

STAGE (Science, Technology and Governance in Europe)

Discussion Paper 3

June 2004

Changing Modes of Biotechnology Governance in Denmark

Jesper Lassen

*CENTRE FOR BIOETHICS AND RISK ASSESSMENT/ DEPARTMENT OF HUMAN NUTRITION, ROYAL VETERINARY AND
AGRICULTURAL UNIVERSITY, COPENHAGEN DENMARK. ROLIGHEDSVEJ 30, DK 1958 FREDERIKSBERG C.*

E-MAIL: JLAS@KVL.DK - PHONE +45 35 28 26 21

STAGE is a thematic network under the Fifth Framework Programme (HPSE –CT2001-50003). STAGE gratefully acknowledges the support of the European Commission

Introduction

The introduction of the so-called new biotechnologies offers a unique opportunity to study science and technology politics. Not only were the new technologies worldwide in the sense that the research infrastructure made the new knowledge available to those who wanted to utilise it; but this simultaneous arrival of new knowledge and its application in research and development called for political strategies in many sub-areas. These policy developments took place nationally, regionally and internationally, and although biotech policies were not developed simultaneous in each region or nation – few, if any, nations in the western world have been able to ignore this development.

The purpose of this paper is to uncover the characteristics of the Danish reception of the new biotechnologies. More precisely it discusses to what extent different governance strategies in relation to biotechnology can be traced, and suggests explanations of such changing governance strategies. This analysis of different modes of biotechnology governance is structured around the analytical frameworks developed by Hagendijk & Kallerud¹. One focal point has thus been an analysis covering different arenas, where governance and its effects can be observed. Among important arenas included in this study are the Danish parliament, the public, NGOs and business. A second focal point has been the institutional and structural constructions the new biotechnologies have been imbedded in. And a third and final focal point for the analysis has been the development of the dominant discourses dealing with biotechnology. The foundation for the latter interest is the observation made by many that the dominant discourses set the frames for politics². As I will show in the following, this by no means is the same as claiming that dominant discourses necessarily are reflected in the politics: the reception of biotechnology in Denmark tell a different story, namely that strong public discourses for a long time coexisted with a policy discourse with a different content. This part of the analysis also draws upon the research into the role agenda setting and the importance of the framing of issues as they have been discussed by Cobb & Elder³.

¹ Hagendijk, R. & Kallerud, E., 2003, Changing conceptions and practices of governance in science and technology in Europe: A framework for analysis. STAGE discussion Paper 2. March 2003.

² See e.g. Fisher, F., 2003, *Reframing public policy. Discursive politics and deliberate practices*. Oxford, p.23

³ Cobb, R.W. & Elder, C.D., 1972, *Participation in American politics. The dynamics of agenda-building*. The John Hopkins University Press.

1. Science and technology policy in Denmark – a brief overview.

The successful industrialisation of agricultural production and food processing in the late 19th century made the agri-food sector one of the most important economic foundations for the development of the Danish welfare state⁴. This success was *on the one hand* based on the development of a particular Danish enlightenment tradition drawing on the ideas of, among others, the philosopher and priest N.F.S. Grundtvig. One outcome of this process was compulsory primary school training, which secured a basic level of skills, and a system of people's high schools disseminating more contextualised knowledge. However, most important in this trend was probably the emergence of a strong co-operative movement. Taken together these developments facilitated a new mode of organisation of agricultural and food production, where (typically) primary producers joined forces and invested in production facilities like dairies and abattoirs. *On the other hand* the success of the agri-food sector was also based on an openness towards new innovations and techniques, securing large-scale production of homogeneous products.

Common for much of this successful production was the reliance on the understanding of biotechnological processes and the importance of controlling not only the breeding of animals and plants, but also the recent discovery of the role of micro organisms as starter cultures in the production of foods such as bacon, beer, cheese and butter. The incipient biotechnological awareness led to the establishment of areas of research into mechanisms of importance for the control of living organisms in production; a knowledge that was applied not only directly within the agri-food sector, but also constituted the basis of production of industrial enzymes and pharmaceuticals. Hence what could be conceptualised as a first generation of biotechnology was an important factor in Denmark already in the beginning of the 20th century, materialised in companies like Novo and Carlsberg or brand names like "Lur Brand Butter" or "Danish Bacon".

Denmark maintained this status of primarily an agricultural country with an important food industry until the mid 20th century. In the post war period the industrial sector grew in importance and today the agricultural sector accounts for as little as 10-11% of the total Danish exports⁵. Along the transition from agriculture to industrial production, the agri-food sector also underwent radical changes resulting in a dramatic concentration of primary as well as food production, making the sector increasingly dependent on scientific knowledge - in sum industrialising agricultural as well as food production.

Like in many other western societies experiencing similar developments, this resulted in an increasing awareness of the side effects of the industrialised production. A growing environmental consciousness commencing in the early 1970s was among the first ex-

⁴ For an introduction to the development of the Danish welfare state see: Søndergaard, J., 2000, "Velfærdsstatens udvikling i det 20. århundrede og perspektiverne for det 21", *Nationaløkonomisk Tidsskrift*, no. 138, p.24-39.

⁵ Danmarks Statistik, 2003

pressions of such reflections over the consequences of the industrialised society.⁶ During the 1970s and 1980s the new consciousness led not only to a critique of the industrial production, consumption and other aspects of the modern industrialised society among individuals, but it was also organised in a plethora of environmental, consumer and other critical movements. The aims of these, mostly new, organisations varied from enlightening the public and engaging in the political processes related to techno-scientific issues, to the practical acting out the new awareness in new ways of organising everyday life and production of alternative products such as organic foods or wind-mills.

Although the social movements play an important role in the science and technology politics, Danish NGOs have rarely employed radical forms of action, but chiefly played after the rules using strategies of information, lobbying, happenings and other legal activities. Compared to other countries, like the UK or Germany, illegal actions including physical boycotts or destruction of property are thus rarely seen, and when these methods are applied, they are often of more symbolic character, seldom causing severe conflicts. Hence NOAH (later FoE-Denmark) which largely followed a strategy of information and attention creation; and the more traditional lobby oriented Society for the Conservation of Nature were the two dominant environmental organisations throughout the 1970s.

The growing awareness of the side effects of the industrial society was, however, also expressed as (or led to) changes in techno-scientific policies. Prominent examples were the adoption of an environmental act in 1974 and the abandonment of nuclear energy in 1982 following ten years of public debate. Two accounts on technology assessment for the Ministry of Industry produced in 1984 express, however, an interest in a more fundamental shift in the techno-scientific. In these accounts the discretionary governance strategies of the past are challenged, by the outline of a deliberative model, where decisions are taken after careful assessments actively involving stakeholders such as interest organisations, the industry and the general public. Despite opposition from the Conservative-Liberal Government coalition governing Denmark throughout the 1980s, the ideas of the new governance model had some impact on Danish politics in the 1980s. Not least owing to the red-green majority in the Parliament, who on several occasions forced the Government to accept a shaping of regulation or institutional constructions, carrying out fundamental ideas of deliberation and technology assessment.

Among the institutional outcomes of this new twist in science and technology politics was the establishment of the Danish Board of Technology (*Teknologirådet*) and the Ethical Council (*Det Ethiske Råd*); institutions that both undertakes an advisory function in relation to the Parliament and stimulate public debate on different aspects of science and technology. The Danish Board of Technology has furthermore played an important role in the development of participatory arrangements facilitating public engagement in techno-scientific politics. The most famous example is perhaps the so-called consensus

⁶ For an overview see: Jamison et al, 1991, *The making of the new environmental consciousness. A comparative study of the environmental movements in Sweden, Denmark and the Netherlands*, Edinburgh University Press, Edinburgh, p.66-120.

conferences, where the intention is to transfer the control of the agenda for technology assessment from experts and policymakers to a panel of lay people.⁷

In addition to this a number of concrete technology assessment projects were carried out, some of these taking place within the frames of the Technology and Society Inactive of the Social Scientific Research Council⁸. A side effect of these research initiatives in the 1980s was the tentative establishment of a scientific discipline dealing with technology assessment and different methods of public engagement in science and technology politics - a field that by and large vanished as the financial sources dried out in the early 1990s⁹.

