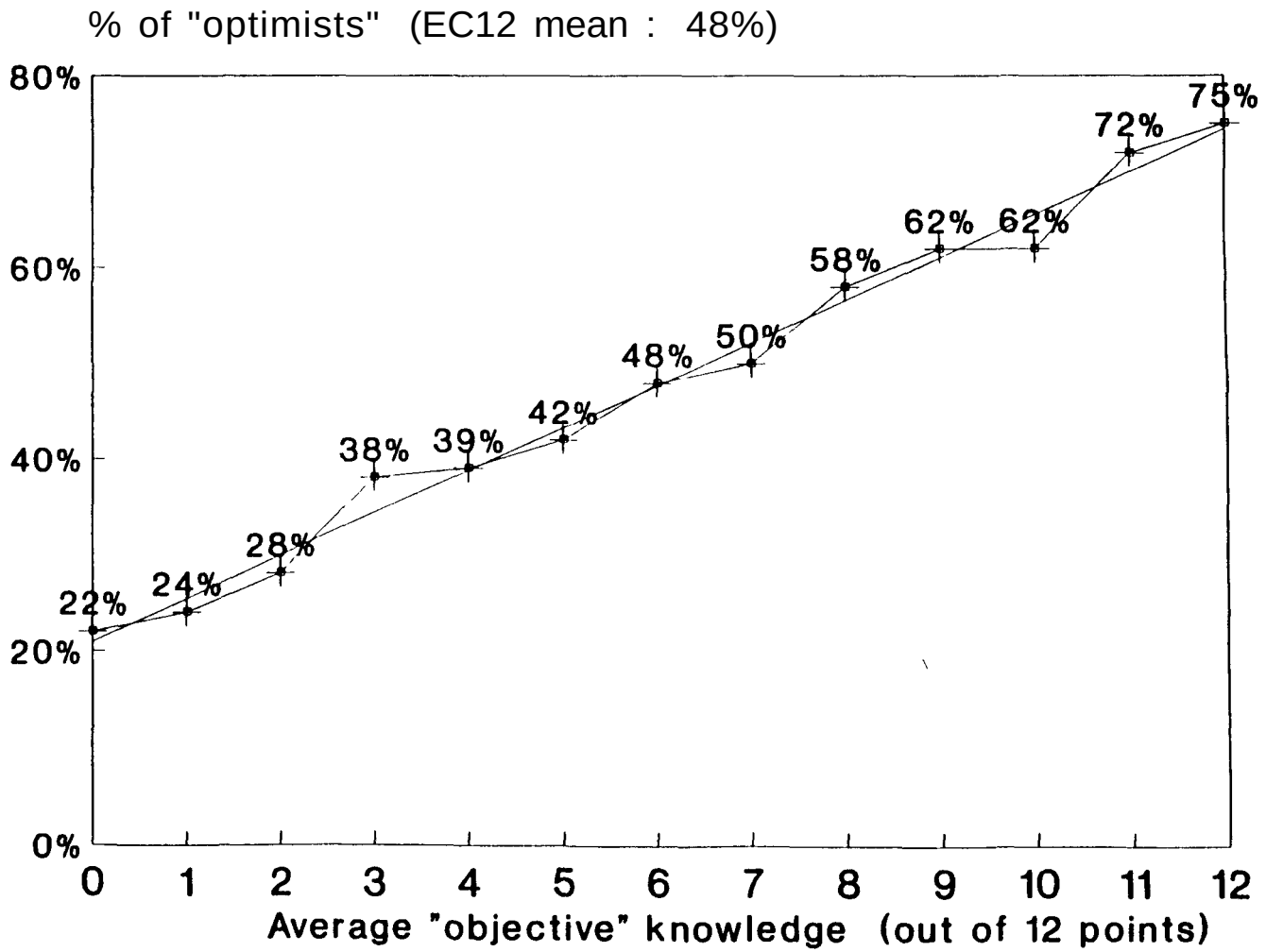


Figure 2.2.2 : Relationship between "objective" knowledge of biotech./genetic engin. and "optimism" with regard to them

(EC12 results for 1993 : Tables 1.1 1.2 and 2.1-2.3)



Among the 9% of persons interviewed who replied correctly to at least 10 out of the 12 items, this optimism attains 66%. The remaining percentages are distributed as follows : 8% "no effect", 16% "will make things worse" and 10% DK/NA.

Although the positive relationships set out in Figs 2.2.1 and 2.2.2 are quite clear and all but perfect (each function closely following its trend), it is nevertheless important to specify, that on average, the level of objective knowledge for "pessimists" (those who think that "biotechnology/genetic engineering will make things worse") is only slightly lower than that of the "optimists" (6.53/12 versus 6.73/12 respectively) [4].

This clearly highlights that one should not look for automatic links between cause (knowledge) and effect (optimism) in these knowledge/optimism relationships.

In more detail, the breakdown of this knowledge among "optimists" and "pessimists" is as follows :

KNOWLEDGE	OPTIMISTS (%)	PESSIMISTS (%)
0/12	22	7
1/12	24	5
2/12	28	10
3/12	38	10
4/12	39	12
5/12	42	17
6/12	48	17
7/12	50	17
8/12	58	18
9/12	62	16
10/12	62	18
11/12	72	15
12/12	75	12

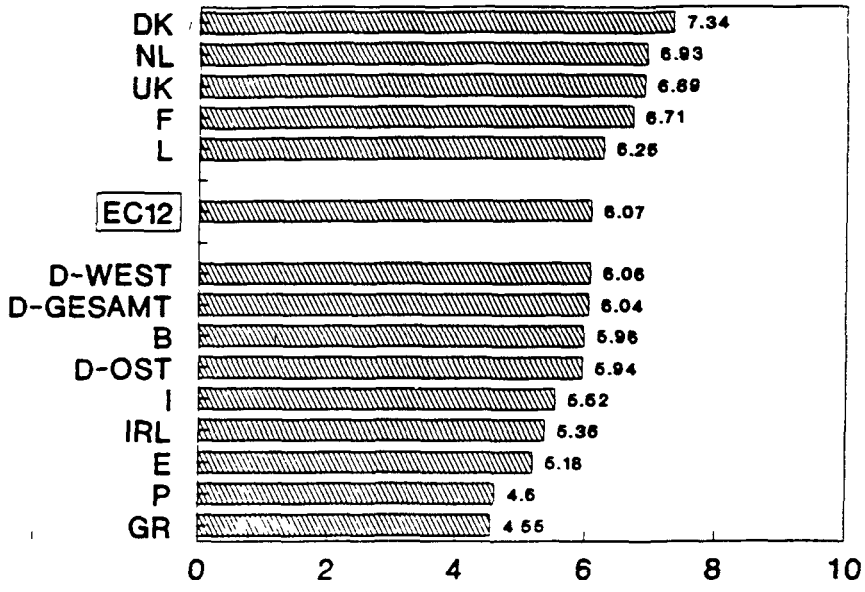
[4] As for the objective knowledge of those who do not expect any "effect", it is 6.12/12, which is also a close result.

The second result is, as one might expect; that objective knowledge (even more so for "thorough" objective knowledge) is closely correlated with the main source of information used by the interviewee to obtain information on "the new developments that affect our way of life" (see Table 2.4)[5]. More generally, this knowledge increases with "media use" (see Annex 1) : 5.00/12 (use ---), 5.42 (use - -), 6.13 (use + +) et 6.51 (use + + +).

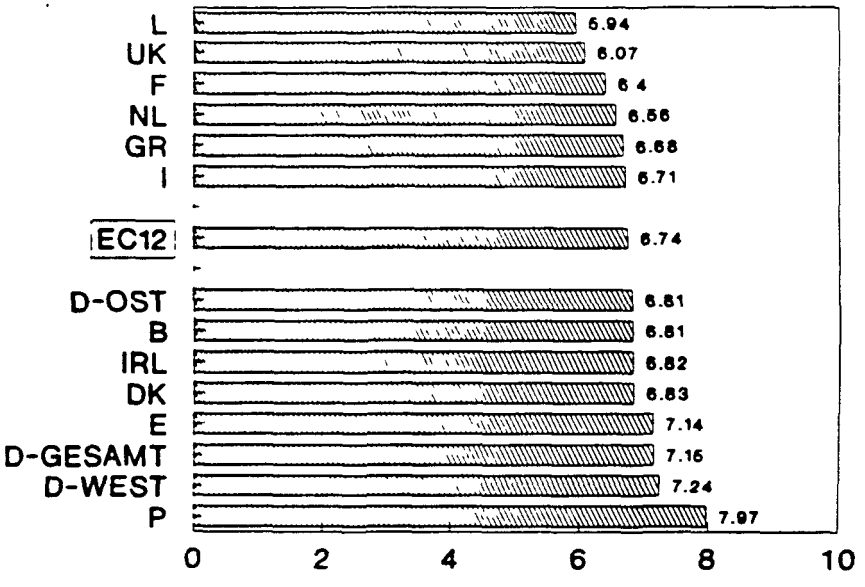
[5] In chapter 4, the reader will find all figures related to the use of these different sources.

Figure 2.3 : 'Objective* and 'subjective' evaluation of knowledge of biotechnology/genetic engineering (national and EC-12 results for 1993)

A. "Objective' evaluation out of 12 points (Tables 2.1-2.3)



B. "Subjective" evaluation out of 10 points
(1 - found "very simple" the topics dealt with in **the** questionnaire ; 10 - found them "very complicated")



B. "SUBJECTIVE" KNOWLEDGE

The "subjective" knowledge that interviewees have of biotechnology/genetic engineering has been based on answers to a question asked relatively far into the questionnaire (see Annex 4) :

> "How did you find the topics we have talked about over the last few minutes : rather simple or rather complicated ? Please answer using this scale from 1 to 10.
> ONE means "very simple" and TEN "very complicated". The scores in between allow you to say how close to either side you are."

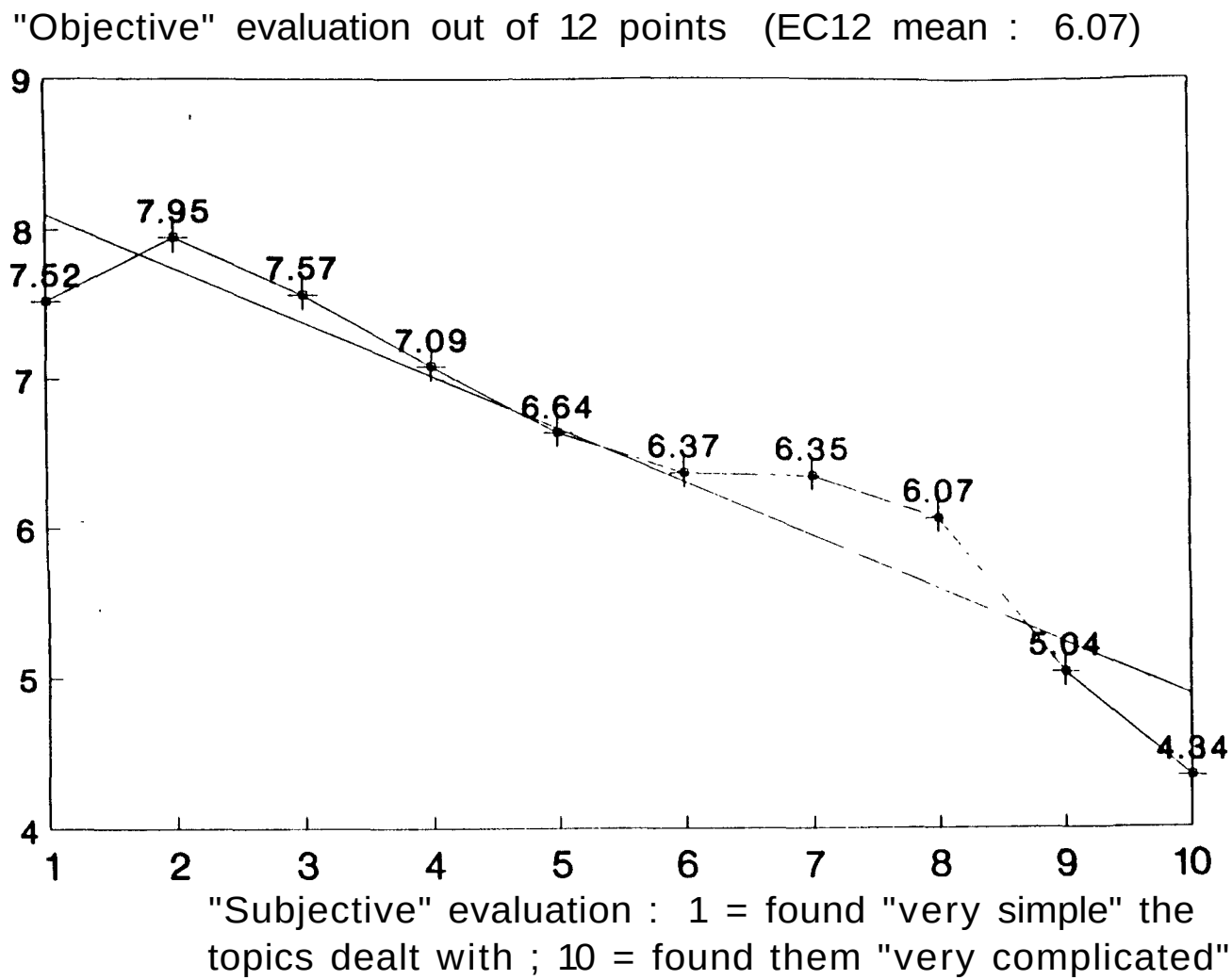
At Community level, the breakdown of responses (in percentages) is as shown below :

2	3	5	7	13	13	16	17	9	14	1	%
1	2	3	4	5	6	7	8	9	10	DK/ NA	

As shown in Figure 2.3, the average "subjective" knowledge for all the EC countries is beyond the central point of the scale (5.5), which means that overall, the subjects tackled in the questionnaire were rated "complicated" rather than "simple".

Figure 2.4 : "Objective" and "subjective" evaluation of knowledge of biotech./genetic engin. - What relationship ?

(EC12 results for 1993 : Tables 2.1-2.3)



This average subjective knowledge varies according to the socio-demographic and socio-political variables as follows :

sex : 6.55 for men, 6.91 for women ;

age : 6.54 for 15-24 year olds, 6.47 for 25-39. year olds, 6.62 for 40-54 year olds, and 7.18 for the over 54s ;

age at end of studies : 7.28 (-16 year olds), 6.68 (16-17 year olds), 6.53 (18-19 year olds), 6.19 (over 19) [still studying : 6.39] ;

level of income : 6.25 (category ++), 6.60 (category +), 6.85 (category -). 7.18 (category --) ;

"opinion leadership" (as defined in Annex 1) : 6.27 (category + +), 6.49 (category +), 6.88 (category -), 7.31 (category - -) ;

religious attitudes : 6.89 among those who consider themselves "religious", independently of whether they practise their religion or not. and 6.48 among those considering themselves as "non-religious", "agnostic" or "atheist."

The effects of the socio-demographic and socio-political variables on "subjective" and "objective" knowledge thus follow exactly the same trend.

This result is hardly surprising : Figure 2.4 clearly shows that on the whole interviewees tend to make a realistic evaluation of their biotechnology/ genetic engineering knowledge.

This is of course very encouraging for those wishing to promote a policy of public information on the subject, given that "The trouble with people is not that they don't know, but that they know so much that ain't so" [6].

[6] Henry Wheeler Shaw (1874), "Josh Billings' Encyclopedia of Wit and Wisdom".

CHAPTER 3

ATTITUDES TO DIFFERENT APPLICATIONS OF BIOTECHNOLOGY AND GENETIC ENGINEERING

In this chapter we will analyse the attitudes of Europeans regarding seven different types of biotechnology/genetic engineering research. These concern :

1) plants ;
2) micro-organisms such as yeast used to make bread, beer or yoghurt ("micro-organisms "A"" [1]) ;
3) micro-organisms used to break down sewage and other waste products in order to turn them into materials harmless to the soil ("micro-organisms "B"" ; see note (1) above) ;
4) farm animals ;
5) food ;
6) pharmaceuticals ; and
7) human beings.

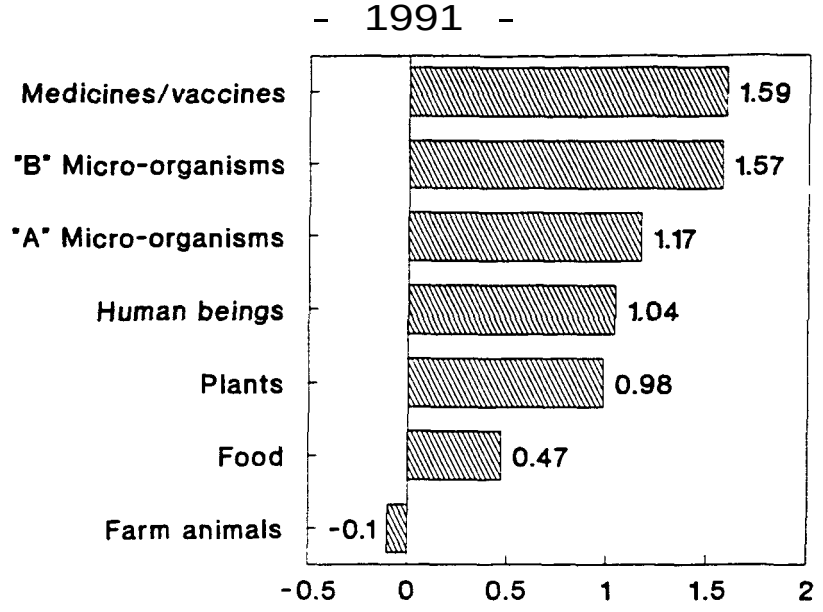
To do this, we shall analyse successively three fundamental questions for each area :

1) What types of research are worthwhile and should be encouraged ?
2) What types of research may involve risks to people or to the environment ?
3) What types of research need to be controlled by the government ?

' It is with the sole aim of lightening the text that we have chosen in this report to designate these micro-organisms by the abbreviation "micro-organisms "A"", and the other micro-organisms mentioned in the question by the abbreviation "micro-organisms "B"". These abbreviations do not in any way refer to official nomenclature.

Figure 3.1 : Types of biotech./genetic engineering research that are worthwhile and should be encouraged

EC12 means : +2= maximal support and -2= minimal support
(Tables 3.1 and 3.2 ; 1991 and 1993 figures)



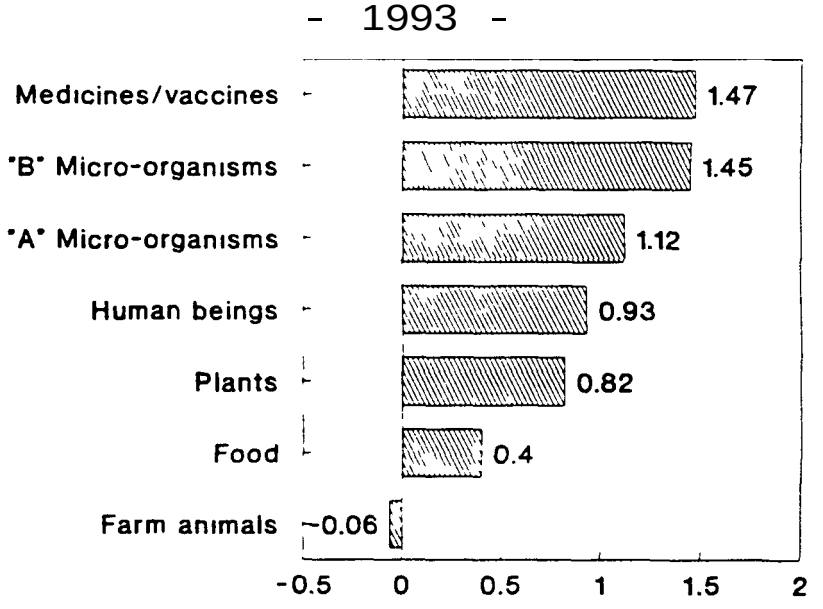
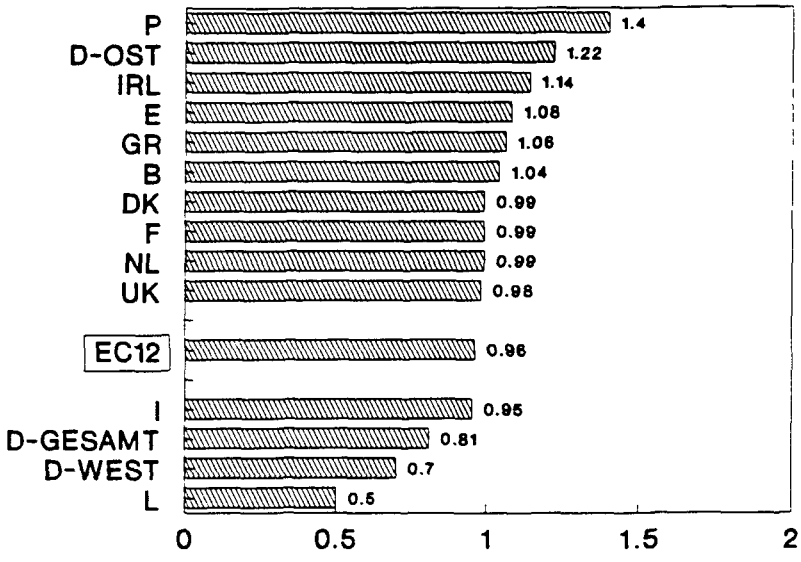


Figure 3.2 : Global support for 7 applications of biotechnology and genetic engineering

National and EC12 means for 1991 and 1993 : +2= maximal support and -2= minimal support; Tables 3.1 and 3.2

- 1991 -



- 1993 -

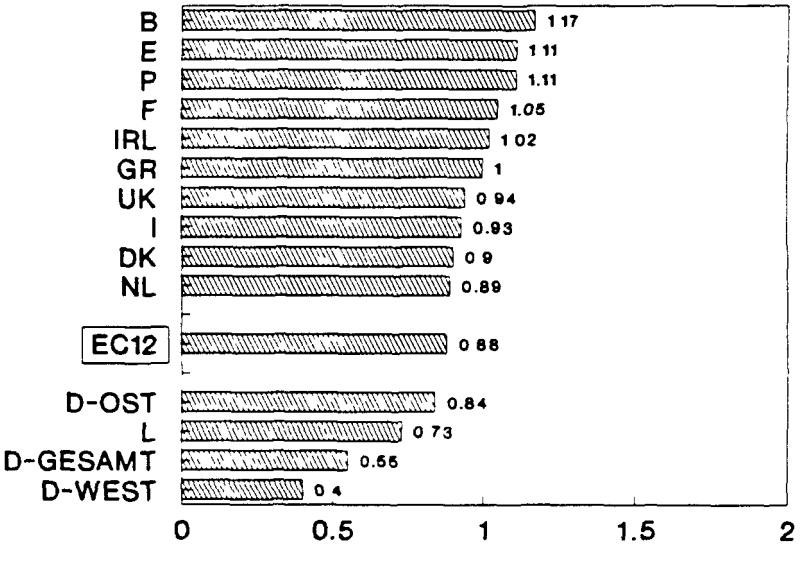
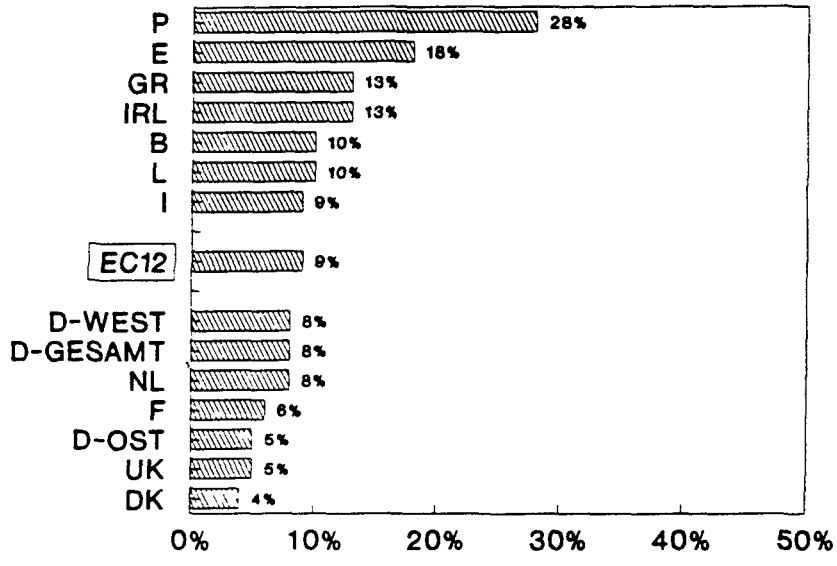


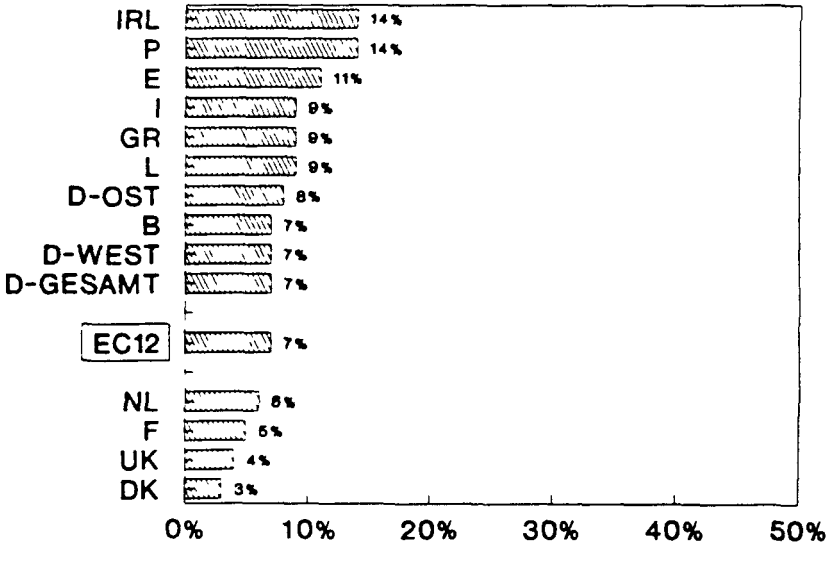
Figure 3.3 : Global support for 7 applications of biotechnology and genetic engineering

(National and EC12 % of DK/NA for 1991 and 1993)
(Tables 3.1 and 3.2)

- 1991 -



- 1993 -



A. SUPPORT FOR THE DIFFERENT APPLICATIONS

As indicated in tables 3.1 A and 3.1B, support for the seven types of research analysed is measured here by averages varying from -2 (minimal support) to + 2 (maximal support). At Community level, the most significant results are the following (see Figs 3.1 and 3.2 ; Table 3.1 A) :

a) As in 1991, all averages are positive, except those related to applications involving farm animals ; research into farm animals is the only one more likely to be "rejected" (by 49% of interviewees ; 1991: 48%) rather than "supported" (44% ; 1991 : 42%).
Among the seven types of research into biotechnology/genetic engineering discussed in the questionnaire, it is six then that receive the support of interviewees (to very differing degrees !).

b) The classification of the seven applications according to the level of support given by EC citizens, is identical in 1991 and in 1993.

