TO TRUMP THE PASSIONS:

The use of scientific knowledge in the introduction of new gene technologies in Europe

Finn Hansson, fh.lpf@cbs.dk
Maja Horst, mh.lpf@cbs.dk

Both from
Department of Management, Politics and Philosophy
Copenhagen Business School
DK-2200 Copenhagen N.

Paper submitted to Rio 2000 Third Triple Helix International Conference,
Rio de Janiero 26-29 April 2000

Keywords: risk society, risk assessment, scientific knowledge, GMO, biotechnology, knowledge society.

Abstract:
In June of 1999, several EU nations issued a joint declaration stating their intention to "take steps to insure that any approval for the sale or release of GMOs in Europe will be suspended." This declaration is the basis of what has come to be known as the "de facto moratorium" on genetically modified organisms in Europe.

In this paper we examine how scientific knowledge is used by proponents and opponents of gene technology in the context of European agricultural policy. We examine two broad categories of knowledge application in this sphere. On the one hand, scientific knowledge is used in the endeavour to "conquer nature" – that is, the uncovering of biological mechanisms that make possible the design of agricultural products (usually by way of engineering seeds that produce plants with specific traits.) On the other hand, scientific knowledge is deployed in political and cultural contexts in the endeavour to "conquer minds" – that is, support for both the ongoing research and the ultimate application of that research in the production of new crops must be garnered in the public sphere. The current state of public discussion on the issue of genetically modified organisms (GMOs) is illustrative of the way in which these two spheres interrelate.

We will argue that both sides uses scientific knowledge in a way that does not acknowledge the social changes in relation to the production and use of scientific knowledge in modern society - a global risk society.

Introduction:

In a 1997 speech to the International Grains Council, U.S. Secretary of Agriculture Dan Glickman, expressed his concern with the state of public opinion in Europe on biotechnology. "I know that biotechnology is an extremely sensitive issue here in Europe," he said, adding that he had been "pelted with genetically-engineered soybeans" at the World Food Summit by protesters who "then took off all their clothes to draw the media's attention." This was "not likely to occur in [his] country," where "sound science is the sole arbiter of our public health decisions." He stressed that "food safety is an area where Americans feel that government does an outstanding job in looking out for them" and that this is the case "despite the public's growing cynicism towards government." Glickman expressed the "utmost respect for consumers here in Europe" and their "healthy scepticism" but he stood firm in his belief that "sound science must trump passion" in the case of biotechnology. This can also be taken to mean that in Europe passion has as yet trumped sound science, leading to the current EU moratorium on GMOs.

On Glickman's view, we know enough about genetic engineering to go ahead, on a foundation of "sound science", with the conquest of nature. The problem in Europe lies with the conquest of minds – or, in his phrase, the trumping of passion. Glickman, and other proponents of biotechnology, deploy scientific knowledge to solve this problem, using arguments such as "The best scientists in the world have shown these means to be safe." This argument is normally combined with (often quite passionate) appeals to the potential benefits of biotechnology, for example: "...researchers are working not to boost farm incomes, but to save the lives of their people."

Glickman's efforts to trump passion with science has to be understood in the light of the particular attitudes towards biotechnology and food held by the different European publics. And whereas Glickman is undoubtedly right in assessing the Europeans as sceptical towards GMOs we are less sure of the fruitfulness in diagnosing this attitude as a mere problem of educating the public with "sound science". This is an argument, that we will develop with respect to the Danish public - one of the most sceptical in Europe in regards to food safety and biotechnology - as an illustrative example.