In the beginning of the 1990s a new trend appeared in Danish science and technology politics: the involvement of the public as consumers in a model of market governance. A first sign of this was seen in 1993 when organic foods were removed from a life of obscurity. Almost explosive sales rates were the result of a coalition between a major producer of organic foods (*Svanholm*) and the Danish Co-op retailer (*FDB*). The experience from the growth in organic purchase, sales and production was that consumption matters; that consumers through targeted purchase could influence the way food was produced. This experience taken together with the successful expression of consumer power in the Brent Spar controversy in 1995, resulted in a focus on consumers as a political force in general, and in relation to S&T politics in particular. This emergence of politicised consumption can e.g. be observed in environmental politics, where a new strategy, the so-called green procurement strategy (*den produktorienterede miljøindsats*) developed by the Ministry for Energy and Environment, stressed the importance consumers green market behaviour in environmental politics¹⁰. This can be seen as a tendency to a marketisation of elements of the decision making in some aspects of science and technology.¹¹

The new biotechnologies encompassing the genetic technologies such as genetic engineering and cloning were introduced to the Danish society in the turbulent years of Danish science and technology politics in the 1980s. On the one hand this made them guinea pigs to the new modes of governance, but also subject to scrutiny, debate and assessment of a hitherto unprecedented nature. On the other hand the technologies themselves, by virtue of their transcendent nature, indeed also contributed to the demand for new and more deliberative modes of governance.

Bearing these general lines in mind, the following will discuss the development of governance strategies addressing the new biotechnologies in Denmark. The discussion will

⁷ For details on The Danish Board of Technology and its methods see: www.tekno.dk

⁸ Cronberg, T. & Friis, D. (eds), 1990, *Metoder i teknologivurdering – erfaring og fornyelse*. Blytmans Forlag, København, p.11ff.

⁹ Løkke, S. & Lassen, J., 2001, Teknologivurdering – Et tomrum skal udfyldes. *Løke*, vol. 19(3), p.14-16.

¹⁰ Miljøstyrelsen, 1996, *En styrket produktorienteret miljøindsats*, Miljø & Energiministeriet, København.

¹¹ For an overview of politicised consumption see: Halkier, B., 1999, Consequences of politicisation of consumption: The example of environmental friendly consumption practices. In: *Journal of Environmental Policy and Planning*. 1, 25-41.

follow a period by period analysis based on the identification of shifting tendencies in biotechnology governance. As it will appear, these periods largely coincide with stages of biotechnological development and the above-discussed general trends in governance, moving from a discretionary model towards a model more open to deliberative ideas and a new role of consumers and the market.

2. Biotechnology? None of our business! – The years between 1972 and 1981/2.

Following the announcement of the first successful gene transfer in 1972, biotechnology moved in the subsequent years from a purely theoretical idea established on the discovery of role of the gene as a key element in the heredity of characteristics; to a practical stage, utilising this insight in research, human therapeutics and material production. As a result still more research into mechanisms of gene transfer and practical applications of these was carried out in a number of countries across the world – the centre of gravity, however, being in the US.

These were also the years of a beginning of public and regulatory attention to the new biotechnologies¹². First of all the new techniques caused some stir inside the international scientific community resulting in debates over the ‘recombinant DNA molecules’, at first taken up at the first so-called Asilomar conferences in 1973, and later at the second Asilomar conferences in 1975 where the biotechnological scientists imposed on themselves a temporary, voluntary, moratorium on genetic research. Alongside this acceptance of responsibility by the scientific community the first regulatory initiatives saw the light of the day – starting with the NIH-guidelines in the US¹³.

To the Danish public these events, however, seemed remote. They were not only taking place across the Atlantic, but no Danish companies were publicly known to have plans of applying biotechnology in their production, as only a few researchers openly announced that they were involved in genetic research. Although the major international events, like the first gene transfer and the Asilomar moratorium, made their way to the Danish press, media accounts were scarce¹⁴. In sum, the biotech-issue cannot be regarded as an important public issue during this period. This may also be explained by the absence social movement organisations, which, if they had taken the issue up, could have pressed for debate and political action as they successfully were doing in relation to other problems arising in the technology-society sphere.

¹² The term ‘biotechnology’ will be used referring to the number new technologies based on the new insights in to the function of the genes, the role of enzymes etc. As such the term cover alternative, but not synonymous, terms such as ‘genetic engineering’, ‘genetic manipulation’, gene splicing’, etc.

¹³ For an overview of the development of biotechnology regulation in the 1970s and 1980s, see: Cantley, M.F., 1995, The regulation of modern biotechnology: A historical and European perspective, in: Brauer, D. (ed.), *Legal, economic and ethical dimensions*. VCH. 505-565

¹⁴ Jelsøe, E. et al., 1998, ”Denmark”, in: Durant et al. (eds), *Biotechnology in the public sphere. A European sourcebook*. Science Museum, London, p.29-42

This relative inactivity in the public sphere was mirrored in the level of attention assigned to biotechnology in the Danish Parliament and public administration. Interestingly the first real initiative to survey and regulate the field did not come from the political sphere, but was taken by the research councils, who in 1976 initiated the so-called Registration Committee Regarding Genetic Engineering (*Registreringsudvalget Vdr. Genetic Engineering, RUGE*). A central activity of RUGE was to coordinate registration of research into and application of genetic engineering. This registration was however voluntary to researchers and industry and, in order to encourage registration, all information was kept secret from the public. Apart from coordinating registration RUGE also followed regulatory developments and currently assessed the need for Danish initiatives. In a report to the Parliamentary Research Committee in 1977 RUGE summarised international developments and Danish needs, arguing that existing regulation was capable of meeting the demands and challenges from the new biotechnologies – the only exception being some uncertainty about the suitability of the existing environmental regulation¹⁵. RUGE thus followed the international trend, based on the argument that the new biotechnologies were not unique, but merely just another technology comparable to any other new technology.

Apart from the discussions in the Parliamentary Research Committee, the new technologies were only taken up on a few occasions in the Parliament. Although the Minister of Justice, when replying to a question in 1980, assured the Parliament that the ambition of the Government was to be ahead of developments¹⁶; the overall impression is that until the early 1980s biotechnology was not considered neither a problem nor a technological field that needed particular stimulation; hence the strategy can at best be described as expectant. No public initiatives were launched to stimulate Danish research and development; similarly the existing regulatory framework by and large was seen as adequate to cope with potential problems.

3. Risks of GM foods – Ethics of human applications. The years between 1981/2 and 1990.

In many ways the 1980s provides a dramatic contrast to the relative silence and passivity characterising the previous period. The technological development was now – in the area of industrial production¹⁷ - at a stage where the first practical applications were seen in the shape of productions of various (pharmaceutical) proteins. Although there were in the first years some announcements of minor plans to utilise biotechnology in Denmark, the new phase of technological development was most clearly demonstrated

¹⁵ See: Indenrigsministeriets Gensplejningsudvalg, 1985, *Genteknologi og sikkerhed*. Betænkning nr. 1043, Indenrigsministeriet, København, p.58ff.

¹⁶ See: Folketingets, 1980, *Spørgsmål. Nr.271*, 23 January 1980.

¹⁷ A distinction is often made between 'industrial application' on the one hand, referring to enclosed uses of GM organisms, typically micro-organisms producing substances in a tank; and 'deliberate release' on the other hand referring to the application of, typically plants, in less contained environments.

in 1984 when two pharmaceutical industries almost simultaneously announced their plans to use GM microorganisms in their production. Novo, by far the larger of the two, went public with plans of producing human insulin using GM yeast, and Nordisk Gentofte publicised their plans to produce human growth hormone, using modified *E. coli*. Like other actors on the early biotechnology arena in Denmark, both companies had maintained a high level of secrecy about their plans, reflecting the absence of regulation and the compulsory registration that was a result of the expectant strategies dominating until the early 1980s.

In the following years the promises and the worries related to the new biotechnologies were salient issues in the public as well as the political arena. This new status of the issue owed not only to the more advanced technological stage and a certain diversification of research and development, but it must also be ascribed to the success of powerful social movements taking up the issue, and an opening in the Danish politics, allowing for public debate and participation in decisions about science and technology.

3.1 Risks or ethics? The emergence of a Danish regulation of biotechnology.

Although the announcement from Novo and Nordisk Gentofte in some sense marked the opening of the debate of biotechnology in the public sphere, such plans were expected in the years prior to the announcement. Thus the expectant strategy was after 1980 gradually replaced by a more proactive approach, and the outlines of a biotechnology policy emerge in the first years of the new decade. The perhaps most important aspect of these initiatives was the completion of a legal framework, among other things consisting of what has become known as the first general act on biotechnology in the world: The Act on Gene Technology and Environment (1987) and the establishment of an Ethical Council (1987).

Behind these legal and institutional constructions were work in two parliamentary committees both set up by the Minister for the Interior in 1983. The Committee for Genetic Manipulation (*Gensplejningsudvalget*) was assigned the task of reviewing the need for public administration of biotechnology, including genetic engineering, in relation to production, research and development. The mandate included assessment of the need for registration, control, dealing with questions of public/private liability and if needed outlining the necessary legislation; these led the committee to focus on issues related to production and research. By contrast The Committee on Ethical Problems Regarding Transplantation, Artificial Insemination and Diagnostics (*Udvalg om Ethiske Problemer ved Ægtransplantation, Kunstig Befrugning og Foster Diagnostik*) - appointed to “*assess the need for regulation/ legislation of genetic manipulation, in vitro fertilisation, insemination and embryo examination*”¹⁸ confined their area of attention to biotechnological applications in the human area.

