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## Interpreting Sustainable Development and Societal Utility in Norwegian GMO Assessments

### **Abstract:**

This article examines the process of assessing applications for genetically modified (GM) crops or plants for import or commercial planting in Norway. GMO legislation in Norway is closely linked to the EU through the Agreement on the European Economic Area (EEA), to which Norway is a party. A central difference with the EU processes is emanating from specific clauses in the Norwegian Gene Technology Act on 'sustainable development' and 'societal utility', which provide a potentially wider leverage for Norwegian authorities to turn down the applications. Research material indicates evidence of an increasingly restrictive practice in the Norwegian evaluations; raising the question of how this can be explained in the face of increasing global acceptance of GMOs. A related question is to what extent and how this result is affected by the trends in the EU. An increasingly restrictive practice may be explained by changes in the access structure to the evaluating body, or it may be due to learning and a growing acceptance of the precautionary principle in this sector. Third, a higher number of rejections may largely be associated with the interest structure pertaining to GMOs in Norway. Final decisions are pending and there are uncertainties concerning how Norwegian authorities will apply the specific criteria of the Gene Technology Act.

**Key words:** genetically modified organisms, biotechnology regulation, environmental policy, assessments, comparative public policy

# 1. Introduction<sup>1</sup>

Among the OECD countries, the EU has enacted some of the most restrictive rules in assessing and deciding on Genetically Modified Organisms (GMO).<sup>2</sup> It is matched only by Norway's GMO legislation, which adds the criteria that a GMO must have a public utility and contribute to sustainable development. This article examines the process of assessing applications for genetically modified crops or plants for import or commercial planting in Norway. The focus is on the assessments made by the Norwegian Biotechnology Advisory Board (NBAB) in its evaluations of GMO applications. Research material indicates evidence<sup>3</sup> of an increasingly restrictive practice in the evaluations and this raises the question of how this can be explained in the face of increasing global acceptance of GMOs. A related question is to what extent and how this result is affected by the trends in the EU. A trend towards growing consensus about the precautionary approach and increased rejection of applications would seem to represent a puzzle as well as an interesting case. It is not obvious to what extent this is counter to current trends in the EU (Lieberman & Gray, 2006) and, if so, what this implies for the Norwegian stand in the matter. By contrasting these procedures, this study aims to discuss the trends and reveal aspects that may have lessons also concerning GMO assessments in the EU.

As to the explanatory aspects, increased restrictiveness might be due to changes in the composition of and access to the Norwegian Biotechnology Advisory Board. Alternatively, the explanation may be found in greater scientific certainty and consensus about the negative effects of GMOs. Both these dimensions indicate the need for a closer look at whether and how knowledge claims have given rise to or supported new principles or instruments in this issue area. These developments may also have fostered a change in the knowledge producers who gain access to the decision-making process, raising the question of the science-policy relationship. Thirdly, any differences between Norwegian and EU assessments may relate to the interest structure and cost-benefit calculations made by affected actors. Finally, it should be borne in mind that GMO legislation in Norway is closely linked to that of the EU through the Agreement on the European Economic Area (EEA). In line with the EEA, all GMO applications sent to the EU must be separately decided on by the Norwegian authorities within an almost identical legal framework. It is hence necessary to take particular notice of how GMO applications are handled within the EU and what these trends may portend for Norwegian behaviour.

The methodological approach applied in the study involves examination of one of the main bodies responsible for GMO assessments, the Norwegian Biotechnology Advisory Board (NBAB). This rather narrow focus on the NBAB as a case will allow for close 'process tracing', making it possible to strengthen possible claims of causal links in the material (King et al., 1994). In addition to the analysis of the written documents that

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<sup>2</sup> Genetically Modified Organisms (GMOs) can be defined as organisms in which the genetic material (DNA) has been altered in a way that does not occur naturally by mating or natural recombination. [http://europa.eu.int/comm/food/food/biotechnology/index\\_en.htm](http://europa.eu.int/comm/food/food/biotechnology/index_en.htm)

<sup>3</sup> The article draws on the material of a much larger report, where the author has analysed 53 GMO applications (Rosendal, 2007). The report includes a table over all the applications and the type of argumentation applied in their assessments.

constitute the assessments themselves, face-to-face, semi-structured interviews with central and relevant decision-makers<sup>4</sup> represented a major channel for data collection and methodological triangulation in the study. Here, the broader question of EU influence is also central and is hence presented in section two. The results from an in-depth analysis of the GMO assessments are given in section three, along with the development of arguments and principles in the assessments. This is followed by a framework for analysing competing knowledge claims and science-policy relations in section four. The final and major part is a discussion of the results in sections five.

## 2. Regulatory Frameworks for GMO Assessment

In this section I briefly present the regulatory frameworks, in which Norwegian policy-making on GMO assessments take place. The aim is to illustrate that there are very similar frameworks for assessments in Norway and in the EU. This provides a background for discussing how we may understand the various trends in GMO assessments.

