

Precautionary Expertise for GM Crops

National Report – Austria

Political Consensus Despite Divergent Concepts of Precaution

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List of abbreviations

CA	Competent authority
EU	European Union
GM(O)	Genetically modified (organism)
NGO	Non-governmental organisation
OLF	Other legitimate factor
PP	Precautionary principle
UBA	Federal Environment Agency
WTO	World Trade Organisation

Abstract

From the beginning of the 1990s, Austria has steered a critical course with respect to agricultural biotechnology. Especially after the mid-1990s, policy makers were reluctant to introduce GMOs after the first, and futile, experimental release attempts triggered public outrage. So far, there have been no releases in Austria, and although public debate has subsided in recent years, policy has not shifted significantly. Citing the precautionary principle, Austria was among the first to ban, under article 16 of Directive 90/220, a GMO already approved by other EU member countries. Subsequently, policy took up popular demands to keep Austria GMO-free and, at the same time, incorporated views from organic agriculture and parts of the agro-food industry that benefited from such a policy. Austria backed the EU's *de facto* moratorium on GMOs and demanded it be further upheld. Austrian institutions statutorily involved in policy advice had long been active in developing precautionary measures and arguments backing government policy. In addition, they contributed, through reports and conferences, to openings for more precautionary approaches abroad.

An investigation of different accounts of the precautionary principle (PP) among political actors shed some light on the individual and institutional background for such a stance. Under the header of the PP, three different concepts of the perceived relation between science and policy and of the roles of uncertainty, risk and benefit in political decision-making emerged:

- 1 According to the scientific concept, risks are defined by science, uncertainty has to be reduced through scientific research, benefits are considered inherent in innovation, and policy should follow scientific advice only. The PP thus demands more science-based research, particularly in order to determine claims about risk.
- 2 The political-economic concept sees science as providing arguments for political decision-making. Science is, or should be, objective, but multiple scientific arguments support divergent positions and uncertainty will always remain. In the face of uncertainty and pluralism, policy takes into account other criteria too, such as the expected distribution of risks and benefits. Even more important than uncertainty about risks is uncertainty about benefits; thus, decisions must be compatible with socio-economic aims.
- 3 The normative systems-critical concept sees the PP as a tool in the political struggle, based on 'strong' environmental ethics and/or a modernisation-critical position. Risks are emphasised in an instrumental way, and benefit is understood as promoting the political aim of a society oriented towards sustainability.

Although most regulators hold views that correspond to concept 2, they have so far succeeded in steering a widely acclaimed GMO-critical course with the help of a coalition of different interests and approaches. From an outsider's perspective, the Austrian position appears remarkably consistent in that its version of a precautionary approach has been sustained over a long time. Yet from an insider's perspective, the Austrian position is viewed as being under threat from the lifting of the *de facto* moratorium, which would demand from Austria adherence to a European policy of, in principle, introducing agricultural biotechnology. Therefore various measures have been discussed that would allow Austria to keep, as far as possible, its status of being largely GMO-free while not violating European regulations. Means to this end were seen as: the establishment of GMO-free areas (the European Commission having acknowledged a pertinent Austrian county law), measures to allow co-existence under stringent and locally adapted conditions, the introduction of new risk assessment categories, and the possibility of 'other legitimate factors' being taken into account to allow the assessment of benefits (or the lack thereof).

Austrian officials are currently looking for a consistent framework that could reconcile demands from a GMO-critical public and agricultural sector with regulatory demands from the EU, in the light of scant interest from policy makers and a weakening

Austrian position on GMOs among other EU member states. This framework must be compatible with, and supported by, 'undistorted' scientific arguments.

Three take-home messages

- 1 The Austrian GMO-critical position is upheld without major public or NGO pressure. It rests upon a coalition of tacit public opinion, political will and economic interests from organic agriculture and the conventional agro-food sector.
- 2 The precautionary principle is largely seen as a political instrument, yet most actors think that science can be, and has to be, independent and pluralistic. Ambiguous scientific arguments open up space for divergent options.
- 3 The Austrian position is under threat. After the end of the de facto moratorium, policy makers will need a new strategy to reconcile GMO-critical domestic demands with a more GMO-friendly EU policy through means such as GMO-free zones, new risk assessment criteria and the taking into account of 'other legitimate factors'.