Europeans in general exhibit widespread scepticism with respect to the food they buy. This can be seen clearly in a Eurobarometer survey (1998) about the attitudes of consumers towards food safety:

> Indeed, eight out of ten consumers call for more and stricter controls, particularly at the production stage. Producers are considered least credible when it comes to telling the truth about food. Similarly, consumer

> associations are considered the most trustworthy, one out of two consumers having confidence in them.
>
> At any rate, on average, one out of two consumers considers food to be safe when it contains neither pesticides nor hormones and when it is controlled by competent bodies.
>
> In general, there is a relatively low level of confidence in producers, whether because of the information they provide about the product or, more importantly, because of the fact that they sell products that are profitable, but not safe. (Eurobarometer 49 - Food safety, 3.9.1998)

This clearly skeptical attitude with respect to food safety and information follows the general tendency shown by an earlier survey (Eurobarometer 44-3, 1996). This earlier survey also showed, that there is no simple relationship between a public being sceptical and a public being more or less knowledgeable. For instance, while the Danish public is relatively knowledgeable, it is at the same time rather sceptical compared to other European publics. So regardless of the fact that the Eurobarometer surveys are saddled with a number of methodological problems, and the fact that they in 1998 didn't directly address the issue of GMOs, it is impossible to interpret these results as anything other than an expression of a popular skepticism that also includes GMOs. What we will follow in this paper is therefore the question of how to begin to understand the connection between scientific research and public attitudes towards GMOs. We have chosen Denmark as an illustrative example.

Mass media arguments – the Danish debate:

A great deal of attention has been directed at GMOs in the Danish mass media making it a hot issue in both news and op/ed pieces. The analysis does not cover all such contributions, but it can be considered a pilot study in which we have focused on contributions to the GMO debate in two Danish newspapers during 1999[1]. In particular, we have looked at how proponents and opponents of gene technologies use arguments based on the distinction between "scientific knowledge" and "passion", and what conception of research and scientific knowledge their arguments imply. Our aim has been to present the sorts of arguments that appear in the media, not to trace them to their possible source prior to the effects of the practices of professional journalism. This is not because we believe these practices to be irrelevant, but rather because our aim is to *describe* the arguments that appear not to *explain* their appearance.

It should also be noted that we do not attempt to assess the correctness or truth of the arguments presented. We will attempt only to show how they are brought to bear on the debate. In other words, we are

not making claims about the opinions of opponents or proponents of gene technologies, but only how those opinions look as they appear in the media – after the aforementioned journalistic practices. Finally, our description will naturally not be exhaustive; it will merely illustrate certain aspects of the use of scientific knowledge in the GMO debates.

In Denmark, the primary proponents of biotechnology are the companies and scientists involved in GMO research. These generally argue within an interpretative framework conditioned by hope for the future. Science plays an important role in the creation of this future by contributing tools for the control of natural processes. The problems associated with biotechnology are presented largely as technical ones, to be resolved by further research. They are generally optimistic about the possibility of creating a better world by means of biotechnology, and the advantages are said to be both of an environmental and an economic kind.

It is characteristic that this vision of the future makes references to as yet non-existent technologies, but the development and implementation of which are taken to be just a matter of time. The technological futopia is presented as unquestionable – a natural consequence of continued research.

The scepticism with respect to GMOs is, accordingly, presented as a transitional phenomenon – a residual of the past, not a symptom the future; something which will disappear as the technology progresses. Science and technological progress is thus possessed of its own rational justification and is in no need of external justification. As soon as consumers see the enormous possibilities of biotechnology their opinions will automatically change:

> Children's fashions for geneplants haven't been particularly stylish. All that talk about Roundup and Basta has hurt the cause. But if we start getting wheat without gluten, so that people with allergies can eat it, and plants that are resistant to the most widespread plant diseases such as the fungi in potatoes, then its something altogether different. (Interview with an agricultural consultant in *Information* 9/9, 1999.)

One particular variant of the argument based on technological hope centres on solving the problems of third world hunger. It is often pointed out that the enormous growth of the world's population demands the development of new high-yield crops, and references to the "green revolution" of the 1960's is used as an argument for this solution. There is talk of "moral necessity" and "the fight against hunger" and "saving the hungry of Africa". The opponents, accordingly, are described as reactionary extremists who, with their opposition, prevent "science" from helping the developing world. They put themselves in the way of progress

– the development of a good society – by preventing the realisation of the research's potentials.