Five levels of legislation make up the framework for dealing with GMOs in Norway (Fauchald, 2005). First, there is international hard law, which includes the WTO (SPS and TBT) and the Cartagena Protocol on Biosafety under the Convention on Biological Diversity (CBD), which concerns the right to apply limits, including the precautionary principle. Second, there is international soft law, made up of the developing standardisation on the level of protection. For Norway, the EEA (1994) brings an additional third level, composed of legally binding EU Directives and Regulations. This comprehensive system includes Directive 2001/18/EC on Deliberate Release of GMOs, Regulation No 178/2002 on Food Safety Authority, and Regulation 1830/2003 on traceability and labelling. Fourth, at the national level, Norway's Gene Technology Act (No. 38/1993) is the most important. The Gene Technology Act predates the EEA agreement and Norway thus has an additional legal body regulating GMOs. The fifth and final level relates to national assessments and decision-making, adding to the legal body relating to GMOs. For Norwegian policy-makers, EU regulations and the Norwegian Gene Technology Act constitute 'hard law', which must be observed in decision-making. As diverging obligations following from these two legally binding frameworks are particularly difficult to handle, it is these two levels that will be in focus.

Within the OECD sphere, the EU has enacted some of the most restrictive rules for assessing and managing GM products.<sup>5</sup> The Norwegian Gene Technology Act represents yet another step towards precaution, with its stipulations that processing and use of GMOs must 'take place in an ethically and socially justifiable way, in accordance with the principle of sustainable development and without detrimental effects on health and the environment (§1) and that "in deciding whether or not to grant the application, significant emphasis shall also be placed on whether the deliberate release represents a benefit to the community and a contribution to sustainable development" (§ 10). This implies that while Norway and the EU put more or less equal weight on the criteria of health and environment, Norway must in

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<sup>4</sup> The respondents come from various sectors and interest groups, including the environment, industry, academe, civil servants/government officials, and the secretariat of the NBAB.

<sup>5</sup> The process now involves environmental risk assessment, mandatory post-market monitoring of GM products, obligatory provision of information to the public, and requirements for labelling and traceability at all stages of the marketing process.

addition take into account the criteria of societal utility and sustainable development. It should, however, be noted that the ethical criterion as well as the wording on socioeconomic concerns in Directive 2001/18, may theoretically draw in the same direction as the additional Norwegian criteria.

In practice, the last time the EU member states approved the commercial growing of a GM plant was in 1998. This restrictive practice, known as the 'de facto' or 'unofficial' moratorium, prompted a reaction from the USA, which argued that the EU used this for protectionism in violation of the WTO agreement. The unofficial EU moratorium ended in 2004. Since then, EU approval processes have ended in deadlock more than 20 times, the EU Commission has authorised 17 applications for GM crops unilaterally, and about 40 are still pending in the EU approval system.<sup>6</sup>

Applications for deliberate release and commercialisation of GMOs follow EU Directive 2001/18/EC and Regulation (EC) 1829/2003 on genetically modified food and feed. According to Directive 2001/18/EC article 6(8), the deliberate release of GMOs into the environment can only be authorised by the explicit decision of a Competent Authority (CA). A qualified majority vote among the Competent Authorities is necessary for approval and if this fails, the application is returned to the Council of Ministers. If the Council again fails to reach a decision (and this is what invariably happens), the case goes to the Commission, which takes the final decision (Lieberman and Gray, 2006). In most cases the Commission's approval of new crops has been based on positive scientific opinions from the European Food Safety Authority (EFSA).

Several Member States have, however, been critical to EFSA and urged the scrapping of the procedures that allow the European Commission to decide unilaterally, as this invariably means a decision in favour of accepting new GM crops despite persistent opposition from many governments (ENDS, 2006). The EU member states remain deeply split over whether to accept GMOs or not – a pattern repeated among the new members, who are also spilt about 50/50 (ENDS, 2004). Single countries, such as Austria, Hungary and Poland, have invoked domestic bans on EU approved GM seeds and crops. When the Hungarian ban on MON810 was deemed by the Commission to conflict with Directive 2001/18/EU, Hungary was supported by 22 of the 27 member states in the EU Environment Council, thus upholding the ban. Only Finland, Sweden, the Netherlands and the United Kingdom voted with the Commission in favour of overturning the Hungarian ban, while Romania abstained.<sup>7</sup> France and Germany have also introduced temporary bans on MON 810 maize, following domestic scientific conclusions that there is 'serious doubts' about its use and safety.<sup>8</sup> In spite of the unilateral approvals by the EU Commission, 40-plus remain bottled up in the bureaucratic process.<sup>9</sup>

EU Directives and Regulations generally apply to Norwegian assessments of applications for import and trade in GMOs. A GMO application that has been approved in the EU will automatically be open to commercialisation in Norway as well, but the Norwegian

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<sup>6</sup> *International Environmental Reporter*, 2006, 29 (20): 744.

<http://www.planetark.com/dailynewsstory.cfm/newsid/47040/story.htm> Accessed February 20th, 2008.