Main findings

Preamble

This project, funded by the European Commission (DG Research), addressed the question:

For genetically modified (GM) crops and their food uses, how do current European practices – regulatory measures, expert judgements and stakeholder roles – compare with different accounts of the precautionary principle?

The research was conducted on a national basis, but contributed to a European comparison. As will be seen from our analysis, in the Austrian context this question translated into slightly different policy problems at the time the research was carried out. In particular, Austrian policy actors had in mind the question of how to relate to the anticipated lifting of the *de facto* moratorium, and whether or not to embrace a policy of co-existence of GM and non-GM agriculture in the light of the fact that Austria had not even had any experimental releases of GM crops, so had remained (officially) GM-free. This report therefore has a slightly different focus from that of the other country reports for the project.

We derived our findings from two sources: we carried out a series of interviews with key actors in 2002, as well as drawing on a stock of interviews we had conducted previously for another similar project. In spring 2003, we invited a group of high-ranking officials for three consecutive informal brainstorming workshop meetings. The following report is largely based on the protocols from those interviews and workshop meetings but begins with a short overview of Austrian political developments in the field of agricultural biotechnology.

Policy background

Regulatory set-up

Austria is a federal republic with considerable power assigned to the nine regions. Especially with regard to agriculture, the regions are relatively autonomous despite the existence of a federal Ministry of Agriculture. Biotechnology is regulated by a federal law issued in 1994, which took into account the European Directive 90/220 in preparation for Austria's accession to the EU, after a Parliamentary enquiry commission had debated the subject. That law was revised in 1998 in the wake of a successful public petition, and again in 2002 to implement European Council Directive 98/81 on contained use. To date (February 2004) the revised European Directive, 2001/18, has not been implemented¹.

The competent authority is the Ministry of Health and Women's Affairs. The responsible sub-department of the ministry has changed its affiliation several times, having belonged to the Federal Chancellery and to the Ministry of Consumer Affairs for a time, amongst others, and generally being moved around like a hot potato. The sub-department itself, however, has hardly changed, the people responsible being for the most part still in office. Apart from the CA, several other ministries have a say on biotechnology. In particular, the Ministry of the Environment and the Ministry of Agriculture, Forest and Water Management (which were amalgamated in 2000) have to be consulted on releases into the environment and marketing permissions. The practical consultation work is mostly done by UBA, the Federal Environment Agency, recently privatised but still working on behalf of the Ministry and with considerable in-house expertise. Furthermore, the Ministry of Education, Science and Arts is

¹ For an overview see http://www.gentechnik.gv.at/gentechnik/B1_orientierung/B1_einfuehr_11195_set.html

responsible for overseeing university research on biotechnology, dealing mostly with issues of contained use, and the Ministry of Economics is also consulted on a regular basis. Thus, a complicated network of responsibilities ensures that various interests have to be considered but makes it difficult to devise a consistent policy.

The Austrian law on biotechnology of 1994 (revised in 1998 and 2002) regulates all aspects of contained use, release and marketing of GMOs, as well as human applications such as genetic tests and gene therapy. The preamble lists several 'principles' that have to be taken into account when the law is applied. Apart from explicitly mentioning the precautionary principle (PP), the preamble also refers to the 'future principle' (stressing that the application of biotechnology should be promoted), the 'step-by-step principle', the 'democratic principle' (stipulating participation and information) and the 'ethical principle' (mainly relevant for human applications). As a result of the Parliamentary Commission's work, the part on marketing permissions contains a peculiar provision to avoid any 'social non-sustainability' resulting from a GM product; however, this provision has never been applied. Nevertheless, it highlights a line of thought that became important in subsequent policy deliberations.