Opposition to biotechnology becomes almost immoral in this connection. It is suggested that "we can't allow ourselves to reject genetically modified foods if they are healthier and cheaper" and that "it is the environment which will lose out if we don't accept the new plants." The proponents generally interpret the scepticism of the opponents as an irrational fear founded in ignorance. This fear is presented as something that can be conquered with cogent arguments and by informing the public. The proponents point out that this is not the first time a new technology has been met with resistance in the early stages, and that this resistance will hopefully subside when consumers realise what the advantages of biotechnology really are. Because science is essentially rational, it will automatically convince the opponents. Resistance will therefore disappear with time and the appearance of even more obviously advantageous GMOs. This process can be encouraged with the use of cogent arguments and information:

> [Right now] it is about feelings but at some point it's got to be about the facts if we're ever going to get to the bottom of things in the discussion: How dangerous is it? Of what use can it be? What are the costs if we reject gene modification?" (Interview with a product manager in *Politiken* 2/6 1999.)

In sum, it is a persistent characteristic of the arguments of the proponents that it rests on an optimistic conception of science as a means to obtain a better world through the conquest of nature. The development of genetically modified plants solve a number of problems which we are faced with today – pesticide pollutants, hunger, allergies – and the fact that these solutions are based on science is presented as a kind of guarantee that they are rational. If there are problems it is because we lack research and technological progress – not a sign that we should stop that progress in its tracks.

In stark contrast to this optimistic vision about the role of science in building a better society, the opponents of biotechnology base their rhetoric on a fear for the future and the intractable consequences of the development of gene technologies. Instead of seeing technology as the solution to social problems, it is presented as the very core of those problems. New technologies create new problems even if they may solve old ones. The general interpretative framework, then, concerns the fact that we don't know enough about the long term consequences and risks that arise in connection with the technology. Some of the arguments focus on

the idea that changing inherited traits means changing something fundamental about life. Something we should not play with:

> Genetic engineering is experimentation with our planet. It may lead to irrevocable and intractable damage to nature and human beings, and we have no way to change our minds after the fact. (*Politiken*, 22/3 1999)

This type of argument, which explicitly or implicitly describes the application of biotechnology as a gigantic scientific experiment is very ubiquitous among the opponents. It is suggested that the development of gene technologies will turn the world into a giant laboratory in which the experiments are uncontrollable and impossible to stop once they have been set in motion. The opponents' conception of scientific rationality is fundamentally different from that of the proponents. In the eyes of the opponents, the researchers have only a limited ability to predict and control, and therefore only limited rationality. This limited rationality is seen as being in glaring contrast with the wide-ranging consequences that gene technologies can bring. The opponents, thus, do not share the proponents' optimistic perception of the inherent rationality of technological progress. On the contrary, the rationale of the opponents' arguments is that the risks associated with a global technological experiment are far too great to be justified by the advantages of GMOs.

It is worth noting that the rationale behind the creation of scientific knowledge is not often put up for discussion. The opponents, too, use scientific arguments when they justify their fear of intractable and irreversible negative effects on people and nature. One case is the notion of "ecological pollution" in which it is suggested that GMOs may spread their genes to non-GMOs by the ordinary biological mechanism of proliferation. This argument is often accompanied with scientific evidence about the ability of plants to pollinate kindred species (and weeds) and the range over which pollens can be spread. Scientific evidence is also used to back up claims that if the use of Roundup-resistant crops leads to overuse of Roundup, then weeds too may very quickly develop resistance to Roundup.

Science or passion?