The separation of areas of application was, however, not the only important distinction between the two committees; they also differed from each other in the types of concerns deemed relevant to their work. This discrepancy arose partly from the mandates laid out by the Ministry and partly from the interpretation of these mandates by the committees. According to the report from the Committee on Genetic Manipulation, their task was to assess the risks and not the ethical aspects. Risks, in their interpretation, were risks in a technical interpretation, including environmental, health and safety aspects. Ethics, it was argued, was to be considered “*in a broader context*”¹⁹ – and hence not as a part of their agenda. On the other hand the Committee on Ethical Problems Regarding Transplantation, Artificial Insemination and Diagnostics interpreted their mandate as restricted to ethical concerns, leaving the above technical interpretation of risks out of their work.

This division of labour and concerns had two major impacts. *Firstly* it worked as the foundation for the construction of two separate political discourses: a relatively well defined *risk discourse* which addressed concerns related to the risks of the new biotech-

¹⁸ Indenrigsministeriets Udvalg om Ethiske Problemer ved Ægtransplantation, Kunstig Befrugning og Fosterdiagnostik, 1984, *Fremskridtets pris*, Indenrigsministeriet, p.1

¹⁹ Indenrigsministeriets Gensplejningsudvalg, *Genteknologi & sikkerhed*, 1995, Betænkning nr.1043, Indenrigsministeriet, p.26-27

nologies in the areas of environment, human health and the working environment. This discourse was largely delimited to applications in the area of production and research, and found a parallel at the international level in the works initiated by e.g. OECD and EU, largely paving the way for the regulation of research and production that saw the light of the day in the late 1980s and first half of the 1990s. In the scientific world this discourse was materialised in the establishment of a scientific field dealing with the developing of methods for calculation and prediction of risks of biotechnology. In addition to this *an ethical discourse* was developed in the human area, addressing wider ethical concerns. In contrast to the risk discourse, this discourse was less specific, and ethics served during the following decade the function as a concept capturing concerns that are not related to risks. This can partly be ascribed to the failing ability to specify ethically relevant reflections in relation to biotechnology in the account addressing human aspects, generally placing ethical discussions outside regulatory debates and reviews²⁰.

Secondly, the division of labour and separation of concerns led to the development of two different regulatory structures. One of the conclusions in the account of the human area was that it would be highly problematic to construct an ethically based regulation of any area²¹. Hence no all-embracing regulation, based of well-defined ethical principles was suggested. Instead the establishment in 1987 of the Ethical Council (*det Etiske Råd*), as suggested in the report from the committee, became the backbone of this part of the issue. The Ethical Council was given the task to monitor the development in the bio-medical area, suggest regulation, advise public authorities, inform the public and initiate public debates of relevant ethical issues.²² Over the years the council have been involved in the preparation of several acts addressing specific ethical questions in the human/ biomedical area or acts where ethical dimensions of bioethical questions are included.

By contrast, applications related to industrial and agricultural production were regulated by a more comprehensive regulation centred around the act on genetchnology from 1986²³. Contrary to the human area, this act was a framework act, specifying the procedures for application and approval – among other things providing a detailed description of the risk assessment that should form the basis for the treatment of applications. A particular feature of the act was a general ban of the release of genetically manipulated organisms – an element that could be interpreted as an attempt to meet the public concern and assure a publicly accountable use of biotechnology. However, a subsequent paragraph in the act specified that it be up to the Minister to decide to grant exemption from this so-called ban, under “special circumstances”. An exemption he willingly gave – without providing any evidence of the “special circumstances”, indicating that the

²⁰ See: Achen, T, 1997, *Den bioetiske udfordring*, Lindköping University, p57-105

²¹ *ibid*

²² Indenrigsministeriet, 1987, *Lov nr. 353 af 3. juni 1987 om oprettelse af et etisk råd og regulering af visse biomedicinske forsøg*.

²³ Miljøministeriet, 1986, *Lov nr. 288 af 4. juni 1986 om miljø og genetchnologi*.

function of the ban was pleasing a sceptical public, rather than imposing a general ban restricting the introduction of biotechnology in Denmark.

An attempt to bridge between ethics and risks on the one hand and human and non-human applications on the other, was made by the establishment of a Genetechnological Council (*Det Genteknologiske Råd*) in 1987. The mandate of this new body was neither restricted to a particular area of application nor to specific concerns but to address ethical as well as safety issues of any application of genetechnology. As such the Genetechnological Council can be seen as an institutionalisation of the concern that genetechnology may cause concerns of ethics as well as risks wherever it is applied. The council is hence an indication of a biotech policy that to some extent can be seen as driven by a desire to account for the totality of potential concerns. Despite its ambitious task the council did, however, never succeed in opening an arena for ethical discussions, but rather appeared as a mouthpiece for industrial and research interests - clearly illustrated by its first annual report omitting ethical questions, to the benefit of concerns about restrictions and barriers to research and industrial production.²⁴

Although the risks themes were absolutely predominant in the parliamentary debates of agricultural and industrial applications, a desire to account for ethical concerns did also occur. This was exemplified in a response from the Minister for the Environment in an enquiry about measures taken to protect humans and the environment, raised by the Socialist Peoples Party (*Socialistisk Folkeparti, SF*) in 1986. Here the Minister stressed that ethical aspects reflecting “*our basic philosophy of life*” must be included in the regulation of biotechnology involving plants and animals²⁵. His subsequent promise to initiate such regulation did, however, not result in any concrete actions in the non-human area, just as the succeeding parliamentary debates remained restricted to risks.

3.2 Developing a framework for deliberative democracy

In addition to the legal institutional and regulatory constructions during this period, the new biotechnologies also became one of the first tests of a new governance strategy assigning a more active role to the public. This was partly reflected in the described regulatory initiatives, trying to be if not ahead, then simultaneous with the technological development – and thus trying to cope with at least some of the concerns. These initiatives can partly be seen as attempts to ensure that the application of the new technologies took place in a publicly accountable manner. Interestingly the attempt to make biotechnology publicly accountable did not only appear as the construction of a regulation handling the concerns over risks and ethics; but also in the arguments for public funding of research. Here the fact that biotechnology held a promise of increased societal prosperity and new jobs almost in itself makes it accountable – rejecting biotechnology is com-

²⁴ Det Genteknologiske Råd, 1998, *Årsberetning 1987*, Forskningsdirektoratet, p.5-8.

²⁵ Folketinget, 1996, *forespørgselsdebat nr. F18*, 4. February 1986.

parable to running the risk of removing the foundations under the praised Danish welfare society.²⁶

One feature of the specific development in the 1980s was a tendency to regard decisions over science and technology as more than a purely technical issue to be decided by experts, bureaucrats and politicians. As discussed in the introduction, this can be seen as a heritage from among other things Danish labour market politics, dominated by a long tradition for negotiation between the parties, rather than political intervention. In addition to the inspiration from other domestic political domains, such contours of a deliberative governance strategy in the biotechnology area drew on (at least) two other important factors to do with the specific historical context the biotechnologies appear within.

Firstly another science and technology issue, the environmental question, had been resolved without dramatic social conflicts during the 1970s – this not least due to strategies of the openness, public access to information and deliberation between involved parties that form an early stage had dominated this young policy domain.

Secondly and related to this process, biotechnology was approaching the stage of production alongside a growing international attention towards technology assessment, where the general idea was to cope with the side effects of the industrial society in a proactive manner. This was largely inspired by activities of e.g. the US Office of Technology Assessment (OTA), and led to the production of two accounts on technology assessment in a Danish context – both of which discussed the need for institutional structures, means of technology assessment and not least mentioned the new biotechnologies as an example of a relevant issue to be taken up²⁷.

In relation to biotechnology the technology assessment activities were taken a step forward by a number of initiatives. *In the first place* different public programmes and institutions initiated and supported research aiming at uncovering consequences of biotechnology. Hence the Research Councils carried out a number of assessments within the frames of a joint initiative. This partly included a ten year long research project assessing the societal opportunities of biotechnology commenced in 1982 at the Technical University in Copenhagen²⁸. Such activities were further reinforced in 1997, when the red-green opposition forced the Conservative led Government to include technology assessment as part of a planned 500 million DKK biotechnological research programme.

In the second place technology assessment was institutionalised in 1986, with the establishment of the Danish Board of Technology (*TeknologiNævnet*, later *Teknologirådet*).

²⁶ For a discussion see: Lassen, J., forthcoming, *Analysing Public Accountability Procedures in Europe: Danish Case Studies*. GM Foods

²⁷ Teknologistyrelsen, 1984a, *Organisering af teknologivurdering i Danmark*, Copenhagen; and: Teknologistyrelsen, 1984b, *Teknologivurdering i Danmark – betænkning udgivet af et udvalg under Teknologirådet*, Copenhagen.