For detailed regulation, there are several ordinances. These regulate, for example, public hearings and the 'book of biotechnology' documenting the technological state of the art. This book has the legal status of an objective expert opinion, but to date, only issues of human application have been covered. Products approved by the EC have to be listed in the 'register of products containing GMOs'; however, in three cases of genetically modified maize with market approval, Austria has issued an import ban in accordance with Article 16 of Directive 90/220 in the form of ordinances. In addition to 'novel food', the ordinance on labelling of products that contain GMOs prescribes mandatory labelling. The ordinance on genetically modified seed prescribes mandatory labelling for all seed varieties covered under Directive 90/220 and sets thresholds for accidental contamination. The ordinance on thresholds of GMOs in feed sets a threshold of 1%. Another ordinance limits emissions in waste water from the contained use of GMOs. The ordinance on the protection of employees against hazards from biological agents contains an annex with a classification of organisms. As a piece of 'soft' law (not legally binding), the '*Codex Alimentarius Austriacus*' provides guidance on the definition of 'GMO-free' foodstuffs.

Attached to the CA, there is a professional advisory body for biotechnology, the *Gentechnikkommission*. It has close to 30 members, among them natural and social scientists, interest representatives and ministerial civil servants, nominated by ministries and interest groups such as industry and trade unions, the churches, the universities and the Academy of Sciences. However, in practice the Commission as such does not play any role; more important are the three 'scientific sub-committees', for contained use, releases and human applications, which involve only the scientists. They give advice to the CA on request, but not usually on their own initiative.

Policy developments

Over the mid to late 1990s, phases of strong NGO campaigning and intensive press coverage fuelled a pronounced domestic public debate on agricultural biotechnology. Over the same period, Austria held a reluctant official position with respect to GM crops. In 1996, there were three applications for releases, but none of them made it to the field (see our previous reports: Mikl and Torgersen, 1996; Grabner and Torgersen, 1998; Torgersen and Seifert, 2000). Since then, no successful domestic release of a GMO has taken place. Early on, Austrian authorities took a stance that was considered extreme among European member states. They were among the first to ban GM crops that had already been positively assessed by other member country CAs, citing the precautionary principle on the grounds of unresolved questions about possible risks. In total, Austria has issued a ban on three GM products (all of them maize varieties)². Thus, Austria has been one of the countries that officially

² Austria has issued a ban on the import of the GM maize varieties CG 00256-176 in 1997 (due to the presence of an ampicillin resistance marker and uncertainties about a possible

spearheaded the application of the PP on a national basis. In addition, the Austrian position has always been that agricultural practices, as a major determinant of environmental impacts, would have to be considered as a complement to, or part of, risk assessment.

This policy contributed, according to Austrian civil servants, to the decision by the European Council to impose the *de facto* moratorium on new applications. In contrast to the Commission and some member countries who now intend to lift the moratorium, Austria, together with a couple of other countries, officially demanded in summer 2003 that the moratorium should be maintained. Thus, the Austrian position has not substantially changed since the late 1990s; on the contrary, it has made a semi-official declaration not to support the development and use of GM crops, at least for the foreseeable future. This position reflects a widespread consensus among the public, NGOs, policymakers and the agro-food sector, which profits from being able to deliver guaranteed GM-free products.

The 'normative force of facts' has prompted industry and science to agree with this position. Until recently, they had still hoped that the official Austrian position on GM crops would change with the collapse of the moratorium, but this turned out to be wishful thinking. Even practical risk research did not take off as officially promised in early 2000, although work on a domestically prominent Austrian development (a virus-resistant apricot tree) had been re-launched under this header. There have been no experimental GMO releases so far, and there are no signs that this blockage will end. Long ago, industry seems to have limited its hopes for the development of the Austrian biotechnology sector to medical applications.

The Austrian position is all the more remarkable if one takes into account that a conservative/right-wing coalition came to power in 2000. Traditionally, agricultural and industry interests are very strongly represented within the conservative party, so it was to be expected that the party would promote agricultural biotechnology.

