

Parallel Session 29: Is it a real social participation in GMO discussion?

COMMUNICATING GENETIC ENGINEERING: NEW CONCEPTS FOR SOCIAL PARTICIPATION

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Abstract

Many publications can be found within the social science domain calling for a change in the communication of scientific expertise in terms of increasing participation and democratization. Still the question that remains is: How do we do it? How must science communication be organized that it does not fall back on the so called deficit model and as far as genetic engineering is concerned does not focus on the knowledge-acceptance-relation. After more than five years of experience the author has gained valuable experiences in organizing such communication processes. Against the backdrop of this some conclusions can be drawn.

Key Words: Genetic Engineering, Participation, Education

Text

Aiming at Participation

When asking for socially sound design of science and technology, one will often get one answer: this can be ensured through participation. A stronger involvement of users, consumers and patients seems to be appropriate to achieve a socially sound practice. Genetic engineering is a prominent example where science communication plays a crucial role. That more should be done to inform the public was a common demand in the course of bio-tech controversies in many countries. Most often the framing of genetic engineering as a problem or matter of science communication focussed mainly on the fact that the public would to a very large extent reject most applications of genetic engineering. A characteristic feature for the concentration on the acceptance problem is its framing. In this view the lack of public acceptance is explained by a lack of information and knowledge in the public sphere. Consequently an increase of information is seen as an adequate means to solve this problem.

The point here is that such a framing which focuses on the knowledge-acceptance-relation goes along with a specific form of science communication. The communication style has become known as the “deficit model” (cf. Wynne 1991). The deficit model refers to a communication mode that concentrates on formal knowledge and aims at imparting such formal knowledge. Against the backdrop of this approach, experts only need to explain genetic engineering properly and all doubts and resistance of lay

people will disappear into thin air. In this framing the seemingly neutral element “knowledge” serves various objectives.

It is obvious that a framing of the relation between science and the public goes along with an instrumentalisation of science communication: Science communication as provision for acceptance. Researchers have found much to criticise in the deficit model. Against the backdrop of the critique on the deficit model many call for alternatives that are occasionally called the democratic model (cf. Durant 1999:315). In essence its aim is to overcome the privileged position of scientists, as well as the one-way-communication from experts to lay people. What is demanded is a equal communication between scientists and non-scientists. In other words an extension of science communication in terms of a true dialogue is needed: the acknowledgement of local and practical knowledge, the right to a say for effected people and the inclusion of contextual aspects such as values, power-relations, profit-interests and issues of justice, economic consequences and risk.

Against the backdrop of the outlined problem, the request for new ways in science communication is not easy to fulfil. How can science communication be organized without falling back on a style that has been criticised as deficit model earlier on? It is argued in this paper that this is possible through job related continuing education (further training). A few accounts can be given why job related continuing education is understood to be a suitable framework to overcome the obsession with the acceptance problem and communication forms of the deficit model type.

The firsts reason that favours job related continuing education is the fact that relationships to action are perfectly given. Vocational activities provide educational processes with relationships to action in a way in which they could hardly be established elsewhere. A precondition, however, is a precise definition of the respective target group. For the case of genetic engineering this means to identify groups of a profession which have to work with applications of genetic engineering directly or indirectly (farmers, health providers, teachers etc.).

Organizing science communication on the organisational basis of job related continuing education one could benefit from the advantage of homogeneous target groups. Such target groups are significantly different from what is often called “the public at large”. Developing an idea of who should be addressed is profitable in any case. Experiences have shown that events addressing a specific target group are much better attended in comparison to events which unspecifically invite everybody.

Continuing education is characteristically organized in the framework of small or medium settings. From a didactical perspective such events usually combine lectures and discussions. Even though more generalisations can’t be drawn on the didactics of continuing education since a wide methodical variety is employed, the interactive character remains elementary for continuing education.

Conclusion

This paper took its point of departure in the democratic aim for more participation through science communication. The proposed way—focussing

on learning processes relevant to action—has been formulated against the backdrop of a critique on the common practice in science communication which in social science literature has been described in terms of the so called deficit model. Summing up it can be said that the integration of the topic genetic engineering within the field of continuing education can be understood as a meaningful approach, not least because in this way perspectives for participatory science communication can be explored, too. However, it should be pointed out that associated measures in continuing education also need proper framework conditions and adequate financial backing if they are to be put into practice in a meaningful and valuable way.