²⁸ For an introduction to Pegasus, see: Kiel, P. et al, 1983, *Gensplejsning, bioteknologi og samfundsudvikling. Beskrivelse, teori og metode. Udfordringer for Danmark i 1980'erne*. Pegasus report no. 1, Institut for Samfundsfag, DtH.

From the start, the intention was that the Board of Technology should serve a double function: Partly initiate and promote the public debate over possibilities and problems related to new technology; and partly strengthen and widen the knowledge-base behind parliamentary decisions in the area of science and technology.

Since its establishment in 1986 the Board of Technology became a key actor in the coordination of debate, assessment and information about biotechnology. Apart from arranging such activities the Board play an important role in the development of participatory arrangements facilitating the involvement of the public in the political processes, eventually hoping that this may assure a development of new technologies (or basic sciences) in a publicly accountable way.

One of the methods developed by the Board of Technology during the 1980s was the consensus conference, originally designed by OTA as a method to coordinate expert assessments of technological issues. The Board of Technology, however, developed the concept into a format where a panel of lay people are offered a voice in the political processes, and not least given the power to set the agenda in a pending techno-scientific controversy by formulating the questions that need to be answered before decisions are made. The entire arrangement last 4-5 months, during which the panel is provided information about the selected topic, relevant experts are selected and questions to be answered by the experts are phrased. During the – partly public – 2-3 days long conference the expert panel answers the questions from the lay panel, which on this background retires and discuss till they reach the consensus presented at the final day of the conference²⁹. The direct outcome of the consensus conference is a document containing the consensus reached by the lay panel.

The Board of Technology carried out two consensus conferences in the 1980s, the first in 1987 addressing gene technology in industry and agriculture, the second in 1989 about the application of increased knowledge about the human genome. Both conferences had effects on the Danish biotechnology debate, and resulted in direct political action. The 1987 conference has thus been closely connected to a (simultaneous) parliamentary decision removing experiments on genetically manipulated animals from a research programme³⁰; and the 1989 conference was followed by a parliamentary decision ordering the Minister to introduce a bill banning the use of genetic tests in matters of insurance and employment.

A general idea of the technology assessment initiatives carried out since the early 1980s is the importance of bridging between the public on the one side, and decision-makers in science, industry and at the political level on the other. Despite this very few of the biotechnology related assessment activities directly addressed the public – rather it was typical that the research agenda and selection of concerns to be addressed in the technology assessment were chosen on the basis of current debates in the scientific community and the life world of the researchers involved.

²⁹ See e.g: Joss, S. & Durant, J. (eds.), 1995, *Public participation in science. The role of consensus conferences in Europe*, Science Museum, London.

³⁰ Einsiedel, E.F. et al., 2001, Publics at the technology table: the consensus conference in Denmark, Canada and Australia, *Public Understanding of Science*, Vol.10, p.1-16. And: Klüver, L., 1995, Consensus conferences at the Danish Board of Technology, in Joss & Durant (eds.): *Public participation in science. The role of consensus conferences in Europe*, Science Museum, London, p.41-49.

Besides forcing the government to include technology assessment in the first biotechnological research programme in 1987, the opposition also enforced the reservation of a sum of money for information activities³¹. In the following years information activities were coordinated by the Board of Technology and a committee for adult education. Apart from arranging larger public meetings and supporting NGO activities information, the core activity was the support of more than 500 local meetings in the years from 1987 to 1990. As it appears from the account of the information activities, these were not propaganda in favour of a particular view on the new technologies, rather they sought to stimulate the debate by involving as different and often opposing positions in the public debate. Among the supported speakers were thus supporters of biotechnology as well as critics, just as the issues taken up covered the wide spectrum of human as well as non-human uses and took up risks as well as wider ethical concerns.³²

3.3 The public

As indicated earlier the public debate of biotechnology did not start with the public information campaign starting in 1987; rather but biotechnology was a salient issue throughout the period and was as such among the most publicly debated (and contested) science and technology issues of the 1980s. The public debate was triggered by the first announcements of industrial use, but was particular intensive in the years between 1985 and 1990³³. Reinforced by the first Danish application for field trails, submitted by the Danish Sugar Manufacturers, the focus of the debate moved in this latter phase from industrial uses towards food and agriculture. After the adoption of the law in 1986, the debates over regulation also changed character, now first of all addressing issues related to regulation at EU level and an ongoing revision of the Act on Genetechnology and Environment.

The fact that biotechnology in these years was an important publicly discussed issue, assigned “the public” a role as a frame of reference for biotech policies during the period. On a few occasions this role was explicit, as when the Minister for the Environment in 1986 responded to an inquiry in the Parliament about the measures taken to ensure safety for humans and the environment. Here the Minister started his argument by referring to a general interest in the public concerning the impacts of genetic engineering³⁴. The image of the concerned public’, can thus to some extent be seen as laying behind the described desire to ensure regulation that assured an accountable use of the new biotechnologies. The public became even more explicit as an important factor in the decisions to develop technology assessment instruments and technology assessment institutions – and indeed when these were used to take up biotechnological issues.

³¹ Jelsøe, E., 2000, Informations role in the introduction and social regulation of new biotechnologies, Dierkes & von Grote (eds.), *Between understanding and trust. The public, science and technology*. Harwood Academic Publishers, Amsterdam, p.287-312

³² Mikkelsen, K., 1991, *Oplysning om bioteknologi 1987-90*, Dansk Folkeoplysnings Samråd, Copenhagen.

³³ see e.g.: Jelsøe, E., 2000, op cit.

³⁴ Folketinget, 1986, *Forespørgselsdebat nr. F18*, 2. February 1986.

Seen in this light, it is striking that there were no attempts to gather information of the nature of public concerns until 1987: neither sociological studies nor participatory technology assessment activities that could contribute to the understanding of public concerns were carried out in these years. Consequently the preparatory work in the committees and the parliamentary debates of the Bills in 1986 was carried out without specific and detailed knowledge about the nature of public concerns. In a representative democracy like the Danish in the 1980s this was, however, the norm for handling controversial issues. As we shall see in the following section, this lack of exploration of the public attitudes in the 1980s led, despite all good intentions, to a failure to incorporate the nature of public concerns into regulation. As such it constituted an important factor explaining the reappearance of the controversy in the mid 1990s.

Lacking systematic information about public concerns, it is fair to assume that the politics, to the extent it was intended to account for these concerns, was partly based on personal experiences and partly on recollections of media stories. In addition to these sources, NOAH, a social movement organisation founded in 1969, played an important role representing the critical position in the biotechnology debate and related policy processes. With a firm basis in the student revolt and a worldview influenced by the new ecological insights from the 1960s, NOAH had since its establishment been criticising the industrial society and its side effects. During the 1980s NOAH enjoyed a de facto monopoly as the only truly visible organisation taking up the biotechnological issues. As such NOAH was active in the policy process – both uninvited criticising the technological development and the regulatory efforts, and on invitation from the authorities e.g. asked to comment on regulation or administrative decisions. Moreover NOAH played an important role as provider of information about the new technologies and their possible consequences – for example as publisher of some of the first books on biotechnology issued in Danish³⁵ and as organiser of a long series of public meetings on biotechnology and a parallel series of publications reporting from the meetings.

As the most visible critical actor in the policy arena, NOAH was the organisation to be called in whenever a critical voice on biotechnology was needed; representatives from NOAH participated thus in many of the publicly supported public meetings after 1987³⁶. As an activist based organisation where only those who are active in a sub-group are counted as members, NOAH neither is nor has ever claimed to be representative of the public. Irrespective of this, and perhaps for lack of other manifest expressions of the public concerns in the biotechnology policy process and the public biotechnology debate, NOAH came to serve a role as public watchdog.

Although NOAH in its activities paid some attention to ethical aspects of applications in the industrial and agri-food area, it cannot be ruled out that the fact that NOAH had a de-facto monopoly of organised resistance combined with their core identity as an environmental movement, reinforced the ‘risk-biased’ focus on applications outside the human area.

³⁵ Halkier, H., 1984, *Gensplejsning - genistreger eller streger i regningen*, NOAHs forlag; And: Toft, J., 1985, *Genteknologi – konsekvenser for miljøet ved anvendelse af gensplejsede mikroorganismer*, NOAHs Forlag.

³⁶ Mikkelsen, K., 1991, op cit.

The first surveys systematically addressing public attitudes to biotechnology were carried out 1987-90 and included only four questions intended at revealing attitudes to new biotechnology³⁷. Whereas these surveys did not reveal in-depth information about the nature and specific concerns shared by the Danish public, a qualitative study from 1987 offers some insight. The study was carried out for the Danish Food Agency (*Levnedsmiddelstyrelsen*) and consisted of focus groups and individual interviews with selected citizens and representatives from NGOs³⁸. Based on the interviews, it was possible to qualify the picture of public concerns on the one hand, and an observed critical attitude towards the public authorities on the other. A quotation from an interview, chosen as the title of the report: “*We are more sceptical than the authorities*” clearly illustrated the divide between the sceptical general public and the public authorities, representing the largely positive politicians.