In sharp contrast to the years 1996-99, public controversy since then has been muted. After cultivation and marketing of the AgrEvo Bt maize was banned in spring 2000, occasional checks found GM material in crops both in autumn 2000 and 2001. This prompted government to command the harvest from those crops to be destroyed. When pesticides were found in fruit and vegetables, government initiated several legislative steps and institutional processes with respect to food safety. NGOs repeatedly started half-hearted attempts to re-mobilise the public, but these achieved little, except in the case of the 'contamination' issue. The reason was that government policy simply left no room for NGO criticism, as it increasingly met every demand apart from officially banning GMOs entirely. Government officials still considered GMOs to be worthwhile as a future option, if other more useful products eventually became available. Similarly, until 2003, official farmer representatives would not declare themselves either against or in favour of agricultural biotechnology.

Nevertheless, the issue remained on the political agenda. Developments in the EU triggered political activity both at federal and region level. In July 2002, a Parliamentary petition demanded zero tolerance with respect to GMO contamination and suggested steps to declare the whole of Austria a 'GM-free region'. This was very popular but obviously politically unfeasible. The debate about GM-free regions and/or co-existence, as well as the pertinent Fischler proposal in March 2003 (devolving responsibility for measures to implement co-existence to the national authorities, Commission of the European Communities, 2003), led to an unprecedented consensus between government and opposition to strive for a GM-free agriculture – even at a time when Austria had intense political conflicts in general. Several federal regions had been discussing and preparing laws aimed at officially establishing GM-

resistance to Bt); MON 810 in 1999 (due to uncertainties about unintended effects on non-target organisms), and T25 in 2000 (due to possible gene transfer by pollen, the lack of a monitoring programme, and the lack of account taken of different local conditions and agricultural practices), see http://www.gentechnik.gv.at/gentechnik/set/recht_set.html. The PP was explicitly mentioned as a justification in the first and second case.

free areas. While the European Commission rejected the approach chosen by the region of Upper Austria to issue an outright if temporary ban, Carinthia was successful with a more moderate solution of a 'precaution law' (banning GM crops in ecologically sensitive areas, and specifying separation distances to prevent gene flow) to be implemented in 2004.

While regions were active, federal government remained silent apart from banning a product that the EU had already approved under the Novel Food Regulation (Bt 11 maize). While the overall line was clear, and even actors from industry³ and science embraced a non-GM future, federal policy seemed to lack co-ordination. During 2003, attempts were made to devise a new and more consistent national strategy to cope with the challenges posed by the intended lifting of the *de facto* moratorium. However, the means by which such a policy would be pursued remained unclear. Austria seemed to have manoeuvred itself into a 'catch-22' situation: on the one hand, an overwhelming national consensus demanded that Austria should stay GM-free, while on the other hand, the EU, under pressure from pending WTO complaints, intended to establish a European approach towards incorporating the GM option into agricultural policy. What Austria now needs is a strategy to reconcile these antagonistic demands.

Although important domestic policy actors tend to see Austria as unique, marginal and on the defensive in Europe, the picture is slightly different if we look at Austria from the European level. Here, the country's GMO policy profile appears much more distinctive due to a history of activities that have raised, and may continue to raise in the future, more uncertainties or to promote more stringent criteria throughout Europe, regardless of whether or not they result in the blocking of GM products (which seems to be the main practical policy question from the Austrian standpoint for the time being). For example, UBA plays a Europe-wide role through its risk-assessment reports, conferences, networking, etc., on issues such as test methods for GM food safety and baseline studies on conventional agriculture⁴. In addition, national-EU negotiation over the Carinthian draft regulations set an EU-wide precedent for coexistence.

In the following, we mostly describe discourses rather than practices. This has to do with the fact that, as already mentioned, there is little practice to discuss.

Concepts of precaution

At first glance, it appears as if the peculiar Austrian position and its broad support among stakeholders, the public and even parts of industry and science has its base in a strong and widely shared common understanding of the *problematique*. Especially regarding official policy, it is hard to believe that such a stance could be the result of a more or less haphazardly collated bundle of measures without a strong co-ordinating force. Yet strangely, even the responsible civil servants criticise a lack of co-ordination and the absence of a policy concept – strangely because after all, they could have developed one. In their view, all that exists is a reluctance on the part of politicians to deal with the issue, and strong forces (public opinion, NGOs) that push policy in a certain direction.