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THE DEMOCRATISATION OF A 'SCIENTIFIC' DECISION: THE 'GM NATION?' EXPERIMENT IN THE UK

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Abstract

This paper takes a critical approach to public participation in technological decision-making. I argue for the separate and concurrent consideration of technical and politico-ethical domains. The “GM Nation?” public debate conducted across the UK in 2003 failed to increase powerful public participation because the policy under scrutiny – the commercialisation of GM crops – could only be determined by science, technocratically. This effectively marginalized alternative citizen framings or understandings of the issue. Observations from 11 GM debates however showed that the majority were adversarial and participants mostly debated propositional and technical matters; but the technical sophistication of citizens was not sophisticated and experts often outmanoeuvred them. It is better that citizens are involved in political and ethical judgement for which they have genuine expertise, whilst technical aspects of a decision are best left to those with certified or experiential expertise. However, unlike regulations as they stand, this technical evaluation should feed into the broader political decision, not be it.

Key words: Expertise; public participation; GM

Text

1. Context and argument

This paper concerns expertise, public participation in real-life decision-making, and the problem of extension (Collins and Evans 2002). The problem of extension refers to determining that point at which participation in technological decision-making can be increased without 'expertise' in itself losing its meaning. The problem arises because of the desire to increase public participation in decisions that would previously have been considered merely technical and for experts. For example various actors and institutions have been pressing for public participation in the case of biotechnologies, including and particularly genetic modification (GM). The call is for a shift in the established and 'natural' policy and decision-making mode, which in the UK has been based on a technocratic rationality. According to the critique, this technical frame effectively disempowers the public from democratic participation. It is easy to see why: Framing is concerned with defining GM as, in the first instance, a certain type of issue or problem. The right to determine problem definition can result

in power, particularly when there are associated policy-making issues, for it entails the terms of reference for that policy. This means determining what questions need to be asked, what form answers would take, and consequently, who holds legitimate contributory knowledge in the decision making process. If the public can be shown to be scientifically and technically unsophisticated or ignorant, then this reflects a deficiency in their democratic capability.

With a concern for democratic principles, that all voices should be heard, and to redress the balance of power more toward 'citizens', social scientists have called for a restructuring of policy making to consider symmetrically, or even primarily, alternative citizen understandings or frames based on the assumption that there is incongruence between citizen frames and those deployed by those in positions of power. This would allow for increased participation in policy-making. "GM Nation? The Public Debate" (GMN), held across the UK in the summer of 2003, was marketed with just these principles in mind: it would be a genuine example of public participation in a policy decision, widely interpreted to be about, more specifically, the possible commercialisation of GM crops. However I wish to show that the context and conduct of the debate meant that it was science that was being democratised: only science mattered for policy, and it was mostly science that the public debated. I then develop a position in support of the concurrent consideration of two separable categories of problem definition – technical and politico-ethical – toward building a more critical approach to public participation.

2. Public participation in a technocracy

The legal structures governing genetically modified organisms (GMO's) in place at the time of GMN had two consequences. First, the space for the UK Government to determine policy on GM crops is formally limited, and in turn, so is the space for public participation. Secondly, the EU legal structure literally defines the problem GM, strictly determining the frame from within which decisions are made. This is how: Under EU Directive 2001/18/EC, GMO's are treated as a 'product', defined as a preparation consisting of, or containing, a GMO or a combination of GMO's placed on the market (e.g. as a food or crop). As such, consent for release is determined only by a technical risk assessment of the risks to human health and the environment. In this way the political, ethical and the technical are fused: the political was the technical and vice versa, effectively excluding alternative framings or understandings of the issue. This legal structure clearly had implications for GMN as a proper participatory exercise.

In the early formulations of GMN, Government committed itself to taking public opinion, expressed through the debate, into consideration in formulating policy on GM crops. A dilemma lay however in offering this commitment whilst at the same time satisfying EU law. Established consent procedures meant that public opinion could not in fact influence a decision either way except, in principle, as it pertained to the technical assessment of specific foods and crops. But could science be so democratised? Recognising the dilemma, the government later attempted to distance the public debate from decisions over crop commercialisation. Despite this shift, the debate still centred on that singular issue. At any rate, Government both before and after the debate constructed the problem GM as only a scientific matter. For example, Prime Minister Tony Blair stated that 'this Government's approach is to make decisions on GM crops on the basis of sound science'¹, and in the face of public

opposition, in March this year the Government risk assessed and passed a GM maize. Again, framing the problem GM as merely a technical matter with a decision to be based on scientific grounds marginalised the public, both in terms of their capacity to participate and the grounds on which GM could be powerfully challenged.