We cannot, then, find support for the claim that opponents don't use or understand scientific rationality. But in contrast to the proponents the opponents only ascribe scientific knowledge a limited rationality. They harbour a more sceptical attitude with respect to scientific knowledge. It can be argued that in contrast to the picture of the opponents painted by the proponents, the opponents actually attempt to understand dangers, utility,

alternatives and costs. They simply assess and interpret risks and advantages differently. In our eyes, the lines of division between opponents and proponents do not run between accepting and rejecting scientific rationality, but between the answers to two rather different questions. First, Who appears as a trustworthy representative of scientific rationality? And second, how broad is the sphere of application for scientific rationality?

In regard to questions of trust, it is remarkable how the opponents distinguish between different forms of scientific rationality. On the one hand, there is lack of trust in the scientific authority found in biotechnology companies. Scientists employed by industry are portrayed as working entirely in the service of an economic rationality. And it is commonly argued that precisely because it is private economic interests that drive research in biotechnology, this research should be considered suspect. On the other hand, there is nothing to suggest that opponents harbour mistrust of publicly funded research, which is often what they demand more of. It is possible to interpret their arguments as a denial that privately funded research into the risks of biotechnology is supported by scientific rationality in any way.

In regard to the sphere of application for rationality, we note that the opponents' primary critique of the proponents is that their risk assessments are far too narrow. They accuse the proponents of not taking long term effects into account, whether as a human health concern, or as a concern about the continuing use of chemical herbicides, biodiversity and transfer of resistance. They proceed from fears about the rise of new problems instead of accepting the proponents' hopes about solutions to old problems. While the proponents focus on enormous possibilities, the opponents focus on enormous risks. Conversely, while the proponents suggest very small risks, the opponents' assessments point to limited future possibilities.

A fundamental difference between the two types of argumentation lies in their approach to the unknown. Or differently put, how each party interprets and assesses uncertainty in connection with research and technological progress. When the basic assumptions are centred on hope for the future, uncertainty is interpreted as opportunities fore great strides forward. This is the case with the proponents of GMOs. But if research and technological progress are understood in terms of the risks they bring, then the same uncertainties are interpreted as signs not to move forward with the new technology.

The debate about the application of GMOs, which we have exemplified, has escalated dramatically in Denmark and the EU. It is played out as an irreconcilable struggle between proponents – normally

large corporations – and opponents – environmental organisations, consumers, and a number of politicians. The arguments for and against are complicated and not free of contradictions and paradoxes. Proponents deploy arguments in full confidence that their scientific foundations provides all the certainty it is reasonable to demand. Opponents, meanwhile, demand more knowledge, express mistrust of corporate knowledge, and sometimes link this to doomsday scenarios for the future.

Scientific knowledge in a risk society:

Vi have up to this point focused on the content of this debate as presented in the media. Its unusual durability in the press gives us good reason to conclude that it is of concern to a great number of people. We will in what follows attempt to incorporate sociological theory – not because our aim is to justify or corroborate the above investigation, but instead to include a broader perspective on the problems that are highlighted in the public debate. In particular, we want to shed some light on the relationship between science, risk assessment and society. By using sociological theory – a theory of the risk society – we can attempt to get further into the complicated explanatory structures and logic which have conditioned the debate.

Based on the above cited Eurobarometer investigation about the attitudes of consumers to food safety, we conclude that there is a broad public scepticism about food safety in Europe. As this paper shows, GMOs are also subject to this scepticism. There is a general lack of trust in the information that producers provide consumers about their products. The existence of these attitudes can seem surprising in light of the intensive campaigns and wide media coverage which have attempted to show that gene technologies are safe and that science stands behind this conclusion. But the extent of popular scepticism or uncertainty in the areas of food safety – an uncertainty which is confirmed again and again by one case after another about dangerous foods, BST, salmonella, etc. – is presumably the reason that the EU has begun a process of revising and tightening the rules for control and approval of food products. This, in response to the public debates.