This may also be the reason why during our workshop meetings there was little concrete mention of what type of risk would warrant applying the PP, or what kind of unintended consequence would be deemed intolerable or 'serious or irreversible harm' – participants were reluctant to be outspoken on this. In our interviews as well, in a face-to-face situation, usually more emphasis was placed on general accounts of how to deal with *any* uncertainty about risks than on listing risks that would be considered 'serious'. The almost canonical list of gene transfer, increased weediness, harm to non-target organisms, health hazards, etc., would certainly be deemed

³ The company that tried to perform the first and futile GMO release now successfully sells guaranteed non-GM seed.

⁴ For an overview of recent UBA activities see Annex IV.

'serious', but sometimes for different reasons. The differentiation between different types of harm was not always clear; for example, gene transfer was conceptualised as an environmental hazard as well as an economic harm. In some instances, frequent reference to 'benefits' appeared to be a way to avoid a painstaking debate, obviously considered futile, about what risk would be severe enough to justify the application of the PP.

While there seems to be a fairly unanimous interpretation of the current political situation among stakeholders, civil servants and scientists, responses from interviewees indicated that this extends to the *de facto* role of the PP as a political tool in routine administration. At least in terms of how the PP has been applied so far, interviewees from very different institutions emphasised its use as a political contingency and interpreted the handling of biotechnology, and GM maize in particular, as based on political considerations yet camouflaged with a scientific rationale. Most interviewees, including regulators, viewed 'risk' as a social (or political) construct in which the role of science is relegated to providing advice. The conceptualisation of science as providing advice, but not determining decisions, allows values to be included separately in an overall consideration of both values and scientific facts, as long as they are kept apart. As a result, science, in an idealised understanding, remains value-free and 'unstained'.

Divergent normative views nevertheless came to the fore when interviewees were asked about their interpretation of precaution as such. From statements made on different understandings of the PP, and taking into account different conceptualisations of uncertainty, we constructed three main 'concepts' of precaution addressing, among other aspects, the role of, and the relation between, science, politics and public perception. Although there were many overlaps, scientists and civil servants from the Ministries of Research and of Trade tended to adhere to concept 1 (see below). Those from the Ministry of Health (the competent authority) and from the Federal Environment Agency (UBA) as well as a member of the cabinet of the Minister of Agriculture argued along the lines of concept 2. NGO representatives and politicians from the Social Democrats and the Greens entertained views in line with concept 3.

Scientific concept

Apart from a concession to public anxieties, aimed at achieving better acceptance, this concept of the PP mainly implies that uncertainty must be reduced by means of new knowledge. That is preferably done through scientific investigation, under the (precautionary) hypothesis of possible risk. What the risks are, and which consequences would be unacceptable, is determined in relation to the 'state-of-the-art' of modern technology and agriculture. (Apart from this, the potential of a risk argument to be applied in mobilising campaigns plays a role in the concept as part of the concession to public anxieties.) Dealing with uncertainty, and hence precaution, has always been a constituent of the scientific method, since the scientific method involves proceeding from case to case making comparisons with already established knowledge. The question of benefit is irrelevant, as the gaining of knowledge already constitutes a benefit, or benefit is taken for granted within the existing system of exploitation of scientific research results. Hence, the PP demands more research, performed by those scientific disciplines that fulfil the criteria of (natural) science. Ethical aspects only play a role at a personal level and hence are scientifically irrelevant. Political decisions are rational provided they are taken primarily on the basis of natural scientific insights. It is preferable for scientists to take the decisions, but not essential, so long as decisions are taken on the basis of science.