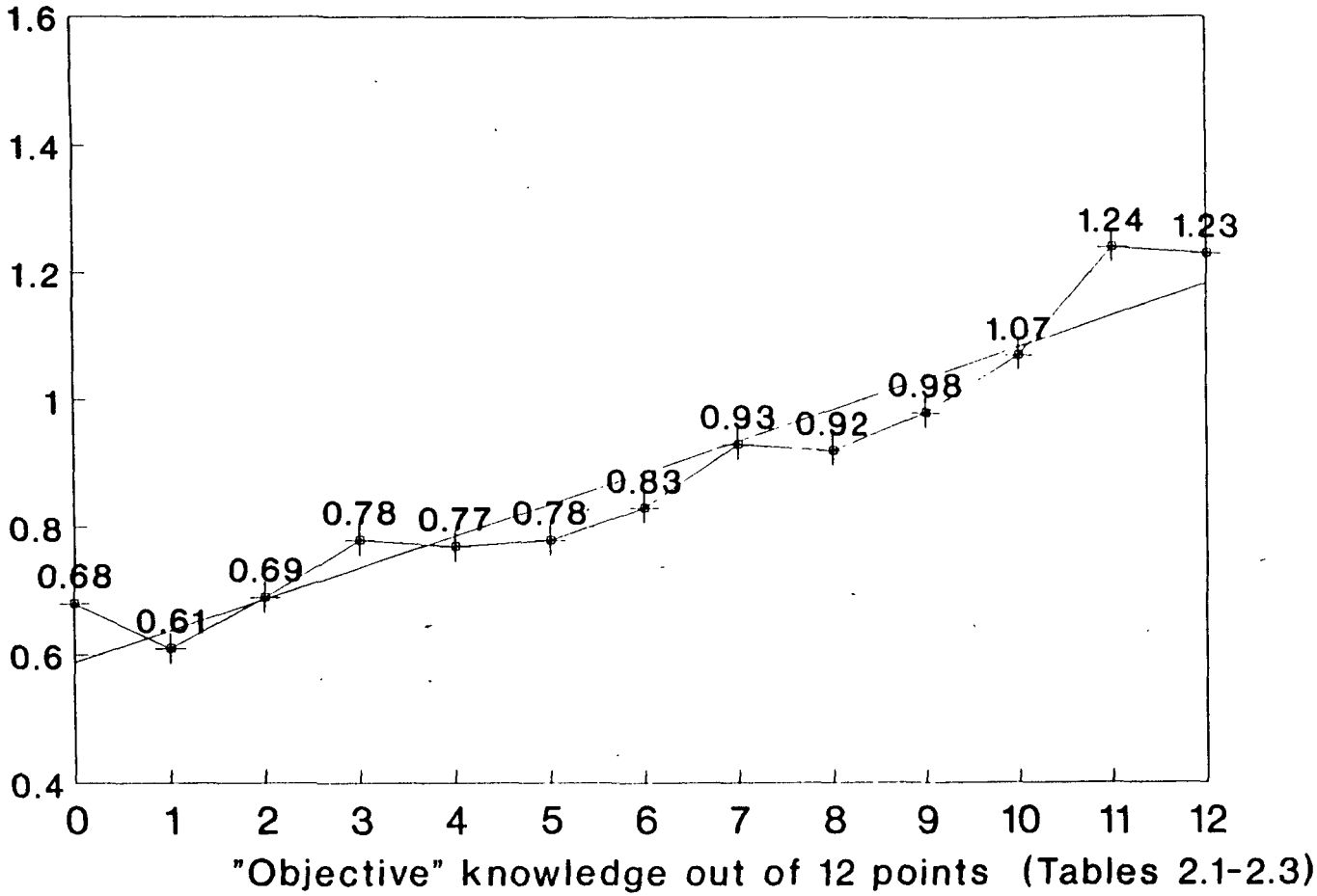
c) With the exception of applications involving farm animals (where a very slight increase can be observed), all averages have fallen **since** 1991. This drop is the most pronounced for applications involving plants.

d) The "global support index", i.e. the average of the averages pertinent to the seven types of research has slightly fallen since the previous survey (this index also varies from -2 to + 2) : it was 0.96 in 1991 and is now 0.88.
It thus remains quite near to 1, which corresponds to the opinion "tends to agree" that such research "is worthwhile and should be encouraged".

e) DK/NA percentages range from 5% to 9% (EC12 average : 7%). They are relatively low, particularly when compared to results shown in tables from chapters 1 and 2. In 1991, the range was 7%-10% (EC12 average : 9%).

Figure 3.4 : Relationship between "objective" knowledge of biotech./genetic engineering and global support for 7 of their applications (EC12 results for 1993)

Global support: +2= maximal support ; -2= minimal support
EC12 mean : +0.88 ; Tables 3.1 and 3.2



At national level, results can be synthesized in the following way (see Figs 3.2 and 3.3 ; Table 3.1B) :

a) As for EC results, most national averages are positive. The few negative averages that do exist only relate to applications concerning farm animals - and, in West Germany only, food (-0.21). The lowest average (-0.58), i.e. the clearest "refusal" is recorded in the Netherlands.
In 1991, the few negative averages were reserved exclusively for applications involving farm animals.
Spain, with a mean of 0.52, gives the most support to research on farm animals.

b) Regardless of the country, support for research into "B" micro-organisms and into medicines/vaccines is massive (it is higher than 1 everywhere). For both these research areas, averages fluctuate within relatively narrow margins : from 1.03 (West Germany) to 1.66 (Belgium and Greece), and from 1.18 (West Germany) to 1.62 (Belgium)respectively.

c) National variations are greatest when it involves supporting research into human beings : 0.22 in West Germany as opposed to 1.4 in Portugal.

d) Support for the different applications remains consistently higher in East than West Germany. Overall it was slightly more pronounced in 1991.
This result is hardly surprising, given that "optimism" with respect to biotechnology/genetic engineering remains higher in East than in West Germany, but the gap has narrowed since the previous survey (see Chapter 1).

e) The "global support index" depends to a great extent on the country in question.
We particularly observe a major change in this index since 1991, with a marked increase in Luxembourg (+0.23). and significant drops in Portugal (-0.29), West Germany (-0.3) and East Germany (-0.38).
The pronounced changes in Germany follow exactly those highlighted in chapter 1.

f) The average DK/NA percentage varies widely from country to country. The major changes in this percentage since 1991 are the considerable falls recorded in Spain (-7 points) and especially in Portugal (-14 points).

As Figure 3.4 shows, the "global support index" is a positive function of the "objective" knowledge of biotechnology/genetic engineering (as defined in Chapter 2): on average, the more the interviewee knows about the different applications of biotechnology/genetic engineering, the more he/she is likely to support research into this area. As for the existing link (see page 30) between knowledge of biotechnology/genetic engineering and the "optimism" related to it (as defined in Chapter 1), it is important to avoid making an automatic relationship between cause (knowledge) and effect (support).

On the other hand, this index barely changes with "media use" (see Annex 1) : for a use "---", "--", "+ +" and "+ + +", it is 0.90, 0.89, 0.91 and 0.84 respectively.

As for the influence of the socio-demographic and socio-political variables (see Table 3.2), we note the following points :

a) The only negative averages shown in table 3.2 involve research carried out on farm animals (for which the lowest mean is -0.21). The "global support index" which fluctuates between 0.75 and 1.00, is relatively high everywhere.

b) The influence of variables such as "sex", "age at end of studies" and "level of income " on the "global support index" globally confirms (in the same logic as Fig 3.4. when this figure is examined in the light of chapter 2) the influences already underlined in chapters 1 and 2.

c) People over 54 years old demonstrate a "global support" (slightly) lower than those younger.

d) The (limited) influence of the variable "political persuasion" shows that individuals to the right of the political spectrum tend to express more support for biotechnology/genetic engineering regardless of the sector of application - than those to the left.

e) The variables of "opinion leadership" and "religious attitudes" barely influence global support.

f) The various distributions of the average DK/NA percentages closely follow the logic of the results previously commented upon.

Given the relative absence of support (with an EC12 average of -0.06, it would be wrong to speak in terms of "rejection" !) for research on farm animals, it is useful to analyse attitudes towards another type of application involving animals in biotechnology/genetic engineering research : research which aims at the development of "life-saving drugs" or at allowing the study of human diseases (see Table 3.3).

If we group together items 2 and 1 in table 3.3 (i.e. answers "it is acceptable for the development of life-saving drugs, even at the cost of some animal suffering" and, in a more limited way, "it is morally acceptable provided that the animals' welfare is safeguarded"), and if we compare the percentages obtained to those relevant to item 3 ("Public Authorities should examine this application of biotechnology/genetic engineering case by case before deciding whether to allow it") and item 4 ("applying biotechnology/ genetic engineering to animals is morally unacceptable and should be banned by public law"), it emerges that :

a) In eleven out of twelve countries, this type of animal experiment is perceived by the majority (relative or absolute depending on the country) as "acceptable" (EC12 average : 46% ; +2 points since 1991).

In Italy, opinions are divided on the question : 37% of those interviewed believe that this application is acceptable and 37% (which constitutes the highest percentage out of the Twelve) think that Public Authorities should examine each case separately. In the previous survey, these figures were 33% and 40% respectively, and Italy was the, only country in which the response "acceptable" was not the majority.

b) If the "acceptable" point of view obtains less than 40% of the votes in Italy (and in this country only), it is on the other hand. shared by 60% of the Portuguese (+13 points, the strongest increase since 1991) and by 62% of the Spaniards (+9 points). In Luxembourg, it has increased by 12 points compared to 1991 (second strongest increase) attaining now 49%. We should note that in Portugal, the DK/NA have fallen from 30% to 11 % since the previous survey and that in Luxembourg, they have tumbled from 11 % to 3%.
In Greece, this percentage fell from 65% in 1991 (which was the highest figure at the time) to 51%. This fall (the biggest recorded) was accompanied by an increase in the percentage of people in favour of a case by case test carried out by Public Authorities (from 12%, the lowest figure in 1991, to 26%).

c) As already pointed out, it is in Italy that those in favour of a case by case examination by Public Authorities are proportionally the most numerous (EC12 average 28% ; unchanged since 1991) ; whereas in Spain and Portugal they are the least.

d) One fifth of Europeans interviewed (status quo compared to 1991) believe that "applying biotechnology/genetic engineering to animals is morally unacceptable and should be banned by public law".
This proportion varies from 11% (Spain and Portugal) to 29% (West Germany) ; in 1991, it fluctuated between 8% (Portugal) and 28% (Luxembourg).

e) DK/NA percentages are relatively low, especially when compared to those illustrated in tables from chapters 1 and 2 (EC12 average: 6%, versus 9% in 1991).
The highest DK/NA percentage (16%) is recorded in Ireland.

Remaining on the subject of animal experiments it should be pointed out that overall EC citizens widely agree with the idea of "a balance between animal welfare and human welfare" (see Table 3.4). If their support for this opinion is measured by means varying from -2 (minimal support) to +2 (maximal support), we note that these fluctuate between 1.43 (United Kingdom) and 1.85 (Greece) ; the Community average is 1.57 .

While continuing to base ourselves on the same "support scale", it should also be pointed out that (see Table 3.4) :

a) The EC12 average regarding the assertion that "only traditional breeding methods should be used, rather than changing the hereditary characteristics of plants or animals through biotechnology/ genetic engineering" is 0.73. According to the country, the average fluctuates between 0.29 (Netherlands) and 1.01 (West Germany).
In Denmark the DK/NA are only 4%, whereas in Spain they reach 24%; at Community level, they are 11%.

b) The EC12 average which relates to the assertion that "traditional breeding methods can be as effective as biotechnology/genetic engineering in changing hereditary characteristics of plants and animals" is 0.71. According to the country, the average varies between 0.22 (Netherlands) and 1.02 (West Germany).
The DK/NA are very numerous and fluctuate between 10% in Denmark and 33% in Spain ; the EC12 average is 20%.

c) If we cross the results relating to the two preceding assertions and if we take assertion (b) as the explanatory variable, we obtain the following means for assertion (a) :

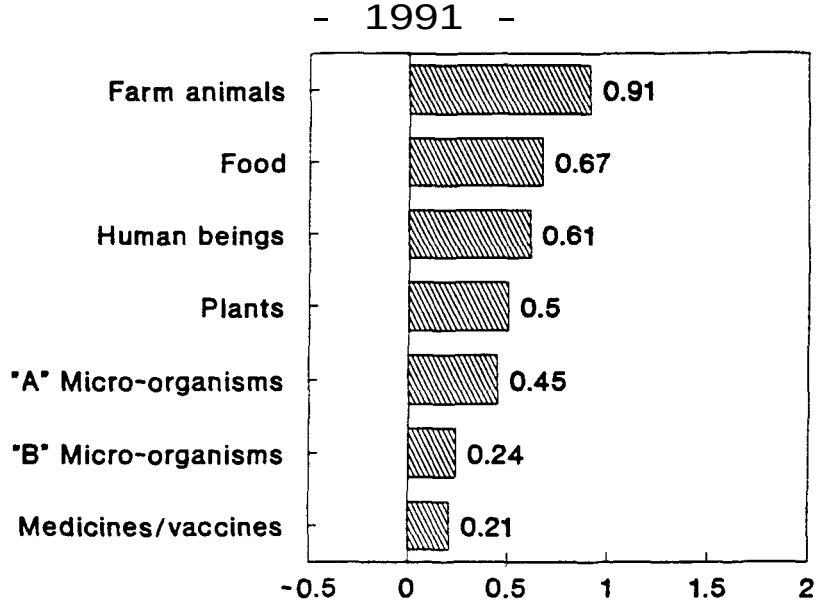
- definitely agree with (b) : average of 1.48 for (a) ;
- tend to agree with (b) : average of 0.7 for (a) ;
- tend to disagree with (b) : average of -0.11 for (a) ;
- definitely disagree with (b) : average of -0.46 for (a).

As we can see the link between these two assertions is unmistakable.

These diverse philosophical considerations should be kept in mind while analysing the various results set out in this first part of chapter 3.

Figure 3.5 : Types of biotech./genetic engineering research that may involve risks to human health or to the environment

EC12 means : +2= maximal risk and -2= minimal risk
(Tables 3.5 and 3.6 ; 1991 and 1993 figures)



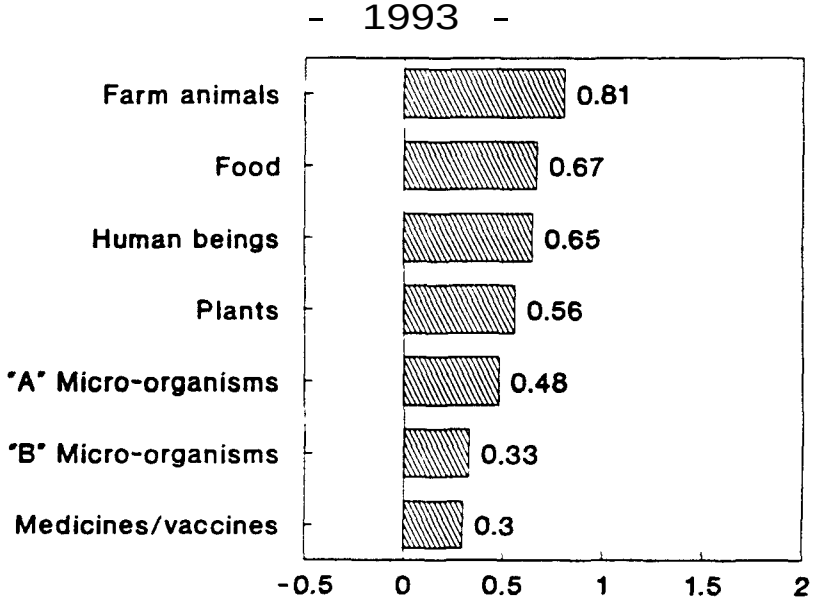
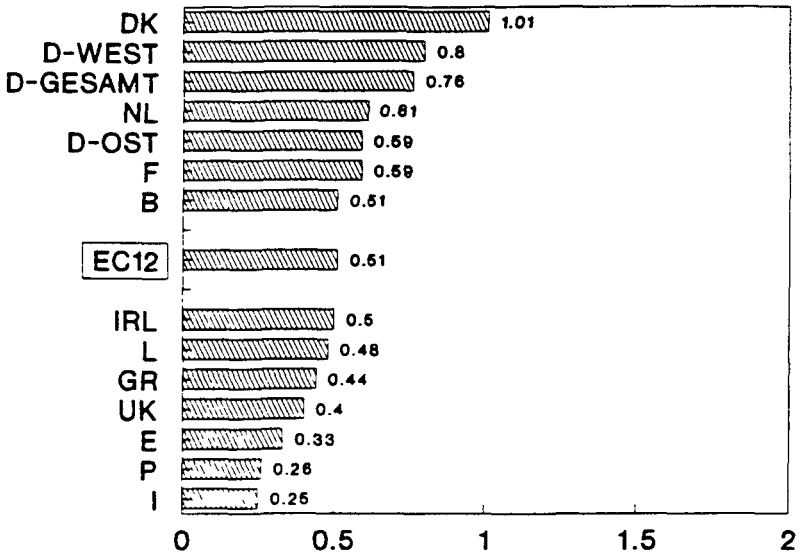


Figure 3.6 : Global perception of the risks implied by 7 applications of biotechnology and genetic engineering

National and EC12 means for 1991 and 1993 : +2= maximal risk and -2= minimal risk ; Tables 3.5 and 3.6

- 1991 -



- 1993 -

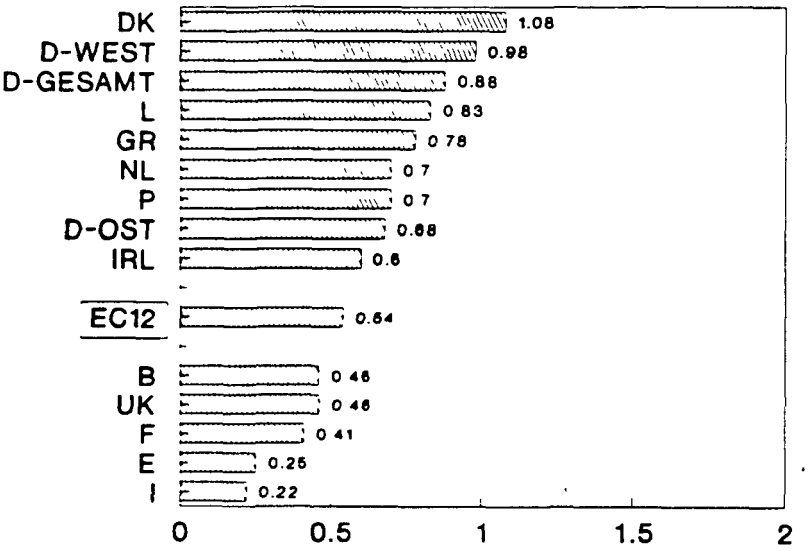
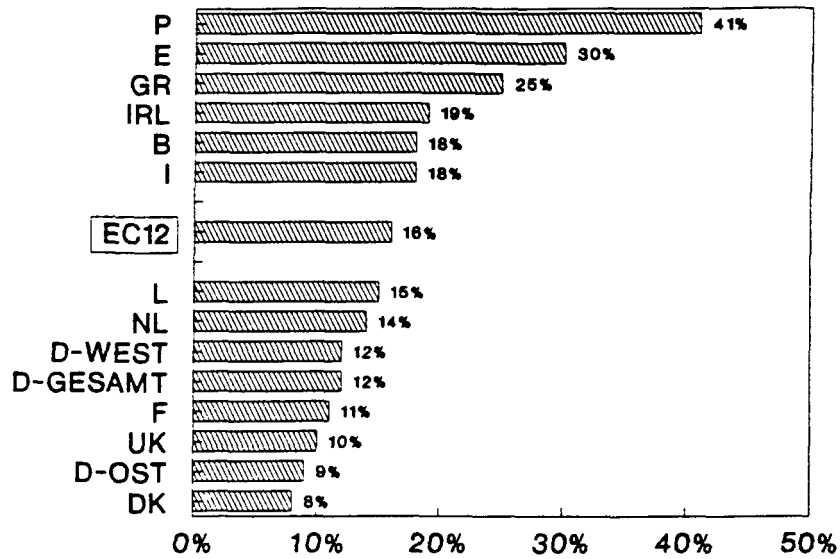


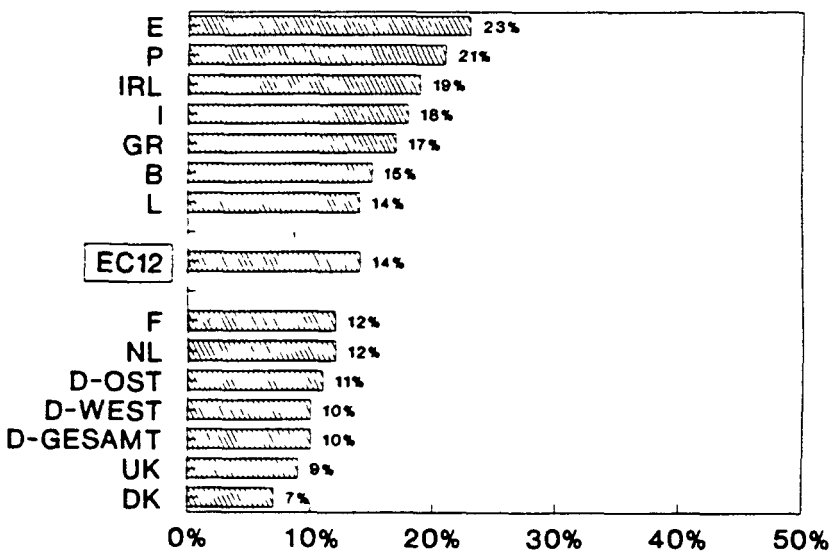
Figure 3.7 : Global perception of the risks implied by 7 applications of biotechnology and genetic engineering

(National and EC12 % of DK/NA for 1991 and 1993)
(Tables 3.5 and 3.6)

- 1991 -



- 1993 -



B. RISKS TO HUMAN HEALTH AND TO THE ENVIRONMENT ASSOCIATED WITH THE DIFFERENT APPLICATIONS

To set the "scene" clearly for the second part of chapter 3, we should begin by indicating that 91% of those interviewed "tend to agree" or "definitely agree" that "if we do not protect the natural environment, human beings will not be able to survive in the future" (see Table 3.4).

If we gauge the support that people have for this idea by averages varying from -2 (minimal support) to +2 (maximal support), we notice that all national averages are higher than 1.4 ; the EC12 average is 1.64.

As shown in tables 3.5A and 3.5B, the risk associated with the seven types of research analysed in this chapter is measured by means varying from -2 (minimal risk) to +2 (maximal risk). At Community level, the principal observations that can be drawn from Figs 3.5 and 3.6, as well as from table 3.5A are the following :

a) As in 1991, all means are positive and vary within margins much narrower than those relating to support (see Figs 3.1 and 3.5). Compared to 1991, this band has become even narrower.
For each of the seven types of research dealt with in the questionnaire, an absolute majority of EC citizens (from 51 % to 67%; 1991 : 48%-68%) "definitely" or "tend to" agree that "such research may involve risks to human health or to the environment" [2].

[2] For a detailed study of the opinions and attitudes of Europeans regarding the environment, the interested reader can refer to :

" *Europeans and the Environment in 1992",* Commission of the European Community, August 1992.

b) The ranking order of the seven applications according to the level of risk attributed to them is identical in 1991 and in 1993.

c) As in 1991, if we classify the seven types of research by increasing order depending on the risk attributed to them, we obtain, except for ("PLANTS"/"ANIMALS"), the same classification as if we had placed them in descending order, according to the support attributed to them. This obviously makes sense [3].

d) Depending on the application in question, averages have evolved in diverse directions since 1991 ; all these variations are small however.

e) The "global risk index", i.e. the average of averages relating to the seven types of research (this index also fluctuates from -2 to +2), has barely changed since the previous survey: in 1991 it was 0.51 and is now 0.54.
Thus, while not altogether negligible, this index remains quite low.

f) Varying between 11% and 15%, the DK/NA percentages remain relatively high (EC12 average: 14%). In 1991, the margins were higher (14%-18% ; EC12 average : 16%).
This probably reveals a certain difficulty in assessing the risk contained in the diverse applications analysed.

At national level, results can be synthesized as follows (see Figs 3.6 and 3.7 ; Table 3.5B) :

a) As in 1991, most national means are positive.
As in 1991 as well, the few (slightly) negative averages all relate to applications which refer to micro-organisms "B" (minimum:-0.1, Italy ; maximum: 0.91, Denmark) or to medicines/vaccines (minimum: -0.15, Italy ; maximum: 0.92, Denmark).
In the light of previous results, this is hardly surprising.

[3] It should be pointed out that the inversion "human beings"/"plants" is quite relative, given the proximity between the levels of support these applications have and the levels of risk attributed to them.

b) As in 1991, national averages differ greatly from one country to the next. This difference is most striking for averages related to research into "B" micro-organisms and into medicines/vaccines (... whereas as we saw in section A of this chapter, national averages of support related to these two areas of research fluctuate within relatively narrow bands).