Other sources of information about public attitudes were the consensus conferences in 1987 and 1989. In contrast to the risk discourse dominating the discussions about industry and environment, the final document from the lay panel in the 1987-conference on industry and agriculture took up risks as well as ethical issues³⁹. As mentioned previously, this resulted in an adjustment of kinds of research that could be supported by the biotechnological research programme. Despite this and few other examples of some receptiveness towards expressions of public concern, the overall impression of the 1980s is that the general lines in the biotech policy pertaining to industry and agriculture remained unaffected by the public concern to the extent that this concern was contrary to the predominant risk perspective.

To sum up, biotechnological governance in the 1980s was characterised by the conflicting interest on the one hand wanting to make biotechnology a reality in Denmark and at the same time wanting to involve the public and making biotechnology publicly accountable. This *firstly* resulted in a regulatory framework enabling the utilisation of the technologies from an early point. *Secondly* a feature of the policy was a divide between the production-risks and human-ethics at the discursive as well as at the regulatory level. *Thirdly* a result was the development of a field of (bio)technology assessment and its institutionalisation in the Danish Board of Technology – and thus a promise of what has been called a national consensus⁴⁰, where political decisions were results of deliberations.

4. Silence – The partial disappearance of a contested issue. The years between 1990 and 1996

1990 marked a turn in the attention given to biotechnology. The issues gradually lost the prominence they had had until the late 1980s: the NGOs (ie. NOAH) were not as active

³⁷ Borre, O., 1990, *Befolkningens holdninger til genteknologi II, kommunikation og tillid*, Teknologinævnets Rapporter 1990/4, Teknologinævnet, Copenhagen.

³⁸ Jensen, L. & Mortensen, A.T., 1987, *Vi er mere skeptiske end myndighederne, En rapport til Levnedsmiddelstyrelsen om folks viden om og holdninger til genteknologi*, Roskilde Universitetscenter.

³⁹ Teknologinævnet, 1987, *Genteknologi i industri og landbrug – Slutdokument*, Teknologinævnet, Copenhagen.

⁴⁰ Toft, 1996, Denmark: seeking a broad-based consensus, *Science and Public Policy*, no.23, p171-4

as in the preceding years, the media attention dropped somewhat as did the political awareness. Despite this biotechnological development continued and products, now including food products, were approaching the market.

A somewhat naïve interpretation of this relative silence was that it represented a national consensus on biotechnology – that the deliberations during the 1980s had led to a regulation ensuring a use and handling of side effects that was acceptable to the public and provided the biotech industry and researchers acceptable frames for developing the technology. Such views were e.g. forwarded by a leading member of NOAH in an account of the Danish development in the 1980s and first half of the 1990s.⁴¹

An alternative interpretation of the relative silence saw it as the existence of a temporary social contract over the use of biotechnology: As long as industry and public authorities obeyed the regulation that was finally enforced in 1990 and some additional "unwritten rules", the public, it was argued, would be willing to accept biotechnology.⁴² The critical acceptance behind this social contract could, however, easily be shaken when the first practical applications in the food area appeared.

In addition to these explanations, at least two other factors played a role in the withdrawal of the issue from the public eye. *Firstly* the technological development of food and agricultural applications moved into a new phase. Where the late 1980s had been marked by e.g. controversies over field trials – this was by now routine in many countries across the world. Instead the development gradually moved into the food industry, where a transformation of the new plants into products that eventually could be marketed, took place. This transition also moved biotechnologies in the agri-food area from the highly visible area of field trials - towards the relative more obscure processes of product development inside the food sector, and hence to some extent removed the issue from the public field of vision. In addition a certain diversification of biotechnology can also be observed during these years. Internationally biotechnology was identified as a new and promising business area, and not only the number of firms investing in biotechnology increased, so did the range of productions and applications.

Secondly another of the salient issues from the late 1980s, regulation of industrial uses and releases into the environment, was (temporarily) in place following the adoption of two directives in 1990⁴³, eliminating one of the focal points of controversy.

The removal of the production related issues from the public agenda, left an open space for biotechnology within the human area. Not in the sense that this took over as a major area of social controversy, but some discussions gathered around themes like the Human Genome Project, infertility and gene therapy made their way into public discussion. This was partly helped by consensus conferences organised by the Board of Technology, in 1993 addressing treatment of infertility and in 1995 addressing gene therapy.

⁴¹ Ibid.

⁴² Jelsøe, E, 2000, op cit.

⁴³ EU directive 90/219 on contained uses of gene technology and EU directive 90/220 on deliberate release on genetically manipulated organisms into the environment.

All in all this phase was relatively calm also at the policy level, although issues related to the regulation of marketing of genetically manipulated food products (GM food) was taken up towards the end of the phase. This was accompanied by initiatives from the EU to enforce a regulation on so-called novel foods, i.e. foods that for one reason or the other are alien to European consumers, and hence a potential cause of health problems. This, however, did not become a public issue until the subsequent phase.

5. Merging ethics and risks in the area of production. The years after 1996

1996/97 marks a new turn in the development and societal reception of biotechnology in Europe as a whole and indeed also in Denmark. At the discursive level this was seen as a reopening of the discussions about biotechnology at all levels from the public to the political. Thus the controversy reappeared although many had believed it to be more or less permanently settled in the beginning of the 1990s. This forced the politicians to revise the strategies and resulted in a shift in the governance strategies directed towards biotechnology. Two events were of particular importance for the reopening of the controversy: Monsanto's marketing of genetically manipulated soya on the European market, and the birth of Dolly, the first animal clone.

Although there had been a few examples of genetically manipulated food products in Europe, they had been local and small in scale – and most important: none of the products containing genetically manipulated material had so far been marketed in Denmark. Soya thus marked the first large-scale marketing of a genetically manipulated food product in Europe, as well as in Denmark. Furthermore the introduction of soya took place in a set-up that in many ways allowed it to develop into a major issue: *Firstly* the genetically manipulated soya was mixed with ordinary soya in the shipments to Europe – making it difficult to ensure a GM free product. *Secondly*, and this was a surprise to most consumers, it was revealed that soya was a basic ingredient in processed foods, as more than 50% of manufactured food products in one way or the other contained soya or breakdown products like soya oil, soya protein or lecithin. *Thirdly* soya approached the market in a way that made a perfect setting for the development of a conflict: the slowly approaching ships crossing the Atlantic offered an opportunity to dramatize and report the fact that the product was developed and introduced by a multinational company with American roots. *Fourthly*, Monsanto rejected the possibility of segregating GM and non-GM soya – an act that by many consumers was seen as an attempt to force-feed.⁴⁴

The other key event behind the revival of the biotechnological issue was in many respects closer related to the human area: the birth of the first cloned animal, Dolly. Cloning was by no means a new issue in the biotechnological discussions; technically much

⁴⁴ For a more extensive account of the reception of genetically manipulated soya in Denmark and other European countries, see: Lassen et al, 2002, Testing times – the reception of roundup ready soya in Europe, Bauer & Gaskell (eds.), *Biotechnology. The making of a global controversy*. Cambridge University Press, Cambridge, p.279-312.

of the research and production of plants was for example based on different ways of avoiding ‘polluting’ the genome of the genetically manipulated plants by simple sexual reproduction. These techniques had, however, never been seriously questioned by the public. Also cloned animals had been produced for some years, but they were all results either of cloning of gametes, or the separation of fertilized cells at an early embryonic stage – and thus largely comparable to monozygotic twins. Dolly, however, was the first example of somatic cloning not based on gametes, but produced on the basis of a somatic cell. As such Dolly evoked a number of well-known images from the world of fiction captured in films like ‘Jurassic Park’ and novels like ‘The Boys from Brazil’.

The renewed attention to biotechnology took place in a political environment that in many respects differed from that of the 1980s. Not only was the then Conservative-Liberal Government, replaced by a coalition between the Social Democrats and a smaller Social-Liberal party, but the conditions for designing regulation and biotech politics had also changed as the biotech politics had experienced a process of europeanisation.

With the adoption of the two directives in 1990 large areas of biotechnological politics was no longer a national issue. National regulations had to reflect the content of the directives – just as new regulatory initiatives in these areas was an issue to be taken up and decided in EU. The outcome of this development increased to some extent the complexity of decision-making. On the one hand the power of decision was moved to Brussels, and with it also a great part of the political attention. On the other hand, however, this did not have the effect that biotechnology disappeared from the realm of national (Danish) politics – rather the opposite, since actors involved in biotech politics from now on needed to lobby in EU alongside their involvement in the local Danish political process aiming at influencing administration of the existing regulation as well as Danish EU biotechnological politics.