<sup>7</sup> *International Environmental Reporter* (INER), 2007, Vol. 30, No. 5: 118.

<sup>8</sup> <http://www.planetark.com/dailynewsstory.cfm?newsid=46350&newsdate=10-Jan-2008> Accessed 22 January 2008.

<sup>9</sup> <http://www.planetark.com/dailynewsstory.cfm?newsid=46351&newsdate=10-Jan-2008> Accessed 23 January 2008.

authorities may decide against it if it is deemed to present a risk to health or the environment, or a breach with the Norwegian Gene Technology Act. Norway's Ministry of the Environment is responsible for deliberate release of GMOs and is also the Competent Authority (CA) in Norway. The domestic decision-making process is delegated to and co-ordinated by the Directorate for Nature Management. Applications are sent out to expert agencies, including the Norwegian Scientific Committee for Food Safety and the Norwegian Biotechnology Advisory Board. The Biotechnology Advisory Board consists of 21 members, 13 appointed on a personal basis and eight are appointed by nomination from various public organisations. The 13 personally appointed members come from a range of research institutions and the private sector. The eight are appointed by various interest groups, including environmental, medical, industrial, agricultural and labour organisations. In addition there is a highly qualified secretariat of five members, who provide advice and expertise. Observers from six government ministries also participate in the meetings of the board.

In the next section I present the trends in the assessments of GMO applications in Norway.

### **3. Developments in NBAB Assessments**

From the similarities in the legal framework as well as the general Norwegian tradition of following the EU lead, we could expect similar trends in Norway's GMO assessments. As yet, no commercial growing of GM crops has been allowed in Norway, but a large number of applications are pending. No GMOs have been authorised in Norway since the end of the EU de facto moratorium. By contrast, within the EU, more than ten applications have been authorised. The EU has not, however, accepted any GM plants for commercial growing since the end of the de facto moratorium and here also a great number of applications are pending final decision. Hence, the similarities may still end up being greater than the differences and there is still suspense with a view to the final decisions.

In this section I draw on an analysis of 50 cases of GMO applications that have been dealt with by the Norwegian Biotechnology Advisory Board (NBAB) between 1994 and 2005 (Rosendal, 2007).<sup>10</sup> The analysis was focused on trends in the NBAB assessments with a view to stringency and robustness in the argumentation. In the analysis, increased stringency was taken to indicate a more restrictive practice, such as a greater tendency to argue for precaution in assessments, or downright rejection of GMO applications. Increased robustness was taken to indicate a higher level of consensus within the NBAB with a view to recommendations.

The number of applications quickly picked up after the EU moratorium was ended. In order to compare developments over time, it is logical to operate with three main phases: an early, pre-moratorium phase (1993–1998) with 24 applications, a moratorium phase (1999–2002) with only five applications, and a post-moratorium phase (2003–2005) with 22 applications. In Norway, four of the EU applications for deliberate release were granted in the pre-moratorium phase: one tobacco plant (grown in France) and three varieties of carnation (the flowers imported on stem only).

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<sup>10</sup> This report includes a table, listing the applications and the type of argumentation applied in their assessments.

In the report (Rosendal, 2007), I analysed the attached recommendations by the NBAB following each of the applications. The main lines of arguments or principles applied by the NBAB when requesting information prior to possible acceptance can be divided into three broad categories: environmental, human health and societal concerns. Environmental concerns include cross-pollination and horizontal spread, including resistance in target species and genetic erosion, effects on non-target species, tracing and labelling, precautionary principle, effects on herbicide use, antibiotic resistance, liability, and co-existence. Health concerns include allergens, digestive effects, antibiotics resistance, and toxicity. Societal concerns include benefits to the community/public utility, opportunities to reuse seeds for farmers (topical due to hybridisation and patents), ethics, and sustainable development – including effects on global agricultural structures and north-south issues of equity. Against this background, I analysed developments in the stringency and robustness of the argumentation presented by the Board.

There are changes in the argumentation used by the NBAB during the various phases. The recommendations show an increased stringency and robustness. With the cases that involve antibiotic resistance (30 per cent of the total number of cases), both stringency and robustness have increased over time. This is evident from the fact that in the early phase, the inclusion of this particular feature was not met with complete rejection: On the contrary, in eight of the twelve cases there was a majority or large minority on the Board in favour of granting the application.<sup>11</sup> Increased robustness is shown by the Board's almost complete unanimity in dealing with such applications during the post-moratorium phase (2003–2005). These trends indicate that there has been both increased stringency (from some approvals to total rejection) and increased robustness (from dissent to almost complete unanimity) in NBAB recommendations in the post-moratorium phase.

Second, there is a general trend towards a more comprehensive argumentation, in the sense that health and societal concerns are more widely applied. During the early phase (1993–1998), the question of reduced pesticide use was a major argument for returning applications with a request for further information (9 of 24). During the same period, there was also frequent uncertainty concerning the risks of cross-pollination (11 of 24 applications). Environmental concerns have persisted throughout the three time-periods, while arguments concerning health and societal issues are far more widely applied in the post-moratorium phase (2003–2005). As regards societal concerns, arguments now include access to seeds for food security, effects on global agricultural structures, and North–South issues of equity. This represents an expansion and operationalisation of the special inclusion of 'ethics, societal utility and sustainable development' in the Norwegian Gene Technology Act of 1993.