The theory of risk-society (Beck 1992, 1999) provides us with some important starting points for an understanding of the social conditions which the above is a part of. A very important feature of the risk society is the consequences which are drawn from social and political experience with the unforeseen and often catastrophic results of applied science and technology in industrial capitalism. The unforeseen results have blazed a dramatic trail since the second world war from Bhopal to Chernobyl. The

most important consequence of this is probably that the traditional status of science as unquestionable knowledge, knowledge which represents the final truth in a particular area, is changing and declining in clear opposition to the scientific and technological optimism which characterises industrial capitalism. Public discussion and confrontation between experts and counter-experts over the interpretation of scientific knowledge and its consequences, and the increasing use of alternative expert opinion and surveys in public debate by social movements and organisations are signs of the softening of structure of authority within science and of a lack of social and political trust in this knowledge. As Beck notes,

> The crucial issue of reflexive modernization, however is this: how do 'we' (experts, social movements, ordinary people, politicians, not to forget sociologists) deal with our unawareness (or inability to know)? How do we *decide* in and between manufactured uncertainties? (Beck 1999 p. 13).

One of the perhaps surprising consequences of this uncertainty is that the experts who mediate the application of knowledge in the public and political sphere themselves play an increasing central role in the political process. Beck points out that this process is rife with contradictions. Different experts oppose each other and virtually challenge each other's scientific authority. This is in perfect accord with a demonstration of the limits of the sorts of solutions provided by scientific rationality. It therefore opens the public's understanding to the possibility that scientific knowledge is not as certain as it traditionally has been taken to be and that alternative forms of knowledge are possible.

The critique of scientific knowledge is thus accompanied by an increasing acceptance of local, 'popular' knowledge, lay knowledge, which is locally based and has no pretensions to universality (Wynne 1996b). It can exist among 'ordinary people' and is developed through experience and dialogue. As Brian Wynne writes,

> . . . a general reason for possible divergence between expert and public knowledges about risks is that expert knowledge embodies social assumptions and models framing its objectivist language, and lay people have legitimate claim to debate those assumptions. (1996a, p. 59)

One explanation for the fact that this situation gains more and more weight lies in the increasing indvidualisation of the risk society. This in turn has been due to a number of changes in the social structure of society – classes, family patterns, career choices, traditions, norms - are undergoing changes so as to lose importance for the way in which the individual organisers her own life. The individual gains extensive freedom to plan her life. But this

freedom brings with it a feeling of risk and uncertainty which reaches deep into her daily activities in the form of demands to take stances on a variety of issues. High levels of education in western welfare societies, which is a precondition of this individualisation, is at the same a cause of the decline in the traditional trust in scientific authority. The basis for optimism about technology is thereby also undermined.

The extent and intensity of the public debate about GMOs has, of course, much to do with the central role of food in daily living, and its connection to a series of historical, cultural and, not least, psychological dimensions which call on the public's interest. But it is at the same time the case that discussion among experts and the production of new knowledge has taken place within a very narrow and traditional scientific discourse.

The dominating approach to risk assessment of genetically modified food has been to place the burden of proof on those who claim the product to be unsafe. But there are often no trustworthy methods for establishing the effects of a product on the environment, and time is rarely set aside for testing over the long term. This means that it is difficult to find examples of risk assessments based on the classical canons of scientific rationality, such as Popper's falsification principle. It is much more often the case that testing and application of new products are tightly interwoven. This is in part due to the enormous costs of developing the technology, and of applying it. Development of new products in fact often presupposes their production. In such a situation, the expert is on unsure ground and can be considered almost a layman, who cannot be held responsible for his mistakes. The result is what Beck calls "organised irresponsibility" under the banner of scientific justification. This almost ideological invocation of scientific authority, used both by public institutions and multinational corporations, is often met with a critique that simply points out the thin scientific basis behind the invocation. The thinness of the scientific basis in relation to the arguments they are supposed to support seem to have completely escaped the internal self-conceptualisation of science.