3. Public GM debates

However, GM is contested in part because there is disagreement over the correct problem definition, and previous research suggests that the public construct additional politico-ethical framings for the problem GM. I attended 11 GM meetings to find out what was discussed. Generally, technical and politico-ethical matters were confounded. Table 1 below summarises the frames deployed across 8 meetings for which I have complete transcript data. The first thing to note is that there was a range of frames deployed. However, the frequency column shows that whilst there was a *wider range* of politico-ethical based frames deployed, the most *frequently used* frames were technically based, particularly concerning GM as *risk*. The majority of meetings I attended were adversarial and the public, as far as they were represented at these meetings, frequently argued over propositional and technical matters. This suggests that science was being democratised in a second sense: participants at these debates spent much of the time contending and defending evaluations of technical questions.

4. Public participation and expertise

But analysis of the technical reasoning of participants reveals limitations. For example, it was common to particularise the *technique* of genetic modification and then consider the *products* (foods, crops) as an undifferentiated category. Any claims of risk were therefore attributed to the whole class without a technical appreciation of for example, contextual factors, that different crops breed differently, or that some food products contain no transgenic material. Another common claim was that the technique is unnatural and that therefore it will lead to new risks and hazards. More rarely it was argued that the products are natural and therefore safe. Of course, it is not the naturalness of a crop, food or technique that determines if it is a risk. Categorisation of products and particularisation of the technique leads to powerful political arguments but not especially sophisticated technical one's. For instance, the precautionary principle is a powerful political tool. But it was sometimes claimed that it must be imposed until proof is provided that products are safe.

We should not be surprised at this deficit, but it meant that the few technical experts often out manoeuvred other participants. It is of course the case that there are people with no formal scientific certification with much expertise to offer in the case of GM, and some GMN participants had much knowledge and expertise. Consequently, as Collins and Evans (2002) argue, there are no publics, just groups of people with different levels of expertise relative to a domain or question. In matters such as the commercialisation of GM crops, there clearly are propositional questions that in principle call for empirical investigation and scientific evaluation. Appeal to deep democracy does not talk these questions away. But there are political and ethical questions too. The public would be better served if the grounds on which they are being invited to participate were made clear. It is better that the public is involved in political and ethical judgement for which they have genuine expertise, whilst technical aspects of a decision are best left to those with certified or experiential

expertise. However, unlike regulations as they stand, this technical evaluation should feed into the broader political decision, not be it. The extent to which the *final* decision should be handed to the public depends on one's favoured version of democracy, and getting the public to trust technical experts is of course a different matter.

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Tables and Figures

Table 1: Frames deployed at GM meetings

Frame	Frame type	Total frequency of frame deployment across meetings (n=8)
Risk	Technical	39
Capitalism	Politico-ethical	19
Benefits	Technical	17
Technology	Technical & politico-ethical	17
Developing world	Politico-ethical & technical	15
Choice	Technical & politico-ethical	13
Futures	Politico-ethical & technical	8
Debate	Meta discursive	7
Science as politics	Politico-ethical	5
Legal	Politico-ethical & technical	4
Co-existence	Technical & politico-ethical	4
Uncertainty	Technical	3

Management	Technical & politico-ethical	2
Trust	Politico-ethical	2
Regulations	Politico-ethical	2
Pure ethics	Politico-ethical	2
Interests	Politico-ethical	1

The left-hand column of this table shows the range of ways that the problem GM was defined (i.e. framed) across 11 public GM meetings. The right hand column shows the frequency with which these frames were deployed at 8. The central column shows whether that frame concerned almost exclusively ('technical') or mostly ('technical & politico-ethical') propositional and technical questions/domains, or whether that frame concerned exclusively ('politico-ethical') or mostly ('politico-ethical & technical') political and ethical questions/domains.