A related characteristic in terms of the observed broader argumentation relates to the use of the precautionary principle. Throughout the phases of assessment, the Biotechnology Advisory Board has made frequent reference to this principle. Here the NBAB differs somewhat from other authoritative Norwegian sources: The Walløe Commission (NOU 2000a:29) recommended giving the green light to GM food, despite its conclusions about the uncertain health effects involved. At the NBAB open meeting, which discussed the Walløe Commission report, the report met with criticism for going against the precautionary principle (NBAB, 2000b).

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<sup>11</sup> In the end, however, none of these was granted approval by the Norwegian authorities.

In order to further substantiate or contest these findings, I used interviews for methodological triangulation. The respondents represented various sectors and interest groups, including the environment, industry, academe, civil servants/government officials, and the secretariat of the NBAB. Key actors who are central in the decision-making on GMO assessments were asked whether or not they believed that there had been an increase in stringency and a tendency towards applying more varied lines of argumentation in the assessments. Respondents were unanimous in responding that today there is more varied argumentation, including not only environmental but also health and societal concerns. Moreover, all respondents agreed that there has been a trend towards a more restrictive practice and an increasingly critical and precautionary approach to GMO applications. In this sense, Norway's approach to GMOs reflects that predominant within the EU, as a precautionary approach to health and environmental issues has tended to prevail over industry's demand for de-regulation in this issue area (Bernauer, 2003; Rosendal, 2005).

As indicated in section two, the final results of the GMO assessments may, however, prove different in Norway and the EU; with Norway in a sense retaining a 'moratorium' still while the EU has accepted a limited number of applications, since the end of the 'moratorium'. At the same time, my respondents emphasised that it is important for Norwegian authorities to adhere to EU procedures in the decision-making process. Hence, there would seem to be a potential contradiction in the expectations regarding the results of the decisions by Norwegian authorities in this case. How can we explain the preliminary results against the crossfire of international and sub-national concerns?

#### **4. Explaining Assessment Trends – Views on Science and Politics**

Having concluded that the GMO assessments of the Norwegian Biotechnology Advisory Board have become more restrictive and robust over time, I put forward some possible explanations. First, it is necessary to examine how competing knowledge claims achieve access and legitimacy to participate in and influence the assessment- and decision-making process relating to GMOs in Norway. An important basic insight in the science-policy relationship is provided by March and Olsen (1995: 101), who note that the authority and status of science hinges on its disengagement and autonomy towards government and various interest groups. Moreover, a predominantly rationalistic-instrumental approach to the impact of scientific advice in a policy process maintains that this will depend on the degree of uncertainty, discord or consensus (Underdal, 2000). With a view to assessing consensus, autonomy and disengagement, we thus need to look at the sources that produce the relevant information.

This accentuates the question of how to distinguish between scientific knowledge production and the political strife between social interest groups. Skodvin and Underdal (2000:22) point out the complexity of the science-policy dialogues and that there is no clear-cut demarcation between the spheres of politics and science. The idea of science as objective and disassociated from political struggles is broadly challenged, although there are still gaps in our knowledge about how new principles affect the science-policy dialogue in environmental governance. One such principle is the precautionary principle, which affects the link between scientific certainty and the assessment of policy options and which opens for a wider range of disciplines that may compete in bringing policy relevant knowledge into decision-making (Gulbrandsen, 2006). Other new principles in environmental governance are transparency and participation, which also has the potential to affect access to decision-

making. Environmental risk assessment is characterised by the legitimate involvement (access) of a growing number of groups and organisations – including research institutes, consultancy firms and the research institutes of stakeholders, such as governmental and other public agencies, industry organisations, and environmental advocacy groups (Stokke, 2005).

What does ‘legitimate involvement’ imply? This question is highly relevant to the examination of access. Legitimate involvement is in fact fraught with stumbling blocks, as the gap between science policy-makers and the general public is widening in the biotechnology sector (Irwin, 1995). Public deliberation has many advantages, such as participant learning, the inclusion of social values, awareness building and stimulation of public debate. The potential disadvantages concern questionable representation, high costs, the readily manipulative agenda setting, and vague conclusions (Mohr, 2002). Controversy about representation and access can be expressed as politicisation, illustrating the level of NGO mobilisation and industry protest (Stokke, 2005). This also points up the difficulty in classifying some knowledge claims as ‘facts’ or ‘scientific’ and others as norm- or value-based argumentation. Where do we draw the line, and are some of these arguments more valid than others? This difficulty is typical of applied science areas, such as environmental assessments, where there is no clear demarcation between science and policy. The boundaries here are negotiable and may shift as a result of political priorities (Jasanoff, 1990).