5.1. A ‘new’ public attention

As indicated above, the reopened debate took many by surprise, and demonstrated that the regulation enforced during the 1980s was either not strict enough or not addressing all relevant issues. A European level survey, carried out in the weeks before the soya controversy opened for real, clearly demonstrated that there was some inconsistency between the regulation and the public; and that the existing regulation was omitting important areas of public concern. This picture was seen in Denmark, but was characteristic for other European countries as well. One major finding of this so-called Eurobarometer survey from 1996 was that although the public based their assessment of biotechnology on perceptions of usefulness and risks, an assessment of the moral acceptability proved to be the most important single factor behind the overall attitude⁴⁵. This picture appeared in relation to the human applications, in line with the political strategies of the

⁴⁵ BECAGP, 1997, Europe ambivalent on biotechnology, *Nature*, 387, pp 845–7

1980s, but the surprise was that it also applied to uses within research and production, indicating that the risk-focus within this area was not adequate.

Having revealed this new insight, the Eurobarometer survey did at the same time present a major black box, since it did not offer a clue to understand what ‘moral acceptability’ meant to people. In Denmark this situation was worsened by the politicians who lacked a language applicable to discussions of the ethical and moral issues in relation to uses outside the human area. During the following years a number of additional surveys confirmed and elaborated the picture from the 1996-Eurobarometer, although they did not provide deep insights to the nature of the moral concern⁴⁶. This was instead provided by subsequent qualitative research both at the European level⁴⁷ and in Denmark⁴⁸. Besides providing insight into the nature of the ethical or moral objections, these studies also confirmed central findings from the surveys, and demonstrated the general support behind medical applications, as opposed to the general opposition towards applications to do with agriculture, and food in particular. In doing so they also provided the background for an elaboration of what in the debate had come to be known as bio-ethics, largely capturing any concern that was not about risks to human health and the environment.

⁴⁶ Additional Eurobarometer surveys were carried out every three years, in addition Danish to local surveys like Thulstrup, J., 2000, *Danskernes syn på bioteknologi*, Nyhedsmagasinet Ingeniøren; And Mejlgaard, N. & Siune, K., 2001, *Folk og forskning. Bioteknologi i videnssamfundet*, Report 2001/7, Analyseinstituttet for Forskning.

⁴⁷ See. E.g. Wagner, W. Et al, 2001, Nature in disorder: the troubled public of biotechnology, in: Gaskell & Bauer (eds.): *Biotechnology 1996-2000 – the years of controversy*, Science Museum, London, p.80-95.

⁴⁸ See: Lassen, J. & Jamison, A., forthcoming, *Genetic Technologies Meet the Public: The Discourses of Concern. Science*; And: Lassen et al., 2002, *Ethics and genetic engineering – lessons to be learned from GM foods*. *Bioprocess and Biosystems Engineering*, 24 (5), Springer Verlag. 263-71

The discourses of concern In relation to genetic technology

Main concern	Central issues	Key words
<i>Social</i>	Environment and Health	Risk; uncertainty
<i>Economic</i>	Profitability and Production	Costs/benefits; Responsibility; Power
<i>Cultural</i>	Religious/moral aspects	Ethics; Rights; Integrity

(Lassen & Jamison, forthcoming)

One way ethics, as the opposite of risks, can be disentangled is by describing the prevailing discourses of concern, distinguishing between a social discourse (largely identical to the discourses of risk); an economic discourse and a cultural discourse⁴⁹ – see figure. The three discourses are deduced from the basis of a series of Danish focus-groups carried out from 2000.

Although the prevailing tone in the public biotechnological debate in Denmark has been negative for a long time, each discourse contains positive as well as negative aspects. Furthermore it is important to note that they in a sense are ideal typical reconstructions – the three discourses co-exist in a close-knit structure forming individual positions and arguments in relation to biotechnology.

Within the *social discourse* biotechnologies are first of all seen as highly uncertain because they constitute a threat to human health and the environment. As such the social concerns resembles the concern normally referred to as 'the risks'. Hence these negative sides of this discourse cover the well known discourse that largely had been mistaken as the only major public concern outside the human area. Although the risk aspects are prevalent, the discourse also has elements portraying biotechnology as beneficial to the extent it constitutes a means to counter (other) risks of modernity.

The aspects hidden under the term 'ethics' in the political debate are largely to be found within the cultural and the economic discourses. The *economic discourse* contains a large element of positive aspects regarding benefits of biotechnology in terms of e.g. increased societal wealth through more competitive production methods or new and efficient technologies in the healthcare sector. It contains, however, also darker sides to do with the (economic) power of biotechnological companies and how this power may be

⁴⁹ The following description of the three discourses is based on Lassen & Jamison op cit.

used to oppress other economic sectors - e.g. organic production. As such also the responsibility (or rather lacking responsibility) of the biotechnological sector is feared or questioned within this discourse. Such concerns also draw on elements of absent democracy or freedom, when economical and technological developments are seen to result in a concentration of power used to oppress specific social groups, consumers in general or less affluent countries in the third world.

The *cultural discourse* cover situation where biotechnology is seen to offend codes of conduct or ethical principles concerning acceptable behaviour. These principles may originate in religious conceptions, most often formulated in terms of mankind's right to violate the will of god or an order of things imposed by other divine structures. They may also be related to concepts of a steering mechanism in Nature, oppressed by the new technologies. Either way, biotechnology is seen as a technology transgressing borders we as humans are not entitled to go beyond.

5.2 New trends in biotechnology governance.

A parliamentary inquiry taking place during the most hectic days of the soya controversy, clearly demonstrated that the awareness of the mismatch between the direction of the political process in the 1980s and the public concerns did not come overnight⁵⁰. Apart from addressing the issue of consumer's freedom to choose, the debate did not move seriously towards concerns within the cultural or economic discourses. The handling of the soya issue during the inquiry and the discussions in the public media in the following weeks, accentuated instead the image of an issue that was to be solved as a matter of risk and consumers right to a free choice. The latter materialised on the one hand when the Minister for Health issued guidelines for labelling GM soya products, requiring the labelling of food and feed ingredients produced on the basis of genetic manipulated soya, however exempting additives⁵¹. On the other hand a result was a parliamentary decision to pursue a regulation ensuring that organic produce were to be kept separated from genetically manipulated organisms at any stage of their production process⁵².

These policies were however largely were symbolic acts since they were known to be overruled within a few months by the pending EU regulation of Novel Foods. Nevertheless they mark a turn in the political strategies towards biotechnology outside the human area. To the risk assessment regime was added a market element.⁵³ In a way, what hap-

⁵⁰ Folketinget, 1996, *Forespørgselsdebat nr. F25*, 12 december 1996.

⁵¹ Levnedsmiddelstyrelsen, 1996, *Vejledning om mærkning af levnedsmidler og levnedsmiddelingredienser fremstillet på grundlag af gensplejsede sojabønner*, Sundhedsministeriet.

⁵² Folketinget, 1996, *Spørgsmål nr. 707*, 4. December 1996.

⁵³ This line dates back to 1994, when a parliamentary debate resulted in the adoption of a statement calling upon the government to work for labelling of GM foods in Denmark as well as in the EU. See: Folketinget, 1994, *Forespørgselsdebat nr. F13*, 6. December 1994.

pened was that the parts of public concern that was not entirely understood at that time (i.e. concerns within the cultural and economic discourses) were allocated to the market.

Another significant event took place in the Parliament during the hectic debates in November and December 1996 when the Government successfully established that biotechnology was not open for debate in the sense that genetic manipulation as such was not to be discussed. This was demonstrated when the left wing party (*Enhedslisten*) suffered a defeat in their attempt to reach an agreement on a total ban of GM foods in the parliamentary inquiry they raised during the soya conflict. No other parties in the parliament were willing to discuss genetchnology as an either-or question.

In the spring 1997, shortly after the soya issue had calmed down, the birth of Dolly was announced. Although Dolly strictly speaking was a medical application, intended produce pharmaceuticals in its milk, the debate was not restricted to medical issues. Instead Dolly evoked a debate about cloning per se. Like soya, Dolly led to parliamentary debates, and in addition the Ethical Council was asked to make a report about cloning. Contrary to the discussions about soya, the parliamentary debates over Dolly drew heavily on particularly the cultural discourse, containing elements of animal integrity and questioning our right to make radical interventions in Creation or Nature. As such the keyword was ‘ethics’, and it led to the adoption of a parliamentary decision urging the Government to ensure that animal cloning was limited to research purposes; that no fully grown animal clones were permitted and that cloning of domestic animals would not take place. It furthermore instructed the Government “...before the end of 1997 (...) to find a method ensuring that intervention against developments offending ethical norms of society can take place in due time; and that a foundation for a renewed debate in the general public as well as in Parliament of ethical limitations to research, is created”.⁵⁴

‘Ethics’ had not only moved to other areas than the human, the Government was also given a specific task and a deadline. Following the parliamentary decision, the Ministry of Trade and Industry (*Erhvervsministeriet*) set up of the so-called BioTIK Committee. The mandate of the 11 members, counting philosophers, biologists, theologians and medical doctors, was to produce a discussion paper that could provide a basis for a balanced debate and increased understanding of the public concern. This paper was already published later the same year and contained discussions of visions as well as problems seen as central to decision-making in the gene technological area; and included furthermore a section suggesting ethical criteria for development and application of gene technology.⁵⁵ This paper, for the first time in the Danish history of biotechnology, juxtaposed benefits and worries within the social, the cultural and the economic discourses – and furthermore transgressed the barrier between human and non-human uses.