¹ Prime Ministers Correspondence, 10/11/2003. Available to view at: http://www.parliament.the-stationery-office.co.uk/pa/cm200203/cmhansrd/cm031110/text/31110w04.htm#31110w04.html_sbhd1
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INCOMMENSURATE RISKS: DEBATES CONCERNING GENETIC MODIFICATION AND CULTURAL TRANSGRESSION AMONG NEW ZEALAND MAORI

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Abstract

Growing public anxiety about the development of genetically modified organisms (GMOs), prompted the New Zealand Government's year 2000 Royal Commission enquiry into Genetic Modification. The Commission noted overwhelming public rejection of GM, including multiple concerns specific to Māori. Maori concerns carry legislative weight because several Acts of Parliament, including that which governs GMOs, require that the views of Maori be considered. This paper draws on primary and secondary sources to identify key values perceived by Maori as important in assessing the effects of GMO's on their culture and traditions, and focuses on the concept of *mauri* (life force or essence).

Key words: mauri, risk, culture

Text

Context

In 2000, the NZ Government ordered a Royal Commission of enquiry into GM, in response to growing public anxiety about research intended to lead to the development of genetically modified organisms (GMOs), and especially the production and release of GM food crops into a currently GMO –free environment. The Commission found that the public in general, including New Zealand's indigenous (Maori) people, overwhelmingly rejected this form of biotechnology. Maori concerns carry legislative weight because several Acts of Parliament, including the Hazardous Substances and New Organisms Act 1996 (HSNO), which governs all GMO activities in New Zealand, require that the views of Maori to be taken into consideration.

Objectives

This paper identifies key values perceived by Maori as important in any consideration of the potential effects of GMO's on their culture and traditions.

Methods

Individual and focus group interviews with Maori were conducted in 2001-2. Transcripts were analysed, then subjected to further discussion by a team of experts. All Māori submissions to the Royal Commission were also examined, along with Māori submissions to the Environmental Risk Management Authority (ERMA) and other contemporary and archival material pertaining to Māori values.

Results

Three concepts were particularly prominent across the various sets of submissions and discussions: *mauri* (life force or essence), *kaitiakitanga* (guardianship) and *whakapapa* (inherited genealogy). Underpinning these was the view that genetic modification was a process demanding the exercise of great caution. Many Maori voiced concerns about the potential for GMOs to impact adversely on the *mauri* and *whakapapa* of the organisms involved, including humans who might eat products with GM components. This paper will focus on the concept of *mauri* in relation to genetic modification.

Mauri is a central notion in Māori philosophy, derived from the Proto-Austronesian term *hudip “to live”, and acquiring in Māori the sense of “the essence which gives a thing its specific natural character” (Metge 1976:57). The word refers both to the life principle or essential quality of a being or entity, and a physical object in which this essence has been located. In this context “being” and “entity” comprise all observable phenomena: individual beings, objects and events (including, for example, a speaker, their speech, and the platform they are standing on) have a *mauri*, and, importantly, ecosystems and social groupings. In classical Māori thought, the *mauri* was linked to the vitality, or *hau*, of a being, bound closely and inseparably to individual human beings, but having a collective significance paralleling *mauri* in relation to the forest and other phenomena (cf. Gathercole 1978, Best 1978).

While references to *hau* were comparatively sparse, the notion of *mauri* was frequently raised across all fora, and also in submissions by Māori to the Environmental Risk Management Authority. Many felt strongly that the transfer of genetic material between organisms, especially the mixture of human and animal genetic material, would have adverse consequences, disrupting the natural order of things, and affecting negatively the *mauri* of ecosystems, the animal world, and humanity. For example, the Ngati Wairere tribe, who objected to an application to insert a human gene into a cow, asserted that this affront to the *mauri* of both donor and recipient organisms would result in physical and psychological ill health for all concerned including Ngati Wairere on whose land the research took place.

Even cultural experts who held that addition or removal of genes did not affect the *mauri* of a particular organism had very strong concern for maintaining the integrity of the natural world, and a parallel certainty that serious disruption to this would affect people as well as things and places.