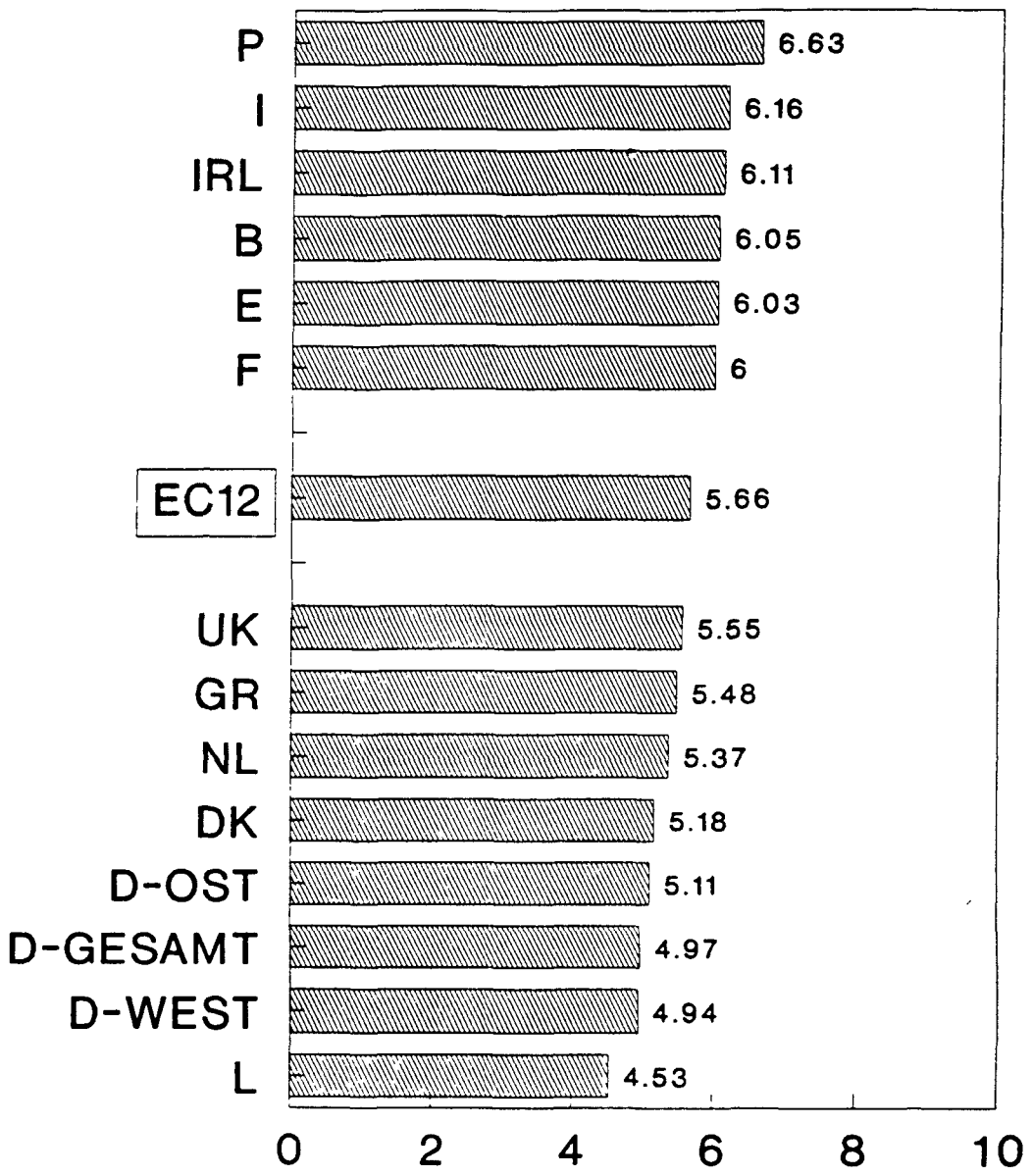
c) The risk associated with the different applications is consistently higher in West than East Germany. This was already the case, though to a lesser extent, in 1991.

d) The "global risk index" depends largely on the country in question. As a major change in this index since 1991, the considerable increase recorded in Portugal (+ 0.44), Luxembourg (+0.35) and Greece (+0.34), should be highlighted. The most decisive drop occurred in France (-0.18).
The reader may recall (see part A of this chapter) that it was also in Luxembourg that the "global support index" had most increased since the previous survey : in this country therefore it is both the global support and global perception of risk which have noticeably increased. In Portugal on the other hand, the sharp rise in the global perception of risk is accompanied by a marked drop in global support.

e) The average DK/NA percentage varies broadly from one country to the next. Major changes in this percentage since 1991 are seen in the sharp drops recorded in Spain (-7 points), Greece (-8 points) and Portugal (-20 points).

Figure 3.8 : People and groups concerned about the potential risks of the development of biotechnology/ genetic engineering - Can they actually influence it ?

(National and EC12 results for 1993 (*))



(*) 1= "no influence at all" ; 10= "a lot of influence"

On the whole the effect of the socio-demographic and socio-political variables on the global perception of risk contained in the different applications examined, is very weak and relatively, diffuse : all averages presented in table 3.6 are positive and can be found within the band 0.22-0.87. As for the "global risk index", it fluctuates between 0.43 and 0.62 thus varying very little .

While bearing this in mind, we note nevertheless that the "global risk index" tends to increase with age, but to decrease with "age at end of studies" and "level of income". We also note that this index is lower among individuals who consider themselves to the right of the political spectrum than among those who consider themselves to the left. This is consistent with the results previously analysed.

The various distributions of the average DK/NA level also follow the same layout as those already exposed.

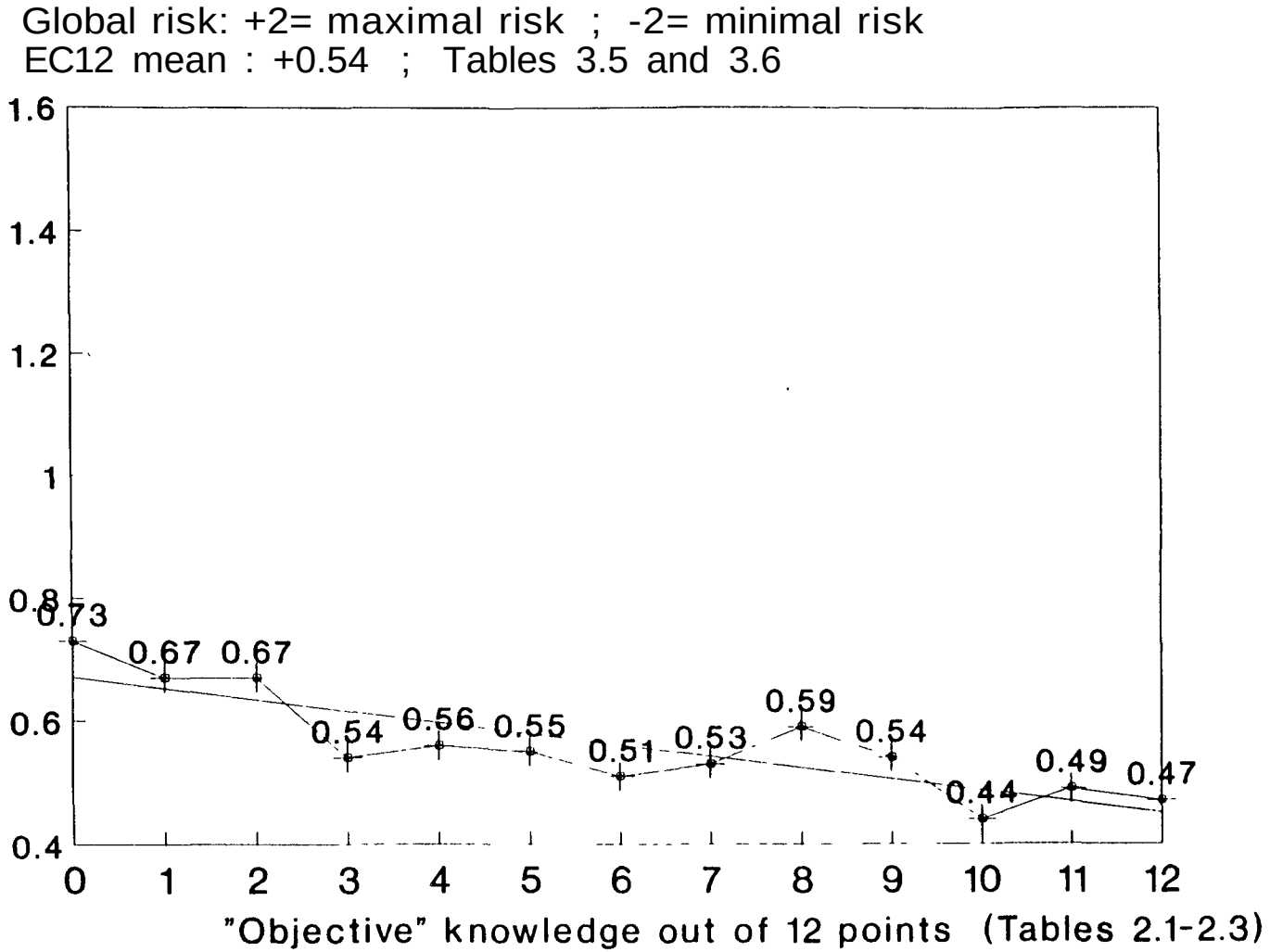
While still aiming at an improved understanding of the Europeans' perception of the risks linked to biotechnology/genetic engineering, we asked the following question :

> "Some people and groups are concerned about the potential risks of the development of biotechnology/genetic engineering and its various applications. In your opinion, can they actually influence this development ?
> Please answer using this scale from 1 to 10. ONE means "no influence at all" and TEN "a lot of influence". The scores in between allow you to say how close to either side you are".

At Community level the breakdown of replies (in percentages) is as follows:

3	4	8	10	17	15	14	11	4.	4	10	%
1	2	3	4	5	6	7	8	9	10	DK/ NA	

Figure 3.9 : Relationship between "objective" knowledge of biotech./genetic engin. and global perception of the risks implied by 7 of their applications (EC12 results for 1993)



As shown in Figure 3.8, national averages calculated from answers given to this question are clearly grouped around the Community average, 5.66/10, which is almost the central point of the scale (5.5).

We should specify that neither sex, age, "age at end of studies", "political persuasion", "opinion leadership" (as defined in Annex 1) nor level of income, have any clear influence on this variable : the average always remains between 5.55 and 5.73. It is the religious attitude which has the most impact here : the average is 5.76 among individuals who consider themselves "religious", independently of whether or not they practise their religion, and 5.51 among those who consider themselves "non religious", agnostic or atheist ; and even in this case the impact remains limited.

We should also specify that the link between this variable and the global risk index is a function which on the whole follows a "U" form: those who situate themselves at 1, 2, ... and 10 respectively, on the "scale of influence" shown on page 57, have a global perception of risk of 0.78, 0.73, 0.59, 0.51, 0.54, 0.47, 0.46, 0.53, 0.62 and 0.71. Therefore it is among those who place themselves at the extreme ends of this scale that the global perception of risk is the highest.

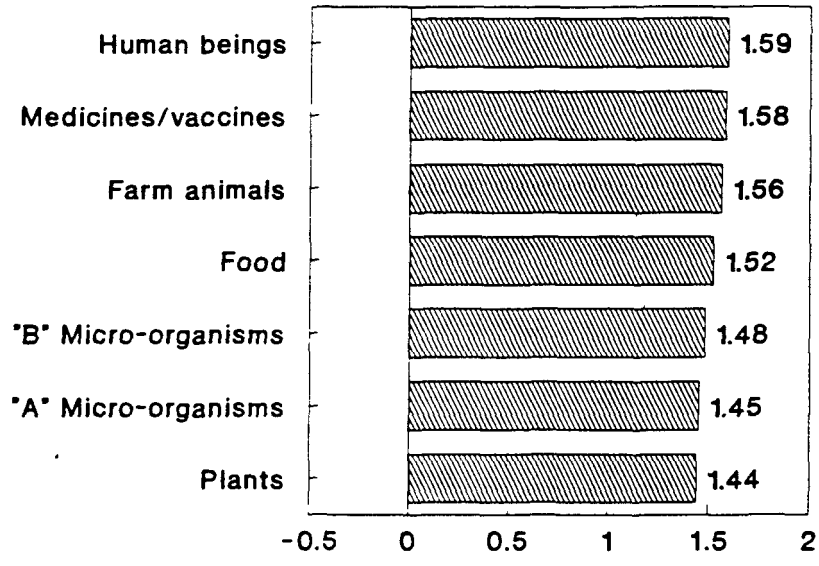
Before concluding the second part of chapter 3, it should be pointed out that Figure 3.9 demonstrates that the "objective" knowledge of biotechnology/ genetic engineering (as defined in chapter 2) has only a very slight lowering influence on the "global risk index" [4]. As for the effect of "media use" (see Annex 1) on this index, it is weak and diffuse (here also, the function follows globally a "U" form) : for a use "---", "--", " + +" and " + + +", the global perception of risk is 0.57, 0.46, 0.46 and 0.64, respectively.

[4] Had we worked on the scale of this graph, we obviously could have highlighted this decline further . In order to remain as neutral as possible, it is just that which we wished to avoid : because all three have the same goal, we have chosen to use the same scale for this figure as for Figs 3.4 and 3.13, a scale which seemed best suited to all three.
It is in pursuing the same goal that we have chosen the scales used in Figs 3.1, 3.5 and 3.10, in Figs 3.2, 3.6 and 3.11, as well as in Figs 3.3, 3.7 and 3.12.

Figure 3.10 : Types of biotech./genetic engineering research that need to be controlled by the government

EC12 means : +2= maximal control and -2= minimal control
(Tables 3.7 and 3.8 ; 1991 and 1993 figures)

- 1991 -



- 1993 -

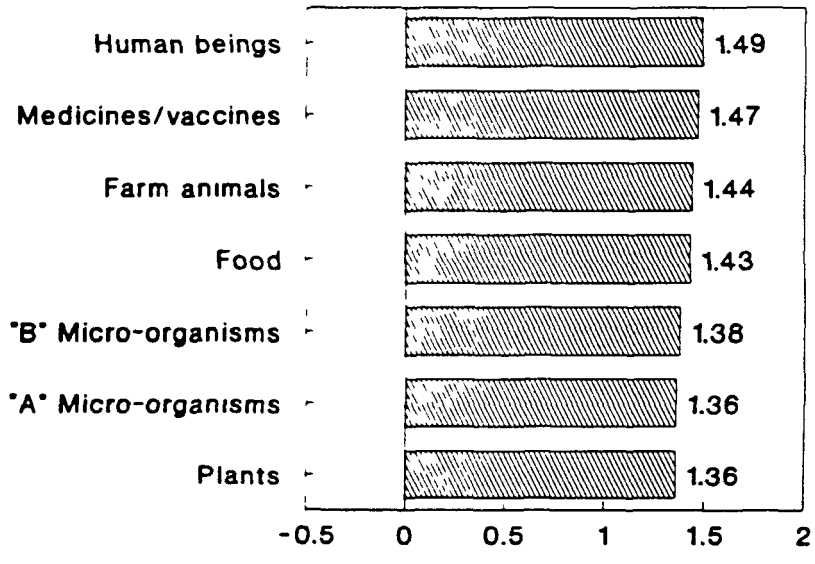


Figure 3.11 : Global demand for controls on 7 applications of biotechnology and genetic engineering

National and EC12 means for 1991 and 1993 : +2= maximal control and -2= minimal control ; Tables 3.7 and 3.8

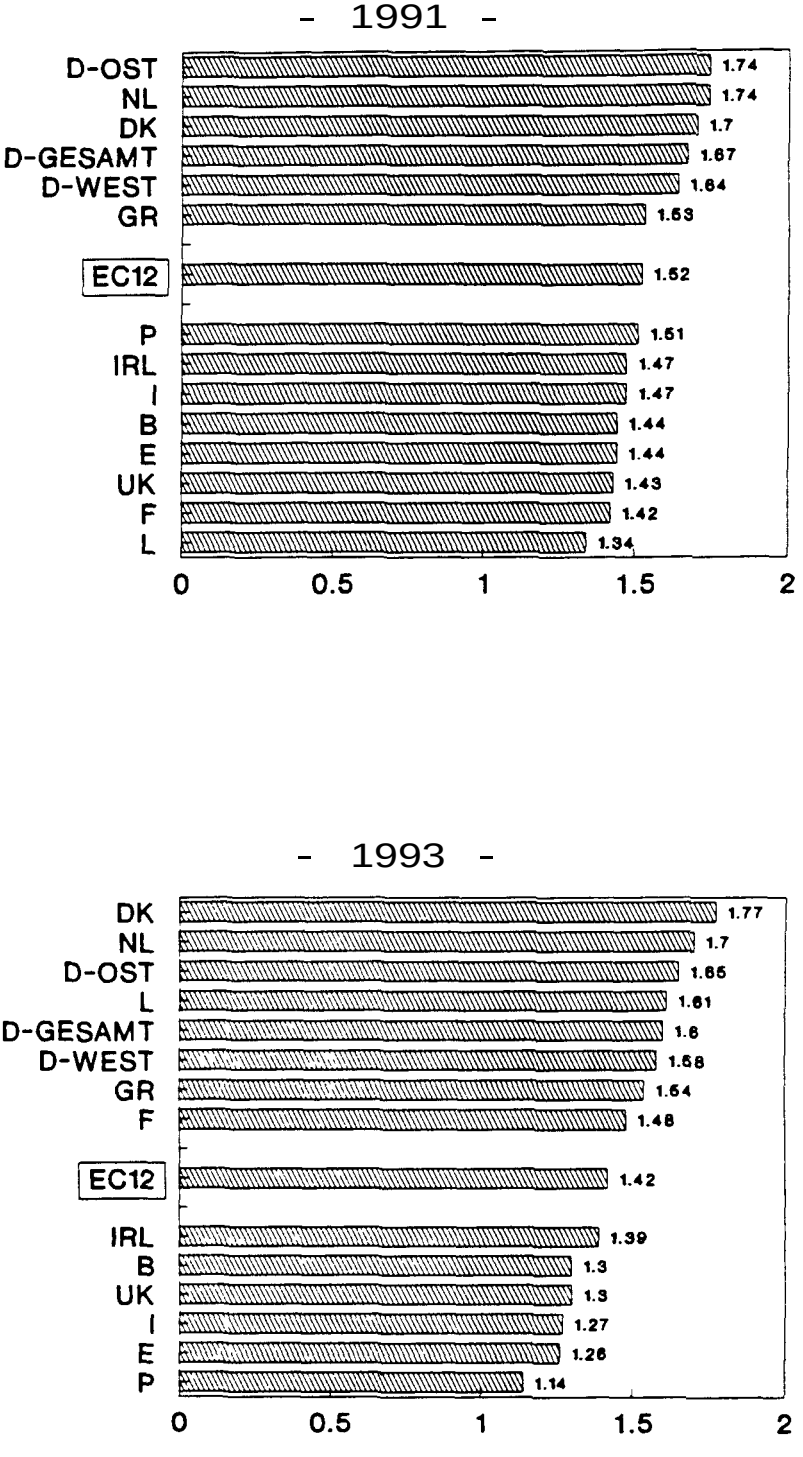
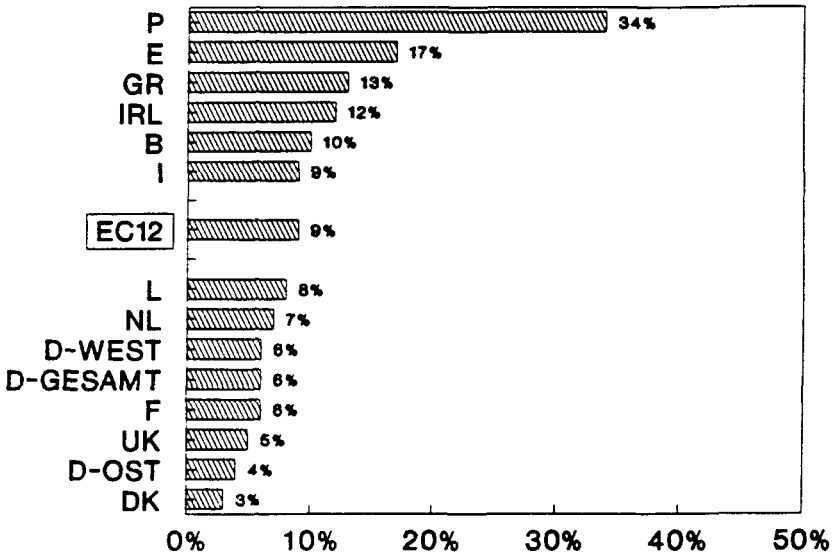


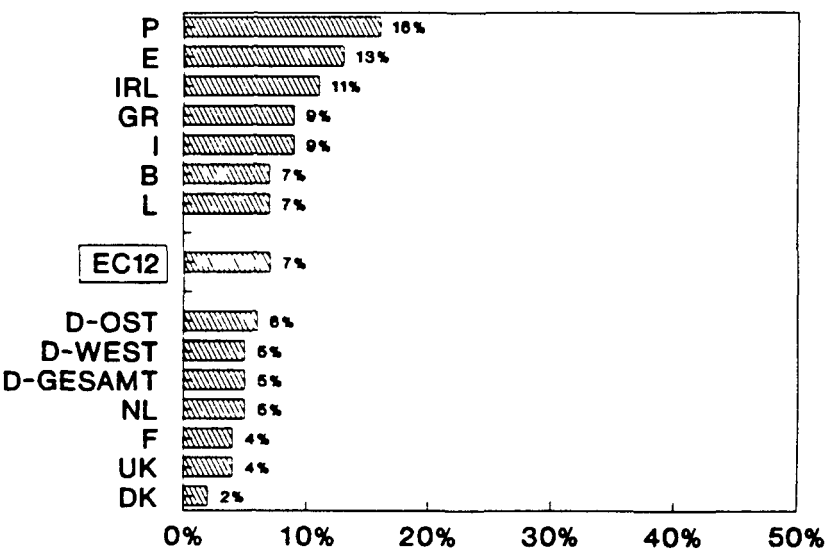
Figure 3.12 : Global demand for controls on 7 applications of biotechnology and genetic engineering

(National and EC12 % of DK/NA for 1991 and 1993)
(Tables 3.7 and 3.8)

- 1991 -



- 1993 -



C. DEMAND FOR GOVERNMENTAL CONTROL OF THE DIFFERENT APPLICATIONS

The data in Tables 3.7A, 3.7B, and 3.8. together with Figs 3.10-3.13 can be summarised fairly briefly :

a) Regardless of the country or the kind of application, all averages (which if we recall can vary between -2 [minimal demand for control] and +2 [maximal demand for control]) vary within very high and narrow limits :

- at the lower end : 1.09 ; this is seen in Portugal and involves research into micro-organisms "A" ;
- at the upper end : +1.85 ; this is seen in Denmark and involves research into human beings.

In 1991, the lower and upper limits were respectively 1.31 (Luxembourg and United-Kingdom ; research into plants) and 1.80 (East Germany ; research into human beings).

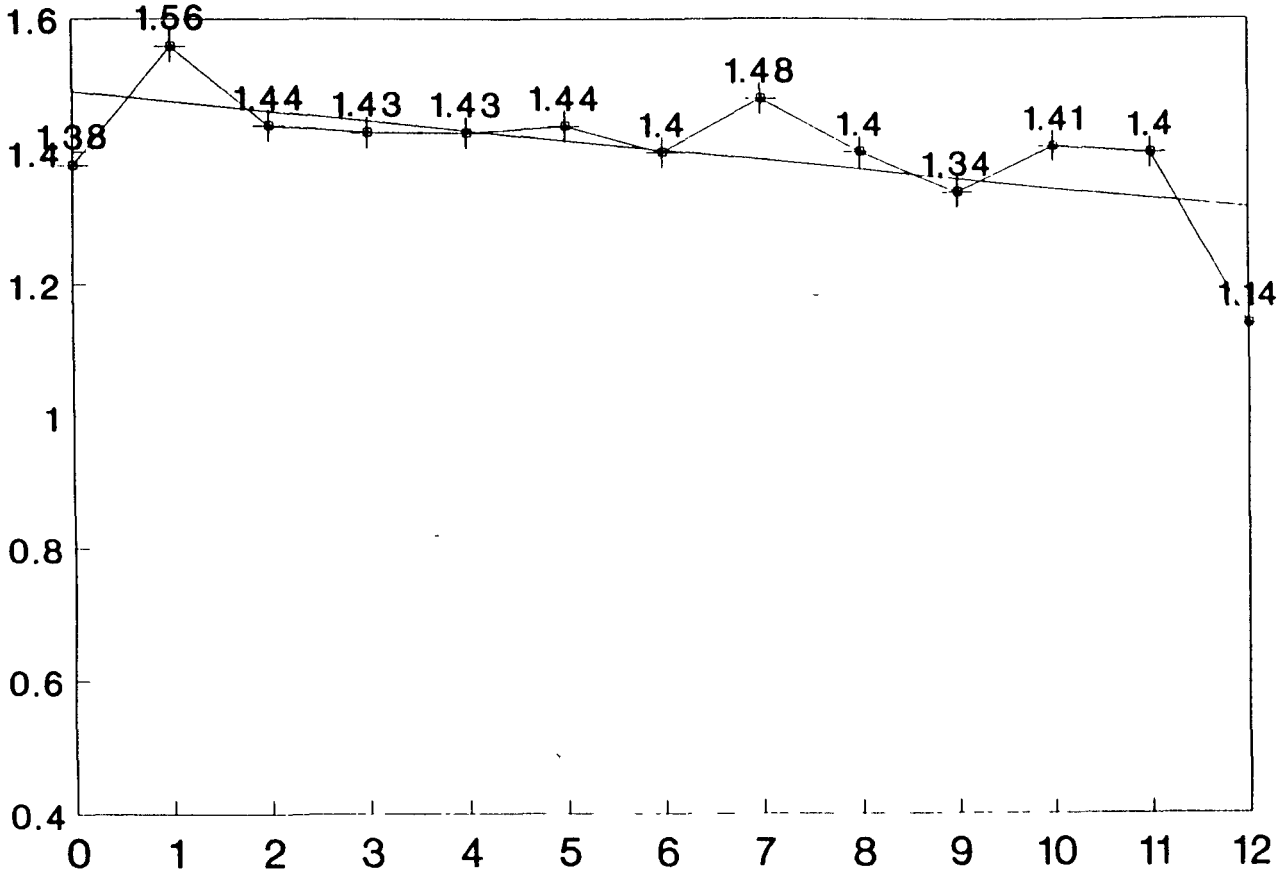
For each of the seven areas of research dealt with in the questionnaire, the "demand for control" is both extremely high and uniform : regardless of application, 83% to 87% (1991 : 82%-87%) of EC citizens agree that it "should be controlled by the government".

b) The classification of the seven applications according to the demand for control which is attributed to them is identical in 1991 and in 1993.

c) Regardless of the type of research in question, averages have all slightly declined since 1991.