Political-economic concept

In this concept, the PP provides guidance in cases of decisions under uncertainty. Criteria are not only scientific but derive from the expected distribution of risks and benefits, or from the compatibility with value judgements. They are therefore predominantly economic or ethical in character and essentially demand a political decision. Since science necessarily, and admittedly, produces uncertainty, there is

always a residual uncertainty about possible risks. While risks from nature must be accepted, man-made risks can and should be minimised. However, the nature of the benefit is equally as important as (if not more important than) the nature of the risk. Therefore the second main criteria for a decision is the uncertainty about benefits. Hence what is at stake is not so much uncertainty about health or environmental risks (although they play a role), as the EU Commission's interpretation of the PP might suggest, but uncertainty about the compatibility with consensual socio-economic aims, for example about nation-wide agreed necessities such as safeguarding the survival of small-scale organic farming. Since, however, only uncertainty about health and environmental risks are internationally acknowledged to be relevant, in taking a decision national authorities have to render instrumental the all-pervasive cognitive uncertainty about such risks as a trigger for invoking the PP in practice.

Normative systems-critical concept

In this concept, the PP opens up space for 'holistic' decisions, as a result of its systematic taking into account of non-quantifiable risks and long-term consequences, and to the slowing-down of the decision-making process that process entails. The criteria for such decisions derive from the relevant actors' normative orientations. There are two dominant critical orientations: on the one hand, environmental ethics based on a normatively charged conceptualisation of Nature; on the other, a 'modernisation'-critical position fighting increasing economic disparities and – on a political level – the quasi-technological logic of *de facto* constraints. The PP, in this interpretation, is a kind of 'resistance principle' to be applied in order to benefit nature understood as inherently reasonable, or to serve the protest against the democratic deficit or the monopolistic and all-engulfing capitalism in general by providing scientific arguments. A benefit, in this understanding, would be anything that promotes the political aim of a society oriented towards sustainability. Potential benefits of biotechnology, even if they could be framed according to this definition, are rejected, since any acknowledgement of a benefit would weaken a position characterised by re-formulating questions of technology shaping in ways that call into question the present system. As with concept 2, to apply the PP is regarded as political, but less in the sense of being publicly accountable for risk-management judgements than in an instrumental sense.

Precaution and policy

These three concepts of precaution imply a successive and step-wise opening up for non-scientific issues (or, rather, a blurring of the strict separation of scientific and non-scientific issues, given how concept 1 narrowly draws the boundary), from an understanding shaped by a strictly scientifically-grounded rationality in concept 1, to a rationality strongly influenced by pragmatic-political reasoning in concept 2, to a deliberately normatively-determined view in concept 3 that sees science as a tool in a political struggle. Although concept 2 seems to be a kind of middle-ground, politically-open and ideologically-underdetermined framing, the different interpretations of precaution are based on particular worldviews and differing understandings of political decision-making and of science in this process. One can 'read' them as being functional for the actors according to their professional aims and interests. Obviously the NGO's interpretation of precaution opens up the debate to arguments other than 'scientific' ones in order to keep the debate about GMOs alive, as a means of questioning the industrialised production system. On the other hand, science conceptualises the PP as a commitment to further research and, at the same time, as a means to address public anxieties. And regulators emphasise the PP as an open-ended means to make decisions that are not determined beforehand. It can be adapted to the needs of their daily political work or to fit into a broad consensus about political aims or public needs, for example with respect to agriculture. The Austrian position as represented by government officials largely corresponds with concept 2 but also takes up arguments from concepts 1 and 3. This eclectic position has to be understood as a piece of mosaic in a larger picture mainly determined by the need to

promote the political aim of preserving the small-scale structure of Austrian agriculture.

Actors do not always reproduce their 'strategic' interpretations of precaution along rational lines. Rather, there are tensions, overlaps, and different understandings between otherwise like-minded actors, as well as unexpected partial agreements among strongly disagreeing ones. The issue of keeping Austria GM-free is just the latest in a series of interests that became held in common. For some actors this view is based on ideological reasons and an acknowledgement of public sentiments, while for others it is held because Austrian companies and farmers have been capitalising for years on the country's reputation as a source of guaranteed GM-free produce.