Conclusions

Communication of these values and their meaning between Māori and scientists responsible for regulatory decisions has been fraught with difficulty. This is in part because: (a) risk management legislation is effects based and hence concern about *mauri* must be matched by forensic proof of adverse consequences; (b) the current decision-making framework cannot weigh cultural transgressions and intangible expressions of risk alongside physical ones; and (c) there is a general lack of knowledge among regulators and lawmakers in an increasingly secular society of Māori spiritual beliefs. Thus despite attempts by the Courts to acknowledge Māori spiritual values, it is the scientific information which dominates the ERMA's risk assessment process. No application has yet been declined for cultural reasons. Thus in the case involving Ngati Wairere, the Authority concluded that "taking into account the need to provide active protection for Māori spiritual beliefs does not extend to accepting those beliefs as the determinant of whether the research ... should be approved". Efforts by Māori to promote a broader decision-making approach to solve this impasse include the development of values-based risk assessment frameworks (e.g. Durie 2003).

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HOW PRESS COVERAGE ON TRANSGENIC FOOD HAS EVOLVED IN COLOMBIA?

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Key words: Genetically Modified Organisms, media, public perception.

Text

Transgenics have been controversial throughout the world, and Colombia is not the exception. This year, for the first time, the Colombian government approved Monsanto's BT cotton and it has been a red-hot issue in the national and regional press. The media, through editorialists, columnists and journalists, has taken on the task of informing, and sometimes misinforming, the public.

The approval of the BT cotton crop has managed to change the journalistic speech and the speech of government sources. The print media, that was indifferent to these matters, now publishes related articles; others who had positions against plant biotechnology now tend to be neutral on the subject. Although opinions and columns harshly questioning the benefits of genetically modified organisms, GMO, are still being published, the media is now more cautious than it was 5 years ago when transgenics were recorded by the Colombian media for the first time in 1999, on occasion of the Biosafety Summit held in Cartagena de Indias.

An analysis of the media coverage since then up to the present day, allows us to confirm that the Colombian press coverage of transgenic food has evolved positively for those who endorse these new technologies.

We found that the articles analyzed were written mostly by science journalists, editorialists and columnists, each one in their own journalistic style, but, what about social responsibility? The journalist must try to find the truth, show the public the different angles of the news; explain the controversy and provide arguments, so the public can take a stand on this issue. Editorialists and columnists must act based on knowledge, recognize the power of the pen and be aware that their comments affect the public opinion. However, in 1999, we found comments like this, from an editorialist opining on biotechnology: "a genetically modified product: a monster that nature by itself would never produce...".

With the objective of analyzing the print media's stand on this issue, we reviewed information published by 26 national and regional circulation newspapers in Colombia. We defined three analysis categories, as follows:

1. PRO articles: those that show a positive angle of the news, from a single source.
2. NEUTRAL articles: those that examine different angles of the news, from several sources.
3. CON articles: those based on a single source against GMO's.

These same categories were applied to columnists and journalists to define their stand on the issue.

How does the transgenic issue should be covered? Although there are many ways to do science journalism, we established that a good article must have: journalistic rigor, suitable sources, different angles of the news, plain language and responsibility.

Considering all the above, we established the evolution of the news coverage on GMO's from the point of view of reporters, sources, the media and the public.

We concluded that in 1999, with the Biosafety Summit, the media was characterized by its immediacy, aggressive headlines, unbalanced visual resources and the importance of the subject, which made front page news.

We found front page information with no further follow-up, as the newspaper did not have the complete news story. This is the case of a ship supposedly loaded with transgenic corn from the United States, arriving in Santa Marta. The news was published as a front page headline with a one-fourth page photo, but no further information.

Headlines such as "*Terminator* protocol to be signed...", "*Frankenstein* Food..." and "Genetic curse", are samples of the aggressiveness with which the media published the information.

News reporters did not research the issue and arrived in Cartagena without a clear understanding of the Summit dimension and the implications of what was to be defined there. As days passed, the quality of the news articles improved, as news reporters steeped themselves in the subject.

Although reporters made efforts to keep the public informed, journalistic flaws were exposed with the publication of inaccurate data, influence on the part of the sources and lack of follow-up to the news generated.

GMO's were new to the sources, so, some were emotionally passionate about it and others preferred not to talk about it. Greenpeace took advantage of the Public Officials' lack of knowledge and organized a protest in Cartagena to grab the media's attention.

By the end of the Biosafety Summit, the public was left confused. The public's perception on the subject was based more on the headlines than on contextualized information.