This ambiguity in views on knowledge can be accentuated from either ideational or more political perspectives. Predominantly ideationally or cognitively based approaches will tend to highlight learning processes and the generation and acceptance of common norms and ideas (Franck, 1990; Haas et al., 1993; Young, 1991). From a more political angle, Barnett & Finnemore (2004) point to the framing effect of technical terminology, and direct attention to how organisations may mould negotiation outputs, in effect influencing the type of knowledge producers that gain access to decision-making. A similar discourse is found in Karen Litfin’s work. In her view – and basic to discourse tradition – power and knowledge cannot and should not be separated. In effect, this relationship becomes the major focal point of these analyses: ‘interests must be problematized as arenas of political struggle that should be formulated in light of contending knowledge claims’ (Litfin, 1994:2).

One implication is that we need to look more explicitly into the power and interest relations in the science–policy relationship. In what he refers to as a ‘malign’ case, Underdal points to the magnitude of costs that are linked to behaviour change following scientific advice (Underdal, 2000). A common example of an easy-to-solve issue-area involves the international efforts to combat ozone depletion. This global pollution issue was in the later phases characterised by a low degree of political contention and fairly simple technical solutions with relatively low costs to the parties concerned. On the basis of cost-benefit analysis, ozone has generally been regarded as a ‘benign’ issue. In other cases, where scientific advice is perceived to be costly, it will be less likely to have an impact on decisions. A situation of explicitly conflicting interests may also be expected to accentuate questions relating to access to the decision-making process.

Against this background, these factors – legitimate access to decision making, state of scientific knowledge and learning, and cost of behaviour change – are examined in the discussion on assessment of GMO applications in the next section.

## **5. Competing knowledge claims in GMO assessments**

In this section I draw on the results from the interviews with respondents from a wide range of sectors and interest groups and the secretariat of the NBAB. The same key actors who were asked about stringency and robustness were also asked how they would explain the changes. This was first posed as an open question, allowing for alternative factors to surface and be identified. Next, the respondents were presented with a set of explanatory factors that might account for the change and developments. One explanation for the change could be related to changes in the access structure of the NBAB itself, such as differences in the composition of Board membership. Another explanation could be that the changes were caused by the members changing their views of GMO; through learning and an altered knowledge base. This will be examined by looking at how new environmental principles have affected decision-making.

I start by looking at the composition and consider the evidence relating to access to decision making processes in general (5.1). The next two sections discuss the state of scientific knowledge; first by taking a look at the major differences between Norwegian and EU assessments of GMOs in the cases of antibiotic resistance (5.2) and then by discussing the basis for these assessments, i.e. the documentation following the GMO applications (5.3). The final section tackles the question of basic economic interests with a view to GMO use (5.4).

### ***5.1 Legitimate involvement and access***

This section looks further into what is perceived as legitimate involvement in a decision-making process on GMOs and relates this to the composition of the NBAB. A study of the GM debate in the UK, Australia and New Zealand found that access to decision-making and the inability to weigh explicit social value judgements with the broad science consensus were the major obstacles to successful deliberative public debate (Walls et al., 2005). For instance, non-scientific arguments were implicitly marginalised because the questionnaire made it difficult to apply societal arguments, such as consideration of the growing dominance of multinational corporations in the life sciences. These enterprises increasingly decide on options for the development of new medicines and food, they are part of the GM revolution – but somehow their role seemed to be ‘beside the point’ in the questionnaire developed to study the public debate (Walls et al., 2005). A similar phenomenon is elaborated by Sheila Jasanoff (2005), who points out how science–policy relations in the biotechnology sector are characterised by the growing absence of public participation and a lack of democratic institutions to deal with this. In the following, I take a closer look at the composition of the NBAB and examine how its composition and knowledge claims have been controversial or legitimate.

The Norwegian Biotechnology Advisory Board was established in 1991 with an explicit mandate to be independent from political authorities and institutions. There is no conclusive evidence that the greater stringency in the Board’s GMO assessments may be traced to changes in its composition, although one respondent pointed out that change in leadership might have had some effect (Rosendal, 2007). Although there have been changes at the individual level, the composition in terms of representation of interest groups has remained fairly stable throughout. For instance, the number of representatives from industry has been stable at two representatives during the life of the NBAB. The actual influence of

industry has, however, not been stable; respondents largely agree that the views of the biotechnology industry have become marginalised.

A central question with regard to legitimate access is to what extent the composition of the NBAB has been contested. As an advisory board to politicians, the NBAB would need to fill both the criteria of skills and disengagement in order to be entrusted with 'legitimate involvement'. First, with regard to skills, the Board takes into account the variety of knowledge and disciplines represented in its members. One respondent pointed to the report (NBAB, 2000a) on implementation of the concepts of 'sustainable development, benefit to the community and ethics' and how this has helped to operationalise the precautionary principle in GMO assessments.<sup>12</sup> Another respondent described the Board's expertise to being based partly on 'sound science' and partly on a broad variety of values and knowledge from various sectors of society'.<sup>13</sup> This was a prevalent view and may help to answer the question of what is perceived as knowledge with legitimate involvement: This knowledge includes 'sound science' as well as a broad understanding based on various kinds of experience from different parts of society. It could indicate that societal knowledge is broadly accepted as legitimate input in the policy-making process and that it is accepted as part of practicing the precautionary principle.