In the workshop meetings held over summer 2003 (three meetings over four and a half months), the political necessity to arrive at a rationale for keeping GM crops outside the country would have suggested support for concept 2 or even 3. Interestingly, many participants instead upheld concept 1, stressing that the PP should be based on science. They wanted to avoid its seeming misuse and devise measures to arrive at similar ends without distorting the 'real' meaning of the PP. They considered the PP to be an instrument to deal with identified data gaps in risk assessment, requiring a need to stick to the criteria of scientific scrutiny, i.e. to establish uncertainty about risks according to science. A clear definition was considered a necessary condition for correctly applying the PP and identifying the questions to answer. For them, the argument that there still existed uncertainties that could possibly lead to serious harmful effects (whatever they might be) was too weak. Hence we could observe that the participants strongly defended the boundary between science and politics, in order to keep 'unbiased' science as an independent source of information. From their basis of a 'scientific' understanding of the PP, they acknowledged its political implications to be valuable as a means in the political struggle to maintain a GM-free agriculture, but not necessarily because they considered GMOs to be risky.

Institutional practices

Analytical questions

The project originally set out to investigate how different accounts of precaution compare with current practices in each country. In particular, it focussed on three questions. The first concerned how regulatory measures make links between risk research, risk assessment and risk management. The second concerned the role of expert advisory bodies in mediating between regulatory science and public-scientific controversy. The third concerned the role of stakeholder groups in attempting to influence regulatory measures, either within or beyond formal procedures. However, applying these questions to the Austrian situation proved to be difficult.

Investigating how risk research, assessment and management are linked in practice, we were faced with the problem that Austria has not yet seen a GMO release, so that it was clear from the beginning that we would not meet much in the way of a 'practice'. In particular, it was difficult to see 'how such links are drawn by innovators, research institutes and regulators' (a question in the original research plan) as there are few innovators, and for several years no research institute has submitted a release application. Thus the question of 'how priorities are set for the cause-effect uncertainties to be tested and managed' remained largely theoretical except for those cases that came from abroad – comments on notification and marketing permits granted elsewhere and processed internally in the regulatory domain. These documents were handled entirely in-house as there was no legal provision that required the involvement of anyone else. Nevertheless, we could observe attempts to separate science and politics, at least on a rhetorical level.

For the question of 'how expert advisory bodies mediate between regulatory science and public-scientific controversy', again, in Austria it was difficult to identify the activity of the official expert advisory body, the Advisory Commission on Genetic Engineering. This was because that body is asked to give its opinion only if there is a

national release application. Since there were no applications over the period of the research, the body was not called on to take any formal action. In contrast, UBA did give its opinion, because its remit is to comment on marketing application files from other member countries. The question of 'how such bodies are broadened or supplemented' is difficult to answer as the Advisory Commission was very broad from the beginning. Although its composition changed slightly after the successful anti-GMO petition, this change had little practical significance. Finally, to investigate 'how they set criteria for evidence, and define environmental norms' and 'how these criteria relate to wider concerns' would require activity in this respect – so far, in Austria the Advisory Commission has been largely marginalised.

The project's aim of investigating 'how stakeholder groups attempt to influence regulatory measures, within or beyond formal procedures' implies an analysis of 'how they participate in deliberative procedures' and 'how they promote accounts of evidence, uncertainty, precaution and sustainable agriculture'. In Austria, many scientists can be described as stakeholders (as is the case in most countries) rather than as being in the position of giving 'independent' advice to regulatory decision-making. Compared to other countries, in Austria industry has been less successful at promoting its interests in agricultural biotechnology. Government policy has taken up certain demands of NGOs and organic farmers so that their role as stakeholders, or their importance as distinct pressure groups, has become institutionally marginalised as in the case of scientists and industry, although for different reasons. Nevertheless, some scientists, industry representatives and leading NGO members have influence on a personal basis. The overall impression is that ministries and institutions linked to government such as UBA aim to stay 'at arm's length' from scientific bodies as well as from industry and NGOs, choosing arguments and demands from all stakeholders in forming their own policy.