In 2001, no notable coverage event occurred. There were no scandals about transgenics, but the subject was discussed in the media, considering social,

political and economic aspects. The issue didn't make front page, but editorials and opinions were published that have influenced the public opinion.

Columnists, in some cases, explained better the scope of plant biotechnology than the journalists who wrote the articles. The difference was the colloquial language used to talk about transgenics. This situation showed the need for training writers in the handling of these matters: So, the Colombian Association of Science Journalism, with the support of Colciencias and AgroBio, carried out regional science journalism workshops aimed at students and journalists.

Sources consulted, including government representatives, private businesses, scientists, etc., are now more knowledgeable, as compared to 1999.

This time, the public took part in the debate through letters that were published by the media. This is a good indicator of the audience's interest in biotechnology issues.

2003 was a key year for biotechnology. The Colombian Ministry of Agriculture approved the sowing of BT cotton in the Cordoba Province and included transgenics in the government plan as an alternative to save the agricultural sector. This brought press coverage from the approval of this initiative to the first cotton harvest.

Journalists, now more familiar with the subject, decided to rely more on government officials to write their articles. The economic aspect is evident. The reports are now more comprehensive and contextualized than they were in 1999. The journalistic speech is more neutral and the sources consulted are more in favor of biotechnology. In other cases, some personalities who oppose GMO's, are the same who always appear in the articles to balance the information, as it is the case with Germán Vélez, of the "Grupo Semilla".

In conclusion, transgenics will continue to be present in the Colombian and international press for a long time. For this reason, it is necessary to conduct coverage studies for specific cases to give the journalistic community the tools to judge their rights and wrongs in relation to the information delivered to the public. It is important to have qualified journalists to cover this subject with responsibility and journalistic rigor.

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SCIENTIFIC CITIZENSHIP: DANISH CITIZENS AND BIOTECHNOLOGY

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Abstract

An emerging paradigm of dialogue and participation in Danish S&T policy provides new arenas for public participation in decision making processes concerning biotechnology. Based on survey data this study examines indicators of both spectator and participatory scientific citizenship. While indicators of spectator scientific citizenship show that Danish citizens increasingly acknowledge the importance of biotechnology *for* their lives, the indicators of participatory scientific citizenship reveal a decreasing inclination to make biotechnology an element of importance *in* the daily lives of Danish citizens. In order to meet their democratic potential, the new arenas for public participation must be further cultivated.

Key Words: Citizen participation.

Context

Recently, within the Danish political discourse on science-society integration, the 'paradigm of science dissemination', which has emphasized the need for one-way transmission of knowledge from the world of science, to the passive lay citizen, has found company in an emerging 'paradigm of dialogue and participation', not least concerning the integration of new genetic technologies in economic and social systems. The Danish Board of Technology has been the primary engine in ensuring direct public participation in S&T assessment and actual face-to-face dialogue between scientists, industrialists, policymakers, and citizens. BioTik, the Danish action plan for biotechnology and ethics, has institutionalized public consultation as a guiding principle, and offers a web-based arena for public debate. NGO participation in long-term strategic S&T prioritization and The Danish Council of Ethics' efforts to support public meetings concerning ethical problems in biotechnology has also contributed to creating arenas for public involvement in biotech policy and debate.

These emerging arenas of participation offer a framework for democratic renewal. The science dissemination paradigm corresponds with the notion 'spectator democracy', in which "...citizens are superficially *interested* in politics - as citizens they want to know what happens - but not by any means *engaged* in politics... Politics is perceived to play a role *for* their lives but it does not play much of a

role *in their lives*" (Andersen & Torpe 2000: 5). This notion of spectator democracy is opposed by the notion of 'participatory democracy', which emphasizes citizen's *engagement* in politics - political consumption, participation in grass root activities or demonstrations, involvement in public debate etc. Participatory democracy stresses the importance of full citizenship in terms of both political and social *rights* and a republican ideal of civiness as a sense of societal obligation or *duty*, in which participation is a *virtue* (Barber 1984). Participatory citizenship is not simply about enjoying the right to enter the sphere of politics, but rather about actually entering it. The emerging paradigm of dialogue and participation in Danish S&T policy potentially enhance a democratic development towards participatory citizenship.