More than two years after the publication of the discussion paper, the Minister for Trade and Industry produced a statement largely based on the conclusions in the paper. The statement met general support among in Parliament and established that it was the pol-

⁵⁴ Folketinget, 1997, Forespørgselsdebat nr. F64. 22-23 May 1997.

⁵⁵ BioTIK Gruppen, 1997, *De genteknologiske valg*, Erhvervsministeriet.

icy of the Danish government to pursue the adoption of an international convention on the inclusion of ethical considerations in biotechnology regulations in the area of plants and food. It furthermore stated that the government shall work for the inclusion of ethics in the regulation of gene technology, particularly ensuring that the pending revision of the EU directive on deliberate release includes ethics; and finally that the government shall develop guidelines for ethical assessments and finally to support debate and information.⁵⁶ This attempt to make an ethical twist in Danish biotechnology policy has, however, so far only been successful to a limited extent. Traces are first of all seen in the areas of information/ debate and research politics. Neither the Social Democratic government, nor its Liberal-Conservative successors, have succeeded in producing specific guidelines for the inclusion of ethics, just as they did not manage to seriously include ethics in Danish or EU regulations – although central regulations at both levels have been revised since 2000.

As regards information and debate, the BioTIK discussion-paper and the governmental statement led to the establishment of a secretariat co-ordinating a substantial public grant. The BioTIK secretariat, named after the group behind the discussion-paper, is unique in that it joined the forces of nine ministries working for the realisation of the intentions in the statement – most successfully in relation to the creation of a platform for a biotech debate that reflects all aspects of public concerns⁵⁷.

Research politics in the area of biotechnology, has been another location where the new ethical recognition has had some impact. Although the general lines of the activities stated in the National Priority on Biotechnology 1999-2002⁵⁸ repeated the traditional intention of utilising biotechnology to the benefit of society, a research programme from the Ministry for Food, Agriculture and Fisheries, preceding the governmental statement, called for research establishing a dialogue between biotechnological research and the attitudes and assumptions of consumers⁵⁹. The result was a “Centre for Bioethics and Risk Assessment” where sociology and philosophy joined forces with biotechnological research⁶⁰.

6. Danish biotechnology governance: all the same or new strategies?

Danish biotechnology politics has never seriously questioned biotechnology as such. Since biotechnology as of the early 1980 was discussed as a possibility for the Danish society, the salient question has been *how* to appropriate these new technologies, rather

⁵⁶ The Ministry of Trade and Industry, 2000, *The Danish government statement on ethics and genetic engineering*, The Danish Ministry of Trade and Industry.

⁵⁷ See e.g. www.biotik.dk

⁵⁸ Forskningsministeriet, 1998, *National delstrategi for bioteknologisk forskning*.

⁵⁹ Ministry of food, Agriculture and Fisheries, 1997, *Biotechnology in Food Research. Invitation of project applications*.

⁶⁰ See: www.bioethics.kvl.dk/eindex.htm

than *if* they should be utilised at all. Mirroring this, most regulatory initiatives have been adopted unanimously in the Parliament – or only resisted by a small minority.

The overall trends in Danish biotechnology politics have accordingly been marked by an interplay between appropriation and accounting. Politics have strived to appropriate the new biotechnologies by manipulating them, and controlling their development and application. In this way, it has been attempted to steer the technological development by for example setting limits to how far research into the cloning techniques were allowed; or what organisms it was allowed to release into the Danish nature. This attempt to shape biotechnology, can on the one hand be seen as a means to avoid the concrete risks it may present to the Danish society, on the other hand it can also be seen as an attempt to meet public concerns by making the technology publicly accountable. In these respects Danish biotechnology governance does not vary a great deal from the overall trend in the biotechnology politics in most EU member states nor in the EU as a whole⁶¹.

One thing that has changed in the course of the years is the latitude for carrying out specific Danish biotechnology politics. Until 1990, the absence of EU legislation left an open space for national politics – this was for example utilised when adopting the act on gene technology and the environment in 1986. Danish politics has since the 1980s generally become more reliant on EU politics, just as directives and regulations in the biotechnology area increasingly direct or dictate Danish regulation. A situation leaving Danish biotechnology policy with relatively limited freedom to manoeuvre, particularly in relation to the regulation of risks in the area of industrial and agricultural uses - less pronounced in the area of ethics, since ethical issues as a general rule are left to be handled at the national level. Despite these frames for operation, some noticeable trends in Danish biotechnology governance can be observed.

The first observation concerns the development of participatory policies. This trend was particularly strong in the 1980s and led to institutional creations and the development of technology assessment arrangements and participatory methods. Public involvement in the technological development has been stressed within this trend, leaving an image of the public as citizens, who through their involvement in politics took part in ensuring a publicly acceptable course of development.

The second observation concerns the response to the observed failure of the participatory policies in the mid 1990s. This has to do with the realisation that the reduction of public concerns to risks was defective, since it ignored cultural and economic concerns. A circumstance that partly reflected the discursive separation between human and non-human biotechnologies and between risks and ethics dating back to the 1980s; and partly a failure to bridge between the concerns shared by citizens and the actual biotechnology politics. The failure of the participatory and assessment activities to fully involve the citizens, indicates that the governance strategies of the 1980s were lived out

⁶¹ See e.g. Torgersen, H. et al., 2002, Promise problems and proxies: twenty –five years of debate and regulation in Europe. Bauer & Gaskell (eds.), *Biotechnology. The making of a global controversy*, Cambridge University Press, p.21-94.

more as a symbolic demonstration of ideas, than a true means to direct the technological development.

Responding to the realisation of this dilemma the strategy changed during the late 1990s increasingly bringing cultural and economic concerns into focus, collecting them under the hat of ethics. Recent developments – e.g. the revision of the directive on deliberate release – demonstrates, however, that turning the biotechnological politics ethical is not at all that simple and the future will show to what extent it will be possible to include such other concerns.

The third observation concerns a certain marketisation of biotechnology governance during the 1990s. This development reflects a general policy trend in Denmark highlighting the possibilities of politicised consumption. At the same time, the trend also reflects the attainment of a new phase in the technological development, moving the biotechnologies closer to the market and thus the consumers. Previously biotechnology had been located either at public or private research facilities or to the extent it led to product development, in products that were sold outside the consumer market, such as pharmaceuticals and auxiliary agents for industrial use. In the new phase genetically manipulated products were offered to consumers, making their choice a power of potential political use.

Besides the attempts to twist the politics in a more ethical direction, the marketisation has to some extent been used as a strategy to remove the less manageable aspects in the area of cultural and economic concerns from the realm of politics, to the consumer's choice in the market. Hence marketisation also marks a certain individualisation of biotech politics and advances the perception of the public as consumers.

Business has had its share in this development – either by making a virtue of the strong consumer reactions towards genetically manipulated foods and abstaining from producing or selling such products; or through the development of a policy covering not only the risks but also, as it has been termed, bioethics⁶².

A fourth and final observation concerns the role of NGOs in the political processes. Through their de facto monopoly on organised resistance in the 1980s, NOAH played a role, particularly in the formation of the critical discourses about biotechnology; but also because they to some extent were taken as representatives of the public concern – and thus directly or indirectly they were also involved in the political process. After the reopening of the controversy in the 1990s, the organised resistance diversifies and a number of new organisations popped up – some of these truly new, having genetic manipulation as a core issue; others old organisations who develop a biotechnology policy.

One important background for the development of social movement organisations in the 1990s were the strategies of the Social Democratic led government, securing substantial public funding of such activities. The 'Green fund' (*Den Grønne Fond*) was established

⁶² Although their main focus is not the consumer market, the pharmaceutical Novo-Nordisk is an example of a company that has pursued this line, developing a so-called triple bottom line reporting system, ranking bioethics alongside economic and environmental accounting. See e.g. The Novo Group, no year, *Charter for companies in the Novo Group*.

in the early 1990s and subsidised organisations working with environmental issues promoting a certain degree of professionalisation of these movements.