Beck has stated a fundamental issue that society faces in what he calls "the second modernity" as follows:

> To repress or to acknowledge knowledge (on *all* sides), that is, the Hamlet question which is being posed on the dividing line of the second, non-linear modernity.
>
> In contrast, a double construction of unawareness characterizes linear modernization. First, *other* forms of knowledge are blocked out and rejected, and, second, we deny our own *inability* to know. This applies not just to experts, but to activist movements as well. The former stands with

> their backs to the future and operates in the false self-assurance that comes from having denied their unawareness. The latter dogmatize their (un)awareness for purposes of political intervention. It is precisely this admitted uncertaincy which opens the context of action for industrial modernity. Both groups would have to look at themselves from outside, so to speak, in order to understand and shape reflexive modernity's horizon of uncertaincy in constructive political terms.
>
> Both issues of second modernity - the deliberate acknowledge of outside perspectives and rationalities, on the one hand, and the explicit working out and processing of unawareness, on the other, - have not really become an issue so far. (Beck, 1999, p.131)

This criticism is directed towards the exclusion of those political and social factors which surround the application of scientific knowledge in the traditional narrow forms of applied science and risk assessment, in situations where the rational foundations of scientific inquiry have been such that laboratory testing has been replaced with assessments of the risks of immediate application. The focus on the social use of scientific knowledge in risk societies not only questions the authority of science and experts but has taken the process of decision making from closed offices in business and state bureaucracy to a much more open political debate. And a large part of the uncertainty in the argumentation for and against GMO technology is a result of this radical change of the authority of science.

Conclusion:

To the extent to which scientific knowledge and its dissemination encounter difficulties in managing the vague boundary between knowledge and non-knowledge in a risk society, and to the extent to which this boundary is connected to a 'manufactured uncertainty' in which scientific rationality is ill suited for distinguishing between the development and application of experimental knowledge, we may expect the invocation of scientific knowledge in public debate to assume an ideological character. This may block or slow down the application of scientific knowledge and technology.

---

[1] The analysis draws on 216 newspaper articles and op/ed pieces from the period January 1, 1999 to November 30, 1999 from two Danish newspapers, **Politiken**, a newspaper with a large nation-wide circulation and a traditional social and liberal profile and **Information,** a much smaller newspaper with an intellectual affiliation and a marked critical interest in debates on technology.

References

Beck, Ulrich and Wolfgang Bonss 1989. "Zum Strukturwandel Von Sozialwissenschaft Und Praxis. Ergebnisse Und Perspektiven Der Verwendungsforschung." Soziale Welt 1/2.

Beck, Ulrich 1992. "Risk Society.Towards a New Modernity." London: Sage.

Beck, Ulrich and Elisabeth Beck-Gernsheim 1995. "The Normal Chaos of Love." Cambridge: Polity Press.

Beck, Ulrich 1999. "World Risk Society." Cambridge: Polity Press.

Glickman, Dan 1997. “Remarks.” Press Release no. 0196.97, International Grain Council. London

INRA (EUROPE) - European coordination office 1998. "La Securite Des Produits Alimentaires." La Commission Europeenne,Direction Générale XXIV.

INRA (Europe) European Coordination Office 1998. "Eurobarometer 49 - Food Safety." European Commission DG24.

Wynne, Brian 1996a. "May the Sheep Safely Graze? A Reflexive View of the Expert-Lay Knowledge Divide." in *Risk, Environment and Modernity. Towards a New Ecology*. Lash, Scott, Bronislaw Szerszynski, og Brian Wynne (eds.) . London: Sage Publications.

Wynne, Brian 1996b. "Misunderstood Misunderstandings: Social Identities and Public Uptake of Science." in *Misunderstanding Science? The Public Reconstruction of Science and Technology*. Wynne, Brian og Alan Irwin (eds.) . Cambridge: Cambridge University Press.