Second, regarding disengagement, the Biotechnology Advisory Board seems to reflect prevalent views within Norwegian public opinion, especially in this issue area.<sup>14</sup> Compared to the public and political criticism raised about EFSA, the Norwegian Biotechnology Advisory Board would seem to enjoy considerable legitimacy with the general Norwegian public – a point on which respondents from the industry sector also partly agreed. On the one hand, the Norwegian biotechnology sector realises that it does not constitute a strong lobby, being too small and fragmented to have much influence within this policy field (Rosendal, 2007). This is accentuated by the fact that it is the NGOs who are currently most active in the policy debate on the GMO issue. On the other hand, Norwegian biotech industry would clearly have preferred a body more in line with EFSA to assess GMO applications and have also made known the wish to exclude ethics, sustainable development and public utility from the criteria applied (Rosendal, 2007). This brings us back to the more philosophical question of whether risk assessment can be fully understood in scientific terms and rationally managed – or if the understanding of risk must involve politics, societal and socioeconomic aspects in addition to science (see also Arcuri, 2007).

In sum, this might indicate a development towards greater public acceptance of the precautionary principle in this sector. Greater acceptance of the precautionary principle may thus have contributed to a low level of controversy with regard to the composition of the NBAB and may go some way in explaining the increased stringency and consensus in the NBAB recommendations. Nevertheless, it is pertinent to investigate alternative explanations and check whether changes may be linked to the state of scientific knowledge about potential dangers posed by GMOs. Recalling Jasanoff on the shifting boundaries between science and politics in environmental assessments, this leads to the question of how the precautionary principle has been applied in GMO evaluations. How are the criteria of the Norwegian Gene

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<sup>12</sup> Interview with representative of Norwegian Society for the Conservation of Nature, 21 June 2006.

<sup>13</sup> Interview with member of the NBAB Secretariat, 5 May 2006.

<sup>14</sup> Some criticism has been raised about the NBAB concerning medical issues, such as prenatal diagnosis (Halgunseth 2006).

Technology Act about ethics, sustainable development and societal utility applied in the assessments?

## ***5.2 Scientific Consensus and Controversy: Cases of antibiotic resistance***

During the interview sessions, respondents indicated various opinions as to how to explain the trends observed. Many felt that the increased stringency and consensus have been caused by changes in the actual knowledge status of NBAB members. As a central example of greater scientific certainty, it was pointed out that concerning GMOs containing antibiotic-resistant genes, the growing tendency towards rejection is primarily linked to additional information and knowledge now available. In part, the NBAB bases its argumentation on a decision of the Norwegian Parliament (the Storting), asking the government to ban production, import and sale of all GM products that contain genes coded for antibiotic resistance.<sup>15</sup> Increasingly, it is argued that this trait should be avoided altogether, even though antibiotic resistance may be a very efficient part of practising GM technology. This would seem to fit well with the proposition that greater scientific consensus enhances the scope for knowledge claims to affect a decision-making process. However, the same ‘learning process’ does not seem to have had a quite similar influence on EU decisions, as the following example will show.

In response to the EU moratorium and evolving legal regimes, industry has tried harder to find alternative technical solutions to antibiotic resistance as a means to multiply and isolate the material needed. In effect, many of the technical solutions currently in use apply less risky antibiotics, such as those no longer administered in affluent societies. This particular trait pinpoints, however, an important difference in EU and Norwegian GMO assessments:

Within the EU, the EFSA GMO panel (EFSA, 2004) has recommended an added element in the assessments by introducing ‘divisions of risks’. Here, it is argued that antibiotic resistance should be considered problematic only if it has a possible negative effect on ‘health and the environment’. This is interpreted to apply solely to conditions in Europe and hence, only for plants that will be grown in Europe. The EFSA ‘division of risks’ implies that information on environmental concerns is not required when the GM plant applied for is not to be grown in Europe. Norway, in contrast, still requires such information. The Norwegian Gene Technology Act, with its clauses on ‘societal utility’ and ‘sustainable development’, comes into play with a view also to health and environmental effects in Third World countries. Hence, the NBAB will argue that the use of these antibiotic resistance genes may cause increased resistance to antibiotics in the GM crop producing country. They may hence have harmful effects on health in poorer countries in the South, where those phased-out antibiotics are still in use in healthcare systems (Rosendal, 2007). When Norway requests additional information about environmental effects relating to these cases no such information is forthcoming (more about this in section 5.3).