Figure 3.13 : Relationship between "objective" knowledge of biotech./genetic engineering and global demand for controls on 7 of their applications (EC12 results for 1993)

Global control: +2= maximal control ; -2= minimal control
EC12 mean : +1.42 ; Tables 3.7 and 3.8



d) The "global control index", in other words the average of averages relating to the seven types of research (this index also fluctuates from -2 to +2) has slightly dropped since the previous survey : in 1991 it was 1.52 and is now 1.42.
As major national changes since 1991 in this index, we would particularly point out the clear increase recorded in Luxembourg (+0.27) and the strong decline evident in Portugal (-0.37).
In Luxembourg (see sections A and B in this chapter), it is at once the global support, the global perception of risk and the global demand for control which have noticeably increased since the previous survey. In Portugal, on the other hand, the sharp rise in the global perception of risk is accompanied by a significant decline in global support and global demand for control.
The global demand for control varies from country to country much more in 1993 than in 1991 ... even if, as we have already pointed out, it is massive throughout the Community.

e) When the difference is significant, demand for control of the different applications is consistently higher in East than West Germany. This difference was slightly more marked in 1991.

f) At EC12 level, the DK/NA percentages are relatively low : they oscillate between 6% and 7% according to the type of research (EC12 average : 7%). In 1991, the margins were 8%-9% (EC12 average : 9%).
The average DK/NA percentage varies broadly from one country to the next. We would particularly highlight the sharp fall recorded in Portugal (-18 points) as reflecting a major change in this percentage since 1991.

g) On the whole, the effect of the socio-demographic and socio-political variables on the global demand for control of the different applications studied, is generally weak and relatively diffuse : all averages shown in table 3.8 are found within an extremely narrow band (1.19-1.56). As for the "global control index", this fluctuates between 1.27 and 1.49, thus varying very little.
When these variations are significant, they are consistent with the results previously analysed. The same applies to the different types of distributions for the average DK/NA rate.

h) The global demand for control is very high. regardless of the degree of "objective" knowledge of biotechnology/genetic engineering (as defined in chapter 2).
The demand is barely influenced by this knowledge (see Figure 3.13). On the other hand, it increases with "media use" (see Annex 1) : for a use "---", "--". "++" and "+++" respectively, the global perception of risk is 1.29, 1.32, 1.40 and 1.50.

Tables 3.9 and 3.10 allow us to assess in some way the opinions relevant to the "ethic and control" dimension regarding biotechnology/genetic engineering. What we learn from these tables can be synthesized as follows :

a) For the applications referring to human beings (91 %), as well as those involved with animals (88%) or plants (75%), an overwhelming majority of EC citizens ("definitely" or "tend to") agree that "there should be clear ethical rules indicating when biotechnology/genetic engineering may not in any way be applied to animals."

b) If we concentrate on the applications involving human beings or animals and if we measure their support for this opinion by means varying from -2 (minimal support) to +2 (maximal support), we note that all averages are very high (EC12 averages : 1.68 and 1.52 respectively) and fluctuate within a narrow band :
   * according to the country in question, between 1.21 (Portugal ; plants) and 1.89 (Denmark ; human beings) ; and
   * depending on the socio-demographic or socio-political variable in question, between 1.46 and 1.75 .

c) If we do the same for applications regarding plants, we note that the consensus is no longer as clear.... even if all averages remain largely positive :

* at EC12 level, it is 1.07 ;
* according to the country in question, it varies between 0.38 (Belgium [5]), 0.75 (United-Kingdom) and 1.55 (Greece) ; and
* according to the socio-demographic or socio-political variable in question, it fluctuates between 0.93 and 1.16 .

d) The average DK/NA level for these three applications is relatively weak at Community level (6%).
It nevertheless varies sharply from country to country (from 1 % in Denmark to 1 5% in Portugal) and depending on the socio-demographic or socio-political variable in question (2%-12%).
These variations follow the same logic as those discussed earlier.

[5] While unusually low compared to other national averages, this result is nevertheless in line with those found in tables 3.1, 3.5 and 3.7 .

D. "SUPPORT", "RISK" AND "GOVERNMENTAL CONTROL' ... SOME ADDITIONAL REMARKS

In this fourth and final part of chapter 3, we present three other types of analysis of the results exposed in sections A, B and C of this chapter.

The first aims at highlighting the coherence which exists between different types of answer : if we cross the "optimism" relating to biotechnology/ genetic engineering (as defined in Chapter 1) with each of the three global indices (support, risk and control) analysed in this chapter, we achieve the following :

a) For the global support index :

* among the "optimists" (those who think that biotechnology/genetic engineering will improve our way of life in the next twenty years), this index is 1.16 ;
* among the "no effect" (those who believe that it will not affect our way of life in the next twenty years), it is **0.7 ;**
* among the "pessimists" (those who think it will make things worse), it is **0.31** ; and
* among the "DK/NA" (26% for this question .'), it is 0.75 .

b) For the global risk index :

* among the "optimists", this index is **0.38 ;**
* among the "no effect", it is **0.62 ;**
* among the "pessimists", it is **0.89** ; and
* among the "DK/NA" it is 0.63 .

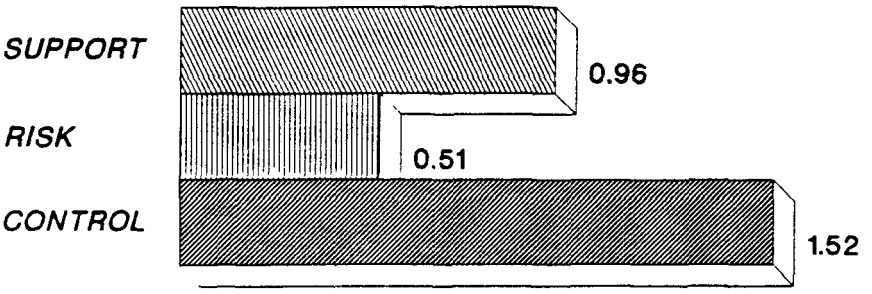
c) For the global control index :

* among the "optimists", this index is **1.36 ;**
* among the "no effect", it is **1.37 ;**
* among the "pessimists", it is **1.55** ; and
* among the "DK/NA", it is 1.48 .

Figure 3.14.1 : Net global indices of support, risk and control with regard to 7 applications of biotechnology and genetic engineering (Figures 3.2. 3.6 and 3.11)

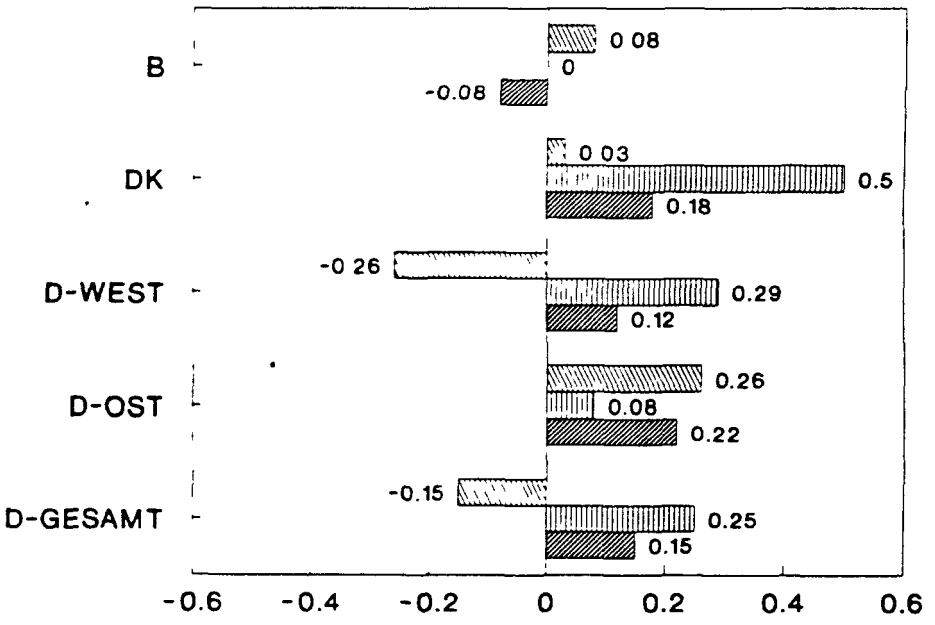
(National results for 1991 (*))

- EC12 global indices for 1991 -

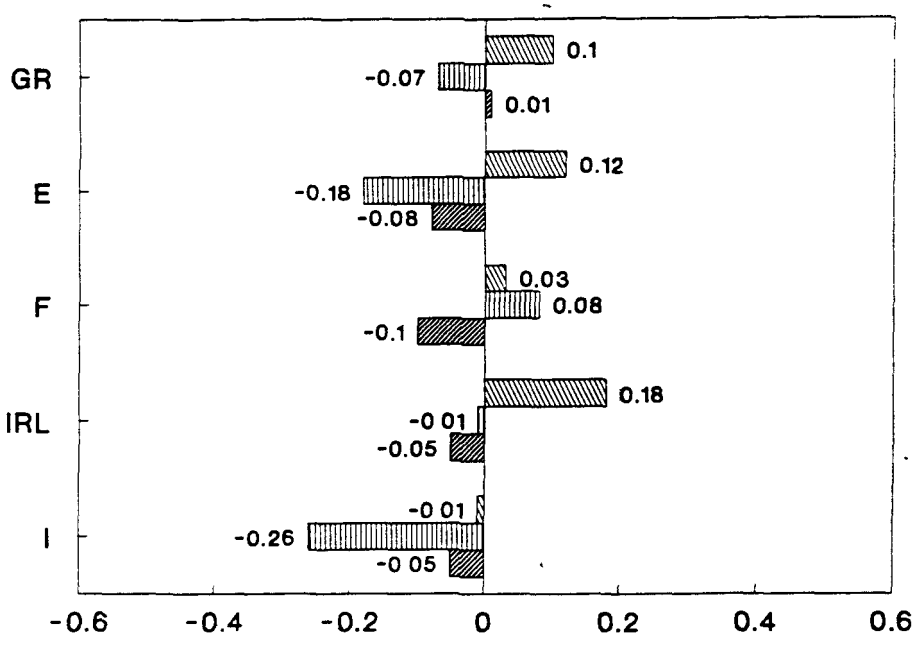


(*) Net global index • National index - EC12 index

- Net global indices by country for 1991 -



- Net global indices by country for 1991 (cont) -



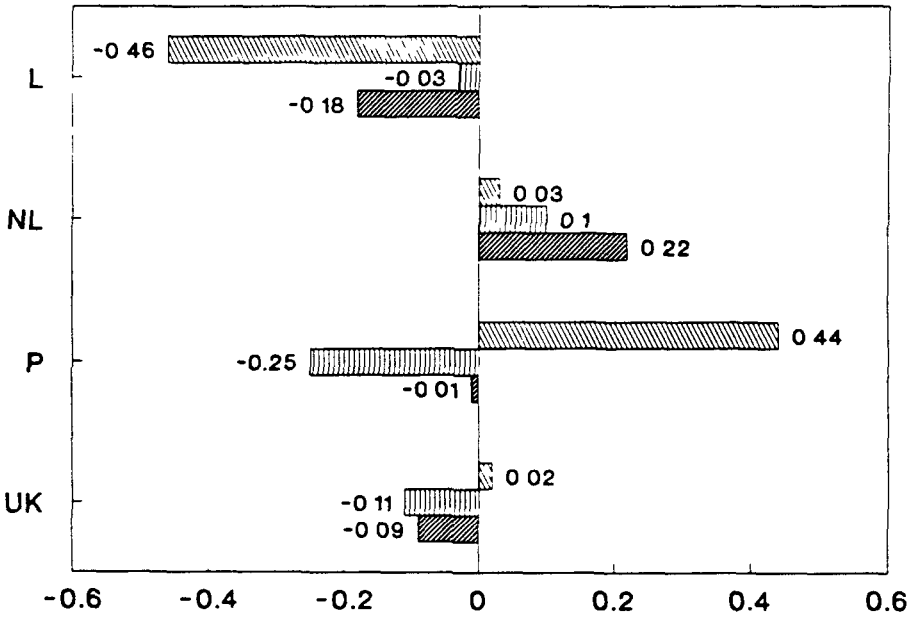
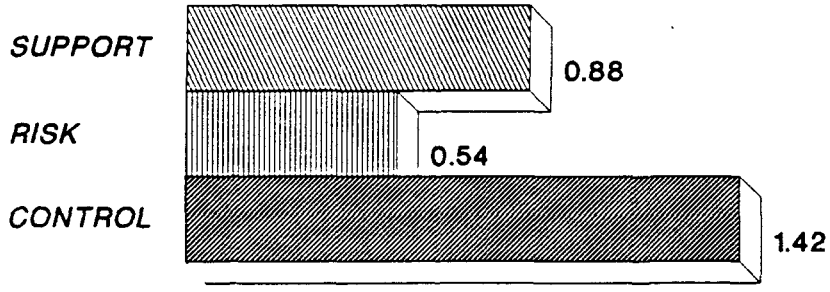


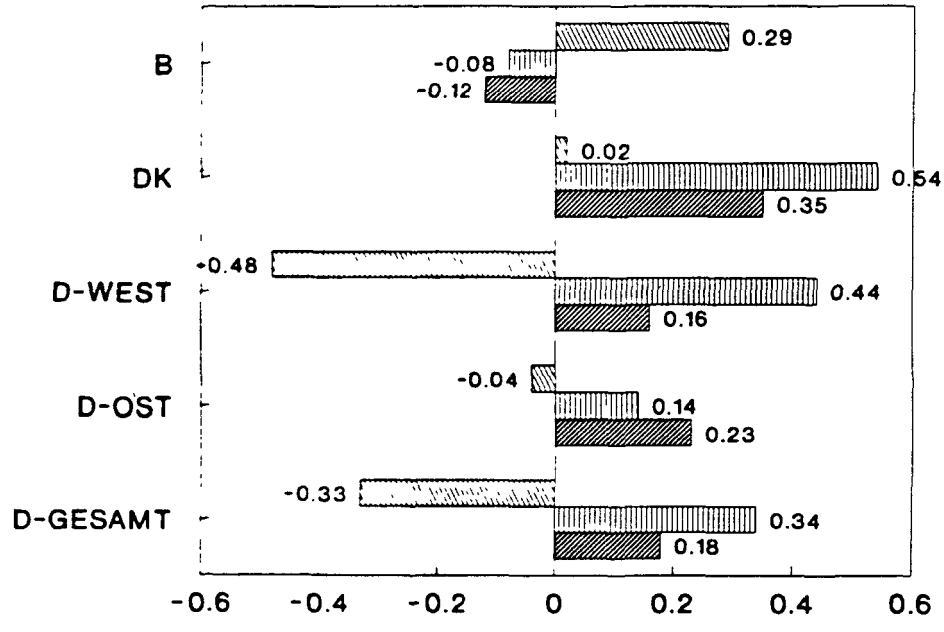
Figure 3.14.2 : Net global indices of support risk and control with regard to 7 applications of biotechnology and genetic engineering (Figures 3.2. 3.6 and 3.11)
(National results for 1993 (*))

, - EC12 global indices for 1993 -

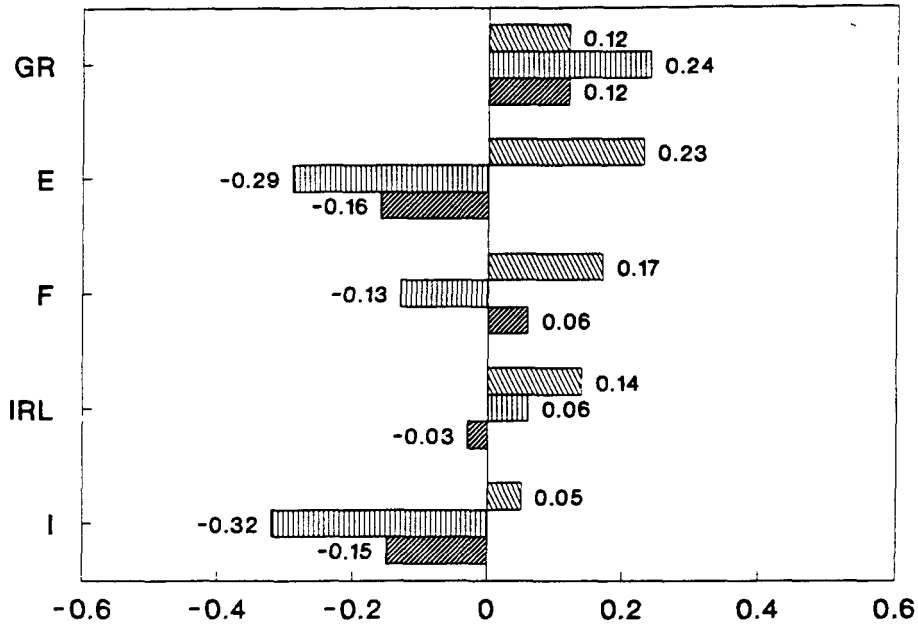


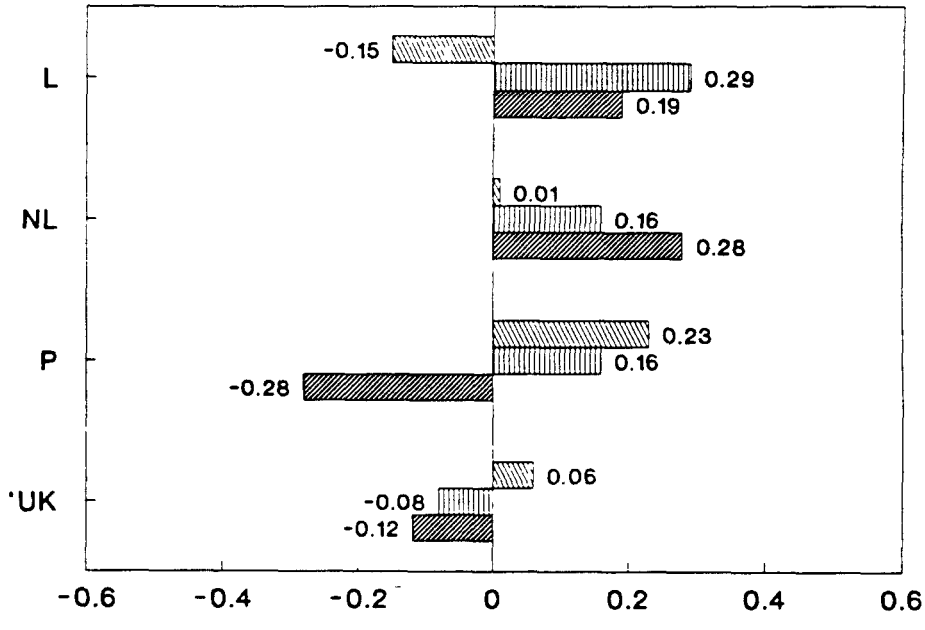
(•) Net global index • National index - EC12 index

- Net global indices by country for 1993 -



- Net global indices by country for 1993 (cont) -





The second type of analysis is based on Figs 3.14.1 and 3.14.2 . The measure used in these two figures is the "net global index", i.e. the national global index minus the corresponding EC12 global index [6].

In Figures 3.14.1 (relating to 1991), we chiefly note the two striking cases below :

a) **Denmark** : whilst the perception of risk is very high in this country (it is in fact the highest in the Community !), support here is nevertheless higher than the EC12 average, though not significantly so ;

b) West **Germany** : although weaker than that recorded in Denmark, the perception of risk here is also very high (it is the second highest out of the Twelve). On the other hand, support here is distinctly lower than the EC12 average (it is the second weakest in the Community).

Figures 3.14.2 (relating to 1993) show that the divergence in attitudes between these two countries is even more pronounced in 1993 than in 1991. This is owing among other things to a drastic decline in support in West Germany (it is now the weakest among the Twelve ; see section A of this chapter).

One plausible explanation of this result is that in 1991 and, distinctly more in 1 993, the Danes are proportionally many more than the West Germans to trust their Public Authorities to "tell the truth about biotechnology/ genetic engineering" (see Chapter 4 ; Tables 4.2.1 and 4.2.2).

[6] If we take the example of support in Belgium in 1991, we have :

* 1.04 as the Belgian global support index in 1991 (see Figs 3.2, section A) ; and
* 0.96 as the EC12 global support index in 1991 (see Fig 3.2 or 3.14.1).

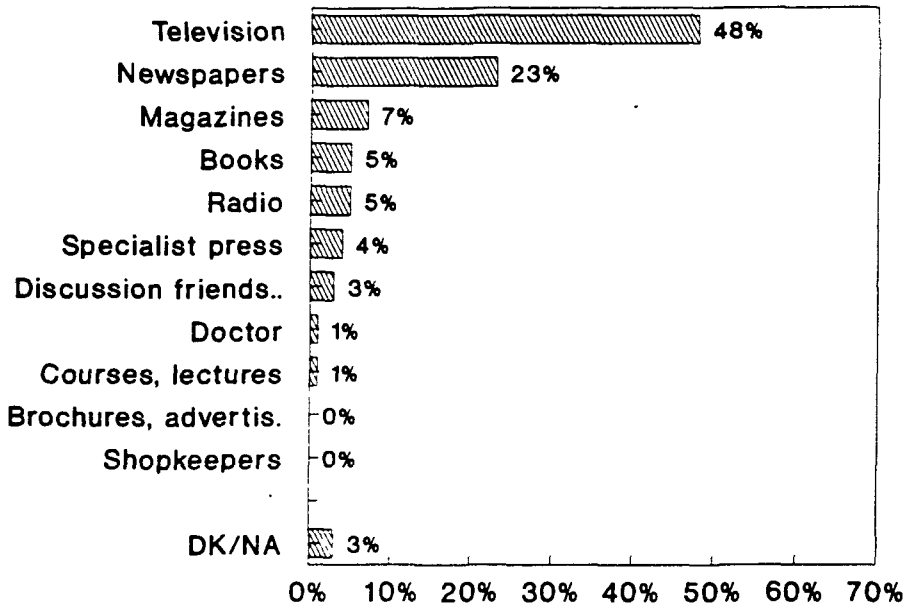
For Belgium, therefore, the net global support in 1991 is (1.04 - 0.96) = 0.08.

Finally, the third analysis is linked to the "subjective" knowledge of biotechnology/genetic engineering (as defined in chapter 2). If we analyse the opinions of the 14% who found the issues tackled in the questionnaire "very difficult" (in other words those who place themselves in box 10 of the scale shown on page 33), we note that out of the entire scale, it is they who have the lowest global support index (0.65 ; EC12 average: 0.88), as well as the highest global risk (0.90 ; EC12 average : 0.54) and control (1.52 ; EC12 average : 1.42) indices.

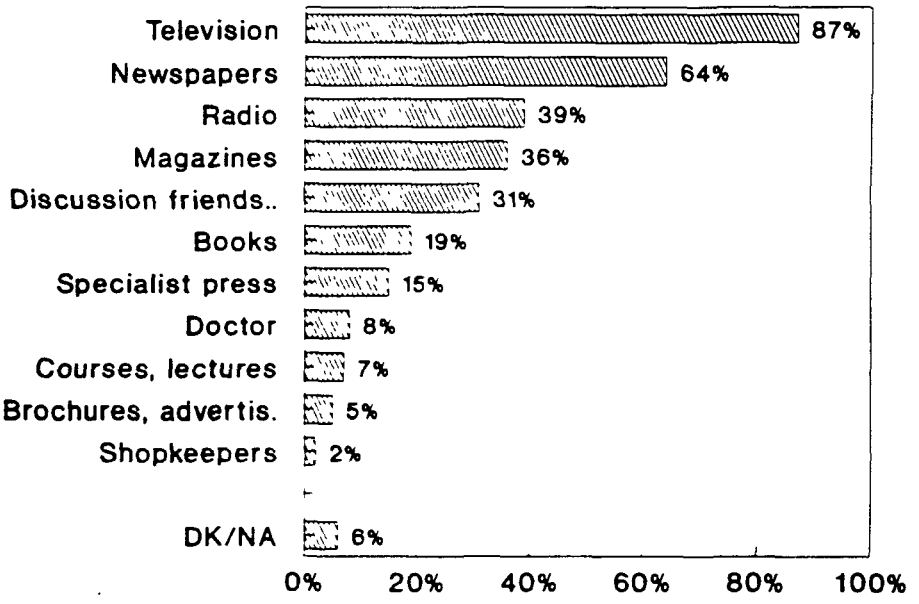
CHAPTER 4

Figure 4.1.1 : Information sources on new developments affecting our way of life (EC12 % for 1991)

Main source (one response only)



All sources (several responses possible)



INFORMATION - SOURCES AND RELIABILITY

This chapter sets out the results relating to two questions dealing with information issues :

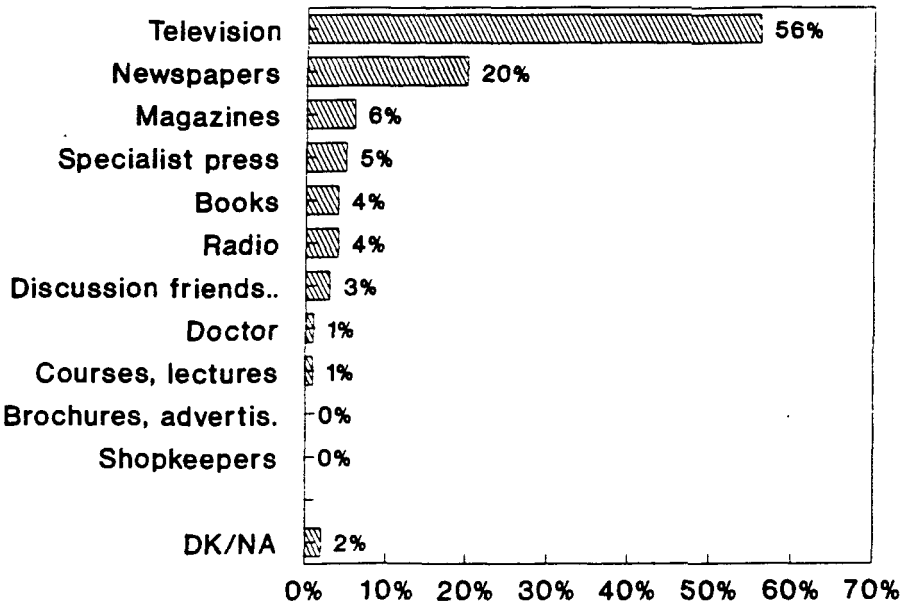
a) to begin with, those related to sources that people use to obtain information on "the new developments which affect our way of life";

b) next, those connected with the reliability of different information sources on biotechnology/genetic engineering.

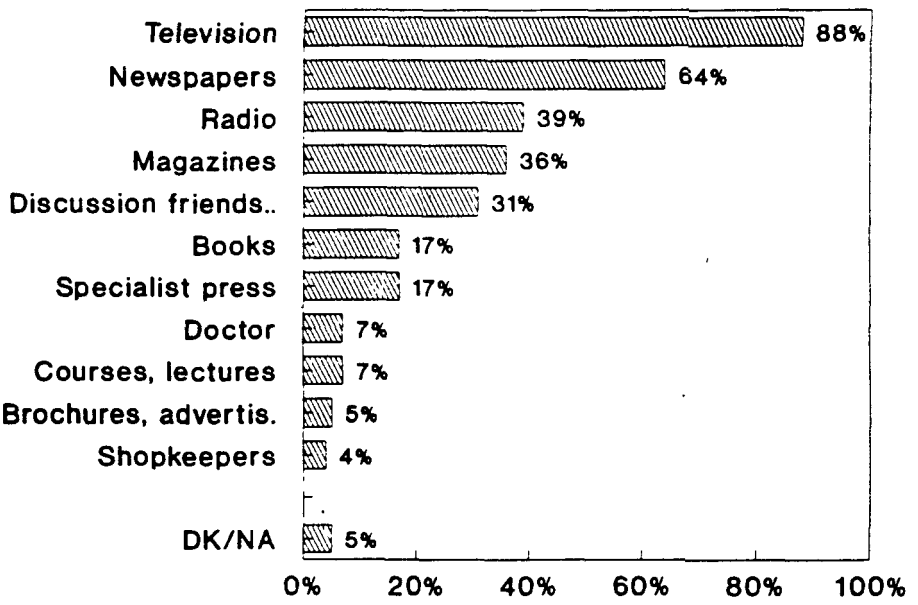
These results of course have a specific importance, given that one of the main aims of this study (see Introduction) is to achieve an improvement in informing the European Public about biotechnology/genetic engineering, and from that, a better understanding of the research in this area, including its' possible risks and its' potential.