The co-existence of different strategies is perhaps one of the most characteristic dilemmas played out in the Danish biotechnology politics. Firstly there has been a move towards a deliberative strategy stressing the importance of involvement of citizens by means of technology assessment and public participation. Secondly there has, increasingly, been a tendency towards a neo-liberal market oriented strategy, perceiving the public as consumers, and the problems to be solved at the market. And thirdly there has – particularly during the Social Democratic regime from 1992 till 2001 – also been a construction of institutions⁶³ and support of movements representing views not necessarily in accordance with those held by 'the political establishment'. During the 1990s, until the liberal-conservative takeover in 2001, Danish (biotechnology) politics can thus be described as standing on three legs: a consensus seeking deliberative model, a market mode allocating decision-making to consumers and what Chantal Mouffe has characterised as an agonistic model⁶⁴ - the latter characterised by acknowledgement of the importance of power and antagonism in the political processes.

References

- Achen, T, 1997, *Den bioetiske udfordring*, Lindköping University.
- BECAGP, 1997, Europe ambivalent on biotechnology, *Nature* 387, pp 845–7.
- BioTIK Gruppen, 1997, *De genteknologiske valg*, Erhvervsministeriet.
- Borre, O., 1990, *Befolkningens holdninger til genteknologi II, kommunikation og tillid*, Teknologinævnets Rapporter 1990/4, Teknologinævnet, Copenhagen.
- Cantley, M.F., 1995, The regulation of modern biotechnology: A historical and European perspective, in: Brauer, D. (eds), *Legal, economic and ethical dimensions*. VCH. 505-565
- Cobb, R.W. & Elder, C.D., 1972, *Participation in American politics. The dynamics of agenda-building*. The John Hopkins University Press.
- Cronberg, T. & Friis, D. (eds), 1990, *Metoder i teknologivurdering – erfaring og fornyelse*. Blytmans Forlag, København.
- Danmarks Statistik, 2003
- Det Genteknologiske Råd, 1998, *Årsberetning 1987*, Forskningsdirektoratet.
- Einsiedel, E.F. et al., 2001, Publics at the technology table: the consensus conference in Denmark, Canada and Australia, *Public Understanding of Science*, Vol.10, p.1-16.
- Fisher, F., 2003, *Reframing public policy. Discursive politics and deliberate practices*. Oxford
- Folketinget, 1980, *Spørgsmål nr. 271*, 23 January 1980.
- Folketinget, 1986, *Forespørgselsdebat F18*, 2. February 1986.
- Folketinget, 1994, *Forespørgselsdebat F13*, 6. December 1994.

⁶³ One such institution was the Council for the Nature (*Naturrådet*), closed by the Liberal-Conservative government in 2002.

⁶⁴ Mouffe, C., 1999, Deliberative democracy or agonistic pluralism? *Social Research*, Vol.66(3), p.745-58

- Folketinget, 1996, *Forespørgselsdebat F18*, 4. February 1986.
- Folketinget, 1996, *Forespørgselsdebat F25*, 12 december 1996.
- Folketinget, 1996, *Spørgsmål nr. 707*, 4. December 1996.
- Folketinget, 1997, *Forespørgselsdebat 64*, 22-23 May 1997.
- Forskningsministeriet, 1998, *National delstrategi for bioteknologisk forskning*.
- Hagendijk, R. & Kallerud, E., 2003, Changing conceptions and practices of governance in science and technology in Europe: A framework for analysis. STAGE discussion Paper 2. March 2003.
- Halkier, B., 1999, Consequences of politicisation of consumption: The example of environmental friendly consumption practices. *Journal of Environmental Policy and Planning*. 1, 25-42.
- Halkier, T., 1984, *Gensplejsning - genistreger eller streger i regningen*, NOAHs forlag.
- Indenrigsministeriet, 1987, *Lov nr. 353 af 3. juni 1987 om oprettelse af et etisk råd og regulering af visse biomedicinske forsøg*.
- Indenrigsministeriets Gensplejsningsudvalg, 1985, *Genteknologi og sikkerhed*. Betænkning nr. 1043, Indenrigsministeriet, København.
- Indenrigsministeriets Udvalg om Ethiske Problemer ved Ægtransplantation, Kunstig Befrugtning og Fosterdiagnostik, 1984, *Fremskridtets pris*, Indenrigsministeriet, København.
- Jamison, A., Eyerman, R., Cramer, J. & Læssøe, J. 1991, *The making of the new environmental consciousness. A comparative study of the environmental movements in Sweden, Denmark and the Netherlands*, Edinburgh University Press, Edinburgh.
- Jelsøe, E. et al., 1998, "Denmark", in: Durant et al. (eds), *Biotechnology in the public sphere. A European sourcebook*, Science Museum, London, p.29-42
- Jelsøe, E., 2000, Informations role in the introduction and social regulation of new biotechnologies, in: Dierkes & von Grote (eds.), *Between understanding and trust. The public, science and technology*. Harwood Academic Publishers, Amsterdam, p.287-312.
- Jensen, L. & Mortensen, A.T., 1987, *Vi er mere skeptiske end myndighederne, En rapport til Levnedsmiddelstyrelsen om folks viden om og holdninger til genteknologi*, Roskilde Universitetscenter.
- Joss, S. & Durant, J. (eds.), 1995, *Public participation in science. The role of consensus conferences in Europe*, Science Museum, London.
- Kiel, P. et al, 1983, *Gensplejsning, bioteknologi og samfundsudvikling. Beskrivelse, teori og metode. Udfordringer for Danmark i 1980'erne*. Pegasus report no. 1, Institut for Samfundsfag, DtH.
- Klüver, L., 1995, Consensus conferences at the Danish Board of Technology, in Joss & Durant (eds.): *Public participation in science. The role of consensus conferences in Europe*, Science Museum, London, p.41-49.
- Lassen et al, 2002, Testing times – the reception of roundup ready soya in Europe, Bauer & Gaskell (eds.), *Biotechnology. The making of a global controversy*. Cambridge University Press, Cambridge, p.279-312.
- Lassen et al., 2002, Ethics and genetic engineering – lessons to be learned from GM foods. *Bioprocess and Biosystems Engineering*, 24 (5), Springer Verlag. 263-71
- Lassen, J. & Jamison, A., forthcoming, Genetic Technologies Meet the Public: The Discourses of Concern.
- Lassen, J., forthcoming, *Analysing Public Accountability Procedures in Europe: Danish Case Studies. GM Foods*.

- Levnedsmiddelstyrelsen, 1996, *Vejledning om mærkning af levnedsmidler og levnedsmiddelingredienser fremstillet på grundlag af gensplejsede sojabønner*, Sundhedsministeriet.
- Løkke, S. & Lassen, J., 2001, Teknologivurdering – Et tomrum skal udfyldes. *Loke*, vol. 19(3), p.14-16
- Mejlgaard, N. & Siune, K., 2001, *Folk og forskning. Bioteknologi i videnssamfundet*, Report 2001/7, Analyseinstituttet for Forskning.
- Mikkelsen, K., 1991, *Oplysning om bioteknologi 1987-90*, Dansk Folkeoplysnings Samråd, Copenhagen.
- Miljøministeriet, 1986, *Lov nr. 288 af 4. juni 1986 om miljø og genteknologi*.
- Miljøstyrelsen, 1996, *En styrket produktorienteret miljøindsats*, Miljø & Energiministeriet, København.
- Ministry of food, Agriculture and Fisheries, 1997, *Biotechnology in Food Research. Invitation of project applications*.
- Mouffe, C., 1999, Deliberative democracy or agonistic pluralism? *Social Research*, Vol.66(3), p.745-58
- Søndergaard, J., 2000, Velfærdsstatens udvikling i det 20. århundrede og perspektiverne for det 21, *Nationaløkonomisk Tidsskrift*, no.138, p.24-39
- Teknologinævnet, 1987, *Genteknologi i industri og landbrug – Slutdokument*, Teknologinævnet, Copenhagen.
- Teknologistyrelsen, 1984a, *Organisering af teknologivurdering i Danmark*, Copenhagen
- Teknologistyrelsen, 1984b, *Teknologivurdering i Danmark – betænkning udgivet af et udvalg under Teknologirådet*, Copenhagen.
- The Ministry of Trade and Industry, 2000, *The Danish government statement on ethics and genetic engineering*, The Danish Ministry of Trade and Industry.
- The Novo Group, no year, *Charter for companies in the Novo Group*.
- Thulstrup, J., 2000, *Danskernes syn på bioteknologi*, Nyhedsmagasinet Ingeniøren
- Toft, J., 1985, *Genteknologi – konsekvenser for miljøet ved anvendelse af gensplejsede mikroorganismer*, NOAHs Forlag.
- Toft, 1996, Denmark: seeking a broad-based consensus, *Science and Public Policy*, no.23, p171-4.
- Torgersen, H. et al., 2002, Promise problems and proxies: twenty –five years of debate and regulation in Europe. Bauer & Gaskell (eds.), *Biotechnology. The making of a global controversy*, Cambridge University Press, p.21-94.
- Wagner, W. Et al, 2001, Nature in disorder: the troubled public of biotechnology, in: Gaskell & Bauer (eds.): *Biotechnology 1996-2000 – the years of controversy*, Science Museum, London, p.80-95.