The example of cases involving antibiotic resistance indicates that Norway might be prepared to be more critical than what is generally accepted in the EU. That would mean that the most important external factor – trends in EU assessments – could have less than anticipated impact on Norwegian GMO assessments. This interpretation was, however,

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<sup>15</sup> The decision came as a response to Stortingsmelding (White Paper) 40, 1996–97 (‘Matmeldingen’).

largely rejected by the respondents, who maintained that the EU remains very important as a role model. One indication that Norway could turn towards a greater acceptance of EU trends is found in a report from the Norwegian Scientific Committee for Food Safety (VKM, 2005), recommending that Norway accept the EU 'division of risks'. In practice, this would mean that Norway would need to change its Gene Technology Act. As yet, no such legal changes are envisaged by the Norwegian authorities.<sup>16</sup>

The example also directs us to the significance of the documentation that accompanies GMO applications and the effects of what is perceived as required information. It is relevant to see how this documentation is perceived and applied by the Norwegian Biotechnology Advisory Board in their assessments.

### ***5.3 Science and politics in GMO documentation***

Aside from the cases of antibiotic resistance, there is still considerable scientific uncertainty about the effects of GMOs on the environment and human health. The analysis of NBAB assessments and the documentation accompanying GMO applications showed that this may be problematic for four reasons, relating to science and politics (Rosendal, 2007). The first and second problems are predominantly political in nature and have to do with transparency. First, while some of this information is available on the Net through the European Food Safety Authority (EFSA), most of the accompanying documentation is confidential. This would seem to be a violation of the Århus Convention on public participation and transparency (ENDS, 2005). Second, the documentation is huge and there are hundreds of megabyte documents attached to each application. It is mandatory for the NBAB to build up an argumentation based on this documentation, but the enormous quantities make thorough checking and argumentation very difficult. Several respondents speculated whether it could be interpreted as a deliberate strategy from the applicants that they provide information in such great masses as to be hardly penetrable. However, such a strategy could work both ways, as it would also strengthen the distrust of this type of knowledge producer.

The third and fourth problems concern the quality of the documentation. First, the scientific quality is questioned. Most of the studies on GM plants and products are based on information provided by the applicants' research laboratories and released by industry (Gaskell et al., 2003). These are not peer-reviewed studies; rather, GMO risk assessments have been carried out largely by the multinational corporations that dominate and have vested interests in the fields of agro-biotechnology and pharmaceuticals (Myhr & Traavik, 2002; Gaskell et al., 2003). In April 2006, EU Environment Commissioner Stavros Dimas was quoted to say that EU assessment procedures for GMO applications relied too much on short-term industry data (Rosendal, 2007). On this point, the concerns are similar in Norway and the EU.

The fourth problem is particular to the Norwegian situation, namely that despite the large quantities of information, important aspects are lacking. Most apparent is of course the lack of information about sustainable development and societal utility. Norway is the only country to formally require information about sustainability and societal utility – these criteria are not part of EU legislation. As a result, industry can hardly be expected to, and

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<sup>16</sup> Interview with representative of the Norwegian authorities, Ministry of the Environment, 24 August 2006.

does not, provide information about such matters. The Norwegian Biotechnology Advisory Board is, however, mandated to take a comprehensive view, which takes into account the specific Norwegian criteria of sustainable development and societal utility. This tends to put Norway in a difficult position and raises a dilemma: On the one side, there is a widespread view that Norwegian authorities will prefer not to go solo on this argumentation – and the special criteria, with their implication for judging e.g. the antibiotics cases, are not part of the argumentation and regulations of the EU. On the other side, this raises the question of whether Norwegian authorities may in the end accept a reversal of the burden of proof. Is lack of information on sustainability and utility the responsibility of Norwegian authorities, in the sense that they must collect such information? It is an unresolved legal question whether the Gene Technology Act places the responsibility on Norwegian authorities for digging up and collecting information on sustainability and public utility. It is less questionable, however, that neglecting these criteria would represent a breach with the Norwegian Gene Technology Act.

One result of these four problematic traits of the documentation would seem to be that, while knowledge claims from industry dominate the input side in decision-making through the increasing number of applications, industry actors and interests are largely marginalised in the actual decision-making process. While this could indicate that the normative persuasion of the precautionary principle seems to have been strengthened, not least through the application of the Gene Technology Act, it is still important to examine alternative perspectives on policy-making processes. This means that we need to look further into the affected actors and interests in this sector. The relationship between risks and utility is important in the GMO issue and hence, we must ask who stands to gain and who stands to lose from the recommendations issued by the Norwegian Biotechnology Advisory Board.

#### ***5.4 Norwegian costs and benefits relating to GMOs***

We have seen that the applications do not include information about sustainable development or societal utility. As no other country makes similar demand for information on societal utility and sustainability, the applicants are unlikely to invest resources in providing it. From the applicants' point of view, gaining Norwegian acceptance of a GMO may not be a particularly high priority. Their first priority is likely to be acceptance in the EU countries, now that the unofficial moratorium is loosening its grip. Similarly, from the perspective of the EU, it may not be considered worthwhile to follow up any deviant Norwegian decisions with pressure to conform. Then what remains to investigate is the receiving end and Norwegian interests in GM technology.