Figure 4.1.2 : Information sources on new developments affecting our way of life (EC12 % for 1993)

Main source (one response only)



All sources (several responses possible)



A. INFORMATION SOURCES ON NEW DEVELOPMENTS AFFECTING OUR WAY OF LIFE

As we observed in chapters 1 and 2, "global optimism" (as defined in Chapter 1) regarding new technologies, as well as "objective" knowledge (as defined in Chapter 2) are strongly correlated with the main source from which we draw information on "new developments which affect our way of life".

From tables 4.1.1 and 4.1.2 as well as Figs 4.1.1 and 4.1.2, it stands out that the use of the different types of sources varies enormously from one source to another, and for the same source, from one country to the next.

Despite these considerable divergences, we particularly note that, in 1993, regardless of the country in question, television is the first medium cited when an interviewee is asked to quote one source only (question A) as indeed when several sources may be given (question A+B).

With the exception of Portugal, the second source most frequently quoted in 1993 (for questions A AND A+B) is "newspapers". In Portugal, other media, apart from television, are quoted as a "primary source" (question A) by only a maximum of 5% of interviewees ; on the other hand, as "one of the information sources" (question A + B), newspapers come clearly in third place (with 48%), behind radio (54%). Throughout the Community, the only medium (other than television or newspapers) to be cited as a primary source by more than 10% of interviewees is "magazines" (exclusively in East Germany).

In 1991, the predominance of television was slightly less pronounced, but the situation was barely different from that which has just been described. The only "exceptions" to this order ("TV, newspapers, others") - exceptions which in fact proved the rule - were :

a) Denmark and the Netherlands, where television shared first place with newspapers (except for question A+B, where television led again in both these countries) ;

b) East Germany, where magazines shared second place with newspapers (except for question A+B, where newspapers regained the lead) ; and

c) Portugal, where the situation was very close to that of 1993 : media other than television are only quoted as a primary source by a maximum of 9% of interviewees (at the top of these media, though not significantly, are newspapers) ; as "one of the information sources", on the other hand, newspapers come in third place (43%), behind radio (54%).

From 1991 to 1993, the supremacy of television in this field has become even clearer : 88% of Europeans use it to obtain their information (1991 : 87%) and 56% use it as their main source of information (1991 : 48%).

B. MOST RELIABLE INFORMATION SOURCES ON BIOTECHNOLOGY AND GENETIC ENGINEERING

Throughout the Twelve, the three sources of information on biotechnology/ genetic engineering most frequently judged as "the most reliable" (question A), i.e. "the most likely to tell the truth" in this field, are the following (see Tables 4.2.1 and 4.2.2 ; Figs 4.2.1 and 4.2.2) :

a) Environmental organisations.

We note that national percentages relating to this source continue to vary widely :

* 1993 : from 17% in Denmark (i.e. from a statistical viewpoint, the same score as Public Authorities [1]), to 36% in Italy and 37% in West Germany (31% in East Germany) ;
* 1991 : from 16% in Denmark (i.e. from a statistical viewpoint, the same score as Public Authorities and School/University) and 17% in Spain, to 34% in East Germany (26% in West Germany [2]).

b) Consumer organisations.

Here as well, national percentages continue to fluctuate within a very wide margin :

1993 : from 14% in Greece, to 37% in East Germany (27% in West Germany) and 39% in France ;

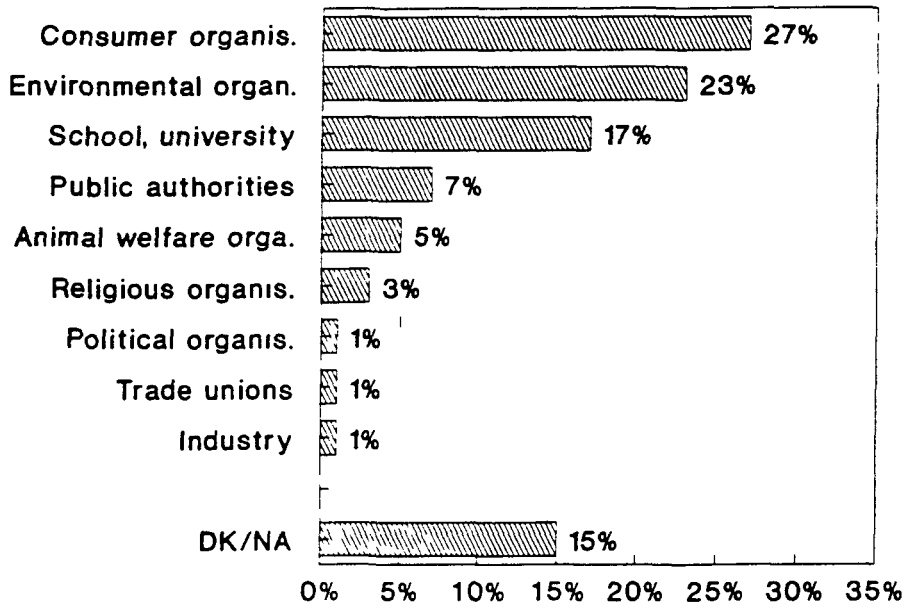
1991 : from 12% in Greece (11% for Public Authorities), to 41 % in France.

' In chapter 3, we already had the opportunity of pointing out this particularly striking result when compared to other Member States. The second highest score for Public Authorities is recorded in the Netherlands (10%). The EC12 average is only 5%. It should be noted that compared to 1991, the Greek percentage fell from 11% (the second highest percentage after Denmark at the time) to 5%.

[2] We note the situation reversal which has occurred here between East and West Germany. For consumer organisations, the same type of scenario came about, but in the opposite way round.

Figure 4.2.1 : Most reliable information sources on biotechnology/genetic engineering (EC12 % for 1991)

Main source (one response only)



All sources (several responses possible)

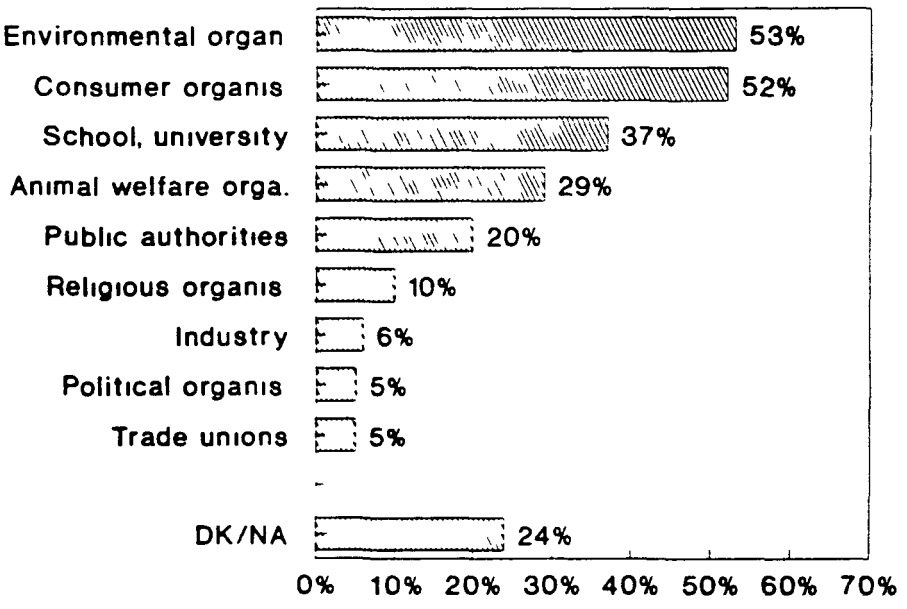
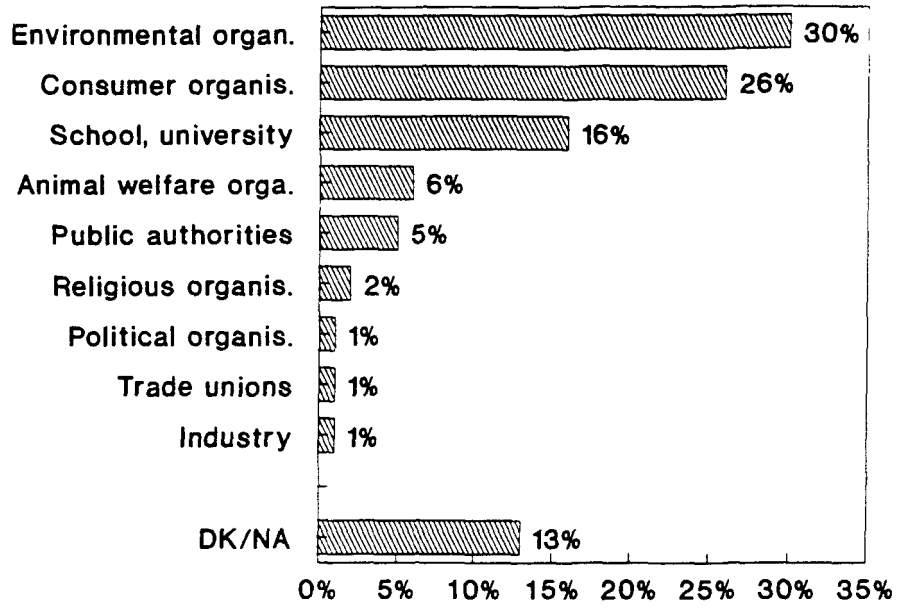
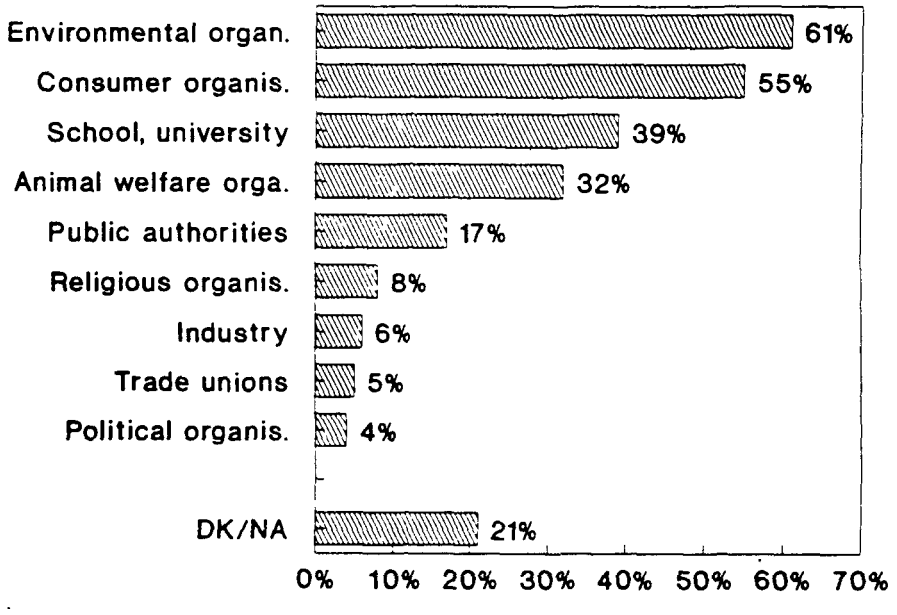


Figure 4.2.2 : Most reliable information sources on biotechnology/genetic engineering (EC12 % for 1993)

Main source (one response only)



All sources (several responses possible)



c) School or University.
Here again variations in the national percentages are considerable and differences striking when compared to 1991 :

* 1993 : from 7% in East Germany (6% for animal welfare organisations) and 9% in West Germany (7% for animal welfare organisations), to 27% in Belgium and in Greece ;

  1991 : from 11 % in West Germany and 12% in East Germany, France and Portugal, to 31% in Greece.

At Community level, we note that environmental organisations have gained popularity both as "the most reliable source" (question A : +7 points), and as "a reliable source" (question A+B : +8 points). Now, they dominate in both these categories.

If consumer organisations have lost their overriding position as "the most reliable source", it is not because they have a smaller score than in 1991 (with 26% in 1993 versus 27% in 1991, the percentage remains unchanged), but because environmental organisations have themselves made considerable progress. As "a reliable source", consumer organisations have gained 3 points.

APPENDIX 1 :

DEFINITION OF THREE EXPLANATORY VARIABLES USED IN CROSS-TABULATIONS

"OPINION LEADERSHIP"

An "opinion leader" is someone who, within the context of certain social functions, generally exercises more influence on the opinion of others than others do on his. If all members of a social group were equal and replaceable in the forming of opinions, attitudes and group behaviour, these opinions, attitudes and behaviour patterns would barely change, even if one or another member of the group were to disappear. The "leader" is precisely that person, as a result of whom things happen differently : he influences others more than he is influenced by them, and not just occasionally, but in a relatively constant and predictable way.

For this reason, one of the aims of market studies and opinion polls, and more generally of social psychology studies, is often to identify these leaders.
To do so, three different approaches can be used :

1. Socio-metric studies of respective influences within a given group. This method is hardly practicable except in a laboratory environment or among small groups.

2. Interviews with privileged informers, who can designate people who according to them exert "leadership" within a given group. This method does not escape the limitations of the previous method and in fact has a higher risk of identifying "eminent" people that is, people who have an important social position rather than real "leaders", actually involved in community life.

3. Selecting leaders through surveys, by defining such persons as individuals demonstrating certain characteristics generally regarded as constituent of a "leadership" attitude : interest in certain problems, degree of activity - in extent and intensity - within community life,...

In this report, we have chosen the third method of defining "opinion leaders", as this can be used in an operational way in surveys among representative samples of large and varied populations.

The analysis of results accumulated during previous "EUROBAROMETER" surveys has shown that it is possible to construct a statistically significant index from answers given to the following two questions :

1) "When you get together with friends, would you say you discuss political matters frequently, occasionally, or never ?"

and

2) "When you hold a strong opinion, do you ever find yourself persuading your friends, relatives or fellow workers to share your views ? Does this happen often, from time to time, rarely, or never ?"

This index distinguishes four degrees of "opinion leadership" : a strong degree (+ +), which characterises around 14% of the EC population above 14 years old; a weak degree (--), or about 17% of the EC population over 14 years old; and two intermediate degrees : (+) and (-).

The following table illustrates the way in which the "opinion leadership" index has been constructed :

	Persuading others ...				
	often	from time to time	rarely	never	DK/NA
Discuss Politics ...					
Often	+ +	+ +	+	+	+
Occasionally	+	+	-	-	-
Never	-	-	--	--	--
DK/NA	-	-	--	--	--

'MEDIA USE"

This index was constructed from responses given by all interviewees to the following question :

"About how often do you ...

... watch the news on television ?

... read the news in the daily papers ?

... listen to news on the radio ?

Every day, several times a week, once or twice a week, less often or never ?"

We distinguish four degrees of "media use" : a strong degree (+++), a weak degree (---) and two intermediary degrees (+ + and --) :

+ + + = News on television, radio and daily papers "every day" or "several times a week" ;

+ + = Two media "every day" or "several times a week" ; the third medium not more than "once or twice a week" ;

-- = One medium "every day" or "several times a week"; the two other media not more than "once or twice a week" ;

--- = The three media not more than "once or twice a week".

"SELF POSITIONING ON THE POLITICAL "LEFT-RIGHT" SCALE"

This variable is established from responses to the question : "In political matters, people speak of "the left and "the right". How would you place your views on this scale ?" (Instructions to interviewers : Do not prompt ; if contact hesitates, ask to try again) :

Left	1	2	3	4	5	6	7	8	9	10	Right

In this report, respondents are grouped into tertiles for each country : those that are positioned to the far left, those that are positioned to the far right and the remaining third, consisting of those who place themselves around the centre. The standard weighting (see Introduction) is used to establish the EC distribution.

APPENDIX 2 :

TABLES

Tables 1.1 A and 1.1B : Anticipated effects of 7 new technologies - 1991 and 1993 figures

QUESTION: 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 ?

A. EC12 percentages and means (*) for 1991 and 1993

	Will improve		Noeffect		Will make things worse		DK/NA		TOTAL		Means	
	% 91	% 93	% 91	% 93	%91	%93	% 91	% 93	%91	%93	91	93
SOLAR ENERGY	76	77	12	12	2	3	9	8	99	100	+0.81	+0.81
COMPUTERS AND INFORMATION TECHNOLOGY	74	73	11	13	5	6	10	8	100	100	+0.76	+0.73
BIOTECHNOLOGY (**)	54	53	9	11	7	10	30	25	100	99	+0.66	+0.57
GENETIC ENGINEERING (***)	47	43	10	11	15	20	28	26	100	100	+0.45	+0.32
TELECOMMUNICATIONS	80	79	10	12	1	2	9	8	100	101	+0.86	+0.83
NEW MATERIALS OR SUBSTANCES	64	62	11	13	4	5	22	21	101	101	+0.76	+0.71
SPACE EXPLORATION	45	44	28	29	7	8	20	18	100	99	+0.47	+0.44

B. National and EC12 breakdown of "DK/NA" (%) and means (*) for 1993

1st column : Means 2nd column : % of DK/NA	B		DK		D-WEST		D-OST		D-GESAMT		GR		E		EC12	
	Mean	?	Mean?		Mean	?	Mean?		Mean	?	Mean	?	Mean	?	Mean	?
SOLAR ENERGY	+0.76	10	+0.83	3	+0.81	7	+0.79	10	+0.80	7	+0.74	12	+0.88	9	+0.81	8
COMPUTERS AND INFORMATION TECHNOLOGY	+0.65	8	+0.69	7	+0.60	9	+0.70	10	+0.62	9	+0.73	16	+0.92	7	+0.73	8
BIOTECHNOLOGY (**)	+0.56	22	+0.55	23	+0.30	23	+0.49	25	+0.34	24	+0.56	46	+0.78	30	+0.57	25
GENETIC ENGINEERING (***)	+0.27	27	0.00	18	-0.03	30	+0.08	26	-0.01	29	+0.37	49	+0.77	29	+0.32	26
TELECOMMUNICATIONS	+0.81	8	+0.81	7	+0.65	10	+0.80	9	+0.68	9	+0.92	11	+0.96	8	+0.83	8
NEW MATERIALS OR SUBSTANCES	+0.76	16	+0.81	14	+0.57	26	+0.65	26	+0.59	26	+0.57	31	+0.76	31	+0.71	21
SPACE EXPLORATION	+0.43	19	+0.49	15	+0.32	20	+0.35	20	+0.32	20	+0.50	26	+0.69	21	+0.44	18
1st column : Means 2nd column : % of DK/NA	f		IRL		I		L		NL		P		UK		EC12	
	Mean?		Mean?		Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?
SOLAR ENERGY	+0.78	6	+0.71	19	+0.79	12	+0.62	4	+0.84	3	+0.83	18	+0.83	6	+0.81	8
COMPUTERS AND INFORMATION TECHNOLOGY	+0.59	7	+0.77	11	+0.88	10	+0.75	6	+0.72	7	+0.87	17	+0.75	4	+0.73	8
BIOTECHNOLOGY (**)	+0.63	17	+0.68	36	+0.73	30	+0.54	23	+0.30	20	+0.81	38	+0.62	23	+0.57	25
GENETIC ENGINEERING (***)	+0.27	19	+0.39	33	+0.57	28	+0.20	17	+0.10	28	+0.72	33	+0.31	22	+0.32	26
TELECOMMUNICATIONS	+0.85	4	+0.88	10	+0.90	10	+0.74	6	+0.86	5	+0.89	12	+0.86	4	+0.83	8
NEW MATERIALS OR SUBSTANCES	+0.82	11	+0.79	24	+0.64	22	+0.67	16	+0.78	12	+0.72	38	+0.78	13	+0.71	21
SPACE EXPLORATION	+0.43	14	+0.36	25	+0.58	21	+0.34	12	+0.44	14	+0.55	37	+0.31	10	+0.44	18

0 Means are calculated by applying the coefficients +1,0 and -1 to responses "will improve our way of life", "no effect" and "will make things worse" respectively. The central point is therefore 0: below this point, negative responses predominate, and above this point, positive responses. "Don't knows" are excluded from the calculation.

(**) This item was proposed to half of the sample; the other half was asked to evaluate genetic engineering.

(***) This item was proposed to half of the sample; the other half was asked to evaluate biotechnology.

Table 1.2 : Anticipated effects of 7 new technologies

(EC12 breakdown of DK/NA (%) and means (*) by various socio-demographic variables ; 1993 figures)

QUESTION: 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?

		SEX		AGE				AGE AT END OF STUDIES					LEVEL OF INCOME (****)				RELIGIOSITY (*****)		TOTAL EC 12
		M	F	15-24	25-39	40-54	55+	-16	16-17	18-19	20+	Still stud.	++ high	+	-	-- low	Reli-gious	Non re-ligious	
SOLAR ENERGY	- Means	+0.83	+0.79	+0.81	+0.83	+0.83	+0.78	+0.78	+0.81	+0.84	+0.83	+0.82	+0.83	+0.83	+0.79	+0.78	+0.80	+0.82	+0.81
	- % DK/NA	6	10	6	5	7	13	13	7	6	3	5	4	5	7	14	9	6	8
COMPUTERS AND INFORMATION TECHNOLOGY	- Means	+0.75	+0.71	+0.77	+0.78	+0.75	+0.65	+0.68	+0.70	+0.77	+0.77	+0.80	+0.82	+0.72	+0.68	+0.64	+0.74	+0.72	+0.73
	- % DK/NA	6	10	4	5	7	14	13	6	5	5	4	4	6	8	13	9	6	8
BIOTECHNOLOGY (**)	- Means	+0.61	+0.53	+0.59	+0.58	+0.65	+0.49	+0.51	+0.55	+0.68	+0.59	+0.61	+0.65	+0.54	+0.50	+0.53	+0.56	+0.61	+0.57
	- % DK/NA	21	29	24	20	22	34	35	23	23	15	21	17	21	23	33	28	22	25
GENETIC ENGINEERING (***)	- Means	+0.35	+0.28	+0.37	+0.36	+0.32	+0.23	+0.33	+0.22	+0.31	+0 34	+0.42	+0.36	+0.31	+0.34	+0.29	+0.35	+0.27	+0.32
	- % DK/NA	23	30	21	22	25	34	35	25	26	18	18	21	22	27	33	28	23	26
TELECOMMUNICATIONS	- Means	+0.85	+0.82	+0.84	+0.84	+0.84	+0.82	+0.81	+0.84	+0.86	+0.86	+0.82	+0.89	+0.83	+0.81	+0.79	+0.84	+0.82	+0.83
	- % DK/NA	5	10	5	4	7	12	12	6	5	4	5	4	6	7	12	8	6	8
NEW MATERIAL OR SUBSTANCES	- Means	+0.73	+0.70	+0.71	+0.75	+0.72	+0.68	+0.66	+0.76	+0.75	+0.74	+0.71	+0.78	+0.73	+0.69	+0.65	+0.71	+0.72	+0.71
	- % DK/NA	16	25	16	18	20	27	27	19	18	17	15	15	19	19	26	22	18	21
SPACE EXPLORATION	- Means	+0.48	+0.40	+0.52	+0.48	+0.42	+0.35	+0.40	+0.41	+0.45	+0.46	+0.55	+0.48	+0.43	+0.40	+0.40	+0.45	+0.43	+0.44
	- % DK/NA	14	22	13	14	17	26	25	15	15	15	13	13	16	17	25	19	16	18
GLOBAL OPTIMISM (******)		4.06	3.61	4.06	4.09	3.91	3.41	3.46	3.83	4.05	4.12	4.17	4.23	3.95	3.73	3.42	3.82	3.88	3.83
GLOBAL "DK/NA" (*******)		0.68	1.06	0.67	0.67	0.79	1.24	1.24	0.77	0.73	0.60	0.61	0.58	0.72	0.82	1.22	0.95	0.73	0.87

(*) Means are calculated by applying the coefficients + 1, 0 and -1 to responses "will improve our way of life", "no effect" and "will make things worse" respectively. Th central point is therefore 0. below this point, negative responses predominate, and above this point, positive responses "Don't knows" are excluded from the calculatior

(**) This item was proposed to half of the sample, the other half was asked to evaluate genetic engineering

(***) This item was proposed to half of the sample, the other half was asked to evaluate biotechnology

(****) Quartiles in each country

(*****) Response to the question "Whether you do or you don't follow religious practices, would you say that you are . a) religious ; b) not religious ; c) an agnostic , d) a atheist , e) don't know.
In this table, the "religious" category includes responses a) and the "non religious" category, responses b), c) and d)

(******) Average number of "will improve" responses provided for all the items , this "global optimism with regard to new technologies" varies between 0 and 6

(*******) Average number of "DK/NA" responses provided for all the items , this "global DK/NA with regard to new technologies" varies between 0 and 6

Table 1.3 : Breakdown of level of income (*) among the sample

(EC12 percentages according to various socio-demographic variables : 1993 figures)

		SEX		AGE				AGE AT END OF STUDIES				
		M	F	15-24	25-39	40-54	55+	-16	16-17	18-19	20+	still Stud.
LEVEL OF INCOME	**	20	15	15	21	25	10	8	17	22	32	15
LEVEL OF INCOME	*	21	19	17	24	23	15	16	23	23	23	14
LEVEL OF INCOME		19	17	14	20	16	21	20	22	18	14	11
LEVEL OF INCOME		15	22	18	12	12	30	29	15	13	8	19
DK/NA/REFUSAL		25	27	36	23	24	24	27	23	24	23	41
TOTAL		100	100	100	100	100	100	100	100	100	100	100

		OPINION LEADERSHIP (**)				MEDIA USE (**)				TOTAL EC 12
		++ high	+	-	-- low	+++ high	++	--	--- low	
LEVEL OF INCOME	++	24	22	14	8	21	17	12	10	17
LEVEL OF INCOME	+	21	20	21	18	22	19	19	13	20
LEVEL OF INCOME	-	17	17	19	19	18	18	17	20	18
LEVEL OF INCOME	--	16	15	19	26	16	19	22	24	19
DK/NA REFUSAL		22	26	27	29	23	27	30	33	26
TOTAL		100	100	100	100	100	100	100	100	100

(*) Quartiles in each country
(**) See Appendix 1

Table 2.1 : "Objective" knowledge of biotechnology/genetic engineering

(EC12 percentages and indices (*) for 1993)

(Ranking in decreasing order according to the value of the EC12 index)

QUESTION : 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.