Objective and methods

Applying quantitative survey-based data on the public understanding of biotechnology in Denmark, indicators of what could be termed 'spectator' and 'participatory' scientific citizenship are examined¹. Indicators of spectator scientific citizenship include general interest in S&T, awareness of biotechnology, and factual knowledge of biotechnology. These indicators concern the passive appropriation of genetic technologies as an issue of importance *for* everyday life. Indicators of participatory scientific citizenship include engaging in discussions with family and friends about biotechnology, the inclination to engage in public debates / hearings concerning biotechnology, and the inclination to seek information by reading articles or watching programmes on the advantages and disadvantages of developments in biotechnology. These indicators concern the active appropriation of genetic technologies as an issue of importance in everyday life. Combining various surveys allows for examining the indicators over time.

Results

Over the last years, interest in S&T, awareness of biotechnology, and factual knowledge of biotechnology in Denmark has increased. The share of citizens that report interest in S&T has significantly increased from 57% in 1997 to 75% in 2000. From 1997 to 2000 the awareness of biotechnology, measured as unprovoked mentioning of biotechnology when describing associations to S&T, increased from 11% to 25%. Similarly, the mean score on a 0-9 scale biotech knowledge index rose from 5.78 in 1996 to 5.87 in 1999 and has recently been measured at 5.98 in 2002. These figures suggest that Danes increasingly consider biotechnology relevant for their lives.

Yet, the fact that Danish citizens have a relatively subtle insight in biotechnology, which is also observed in cross-country comparisons, does not necessarily imply that scientific citizenship is in accordance with its democratic potential. Citizens recognize and appreciate the importance of biotechnology *for* their lives, but the indicators for participatory scientific citizenship seem to tell a somewhat different story. The share of respondents, who report having engaged in discussion about biotechnology prior to the interview decreased from 53% in 1996 to 50% in 2002. Citizens were also less inclined to engage in public debates or hearing in 2002 (44%) compared to 1999 (53%). Finally, making a dedicated effort to read an

article or watch a programme, in order to better grasp advantages and disadvantages of developments in biotechnology seemed less attractive in 2002 (77%) than in 1999 (83%). The active appropriation of biotechnology, in which biotechnology figures as an element of importance *in* the daily lives of citizens is thus modestly declining.

Conclusions

In Denmark, new arenas for public participation in decision making processes concerning biotechnology offer a democratic development towards participatory scientific citizenship. Yet, survey results indicate that while Danish citizens tend to be increasingly aware of biotechnology from a spectator position, the level of active engagement is modestly decreasing. In order to strengthen the level of inclusion and ensure that scientific citizenship meets the promises it holds, the new arenas of public participation must be further cultivated.

Notes

1. Eurobarometers 46.1, 52.1, 58.0 and two Danish studies (1997 and 2000) are applied. It should be observed that the reported results cover disparate time spans due to changing items in the surveys.

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Parallel Session 29: Is it a real social participation in GMO discussion?

FRAMING BIOTECHNOLOGIES IN GREECE

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Abstract

In this paper we will attempt to scrutinize the framing of biotechnologies in Greece, where the debates over biotechnologies have been following rather than leading their counterparts in other European countries. Initially, public awareness about the applications of biotechnologies has not been comparable to that of other countries of the European Union. In fact, the Greek public has been by and large uninformed of the innovative biotechnological applications until the mid 1990s. Curiously, the initial unawareness about these issues in the early 1990s has not been translated to negative public stance towards biotechnologies. Nevertheless, the increased media coverage of issues such as the cloning of Dolly has ignited public debates. Subsequently, it has been the permission for experimental cultivations of GM crops in Greece that provided to NGOs and consumers' organisations the opportunity to set the agenda in terms of protest mobilisations leading to a suspension of these cultivations. Subsequently, the Greek government has been trying to incorporate the EU directives rather than making attempts to promote public engagement with biotechnologies.

Our aim will be to give a picture of both the impact of the novel applications of biotechnologies on the Greek society and the public responses to it. For this purpose, we will provide an account of the public debates about biotechnologies in Greece during the 1980s and the 1990s. We will focus on the key decisions in regulating biotechnologies as well as on issues pertaining to public engagement with biotechnology in Greece, such as the agenda setting role of the actors involved in policy-making, the formats of participation and the framing of issues, expertise and the publics. To accomplish this we are going to utilise the results of a survey of a Greek daily newspaper's articles concerning biotechnologies.