So far, the plants applied for (predominantly rice, cotton and maize) have little practical utility for Norwegian farmers. This situation indicates that the GM issue is not (yet) very controversial in Norway, as there are low costs involved for relevant actors in following the results of the assessment procedures. But what would happen with an application for a potato or a strawberry that could flourish with the application of far less pesticides? This might be of great economic interest to Norwegian farmers. So far, the likelihood of this scenario has not been great, as Norway represents a rather marginal climatic area for agriculture. However, North America certainly has a share of similar climatic zones and areas, so Norway must expect in the future to get applications that are more economically interesting and relevant. This is not least the case with regard to Norwegian aquaculture, where GM feed is becoming increasingly relevant in a global market. This could bring new

elements into the discussion also with a view to societal utility with arguments 'closer to home'.

On the other hand, the Norwegian farmer might choose to stick to the strategy of using 'GMO-free zones' as its marketing brand. In an open letter to the government, the two main Norwegian farmers' organisations together with 13 environmental, health and women's NGOs urged for a general moratorium on all GM plants in Norwegian fields.<sup>17</sup> The organisations emphasised the environmental and health concerns and the precautionary principle, arguing that it is impossible to control co-existence between GM plants and traditional plants. Moreover, the organisations behind the letter expressed criticism of the work of the Food Authorities (Mattilsynet) on developing regulations for such co-existence. This broad-based criticism directed at the Food Authorities, as well as at the Walløe Commission and the Norwegian Scientific Committee for Food Safety (VKM), illustrates how the precautionary principle is less widely applied by politically appointed expert forums than it is acknowledged by the general civil society.

## 6. Concluding remarks

Norway has largely adjusted its legislation to the EU rules in the GMO issue area; however, the Norwegian Gene Technology Act opens for specific concerns on sustainable development and societal utility. In addition, changes in the knowledge situation, most particularly the greater inclusion of the precautionary principle, may have accentuated this legal factor. This would seem to imply a greater scope for value-based perceptions of technology, which in turn might result in a less rationalistic-technocratic approach to GMOs compared to other issues. In this light, the Gene Technology Act allows for more comprehensive evaluations, including consideration of conditions in third (world) countries. This accentuated a difference between the Norwegian and EU assessments of many cases involving antibiotic resistance.

Another major difference is found in the number of GMO cases that have been accepted by Norway and the EU Commission respectively since the end of the de facto moratorium. That general trend might be better explained by variety in interest structures and cost-benefit calculations: One of the main reasons why Norway keep turning down GMO applications may be that they are not economically interesting to Norwegian farmers. In turn, the costs of following dominating knowledge claims are not (yet) very high in the case of Norway.

Nevertheless, it could be argued that the similarities are greater than both the legal and interest based interpretations would imply. The EU criterion of ethics could arguably be used in the same manner as the societal utility and sustainable development criteria of the Norwegian Gene Technology Act. There are similarities in public opinion about GMOs; particularly in the views on GMO documentation, which is seen to lack transparency and disengagement towards interest groups objectivity. Again, however, the Norwegian Gene Technology Act would seem to go one step further in terms of reacting to this lack of information.

The increasingly detailed argumentation behind the restrictive practice of the NBAB may be associated with a growing acceptance of the precautionary principle in this sector. In

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<sup>17</sup> Press release, 14 October 2006: 'Nei til genmodifisering av norsk landbruk' (No to gene modification of Norwegian agriculture). Open letter to the Ministries of Agriculture, Ministry of the Environment, the Stortinget's Standing Committees on Commerce and Industry, and on Energy and the Environment.

fact, the precautionary principle seems to have higher level of acceptance by the general civil society than with the central government and with politically appointed expert forums. Reports and recommendations from official governmental sources, such as the Food Authorities, the Norwegian Scientific Committee for Food Safety, and the Walløe Commission, revealed less focus on this principle.

Thus, the GMO issue provides a prime example of the dilemma of regulators, in seeking to skirt the dangers of being co-opted by technocrats with too little democratic control, as portrayed in the scenario of Barnett & Finnemore, or on the other hand, leaving the agenda to be shaped in overly populist terms. Equally important, however, the case indicates the difficulties in organizing this type of communication between competing knowledge claims. Moreover, it reminds us how, in spite of efforts to have open and public deliberations, it may still be hard to reach the aims of full participation and transparency, not only in the decision-making process but with regard to the final decision. Whichever way the final decisions on GMO applications go, the government will have to choose between disappointing a unified public opinion that includes a wide range of Norwegian interest groups, and going against potential biotechnological developments and economic gains as well as parts of the European Union. The great number of GMO applications that is pending final EU decision, indicates that this dilemma is not restricted to Norway. The debate over the merits and risks of GMO crops is taking on new urgency as global prices for corn and other staples have doubled over the past two years. Corn that has not been modified is often more expensive than genetically-altered varieties and this may bring another element into the already complex issue for decision-makers. It also emphasises how any decision on GMOs is inherently political in nature and not likely to be resolved by scientific findings alone.

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