ITEM 1: There are bacteria which live from waste water. (CORRECT ANSWER : TRUE)

ITEM 2: It is possible to find out whether a child will have Down's Syndrome (i.e will be a "mongol"), within the first few months of pregnancy. (CORRECT ANSWER : TRUE)

ITEM 3: Yeast for brewing beer consists of living organisms. (CORRECT ANSWER : TRUE)

ITEM 4: It is possible to change the hereditary characteristics of plants, enabling them to develop their own defence against certain insects. (CORRECT ANSWER : TRUE)

ITEM 5: Children look like their parents because they have the same red blood cells. (CORRECT ANSWER : FALSE)

ITEM 6: Biotechnology/genetic engineering makes it possible to increase the milk production of cows (CORRECT ANSWER : TRUE)

ITEM 7: It is possible to modify bacteria genetically so that they will produce useful substances (CORRECT ANSWER : TRUE)

ITEM 8: There are test tube babies who were developed entirely outside the mother's body. (CORRECT ANSWER : FALSE)

ITEM 9: Most bacteria are harmful to human beings (CORRECT ANSWER : FALSE)

ITEM 10: The cloning of living things produces exactly identical offspring (CORRECT ANSWER : TRUE)

ITEM 11: Genes of all living things on earth are made up of different combinations of only 4 or 5 chemical building blocks (CORRECT ANSWER : TRUE)

ITEM 12: Viruses can be contamined by bacteria (CORRECT ANSWER : FALSE)

0 Index calculated by dividing the percentage of correct answers by the sum of the percentages of incorrect answers and of "DK/NA"

	% CORRECT (A)	% INCORRECT (B)	% DK/NA (C)	INDICES A B+C
ITEM 1	82	3	15	4.55
ITEM 2	75	7	17	3.12
ITEM 3	67	9	24	2.03
ITEM 4	63	7	30	1.70
ITEM 5	62	16	22	1.63
ITEM 6	61	8	31	1.56
ITEM 7	57	8	35	1.32
ITEM 8	36	42	23	0.55
ITEM 9	34	50	16	0.51
ITEM 10	32	18	50	0.47
ITEM 11	24	13	63	0.31
ITEM 12	15	43	42	0.17

Table 2.2 : "Objective" knowledge of biotechnology/genetic engineering - "Elementary" and "thorough" knowledge (National and EC12 indices (*) for 1993)

QUESTION : see table 2.1

		B	DK	D-WEST	D-OST	D-GESAMT	GR	E	EC12
Elementary knowledge (out of 6 points)	Correct	4.03	4.82	4.23	4.21	4.22	3.25	3.60	4.10
	Incorrect	0.57	0.37	0.56	0.52	0.55	0.59	0.45	0.50
	DK/NA	1.37	0.78	1.21	1.24	1.22	2.15	1.94	1.38
Thorough knowledge (out of 6 points)	Correct	1.93	2.51	1.84	1.73	1.82	1.30	1.58	1.97
	Incorrect	1.83	1.45	1.98	1.94	1.98	1.94	1.44	1.74
	DK/NA	2.20	2.00	2.17	2.28	2.19	2.75	2.98	2.28
Global knowledge (out of 12 points)	Correct	5.96	7.34	6.06	5.94	6.04	4.55	5.18	6.07
	Incorrect	2.40	1.83	2.54	2.47	2.53	2.53	1.89	2.24
	DK/NA	3.57	2.78	3.38	3.53	3.41	4.90	4.92	3.66
		F	IRL	1	L	NL	P	UK	EC12
Elementary knowledge (out of 6 points)	Correct	4.35	3.60	3.75	4.25	4.45	2.96	4.60	4.10
	Incorrect	0.40	0.64	0.51	0.43	0.52	0.76	0.48	0.50
	DK/NA	1.25	1.76	1.74	1.32	1.02	2.28	0.88	1.38
Thorough knowledge (out of 6 points)	Correct	2.36	1.76	1.77	2.00	2.47	1.64	2.29	1.97
	Incorrect	1.50	1.98	1.51	1.79	1.76	1.63	2.01	1.74
	DK/NA	2.14	2.26	2.72	2.21	1.77	2.74	1.65	2.28
Global knowledge (out of 12 points)	Correct	6.71	5.36	5.52	6.26	6.93	4.60	6.89	6.07
	Incorrect	1.90	2.62	2.02	2.22	2.28	2.38	2.49	2.24
	DK/NA	3.39	4.02	4.46	3.53	2.79	5.02	2.53	3.66

(*) In this study, "elementary objective knowledge" refers to the knowledge of items 1 ...6 of the question, i.e. items tor which EC12 indices (see Table 2.1) are the highest. As for "thorough objective knowledge", it refers to the knowledge of items 7.. 12 of the question, i.e. items for which EC12 indices (see Table 2.1) are the lowest. Each of these 3 indices referring to these 2 types of "objective knowledge" varies therefore between 0 and 6

Table 2.3 : "Objective" knowledge of biotechnology/genetic engineering - "Elementary" and "thorough" knowledge

(Breakdown of EC12 indices (*) by various socio-demographic and socio-political variables ; 1993 figures)

QUESTION : see table 2.1

		SEX		AGE				AGE AT END OF STUDIES					TOTAL EC 12
		M	F	15-24	25-39	40-54	55+	-16	16-17	18-19	20+	still stud.	
Elementary knowledge (out of 6 points)	Correct	4.25	3.97	4.11	4.34	4.30	3.75	3.55	4.27	4.31	4.70	4.23	4.10
	Incorrect	0.50	0.51	0.61	0.46	0.44	0.51	0.57	0.53	0.47	0.37	0.52	0.50
	DK/NA	1.25	1.51	1.28	1.19	1.26	1.72	1.87	1.20	1.21	0.93	1.24	1.38
Thorough knowledge (out of 6 points)	Correct	2.14	1.81	2.16	2.20	2.06	1.59	1.40	1.98	2.13	2.65	2.37	1.97
	Incorrect	1.72	1.76	1.76	1.74	1.73	1.73	1.80	1.89	1.71	1.52	1.65	1.74
	DK/NA	2.13	2.42	2.07	2.04	2.20	2.66	2.79	2.12	2.13	1.82	1.98	2.28
Global knowledge (out of 12 points)	Correct	6.39	5.78	6.27	6.54	6.36	5.34	4.95	6.24	6.44	7.35	6.60	6.07
	Incorrect	2.21	2.26	2.37	2.20	2.16	2.24	2.37	2.41	2.17	1.89	2.18	2.24
	DK/NA	3.38	3.93	3.35	3.23	3.46	4.38	4.65	3.32	3.34	2.75	3.22	3.66

		LEFT-RIGHT SCALE (**)			OPINION LEADERSHIP (**)				LEVEL OF INCOME (***)				RELIGIOSITY (****)		TOTAL EC 12
		L.	C.	R.	++ high	+	-	-- low	++ high	+	-	-- low	Reli-gious	Non re-ligious	
Elementary knowledge (out of 6 points)	Correct	4.33	4.15	4.21	4.53	4.38	4.00	3.48	4.72	4.34	4.02	3.61	3.94	4.40	4.10
	Incorrect	0.46	0.51	0.50	0.47	0.46	0.50	0.60	0.40	0.49	0.56	0.57	0.53	0.46	0.50
	DK/NA	1.20	1.33	1.28	1.00	1.15	1.49	1.91	0.87	1.16	1.42	1.81	1.52	1.12	1.38
Thorough knowledge (out of 6 points)	Correct	2.25	1.92	2.06	2.34	2.15	1.86	1.55	2.54	2.14	1.89	1.60	1.82	2.24	1.97
	Incorrect	1.70	1.79	1.79	1.75	1.72	1.75	1.75	1.64	1.81	1.80	1.73	1.76	1.72	1.74
	DK/NA	2.04	2.28	2.14	1.89	2.11	2.38	2.69	1.81	2.05	2.30	2.66	2.41	2.02	2.28
Global knowledge (out of 12 points)	Correct	6.57	6.07	6.27	6.87	6.53	5.86	5.03	7.26	6.48	5.91	5.22	5.76	6.64	6.07
	Incorrect	2.16	2.30	2.30	2.22	2.18	2.25	2.35	2.04	2.30	2.36	2.30	2.29	2.18	2.24
	DK/NA	3.24	3.61	3.41	2.89	3.27	3.87	4.59	2.68	3.21	3.71	4.47	3.93	3.15	3.66

(*) In this study, "elementary objective knowledge" refers to the knowledge of items 1...6 of the question, i.e. items for which EC12 indices (see Table 2.1) are the highest. As for "thorough abjective knowledge", it refers to the knowledge of items 7...12 of the question, i.e. items for which EC12 indices (see Table 2.1) are the lowest. Each of these 3 indices referring to these 2 types of "objective knowledge" varies therefore between 0 and 6.

(**) See Appendix 1.

(***) Quartiles in each country.

(****) Response to the question : "Whether you do or you don't follow religious practices, would you say that you are : a) religious ; b) not religious ; c) an agnostic ; d) an atheist; e) don't know.
In this table, the "religious" category includes responses a) and the "non-religious" category, responses b), c) and d).

Table 2.4 : Relationship between "objective" knowledge of biotechnology/genetic engineering and main source of information on "new developments that affect our way of life"

(EC12 indices (*) for 1993)

QUESTIONS: 1) What is normally your main source of information about new developments that affect our way of life ? (see tables 4.1.1 and 4.1.2)
Please select your answer from this list (one answer only).

2) see table 2.1

	KNOWLEDGE		
	ELEMENTARY (out of 6 points)	THOROUGH (out of 6 points)	GLOBAL (out of 12 points)
Courses and lectures	4.84	2.79	7.63
Specialist press	4.80	2.78	7.58
Books	4.63	2.51	7.14
Magazines	4.51	2.35	6.86
Newspapers	4.38	2.16	6.54
Radio	4.22	2.01	6.23
Company brochures and advertisements (**)	4.07	2.00	6.07
Discussions with friends, family, col leagues	3.91	1.96	5.87
Television	3.94	1.79	5.73
Your doctor (**)	3.36	1.74	5.11
Shopkeepers when buying something (**)	3.24	1.31	4.55

(*) see tables 2.2 and 2.3
(**) These indices are calculated from a very small base and are only shown for purely indicative purposes.

Tables 3.1 A and 3.1B : Types of biotechnology/genetic engineering research that are "worthwhile and should be encouraged" - 1991 and 1993 figures

QUESTIONS : I would like to ask your opinion about some examples of biotechnology/genetic engineering research:

1) Let us start with an example concerning plants.
Scientists are trying to use biotechnology/genetic engineering to change plants, in ways that may be quicker or more precise than traditional breeding program's, in order to make the plants more useful.
For example, make them resistant to diseases or pests, make them ripen faster or give them the ability to grow in dry or salty soils.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement : such research on plants is worthwhile and should be encouraged. **(PLANTS)**

2) Here is an example concerning micro-organisms, such as the yeast we use to make bread, or beer, or yoghurt ; or the micro-fungi we use to make medicines such as penicillin.'
Scientists know how to change these micro-organisms through biotechnology/genetic engineering, in order to improve their performance - that means, getting them to work faster or even to produce new products.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement . such research on these micro-organisms is worthwhile and should be encouraged. ("A" MICRO-ORGANISMS)

3) Some of these micro-organisms are used to break down sewage and other waste products and to turn them into materials harmless to the soil
Here again, scientists are trying, through biotechnology/genetic engineering, to improve these micro-organisms ,
They are trying to make them work faster or to make them clean up oil-slicks or other contaminants in the environment
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement such research on these micro-organisms is worthwhile and should be encouraged. ("B" MICRO-ORGANISMS)

4) Another development is the application of biotechnology/genetic engineering to farm animals, to change them in quicker or more precise ways than traditional breeding programs, in order to make them more useful for example, make them resistant to diseases, or grow faster, or produce more or better quality meat or milk
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement . such research on farm animals is worthwhile and should be encouraged (FARM ANIMALS)

5) These news methods of biotechnology/genetic engineering are also being applied to the production and processing of foods. Scientists say that they can improve the quality of food and drink - for example, by making it higher in protein, or lower in fat, or making it keep longer, or taste better.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement : such research on food is worthwhile and should be encouraged. **(FOOD)**

6) Yet another application of biotechnology/genetic engineering is the development of new medicines and vaccines to improve human health, for example the production of human insulin for the treatment of diabetics.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement : such research on medicines and vaccines is worthwhile and should be **encouraged (MEDICINES/VACCINES)**

7) Science is also trying to apply some of the new methods of biotechnology/genetic engineering to human beings, or to their cells and their tissues, for various purposes such as detecting, or curing diseases, and characteristics we might have inherited from our parents
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement : such research on human beings is worthwhile and should be encouraged (HUMAN BEINGS)

A. EC12 percentages and means (*) for 1991 and 1993

	Agree ++		Agree +		Disagree -		Disagree--		DK/NA		TOTAL		Means	
	% 91	% 93	% 91	% 93	% 91	% 93	% 91	% 93	% 91	% 93	% 91	% 93	91	93
PLANTS	41	36	33	34	11	14	7	8	9	8	101	100	+0.98	+0.82
"A" MICRO-ORGANISMS	44	43	34	36	8	9	4	4	10	8	100	100	+1.17	+1.12
"B" MICRO-ORGANISMS	63	58	24	29	3	4	2	3	9	7	101	101	+1.57	+1.45
FARM ANIMALS	21	21	21	23	24	26	24	23	9	7	99	100	-0.10	-0.06
FOOD	29	27	29	31	19	21	13	13	10	8	100	100	+0.47	+0.40
MEDICINES/VACCINES	63	60	25	29	3	4	1	3	7	5	99	101	+1.59	+1.47
HUMAN BEINGS	44	40	30	33	9	11	7	8	10	9	100	101	+1.04	+0.93

B. National and EC12 breakdown of "DK/NA" (%) and means (*1 for 1993

1st column : Means 2nd column : % of DK/NA	B		DK		D-WEST		D-OST		D-GESAMT		GR		E		EC12	
	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?
PLANTS	+1.19	8	+0.84	3	+0.30	8	+0.82	9	+0.40	8	+0.77	8	+1.04	10	+0.82	8
"A" MICRO-ORGANISMS	+1.36	9	+1.08	5	+0.69	8	+1.17	9	+0.79	8	+0.88	12	+1.21	13	+1.12	8
"B" MICRO-ORGANISMS	+1.62	7	+1.60	3	+1.18	6	+1.47	7	+1.24	6	+1.52	12	+1.41	12	+1.45	7
FARM ANIMALS	+0.18	6	-0.22	2	-0.40	7	+0.10	7	-0.30	7	+0.40	8	+0.52	10	-0.06	7
FOOD	+0.84	9	+0.18	3	-0.21	7	+0.27	8	-0.11	7	+0.48	9	+0.84	11	+0.40	8
MEDICINES/VACCINES	+1.66	4	+1.65	1	+1.03	5	+1.48	5	+1.12	5	+1.66	6	+1.53	9	+1.47	5
HUMAN BEINGS	+1.34	7	+1.15	3	+0.22	9	+0.55	8	+0.29	8	+1.31	9	+1.21	13	+0.93	9

1st column : Means 2nd column : % of DK/NA	F		IRL		I		L		NL		P		UK		EC12	
	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?
PLANTS	+1.02	5	+0.92	15	+0.81	9	+0.54	11	+0.85	5	+0.93	17	+1.01	4	+0.82	8
"A" MICRO-ORGANISMS	+1.32	6	+1.13	14	+1.18	10	+0.91	11	+1.27	7	+1.26	17	+1.22	5	+1.12	8
"B" MICRO-ORGANISMS	+1.56	4	+1.45	15	+1.50	9	+1.28	10	+1.60	6	+1.45	13	+1.52	4	+1.45	7
FARM ANIMALS	-0.09	4	+0.14	15	+0.09	9	-0.29	8	-0.58	6	+0.28	13	-0.23	5	-0.06	7
FOOD	+0.52	5	+0.62	14	+0.52	9	+0.12	8	+0.53	7	+0.85	14	+0.43	4	+0.40	8
MEDICINES/VACCINES	+1.62	4	+1.59	8	+1.53	6	+1.53	7	+1.54	5	+1.62	10	+1.60	3	+1.47	5
HUMAN BEINGS	+1.36	4	+1.23	15	+0.87	13	+1.02	8	+1.00	8	+1.40	15	+1.05	5	+0.93	9

(*) These means are calculated by applying the coefficients +2, + 1, -1 and -2 to the responses "definitely agree". "tend to agree", "tend to disagree" and "definitely disagree" respectively The central point is therefore 0 : below this point, negative responses predominate, and above, positive responses. "Don't knows" are excluded from the calculation

Table 3.2 : Types of biotechnology/genetic engineering research that are "worthwhile and should be encouraged

(Breakdown of EC12 means by various socio-demographic and socio-political variables ; 1993 figures)

QUESTION : see tables 3.1A and 3.1B.

		SEX		AGE				AGE AT END OF STUDIES					TOTAL EC 12
		M	F	15-24	25-39	40-54	55+	-16	16-17	18-19	20+	still stud.	
PLANTS	(*)	+0.93	+0.71	+0.89	+0.87	+0.84	+0.71	+0.66	+0.84	+0.84	+0.98	+0.97	+0.82
"A" MICRO-ORGANISMS	(*)	+1.18	+1.07	+1.12	+1.18	+1.13	+1.07	+1.04	+1.09	+1.16	+1.23	+1.18	+1.12
"B" MICRO-ORGANISMS	(*)	+1.50	+1.40	+1.44	+1.51	+1.47	+1.38	+1.35	+1.42	+1.55	+1.55	+1.47	+1.45
FARM ANIMALS	(*)	+0.08	-0.19	+0.02	-0.04	-0.04	-0.15	-0.14	-0.18	-0.05	-0.08	+0.13	-0.06
FOOD	(*)	+0.50	+0.30	+0.49	+0.37	+0.41	+0.36	+0.31	+0.31	+0.51	+0.45	+0.57	+0.40
MEDICINES/VACCINES	(*)	+1.52	+1.43	+1.49	+1.50	+1.48	+1.43	+1.39	+1.42	+1.56	+1.54	+1.55	+1.47
HUMAN BEINGS	(*)	+0.98	+0.89	+0.98	+0.97	+0.96	+0.86	+0.85	+0.90	+0.99	+1.03	+0.98	+0.93
GLOBAL SUPPORT INDICES	(**)	+0.96	+0.80	+0.92	+0.91	+0.89	+0.81	+0.78	+0.83	+0.93	+0.99	+0.98	+0.88
MEANS OF "DK/NA" (%)	(***)	6	9	5	5	7	11	12	6	5	4	5	7

		LEFT-RIGHT SCALE (****)			OPINION LEADERSHIP (****)				LEVEL OF INCOME (*****)				RELIGIOSITY (******)		TOTAL EC 12
		L.	C.	R.	++ high	+	-	-- low	++ high	+	-	-- low	Reli-gious	Non re-ligious	
PLANTS	(*)	+0.80	+0.80	+0.94	+0.86	+0.86	+0.79	+0.76	+1.03	+0.86	+0.75	+0.60	+0.81	+0.86	+0.82
"A" MICRO-ORGANISMS	(*)	+1.12	+1.13	+1.19	+1.14	+1.14	+1.09	+1.10	+1.24	+1.17	+1.11	+0.99	+1.12	+1.14	+1.12
"B" MICRO-ORGANISMS	(*)	+1.42	+1.46	+1.52	+1.54	+1.47	+1.43	+1.36	+1.55	+1.49	+1.41	+1.32	+1.44	+1.47	+1.45
FARM ANIMALS	(*)	-0.09	-0.09	+0.03	-0.02	-0.03	-0.12	-0.07	+0.08	-0.06	-0.11	-0.21	-0.06	-0.07	-0.06
FOOD	(*)	+0.40	+0.37	+0.49	+0.43	+0.38	+0.34	+0.47	+0.51	+0.36	+0.38	+0.28	+0.42	+0.37	+0.40
MEDICINES/VACCINES	(*)	+1.48	+1.47	+1.53	+1.50	+1.47	+1.45	+1.47	+1.55	+1.49	+1.41	+1.40	+1.45	+1.51	+1.47
HUMAN BEINGS	(*)	+0.96	+0.88	+1.02	+0.94	+0.96	+0.85	+0.97	+1.02	+0.96	+0.88	+0.86	+0.92	+0.95	+0.93
GLOBAL SUPPORT INDICES	(**)	+0.87	+0.86	+0.96	+0.91	+0.90	+0.84	+0.87	+1.00	+0.90	+0.83	+0.75	+0.87	+0.89	+0.88
MEANS OF "DK/NA" (%)	(***)	6	6	6	4	5	8	12	3	5	7	12	8	5	7

(*) These means are calculated by applying the coefficients +2, +1, -1 and -2 to the responses "definitely agree", "tend to agree", "tend to disagree" and "definitely disagree" respectively. The central point is therefore 0 : below this point, negative responses predominate, and above, positive responses. "Don't knows" are excluded from the calculation.

(**) Average of the means, i.e. the sum of the averages "PLANTS", ""A"MICRO-ORGANISMS", ... and "HUMAN BEINGS", divided by 7.

(***) Means of the "DK/NA" percentages registered for items "PLANTS", ""A" MICRO-ORGANISMS", ... and "HUMAN BEINGS".

(****) See Appendix 1.

(*****) Quartiles in each country.

(******) Response to the question : "Whether you do or you don't follow religious practices, would you say that you are : a) religious ; b) not religious ; c) an agnostic; d) an atheist; e) don't know.
In this table, the "religious" category includes responses a) and the "non-religious" category, responses b), c) and d).

Table 3.3 : Opinion on the application of biotechnology/genetic engineering to animals (National and EC12 percentages for 1991 and 19931

QUESTION : Scientists can apply biotechnology/genetic engineering to animals to develop life-saving drugs, or 10 study human diseases. Animal protection is guaranteed by law and some people say it is morally wrong to apply biotechnology/genetic engineering to animals. Which of the following is closest to your personal opinion ?

ITEM 1: Applying biotechnology/genetic engineering to animals is morally acceptable, provided that the animals' welfare is safeguarded.

ITEM 2: It is acceptable for the development of life-saving drugs, even at the cost of some animal suffering.

ITEM 3: Public authorities should examine this application of biotechnology/genetic engineering case by case before deciding whether to allow it.

ITEM 4: Applying biotechnology/genetic engineering to animals is morally unacceptable and should be banned by public law.

	B		OK		D-WEST		D-OST		D-GESAMT		GR		E		EC 12	
	91	93	91	93	91	93	91	93	91	93	91	93	91	93	91	93
ITEM 1	39	37	35	31	29	30	41	39	32	32	45	30	39	46	31	32
ITEM 2	16	15	12	It	12	12	12	13	12	12	20	21	14	16	13	14
ITEM 3	20	27	34	34	27	26	30	28	28	26	12	26	19	16	28	28
ITEM 4	21	16	16	19	25	29	13	15-	22	26	12	13	13	11	20	20
DK/NA	5	5	4	2	6	4	5	5	6	4	12	11	14	11	9	6
TOTAL	101	100	101	100	99	101	101	100	100	100	101	101	99	100	101	100

	f		IRL		I		L		NL		P		UK		EC 12	
	91	93	91	93	91	93	91	93	91	93	91	93	91	93	91	93
ITEM 1	32	35	35	32	16	17	25	34	31	27	41	44	33	33	31	32
ITEM 2	7	8	11	11	17	20	12	15	11	14	6	16	12	13	13	14
ITEM 3	25	30	23	23	40	37	25	23	34	35	15	17	27	27	28	28
ITEM 4	26	22	18	18	19	18	28	26	17	18	8	11	22	24	20	20
DK/NA	9	6	14	16	8	8	11	3	7	5	30	11	6	3	9	6
TOTAL	99	101	101	100	100	100	101	101	100	99	100	99	100	100	101	100

Tables 3.4A and 3.4B : Biotechnology/genetic engineering and one's personal philosophy of life ;

1993 figures

QUESTION : I am going to read you a few statements. For each of them, please tell me whether you definitely agree, tend to agree, tend to disagree or definitely disagree

ITEM 1: Only traditional breeding methods should be used, rather than changing the hereditary characteristics of plants or animals through biotechnology/genetic engineering

ITEM 2: One should look for a balance between animal welfare and human welfare.

ITEM 3: If we do not protect the natural environment, human beings will not be able to survive in the future

ITEM 4: Traditional breeding methods can be as effective as biotechnology/genetic engineering, in changing hereditary characteristics of plants and animals.

A. EC12 percentages and means (*)

	Agree ++ (%)	Agree + (%)	Disagree - (%)	Disagree -- (%)	DK/NA (%)	TOTAL (%)	Means
ITEM 1	35	28	20	6	11	100	+0.73
ITEM 2	63	28	3	1	5	100	+1.57
ITEM 3	71	20	3	1	4	99	+1.64
ITEM 4	30	26	17	6	20	99	+0.71

B. National and EC12 breakdown of "DK/NA" (%) and means (*)

1st column : Means 2nd column : % of DK/NA	B		DK		D-WEST		D-OST		D-GESAMT		GR		E		EC12	
	Mean?		Mean	?	Mean	?	Mean?'		Mean	?	Mean?		Mean?		Mean	?
ITEM 1	+0.37	13	+0.78	4	+1.01	7	+0.74	9	+0.96	8	+0.98	16	+0.33	24	+0.73	11
ITEM 2	+1.52	5	+1.80	2	+1.55	2	+1.53	4	+1.55	3	+1.85	8	+1.47	10	+1.57	5
ITEM 3	+1.59	6	+1.70	2	+1.61	3	+1.77	2	+1.65	3	+1.94	4	+1.64	8	+1.64	4
ITEM 4	+0.43	24	+0.49	10	+1.02	14	+1.00	13	+1.01	14	+0.50	27	+0.59	33	+0.71	20

1st column : Means 2nd column : % of DK/NA	F		IRL		1		L		NL		P		UK		EC12	
	Mean	?	Mean	?	Mean	?	Mean?		Mean	?	Mean	?	Mean	?	Mean	?
ITEM 1	+0.75	11	+0.83	18	+0.77	12	+0.91	10	+0.29	11	+0.47	22	+0.70	6	+0.73	11
ITEM 2	+1.62	4	+1.47	11	+1.68	6	+1.56	5	+1.52	4	+1.66	13	+1.43	3	+1.57	5
ITEM 3	+1.69	4	+1.60	9	+1.70	6	+1.75	4	+1.44	5	+1.69	11	+1.51	3	+1.64	4
ITEM 4	+0.62	22	+0.86	25	+0.59	23	+0.58	22	+0.22	22	+0.61	31	+0.77	15	+0.71	20

(') These means are calculated by applying the coefficients +2, +1, -1 and -2 to the responses "definitely agree", "tend to agree", "tend to disagree" and "definitely disagree" respectively The central point is therefore 0 : below this point, negative responses predominate, and above, positive responses "Don't knows" are excluded from the calculation

Tables 3.5A and 3.5.B : Types of biotechnology/genetic engineering research that "may involve risks to human health or to the environment" - 1991 and 1993 figures

QUESTIONS : I would like to ask your opinion about some examples of biotechnology/genetic engineering research:

1) Let us start with an example concerning plants
Scientists are trying to use biotechnology/genetic engineering to change plants, in ways that may be quicker or more precise than traditional breeding program's, in order to make the plants more useful.
For example, make them resistant to diseases or pests, make them ripen faster or give them the ability to grow in dry or salty soils.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement . such research on plants may involve risks to human health or to the environment. **(PLANTS)**

2) Here is an example concerning micro-organisms, such as the yeast we use to make bread, or beer, or yoghurt ; or the micro-fungi we use to make medicines such as penicillin.
Scientists know how to change these micro-organisms through biotechnology/genetic engineering, in order to improve their performance - that means, getting them to work faster or even to produce new products.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement • such research on these micro-organisms may involve risks to human health or to the environment ("A" MICRO-ORGANISMS)

3) Some of these micro-organisms are used to break down sewage and other waste products and to turn them into materials harmless to the soil
Here again, scientists are trying, through biotechnology/genetic engineering, to improve these micro-organisms
They are trying to make them work faster or to make them clean up oil-slicks or other contaminants in the environment
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement such research on these micro-organisms may involve risks to human health or to the environment ("B" MICRO-ORGANISMS)

4) Another development is the application of biotechnology/genetic engineering to farm animals, to change them in quicker or more precise ways than traditional breeding programs, in order to make them more useful for example, make them resistant to diseases, or grow faster, or produce more or better quality meat or milk
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement such research on farm animals may involve risks to human health or to the environment (FARM ANIMALS)

5) These news methods of biotechnology/genetic engineering are also being applied to the production and processing of foods Scientists say thai they can improve the quality of food and drink - for example, by making it higher in protein, or lower in (at, or making it keep longer, or taste better.
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement . such research on food may involve risks to human health or to the environment. **(FOOD)**

6) Yet another application of biotechnology/genetic engineering is the development of new medicines and vaccines to improve human health, (or example the production of human insulin for the treatment of diabetics
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement • such research on medicines and vaccines may involve risks to human health or to the environment. (MEDICINES/VACCINES)

7) Science is also trying to apply some of the new methods of biotechnology/genetic engineering to human beings, or to their cells and their tissues, for various purposes such as detecting, or curing diseases, and characteristics we might have inherited from our parents
' Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement • such research on human beings may involve risks to human health or to the environment (HUMAN BEINGS)

A. EC12 percentages and means (*) for 1991 and 1993

	Agree ++		Agree +		Disagree -		Disagree--		DK/NA		TOTAL		Means	
	% 91	% 93	% 91	% 93	% 91	% 93	% 91	% 93	% 91	% 93	% 91	% 93	91	93
PLANTS	23	24	34	34	20	21	8	7	16	14	101	100	+0.50	+0.56
"A" MICRO-ORGANISMS	20	21	34	34	21	23	8	7	18	15	101	100	+0.45	+0.48
"B" MICRO-ORGANISMS	19	20	30	31	22	25	12	9	17	15	100	100	+0.24	+0.33
FARM ANIMALS	35	33	33	34	13	16	6	7	14	11	101	101	+0.91	+0.81
FOOD	27	27	35	35	17	19	7	6	15	13	101	100	+0.67	+0.67
MEDICINES/VACCINES	19	21	29	30	23	26	13	10	16	14	100	101	+0.21	+0.30
HUMAN BEINGS	26	27	32	34	17	18	8	7	17	14	100	100	+0.61	+0.65

B. National and EC12 breakdown of "DK/NA" (%) and means (*) for 1993

1st column : Means 2nd column : % of DK/NA	B		DK		D-WEST		D-OST		D-GESAMT		GR		E		EC12	
	Means	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?
PLANTS	+0.25	17	+1.06	6	+1.03	10	+0.70	11	+0.96	10	+1.06	15	+0.25	24	+0.56	14
"A" MICRO-ORGANISMS	+0.39	18	+1.09	8	+0.89	11	+0.57	11	+0.82	11	+0.97	17	+0.17	26	+0.48	15
"B" MICRO-ORGANISMS	+0.17	16	+0.91	8	+0.62	12	+0.38	12	+0.57	12	+0.52	25	+0.20	26	+0.33	15
FARM ANIMALS	+0.82	11	+1.15	6	+1.19	8	+0.88	10	+1.13	8	+1.12	13	+0.50	19	+0.81	11
FOOD	+0.67	15	+1.21	7	+1.13	8	+0.87	10	+1.08	9	+1.09	14	+0.38	22	+0.67	13
MEDICINES/VACCINES	+0.25	15	+0.92	9	+0.84	10	+0.49	10	+0.77	10	+0.17	17	-0.02	22	+0.30	14
HUMAN BEINGS	+0.65	15	+1.21	7	+1.12	11	+0.90	11	+1.07	11	+0.49	18	+0.25	25	+0.65	14
1st colunn : Means 2nd column : %of DK/NA	F		IRL		I		L		NL		P		UK		EC12	
	Mean	?	Mean	?	Mean?		Mean	?	Mean?		Mean	?	Mean?		Mean	?
PLANTS	+0.43	11	+0.54	19	+0.37	18	+0.88	13	+0.64	11	+0.70	21	+0.34	9	+0.56	14
"A" MICRO-ORGANISMS	+0.37	13	+0.52	19	+0.12	19	+0.93	15	+0.69	12	+0.66	24	+0.37	10	+0.48	15
"B" MICRO-ORGANISMS	+0.28	13	+0.50	22	-0.10	19	+0.60	16	+0.39	13	+0.48	22	+0.40	10	+0.33	15
FARM ANIMALS	+0.83	8	+0.84	17	+0.52	16	+1.00	11	+1.07	10	+0.94	17	+0.59	7	+0.81	11
FOOD	+0.60	11	+0.60	19	+0.39	17	+1.01	12	+0.68	14	+0.73	20	+0.45	8	+0.67	13
MEDICINES/VACCINES	-0.01	13	+0.45	18	-0.15	18	+0.59	15	+0.57	13	+0.57	22	+0.37	9	+0.30	14
HUMAN BEINGS	+0.35	12	+0.74	21	+0.35	19	+0.82	14	+0.82	12	+0.76	22	+0.69	9	+0.65	14

(*) These means are calculated by applying the coefficients +2, + 1, -1 and -2 to the responses "definitely agree", "tend to agree", "tend to disagree" and "definitely disagree" respectively The central point is therefore 0 : below this point, negative responses predominate, and above, positive responses. "Don't knows" are excluded from the calculation

Table 3.6 : Types of biotechnology/genetic engineering research that "may involve risks to human health or to the environment"

(Breakdown of EC12 means by various socio-demographic and socio-political variables ; 1993 figures)

QUESTION : see tables 3.5A and 3.5B.

		SEX		AGE				AGE AT END OF STUDIES					TOTAL EC 12
		M	F	15-24	25-39	40-54	55+	-16	16-17	18-19	20+	still stud.	
PLANTS	(*)	+0.53	+0.59	+0.49	+0.49	+0.59	+0.66	+0.66	+0.56	+0.56	+0.48	+0.41	+0.56
"A" MICRO-ORGANISMS	(*)	+0.50	+0.46	+0.37	+0.44	+0.52	+0.55	+0.57	+0.45	+0.49	+0.43	+0.34	+0.48
"B" MICRO-ORGANISMS	(*)	+0.33	+0.33	+0.30	+0.30	+0.34	+0.37	+0.41	+0.36	+0.30	+0.26	+0.22	+0.33
FARM ANIMALS	(*)	+0.76	+0.85	+0.65	+0.80	+0.85	+0.87	+0.86	+0.83	+0.84	+0.79	+0.61	+0.81
FOOD	(*)	+0.65	+0.69	+0.55	+0.68	+0.71	+0.73	+0.75	+0.69	+0.62	+0.62	+0.58	+0.67
MEDICINES/VACCINES	(*)	+0.33	+0.28	+0.28	+0.29	+0.33	+0.29	+0.35	+0.33	+0.25	+0.25	+0.25	+0.30
HUMAN BEINGS	(*)	+0.67	+0.62	+0.62	+0.61	+0.66	+0.68	+0.68	+0.63	+0.64	+0.61	+0.64	+0.65
GLOBAL INDICES OF RISK	(**)	+0.54	+0.55	+0.46	+0.52	+0.58	+0.60	+0.61	+0.55	+0.53	+0.49	+0.43	+0.54
MEANS OF "DK/NA" (%)	(***)	12	15	11	11	13	18	18	12	11	10	10	14

		LEFT-RIGHT SCALE (****)			OPINION LEADERSHIP (****)				LEVEL OF INCOME (*****)				RELIGIOSITY (******)		TOTAL EC 12
		L.	C.	R.	++ high	+	-	-- low	++ high	+	-	-- low	Reli-gious	Non re-ligious	
PLANTS	(*)	+0.62	+0.55	+0.42	+0.61	+0.55	+0.55	+0.56	+0.45	+0.50	+0.63	+0.65	+0.56	+0.54	+0.56
"A" MICRO-ORGANISMS	(*)	+0.51	+0.45	+0.40	+0.50	+0.49	+0.48	+0.43	+0.41	+0.42	+0.43	+0.62	+0.48	+0.46	+0.48
"B" MICRO-ORGANISMS	(*)	+0.39	+0.25	+0.28	+0.35	+0.30	+0.31	+0.39	+0.24	+0.27	+0.30	+0.44	+0.33	+0.33	+0.33
FARM ANIMALS	(*)	+0.85	+0.82	+0.69	+0.84	+0.81	+0.82	+0.76	+0.77	+0.82	+0.82	+0.87	+0.81	+0.81	+0.81
FOOD	(*)	+0.73	+0.66	+0.56	+0.69	+0.67	+0.72	+0.62	+0.64	+0.67	+0.67	+0.77	+0.67	+0.68	+0.67
MEDICINES/VACCINES	(*)	+0.35	+0.24	+0.26	+0.31	+0.31	+0.30	+0.28	+0.27	+0.29	+0.28	+0.33	+0.28	+0.33	+0.30
HUMAN BEINGS	(*)	+0.66	+0.65	+0.63	+0.69	+0.66	+0.69	+0.54	+0.63	+0.64	+0.66	+0.66	+0.64	+0.65	+0.65
GLOBAL INDICES OF RISK	(**)	+0.59	+0.52	+0.47	+0.57	+0.54	+0.56	+0.51	+0.49	+0.52	+0.54	+0.62	+0.54	+0.54	+0.54
MEANS OF "DK/NA" (%)	(***)	12	12	13	9	11	14	20	8	10	12	19	15	10	14

(*) These means are calculated by applying the coefficients +2, +1, -1 and -2 to the responses "definitely agree", "tend to agree", "tend to disagree" and "definitely disagree" respectively. The central point is therefore 0 : below this point, negative responses predominate, and above,positive responses. "Don't knows" are excluded from the calculation.

(**) Average of the means, i.e. the sum of the averages "PLANTS", ""A"MICRO-ORGANISMS", .. and "HUMAN BEINGS", divided by 7.

(***) Means of the "DK/NA" percentages registered for items "PLANTS", ""A" MICRO-ORGANISMS", ... and "HUMAN BEINGS".

(****) See Appendix 1.

(*****) Quartiles in each country.

(******) Response to the question : "Whether you do or you don't follow religious practices, would you say that you are : a) religious ; b) not religious ; c) an agnostic; d) an atheist; e) don't know.
In this table, the "religious" category includes responses a) and the "non-religious" category, responses b), c) and d).

Tables 3.7A and 3.7B : Types of biotechnology/genetic engineering research that "need to be controlled by the government" - 1991 and 1993 figures

QUESTIONS 1 would like to ask your opinion about some examples of biotechnology/genetic engineering research

1) Let us start with an example concerning plants
Scientists are trying to use biotechnology/genetic engineering to change plants, in ways that may be quicker or more precise than traditional breeding programms, in order to make the plants more useful
For example, make them resistant to diseases or pests, make them ripen faster or give them the ability to grow in dry or salty soils
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement such research on plants needs to be controlled by the government **(PLANTS)**

2) Here is an example concerning micro-organisms, such as the yeast we use to make bread, or beer, or yoghurt , or the micro-fungi we use to make medicines such as penicillin
Scientists know how to change these micro-organisms through biotechnology/genetic engineering, in order to improve their performance - that means, getting them to work faster or even to produce new products
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement such research on these micro-organisms needs to be controlled by the government ("A" MICRO-ORGANISMS)

3) Some of these micro-organisms are used to break down sewage and other waste products and to turn them into materials harmless to the soil
Here again, scientists are trying, through biotechnology/genetic engineering, to improve these micro-organisms
They are trying to make them work faster or to make them clean up oil-slicks or other contaminants in the environment
Please indicate whether you definitely agree tend to agree, tend to disagree, or definitely disagree with the following statement such research on these micro-organisms needs to **be** controlled by the **government** ("B" **MICRO-ORGANISMS)**

4) Another development is the application of biotechnology/genetic engineering to farm animals, to change them in quicker or more precise ways than traditional breeding programs, in order to make them more useful for example, make them resistant to diseases, or grow faster, or produce more or better quality meat or milk
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement such research on farm animals needs to be controlled by the government (FARM ANIMALS)

5) These news methods of biotechnology/genetic engineering are also being applied to the production and processing of foods Scientists say that they can improve the quality of food and drink - for example, by making it higher in protein, or lower in fat. or making it keep longer, or taste better
Please indicate whether you definitely agree tend to agree tend to disagree, or definitely disagree with the following statement such research on food needs to be controlled by the government **(FOOD)**

6) Yet another application of biotechnology/genetic engineering is the development of new medicines and vaccines to improve human health, for example the production of human insulin for the treatment of diabetics
Please indicate whether you definitely agree, tend to agree tend to disagree, or definitely disagree with the following statement such research on medicines and vaccines needs to be controlled by the government (MEDICINES/VACCINES)

7) Science is also trying to apply some of the new methods of biotechnology/genetic engineering to human beings, or to their cells and their tissues for various purposes such as detecting, or curing diseases, and Characteristics we might have inherited from our parents
Please indicate whether you definitely agree, tend to agree, tend to disagree, or definitely disagree with the following statement such research on human beings needs to be controlled by the government **(HUMAN BEINGS)**

A. EC12 percentages and means (*) for 1991 and 1993

	Agree ++		Agree +		Disagree -		Disagree--		DK/NA		TOTAL		Means	
	% 91	% 93	% 91	% 93	% 91	% 93	%91	% 93	% 91	% 93	%91	% 93	91	93
PLANTS	60	57	22	27	5	7	3	3	9	7	99	101	+1.44	+1.36
"A" MICRO-ORGANISMS	61	57	22	27	5	7	3	3	9	7	100	101	+1.45	+1.36
"B" MICRO-ORGANISMS	62	57	22	26	5	6	3	3	8	7	100	99	+1.48	+1.38
FARM ANIMALS	68	63	17	23	4	5	3	4	8	6	100	101	+1.56	+1.44
FOOD	64	60	20	25	4	5	3	3	9	7	100	100	+1.52	+1.43
MEDICINES/VACCINES	68	63	19	24	3	5	2	3	8	6	100	101	+1.58	+1.47
HUMAN BEINGS	68	63	17	22	4	4	3	3	9	7	101	99	+1.59	+1.49

B. National and EC12 breakdown of "DK/NA" (%) and means (*) for 1993

1st column : Means 2nd column : X of DK/NA	B		DK		D-WEST		D-OST		D-GESAMT		GR		E		EC12	
	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?
PLANTS	+1.15	8	+1.74	2	+1.59	5	+1.64	7	+1.60	5	+1.52	9	+1.18	13	+1.36	7
"A" MICRO-ORGANISMS	+1.19	7	+1.73	3	+1.56	4	+1.58	6	+1.57	5	+1.51	10	+1.17	13	+1.36	7
"B" MICRO-ORGANISMS	+1.17	7	+1.72	2	+1.48	5	+1.58	6	+1.50	5	+1.49	11	+1.25	13	+1.38	7
FARM ANIMALS	+1.39	6	+1.78	1	+1.58	4	+1.67	5	+1.60	4	+1.53	7	+1.24	12	+1.44	6
FOOD	+1.39	7	+1.77	2	+1.61	5	+1.67	6	+1.62	5	+1.54	9	+1.25	13	+1.43	7
MEDICINES/VACCINES	+1.34	7	+1.80	1	+1.60	4	+1.69	4	+1.62	4	+1.58	7	+1.34	11	+1.47	6
HUMAN BEINGS	+1.45	8	+1.85	2	+1.63	5	+1.69	6	+1.64	5	+1.59	9	+1.36	13	+1.49	7
1st column : Means 2nd column : X of DK/NA	F		1RL		I		L		NL		P		UK		EC12	
	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	?	Mean	7
PLANTS	+1.38	4	+1.29	11	+1.26	10	+1.58	7	+1.63	4	+1.10	18	+1.14	5	+1.36	7
"A" MICRO-ORGANISMS	+1.41	4	+1.31	12	+1.23	10	+1.57	7	+1.65	4	+1.09	18	+1.20	5	+1.36	7
"B" MICRO-ORGANISMS	+1.45	4	+1.35	12	+1.28	9	+1.62	7	+1.65	4	+1.12	16	+1.25	4	+1.38	7
FARM ANIMALS	+1.51	3	+1.46	12	+1.26	9	+1.57	6	+1.76	5	+1.18	14	+1.38	4	+1.44	6
FOOD	+1.46	4	+1.38	,12	+1.28	9	+1.61	7	+1.72	6	+1.14	15	+1.30	4	+1.43	7
MEDICINES/VACCINES	+1.57	3	+1.47	8	+1.31	8	+1.69	6	+1.73	5	+1.15	14	+1.37	3	+1.47	6
HUMAN BEINGS	+1.55	3	+1.46	11	+1.27	10	+1.66	6	+1.75	6	+1.23	15	+1.41	4	+1.49	7

(*) These means are calculated by applying the coefficients +2, + 1, -1 and -2 to the responses "definitely agree*, "tend to agree", "tend to disagree" and "definitely disagree" respectively. The central point is therefore 0 : below this point, negative responses predominate, and above, positive responses. "Don't knows" are excluded from the calculation.

Table 3.8 : Types of biotechnology/genetic engineering research that "need to be controlled by the government" -

(Breakdown of EC12 means by various socio-demographic and socio-political variables ; 1993 figures)

QUESTION : see tables 3.7A and 3.7B.

		SEX		AGE				AGE AT END OF STUDIES					TOTAL EC 12
		M	F	15-24	25-39	40-54	55+	-16	16-17	18-19	20+	still stud.	
PLANTS	(*)	+1.34	+1.37	+1.21	+1.31	+1.43	+1.45	+1.42	+1.38	+1.35	+1.33	+1.21	+1.36
"A" MICRO-ORGANISMS	(*)	+1.35	+1.38	+1.20	+1.29	+1.45	+1.46	+1.42	+1.38	+1.35	+1.36	+1.19	+1.36
"B" MICRO-ORGANISMS	(*)	+1.36	+1.39	+1.24	+1.33	+1.44	+1.46	+1.43	+1.40	+1.38	+1.35	+1.23	+1.38
FARM ANIMALS	(*)	+1.42	+1.47	+1.30	+1.44	+1.51	+1.49	+1.44	+1.48	+1.48	+1.47	+1.31	+1.44
FOOD	(*)	+1.41	+1.45	+1.27	+1.41	+1.48	+1.51	+1.46	+1.45	+1.45	+1.43	+1.28	+1.43
MEDICINES/VACCINES	(*)	+1.46	+1.49	+1.36	+1.45	+1.54	+1.52	+1.47	+1.51	+1.52	+1.49	+1.34	+1.47
HUMAN BEINGS	(*)	+1.48	+1.49	+1.33	+1.47	+1.56	+1.55	+1.51	+1.53	+1.49	+1.50	+1.33	+1.49
GLOBAL INDICES OF CONTROL	(**)	+1.40	+1.43	+1.27	+1.39	+1.49	+1.49	+1.45	+1.45	+1.43	+1.42	+1.27	+1.42
MEANS OF "DK/NA" (%)	(***)	5	8	6	4	6	10	11	5	5	3	5	7

		LEFT-RIGHT SCALE (****)			OPINION LEADERSHIP (****)				LEVEL OF INCOME (*****)				RELIGIOSITY (******)		TOTAL EC 12
		L.	C.	R.	++ high	+	-	-- low	++ high	+	-	-- low	Religious	Non religious	
PLANTS	(*)	+1.39	+1.35	+1.30	+1.43	+1.37	+1.38	+1.26	+1.30	+1.36	+1.38	+1.41	+1.37	+1.35	+1.36
"A" MICRO-ORGANISMS	(*)	+1.39	+1.37	+1.31	+1.43	+1.36	+1.41	+1.27	+1.29	+1.37	+1.37	+1.43	+1.36	+1.35	+1.36
"B" MICRO-ORGANISMS	(*)	+1.38	+1.38	+1.33	+1.43	+1.37	+1.42	+1.31	+1.28	+1.38	+1.40	+1.44	+1.38	+1.38	+1.38
FARM ANIMALS	(*)	+1.47	+1.45	+1.42	+1.53	+1.45	+1.46	+1.37	+1.43	+1.47	+1.44	+1.47	+1.43	+1.46	+1.44
FOOD	(*)	+1.45	+1.45	+1.39	+1.47	+1.43	+1.48	+1.35	+1.39	+1.47	+1.39	+1.47	+1.42	+1.43	+1.43
MEDICINES/VACCINES	(*)	+1.50	+1.48	+1.43	+1.55	+1.47	+1.49	+1.41	+1.45	+1.45	+1.47	+1.52	+1.47	+1.48	+1.47
HUMAN BEINGS	(*)	+1.52	+1.48	+1.48	+1.55	+1.49	+1.53	+1.40	+1.47	+1.51	+1.46	+1.53	+1.47	+1.51	+1.49
GLOBAL INDICES OF CONTROL	(**)	+1.44	+1.42	+1.38	+1.48	+1.42	+1.45	+1.34	+1.37	+1.43	+1.41	+1.47	+1.42	+1.42	+1.42
MEANS OF "DK/NA" (%)	(***)	5	5	6	4	5	7	11	3	5	5	11	8	5	7

(*) These means are calculated by applying the coefficients +2, +1, -1 and -2 to the responses "definitely agree", "tend to agree", "tend to disagree" and "definitely disagree" respectively. The central point is therefore 0 : below this point, negative responses predominate, and above, positive responses. "Don't knows" are excluded from the calculation.

(**) Average of the means, i.e. the sum of the averages "PLANTS", ""A"MICRO-ORGANISMS", ... and "HUMAN BEINGS", divided by 7.

(***) Means of the "DK/NA" percentages registered for items "PLANTS", ""A" MICRO-ORGANISMS", ... and "HUMAN BEINGS".

(****) See Appendix 1.

(*****) Quartiles in each country.

(******) Response to the question : "Whether you do or you don't follow religious practices, would you say that you are : a) religious ; b) not religious ; c) an agnostic; d) an atheist; e) don't know.
In this table, the "religious" category includes responses a) and the "non-religious" category, responses b), c) and d).

Tables 3.9A and 3.9B : Biotechnology/genetic engineering - Ethics and control ; 1993 figures

QUESTION : I am going to read you a few statements. For each of them, please tell me whether you definitely agree, tend to agree, tend to disagree or definitely disagree.

There should be clear ethical rules indicating when biotechnology/genetic engineering may not in any way be applied to human beings. **(HUMAN BEINGS)**

There should be clear ethical rules indicating when biotechnology/genetic engineering may not in any way be applied to animals. **(ANIMALS)**

There should be clear ethical rules indicating when biotechnology/genetic engineering may not in any way be applied to plants. (PLANTS)

A. EC12 percentages and means (*)

	Agree ++ (%)	Agree + (%)	Disagree - (%)	Disagree -- (%)	DK/NA (%)	TOTAL (%)	Means
HUMAN BEINGS	72	19	2	1	6	100	+1.68
ANIMALS	62	26	5	2	6	101	+1.52
PLANTS	45	30	13	5	7	100	+1.07

B. National and EC12 breakdown of "DK/NA" (%) and means (*)

1st column : Means 2nd column : % of DK/NA	B Mean ?	DK Mean ?	D-WEST Mean ?	D-OST Mean ?	D-GESAMT Mean ?	GR Mean ?	E Mean ?	EC12 Mean ?
HUMAN BEINGS	+1.68 6	+1.89 1	+1.72 1	+1.86 3	+1.75 2	+1.83 12	+1.59 13	+1.68 6
ANIMALS	+1.32 6	+1.82 1	+1.59 2	+1.68 3	+1.61 2	+1.72 12	+1.35 12	+1.52 6
PLANTS	+0.38 11	+1.41 2	+1.29 3	+1.38 5	+1.31 3	+1.55 12	+1.08 14	+1.07 7

1st column : Means 2nd column : % of DK/NA	F Mean ?	IRL Mean ?	I Mean ?	L Mean ?	NL Mean ?	P Mean ?	UK Mean ?	EC12 Mean ?
HUMAN BEINGS	+1.68 5	+1.69 10	+1.67 7	+1.78 6	+1.68 4	+1.44 15	+1.66 3	+1.68 6
ANIMALS	+1.48 6	+1.55 12	+1.49 7	+1.62 5	+1.57 5	+1.21 14	+1.56 3	+1.52 6
PLANTS	+0.98 7	+1.09 14	+1.19 9	+1.33 6	+0.88 7	+0.98 16	+0.75 6	+1.07 7

(*) These means are calculated by applying the coefficients +2, + 1, -1 and -2 to the responses "definitely agree", "tend to agree", "tend to disagree" and "definitely disagree" respectively. The central point is therefore 0 : below this point, negative responses predominate, and above, positive responses. "Don't knows" are excluded from the calculation

Table 3.10 : Biotechnology/genetic engineering - Ethics and control

(Breakdown of EC12 means by various socio-demographic and socio-political variables ; 1993 figures)

QUESTION : see tables 3.9A and 3.98.

		SEX		AGE				AGE AT END OF STUDIES					TOTAL EC 12
		M	F	15-24	25-39	40-54	55+	-16	16-17	18-19	20+	still stud.	
HUMAN BEINGS	(*)	+1.66	+1.71	+1.60	+1.69	+1.70	+1.72	+1.68	+1.66	+1.74	+1.72	+1.60	+1.68
ANIMALS	(*)	+1.47	+1.57	+1.47	+1.51	+1.55	+1.53	+1.54	+1.51	+1.57	+1.49	+1.46	+1.52
PLANTS	(*)	+1.00	+1.13	+0.93	+1.01	+1.14	+1.16	+1.15	+1.06	+1.10	+1.02	+0.90	+1.07
GLOBAL MEANS	(**)	+1.38	+1.47	+1.33	+1.41	+1.47	+1.47	+1.46	+1.41	+1.47	+1.41	+1.32	+1.43
MEANS OF "DK/NA" (%)	(***)	5	7	3	4	6	10	11	5	3	3	3	6

		LEFT-RIGHT SCALE (****)			OPINION LEADERSHIP (****)				LEVEL OF INCOME (*****)				RELIGIOSITY (******)		TOTAL EC 12
		L.	C.	R.	++ high	+	-	-- low	++ high	+	-	-- low	Reli-gious	Non re-ligious	
HUMAN BEINGS	(*)	+1.68	+1.70	+1.68	+1.75	+1.68	+1.72	+1.61	+1.74	+1.73	+1.68	+1.64	+1.69	+1.67	+1.68
ANIMALS	(*)	+1.53	+1.53	+1.50	+1.51	+1.52	+1.56	+1.49	+1.53	+1.55	+1.53	+1.51	+1.52	+1.52	+1.52
PLANTS	(*)	+1.07	+1.09	+0.97	+1.15	+1.02	+1.13	+1.03	+0.99	+1.08	+1.13	+1.13	+1.12	+0.99	+1.07
GLOBAL MEANS	(**)	+1.43	+1.44	+1.38	+1.47	+1.41	+1.47	+1.38	+1.42	+1.46	+1.45	+1.43	+1.45	+1.40	+1.43
MEANS OF "DK/NA" (%)	(***)	5	5	6	4	4	6	12	2	4	6	10	8	4	6

(*) These means are calculated by applying the coefficients +2, +1, -1 and -2 to the responses "definitely agree", "tend to agree", "tend to disagree" and "definitely disagree" respectively. The central point is therefore 0 : below this point, negative responses predominate, and above, positive responses. "Don't knows" are excluded from the calculation.

(**) Average of the means, i.e. the sum of the averages "PLANTS", ""A"MICRO-ORGANISMS", ... and "HUMAN BEINGS", divided by 7.

(***) Means of the "DK/NA" percentages registered for items "PLANTS", ""A" MICRO-ORGANISMS", ... and "HUMAN BEINGS".

(****) See Appendix 1.

(*****) Quartiles in each country.

(******) Response to the question : "Whether you do or you don't follow religious practices, would you say that you are : a) religious ; b) not religious ; c) an agnostic; d) an atheist; e) don't know.
In this table, the "religious" category includes responses a) and the "non-religious" category, responses b), c) and d).

Table 4.1.1 : Information sources on new developments affecting our way of life

(National and EC12 percentages : 1991 figures!

QUESTIONS: A) What is normally your main source of information about new developments that affect our way of life ?
Please select your answer from this list (one answer only)

B) And which are your other sources of information ?
Please select your answer from this list (several answers possible).

Books
Newspapers
Magazines
Specialist press
Radio
Television
Company brochures and advertisements
Discussions with friends, family, colleagues
Your doctor
Courses and lectures
Shopkeepers when buying something

1st column : Question A 2nd column : Question A + Question B	B		DK		D-WEST		D-OST		D-GESAMT		GR		E		EC12	
	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B
Books	6	18	4	17	5	22	4	22	5	22	6	20	5	15	5	19
Newspapers	21	59	38	86	20	63	16	64	20	63	19	67	16	46	23	64
Magazines	12	45	3	17	12	51	14	53	12	52	3	23	4	16	7	36
Specialist press	2	12	8	27	7	21	6	20	7	21	2	7	3	11	4	15
Radio	4	36	6	54	3	44	5	55	4	46	5	55	6	35	5	39
Television	43	83	37	91	45	88	48	92	46	89	57	90	51	79	48	87
Company brochures and advertisements	0	7	0	7	0	6	0	5	0	6	1	4	0	3	0	5"
Discussions with friends,...	4	26	2	39	2	35	2	27	2	33	2	24	3	14	3	31
Your doctor	2	12	0	5	2	13	1	10	2	13	1	5	0	2	1	8
Courses and lectures	4	11	2	16	1	5	1	5	1	5	1	5	1	4	1	7
Shopkeepers when buying sthg.	0	3	0	2	0	2	0	3	0	2	0	2	0	1	0	2
DK/NA	3	4	1	1	3	4	2	2	3	4	2	7	11	18	3	6

1st column : Question A 2nd column : Question A + Question B	F		IRL		I		L		NL		P		UK		EC12	
	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B
Books	7	21	7	21	4	15	13	27	2	20	6	16	3	20	5	19
Newspapers	17	54	32	73	27	70	20	53	39	79	9	43	30	78	23	64
Magazines	11	38	4	23	4	38	5	23	7	36	4	27	4	28	7	36
Specialist press	5	17	1	4	2	13	6	18	2	11	2	10	3	10	4	15
Radio	6	38	5	44	4	29	6	36	4	44	8	54	5	35	5	39
Television	48	83	42	86	54	91	35	70	41	88	52	78	47	89	48	87
Company brochures and advertisements	1	5	0	3	0	2	0	6	0	8	0	3	1	9	0	5
Discussions with friends,...	3	33	2	16	3	31	3	19	3	26	4	31	5	39	3	31
Your doctor	1	11	0	3	0	5	1	5	0	5	0	5	1	5	1	8
Courses and lectures	1	8	2	8	0	6	1	6	1	9	1	5	2	10	1	7
Shopkeepers when buying sthg.	0	3	0	2	0	2	0	3	0	3	0	4	0	3	0	2
DK/NA	1	4	4	7	2	7	9	17	1	4	14	20	1	3	3	6

Table 4.1.2 : Information sources on new developments affecting our way of life

(National and EC12 percentages ; 1993 figures)

QUESTIONS: A) What is normally your main source of information about new developments that affect our way of life 7
Please select your answer from this list (one answer only)

B) And which are your other sources of information ?
Please select your answer from this list (several answers possible).

Books
Newspapers
Magazines
Specialist press
Radio
Television
Company brochures and advertisements
Discussions with friends, family, colleagues
Your doctor
Courses and lectures
Shopkeepers when buying something

1st column : Question A 2nd column : Question A + Question B	B		DK		D-WEST		D-OST		D-GESAMT		GR		E		EC12	
	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B
Books	A	18	3	13	3	17	4	18	3	17	5	20	5	16	4	17
Newspapers	18	56	38	78	19	70	15	62	18	68	12	52	14	52	20	64
Magazines	9	38	3	17	8	45	12	44	9	45	4	27	4	22	6	36
Specialist press	3	It	5	27	5	19	7	21	6	20	1	6	8	17	5	17
Radio	6	45	7	61	3	41	4	41	3	41	3	45	6	41	4	39
Television	51	83	41	91	56	90	51	90	55	90	66	89	53	81	56	88
Company brochures and advertisements	0	7	0	7	0	3	1	5	0	4	1	6	0	4	0	5
Discussions with friends,...	4	28	2	31	3	29	3	31	3	29	3	32	3	23	3	31
Your doctor	1	8	0	4	1	8	1	11	1	8	1	7	0	2	1	7
Courses and lectures	2	10	1	13	0	4	1	5	0	4	0	5	1	6	1	7
Shopkeepers when buying sthg.			0	2	0	1	0	2	0	1	0	2	1	3	0	4
DK/NA			1	2	2	2	2	2	2	2	3	13	6	14	2	5

Ind column : Question A 2nd column : Question A * Question B	{		1RL		I		L		NL		P		UK		EC12	
	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B
Books	i	17	4	18	3	16	6	23	4	20	5	22	2	18	4	17
Newspapers	18	57	25	71	21	65	18	55	35	77	5	48	22	74	20	64
Magazines	9	36	4	26	4	37	9	33	6	40	2	29	3	32	6	36
Specialist press	6	22	1	4	2	14	7	21	2	13	3	10	3	15	5	17
Radio	6	38	6	48	4	27	6	45	4	49	5	54	4	35	4	39
Television	51	85	52	89	62	91	44	83	44	87	69	89	58	91	56	88
Company brochures and advertisements	0	4	0	4	0	1	0	7	1	12	0	3	1	9	0	5
Discussions with friends,...	3	38	3	19	2	30	5	29	3	31	5	43	3	30	3	31
Tour doctor	1	12	1	4	1	7	1	11	1	7	1	5	0	5	1	7
Courses and lectures	1	8	2	7	0	4	1	8	1	10	1	4	2	12	1	7
Shopkeepers when buying sthg.	0	5	0	3	0	5	0	2	0	5	1	9	0	4	0	4
DK/NA	1	3	2	5	2	7	2	5	1	3	4	10	1	3	2	5

Table 4.2.1 : Most reliable information sources on biotechnology/genetic engineering

(National and EC12 percentages : 1991 figures)

QUESTIONS. Which of the following sources of information have you confidence in to tell you the truth about biotechnology/genetic engineering [7]

A) Please select from this list the one source you would have most confidence in (one answer only)

B) Indicate also which other sources you would trust to tell you the truth about biotechnology/genetic engineering (several answers possible)

Consumer organisations
Environmental organisations
Animal welfare organisations
Political organisations
Trade Unions
Religious organisations
Public authorities
Industry
School or University

1st column : Question A 2nd column : Question A + Question B	B		DK		D-WEST		D-OST		D-GESAMT		GR		E		EC12	
	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B
Consumer organisations	29	52	34	64	32	64	30	63	32	64	12	36	24	45	27	52
Environmental organisations	20	50	16	47	26	61	34	76	27	64	20	48	17	42	23	53
Animal welfare organisations	4	26	7	26	4	34	6	43	5	36	2	16	6	23	5	29
Political organisations	1	3	0	3	2	8	1	4	2	7	1	5	1	3	1	5
Trade Unions	1	5	1	4	1	6	1	6	1	6	1	4	2	6	1	5
Religious organisations	2	6	1	2	4	13	2	8	3	12	3	6	3	6	3	10
Public authorities	5	20	16	39	8	28	7	28	8	28	11	24	6	15	7	20
Industry	1	6	2	6	1	7	0	3	1	6	0	2	2	5	1	6
School or University	24	48	15	38	11	34	12	34	11	34	31	52	17	32	17	37
DK/NA	14	20	7	15	12	15	7	11	11	15	18	29	22	31	15	24

1st column : Question A 2nd column : Question A + Question B	F		IRL		I		L		NL		P		UK		EC12	
	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B
Consumer organisations	41	64	16	42	19	40	24	43	33	63	15	31	21	45	27	52
Environmental organisations	19	52	29	56	25	52	22	46	19	48	19	42	23	49	23	53
Animal welfare organisations	5	32	4	21	4	32	7	23	5	27	4	27	6	22	5	29
Political organisations	1	3	1	7	1	5	3	7	2	7	1	6	1	4	1	5
Trade Unions	1	4	1	7	1	6	1	7	1	6	1	6	1	5	1	5
Religious organisations	2	8	4	12	4	12	3	8	2	7	4	14	4	10	3	10
Public authorities	5	13	6	22	5	15	9	20	9	29	6	18	8	21	7	20
Industry	2	7	1	8	1	6	2	5	1	6	0	5	2	7	1	6
School or University	12	31	21	41	20	41	14	33	17	41	12	31	23	42	17	37
DK/NA	13	26	15	22	17	29	15	32	10	18	37	45	12	27	15	24

Table 4.2.2 : Most reliable information sources on biotechnology/genetic engineering

(National and EC12 percentages : 1993 figures)

QUESTIONS: Which of the following sources of information have you confidence in to tell you the truth about biotechnology/genetic engineering 7

A) Please select from this list the one source you would have most confidence in (one answer only)

B) Indicate also which other sources you would trust to tell you the truth about biotechnology/genetic engineering (several answers possible).

Consumer organisations
Environmental organisations
Animal welfare organisations
Political organisations
Trade Unions
Religious organisations
Public authorities
Industry
School or University

1st column : Question A 2nd column : Question A + Question B	B		DK		D-UEST		D-OST		D-GESAMT		GR		E		EC12	
	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B
Consumer organisations	24	52	30	60	27	71	37	71	29	71	14	39	21	44	26	55
Environmental organisations	23	51	17	45	37	72	31	71	36	72	27	57	25	55	30	61
Animal welfare organisations	6	30	7	22	7	42	6	37	7	41	2	22	4	24	6	32
Political organisations	1	3	0	3	1	6	1	4	1	5	1	4	0	4	1	4
Trade Unions	1	5	1	5	1	7	1	6	1	7	1	4	1	4	1	5
Religious organisations	1	4	1	2	2	12	2	7	2	11	2	6	1	6	2	8
Public authorities	3	12	18	45	4	16	6	19	5	16	5	16	6	15	5	17
Industry	1	7	1	5	1	5	0	2	1	4	1	5	2	6	1	6
School or University	27	51	21	48	9	32	7	27	9	31	27	53	19	39	16	39
DK/NA	13	23	5	14	11	14	10	14	10	14	21	31	21	32	13	21

1st column : Question A 2nd column : Question A + Question B	F		IRL		I		L		NL		P		UK		EC12	
	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B
Consumer organisations	39	69	17	48	19	45	21	46	33	61	17	47	20	43	26	55
Environmental organisations	24	59	31	61	36	62	28	54	20	49	26	57	29	55	30	61
Animal welfare organisations	5	31	6	27	6	36	9	32	8	33	5	38	8	25	6	32
Political organisations	0	3	2	8	0	2	1	6	1	6	1	10	1	4	1	4
Trade Unions	1	4	1	8	1	5	2	8	1	8	2	6	2	5	1	5
Religious organisations	2	5	5	14	3	9	0	5	1	6	7	20	3	8	2	8
Public authorities	5	18	6	17	2	10	7	19	10	30	4	17	6	20	5	17
Industry	1	6	2	7	1	6	1	5	1	7	1	8	2	7	1	6
School or University	14	37	17	40	17	40	18	44	17	42	16	42	20	42	16	39
DK/NA	10	18	14	19	14	25	13	18	10	18	21	27	11	21	13	21

APPENDIX 3 :

SURVEY'S TECHNICAL SPECIFICATIONS

Between May 10, and June 5 1993, INRA (EUROPE), a European Network of *Marker-* and Public Opinion Research agencies, carried out wave 39.1 of the STANDARD EUROBAROMETER, on request of the COMMISSION OF THE EUROPEAN COMMUNITY.

The EUROBAROMETER 39.1 covers the population of the respective nationalities, aged 15 years and over, in each of the Member States of the European Community. The basic sample design applied in all Member States is a multi-stage, random (probability) one. In each EC country, a number of sampling points was drawn with probability proportional to population size (for a total coverage of the country) and to population density

For doing so, the points were drawn systematically from all "administrative regional units", after stratification by individual unit and type of area They thus represent the whole 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 the selected sampling points, a starting address was drawn, at random. Further addresses were selected as every Nth address by standard random route procedures, from the initial address In each household, the respondent was drawn, at random. All interviews were face-to-face in people's home and in the appropriate national language.

COUNTRIES	INSTITUTES	N° INTERVIEWS	FIELDWORK DATES	POPULATION 15 + (x 000)
Belgium	MARKETING UNIT	1034	15/05 - 02/06	7 994 4
Denmark	GFKDANMARK	1000	15/05 - 03/06	4 160 4
Germany(East)	SAMPLE INSTITUT	1063	17/05 - 30/05	13 607.0
Germany(West)	SAMPLE INSTITUT	1027	16/05 - 30/05	51 708:0
Greece	KEME	1000	17/05 - 29/05	7 825.6
Spain	CIMEI	1000	14/05 - 31/05	29 427.2
France	TMO Consultants	1004	17/05 - 29/05	43 318.5
Ireland	LANSDOWNE Market Research	1001	15/05 • 04/06	2 583.0
Italy	PRAGMA	1024	17/05 - 31/05	45 902 8
Luxemburg	ILRES	500	10/05 - 05/06	302.6
The Netherlands	NIPO	1005	15/05 - 03/06	11 603.6
Portugal	NORMA	1000	17/05 - 31/06	7 718 7
Great Britain	NOP Corporate and Financial	1066	15/05 - 31/05	44 562.0
Northern Ireland	ULSTER MARKETING SERVICES	308	14/05 - 04/06	1159 1

For each country, a comparison between the sample and the universe was carried out The Universe description was derived from EUROSTAT population data For alt EC member-countries a national weighting procedure, using marginal and intercellular weighting, was carried out based on this Universe description As such in all countries, minimum sex, age, region NUTS II and size of locality were introduced in the iteration procedure For international weighting (i.e. EC averages), INRA (EUROPE) applies the official population figures as published by EUROSTAT in the Regional Statistics Yearbook of 1989 The total population figures for input in this post-weighing procedure are listed above

The results of the EUROBAROMETER studies are reported in the form of tables, datafiles and analyses Per question a table of results is given with the full question text (English and French) on lop, the results are expressed 1) as a percentage on total base and 2) as a percentage on the number of "valid" responses d e "Don't Know" and "No Answer" excluded). All EUROBAROMETER datafiles are stored at the Zentral Archiv (Universitat Koln, Bachemer Strasse, 40, D-5000 K6ln 41) They are at the disposal of all institutes members of the European Consortium for Political Research (Essex), of the Inter-University Consortium for Political and Social Research (Michigan) and of all those interested in social science research. The results of the EUROBAROMETER surveys are analysed and made available through the Unit "Surveys, Research, Analyses" of DG X of the Commission of the EC, "EUROBAROMETER". Rue de la Loi 200 B-1049 Brussels

Readers are reminded that survey results are estimations the accuracy of which, everything being equal, rests upon the sample size and upon the observed percentage With samples of about 1 000 interviews, the real percentages vary within the following confidence limits

Observed percentages	10% or 90%	20% or 80%	30% or 70%	40% or 60%	50%
Confidence limits	± 1 9%	± 2 5 %	± 2 7 %	± 3.0%	± 3.1%

"SPLIT BALLOT"

As in 1991 (*), for questions dealing with biotechnology/genetic engineering, the impact of question-wording ("biotechnology" or "genetic engineering") had to be assessed on knowledge of the subject and attitudes towards it.

In order to do this, the sample was split into 2 : one half was interviewed exclusively on "biotechnology" and the other half, exclusively on "genetic engineering". For each language, the following expressions were used :

	First half	Second half
English	biotechnology	genetic engineering
Spanish	biotechnologia	ingenieria genetica
French	biotechnologie	genie genetique
German	biotechnologie	gentechnologie
Portuguese	biotecnologia	engenharia genetica
Dutch	biotechnologie	gentechnologie
Danish	bioteknologi	gensplejsning
Italian	biotecnologia	ingegneria genetica
Greek	*filorfxvQAoyla*	*Ytve-riKri pnxaviKri*

The first Eurobarometer survey on biotechnology/genetic engineering was conducted in Spring 1991. in the context of Eurobarometer 35.1. The report on this survey was published in :
Durant, J. (editor). *Biotechnology in Public - A review of recent research,* (London: Science Museum, 1992).

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APPENDIX 4 :

QUESTIONNAIRE

Scientists know better and better how living things work and how to modify micro-organisms (such as yeast), crops, farm animals, as well as the cells of the human body. These modifications can be very useful, but can also involve some risks. I would like to ask you a few questions on this issue.

Q.1. 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 ?

Solar energy
Computers and information technology
Biotechnology/genetic engineering
Telecommunications
New materials or substances
Spaceexploration

Q.2. 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 AND SHOW CARD)

There are bacteria which live from waste water
Most bacteria are harmful to human beings
The cloning of living things produces exactly identical offspring
Children look like their parents because they have the same red blood cells
It is possible to modify bacteria genetically so that they will produce useful substances
It is possible to find out whether a child will have Down's Syndrome (i.e. will be a "mongol"), within the first few months of pregnancy
Viruses can be contaminated by bacteria
Yeast for brewing beer consists of living organisms
It is possible to change the hereditary characteristics of plants, enabling them to develop their own defence against certain insects
Biotechnology/genetic engineering makes it possible to increase the milk production of cows
There are test tube babies who were developed entirely outside the mother's body
Genes of all living things on earth are made up of different combinations of only 4 or 5 chemical building blocks

Q.3. Scientists are trying to use biotechnology/genetic engineering to change plants, in ways that may be quicker or more precise than traditional breeding programmes, in order to make the plants more useful.
For example, make them resistant to diseases or pests, make them ripen faster or give them the ability to grow in dry or salty soils.
Please indicate to what extent you agree or disagree with each of the following statements concerning plant research. (SHOW CARD)

Such research is worthwhile and should be encouraged
Such research may involve risks to human health or to the environment
In any case, this research needs to be controlled by the government

Q.4. Let us now talk about micro-organisms, such as the yeast we use to make bread, or beer, or yoghurt; or the micro-fungi we use to make medicines such as penicillin.
Scientists know how to change these micro-organisms through biotechnology/genetic engineering, in order to improve their performance - that means, getting them to work faster or even to produce new products.
Please indicate to what extent you agree or disagree with each of the following statements concerning research and micro-organisms. (SHOW CARD)

Such research is worthwhile and should be encouraged
Such research may involve risks to human health or to the environment
In any case, this research needs to be controlled by the government

Q.5. Some of these micro-organisms are used to break down sewage and other waste products and to turn them into materials harmless to the soil.
Here again, scientists are trying, through biotechnology/genetic engineering, to improve these micro-organisms. They are trying to make them work faster or to make them clean up oil-slicks or other contaminants in the environment.
Please indicate to what extent you agree or disagree with each of the following statements concerning micro-organisms and the environment. (SHOW CARD)

Such research is worthwhile and should be encouraged
Such research may involve risks to human health or to the environment
In any case, this research needs to be controlled by the government

Q.6. Another development is the application of biotechnology/genetic engineering to farm animals, to change them in quicker or more precise ways than traditional breeding programmes, in order to make them more useful: for example, make them resistant to diseases, or grow faster, or produce more or better quality meat or milk.
Please indicate to what extent you agree or **disagree** with each of the following statements concerning such research on farm animals. (SHOW CARD)

Such research is worthwhile and should be encouraged
Such research may involve risks to human health' or to the environment
In any case, this research needs to be controlled by the government

Q.7. Scientists can also apply biotechnology/genetic engineering to animals to develop life-saving drugs, or to study human diseases.
Animal protection is guaranteed by law and some people say it is morally wrong to apply biotechnology/genetic engineering to animals.
Which of the following is closest to your personal opinion ? (SHOW CARD - ONE ANSWER ONLY)

Applying biotechnology/genetic engineering to animals is morally acceptable, provided that the animals' welfare is safeguarded
It is acceptable for the development of life-saving drugs, even at the cost of some animal suffering
Public authorities should examine this application of biotechnology/ genetic engineering case by case before deciding whether to allow it
Applying biotechnology/genetic engineering to animals is morally unacceptable and should be banned by public law
DK

Q.8. These new methods of biotechnology/genetic engineering are also being applied to the production and processing of foods. Scientists say that they can improve the quality of food and drink - for example by making it higher in protein, or lower in fat, or making it keep longer, or taste better.
Please indicate to what extent you agree or disagree with each of the following statements concerning such research on food. (SHOW CARD)

Such research is worthwhile and should be encouraged
Such research may involve risks to human health or to the environment
In any case, this research needs to be controlled by the government

Q.9. Yet another application of biotechnology/genetic engineering is the development of new medicines and vaccines to improve human health, for example the production of human insulin for the treatment of diabetics. Please indicate to what extent you agree or disagree with each of the following statements concerning such research on medicines and vaccines. (SHOW CARD)

Such research is worthwhile and should be encouraged
Such research may involve risks to human health or to the environment
In any case, this research needs to be controlled by the government

Q. 10. Science is also trying to apply some of the new methods of biotechnology/ genetic engineering to human beings, or to their cells and tissues, for various purposes such as detecting, or curing diseases, and characteristics we might have inherited from our parents.
Please indicate to what extent you agree or disagree with each of the following statements concerning such research on human beings, medicines and vaccines. (SHOW CARD)

Such research is worthwhile and should be encouraged
Such research may involve risks to human health or to the environment
In any case, this research needs to be controlled by the government

Q.11. How did you find the topics we have talked about over the last few minutes : rather simple or rather complicated ?
Please answer using this scale from 1 to 10. ONE means "very simple" and TEN "very complicated".
The scores in between allow you to say how close to either side you are. (SHOW CARD)

Q.12. a) What is normally your main source of information about new developments that affect our way of life ?
Please select your answer from this list. (SHOW CARD - ONE ANSWER ONLY)

b) And which are your other sources of information ? (SEVERAL ANSWERS POSSIBLE)

Books
Newspapers
Magazines
Specialist press
Radio
Television

Company brochures and advertisements
Discussions with friends, family, colleagues
Your doctor
Courses and lectures
Shopkeepers when buying something
DK

Q.13. Now, I would like to know which of the following sources of information you have confidence in, to tell you the truth about biotechnology/genetic engineering.

a) Please select from this list the one source you would have most confidence in. (SHOW CARD - ONE ANSWER ONLY)

b) Indicate also which other sources you would trust to tell you the truth about biotechnology/genetic engineering. (SEVERAL ANSWERS POSSIBLE)

Consumer organisations
Environmental organisations
Animal welfare organisations
Political organisations
Trade Unions
Religious organisations
Public authorities
Industry
School or University
DK

Q. 14. I am going to read you a few statements. For each of them, please tell me whether you definitely agree, tend to agree, tend to disagree or definitely disagree ? (READ OUT AND SHOW CARD)

There should be clear ethical rules indicating when biotechnology/ genetic engineering may not in any way be applied to human beings

There should be clear ethical rules indicating when biotechnology/ genetic engineering may not in any way be applied to animals

There should be clear ethical rules indicating when biotechnology/ genetic engineering may not in any way be applied to plants

Only traditional breeding methods should be used, rather than changing the hereditary characteristics of plants or animals through biotechnology/genetic engineering

One should look for a balance between animal welfare and human welfare

If we do not protect the natural environment, human beings will not be able to survive in the future

Traditional breeding methods can be as effective as biotechnology/ genetic engineering, in changing hereditary characteristics of plants and animals

Q.15. Some people and groups are concerned about the potential risks of the development of biotechnology/genetic engineering and its various applications.
In your opinion, can they actually influence this development ?
Please answer using this scale from 1 to 10. ONE means "no influence at all" and TEN "a lot of influence".
The scores in between allow you to say how close to either side you are.
(SHOW CARD)