Despite these difficulties in addressing the research questions as originally posed, a range of other interesting questions arose during the project work. In particular, actors were occupied by the policy question of how to relate to the post-moratorium era. The big problem was how to position Austria within the European context, and how to develop, and retain, a genuinely Austrian way of dealing with the challenge of introducing – or declining to introduce – GM crops. In researching actors' ideas and perceptions about this question, we learned much with respect to the project's overall research agenda without sticking too closely to the original questions.

Risk assessment

The separation of science and politics is mirrored, for example, in the concept of uncertainty, which has in common that uncertainty is seen as inevitable, to be managed through decisions that must be taken on a political basis, but clearly indicated as such. Risk assessment among institutional stakeholders and civil servants seems to be oriented to an understanding of science as independent, but the results must be subject to political deliberations. In particular, possible risks must be matched with 'benefits' – whatever they are and however they might be established. This was a prominent argument that recurred in different forms and gave rise to extended debates about 'other legitimate factors'.

In addition, Austrian authorities follow a different track from other member states in assessing risks that have been underestimated or that have not been evaluated rigorously in their view, such as toxicological and allergenic effects, especially of GM food products⁵. Another aspect is their preference for taking into account local conditions that might be different from those in other places and that might suggest

⁵ For example, UBA sponsored two international conferences, in October 2001 and December 2003, highlighting research gaps in the assessment of food products and methods to overcome them (see Annex IV).

different solutions from an environmental point of view⁶. They aim at an integrated, contextual assessment – taking into account as many parameters as possible, with the (perhaps not unintended) effect that things become rather complicated, to the extent that decisions become difficult if not impossible. This ‘making things complicated’ might even be a strategy (implicitly acknowledged) to gain time. For the time being, it is difficult to see how a pro-GM decision would be advocated.

In search of arguments that could be applied in order to defend the Austrian policy of keeping GMOs out, a big problem so far has been that support from ‘scientific’ arguments has been difficult to obtain. In numerous instances interviewees and workshop participants stressed that the official Austrian position, for example on not granting permission for certain products, has frequently met problems with the European Commission. The Commission often considered scientific arguments brought forward by the Austrian CA to be too weak, not new or irrelevant. In a way, Austria has met problems similar to those the EU has experienced with the US on several occasions in struggles from hormone beef to the restrictions for GM products⁷. The reactions of responsible civil servants seem to have been similar in so far as their interpretation of the need to stick to scientific arguments is concerned. They did not question this necessity; rather, they searched for ‘appropriate’ scientific underpinnings of their political position or struggled to gain acceptance for those investigations and interpretations that would support their policy. For Austria, it was particularly important to gain support for a widening of the scope of risk assessment and for the agricultural context to be taken into account, at a time when this was not yet specified by European legislation. Since then, Austria and other countries with a similar position seem to have succeeded in introducing some of their views into the revised Deliberate Release Directive (or, at least, the Directive has taken up additional aspects for various reasons). Now, accordingly, the struggle must go on to introduce even more criteria, such as toxicity and allergenicity tests, and interpret them in a stringent way⁸.

The Bt 11 maize case provides an example of how different arguments were applied in order to justify a national stance that was politically necessary. Advocated by France under the Deliberate Release Directive, the application was criticised by other member states for its lack of detailed data, a certain sloppiness of experimental design and, most importantly, the fact that it was submitted under the old framework. The Austrian position, however, added another dimension. As a result, any application will have to wait until the problems of co-existence, cross-contamination and traceability have been solved at a European level. Given the fact that responsibility for implementation of co-existence measures, according to the Fischler proposal of spring 2003 (subsequently agreed by the EC), will remain at a national level, harmonisation of the pertinent issues is likely to take a considerable time, not only in relation to the Deliberate Release Directive but also for the Novel Food Directive.

Risk management and other legitimate factors

Adding criteria is one way to pursue Austria’s policy. However, in the long run, Austrian civil servants would prefer to have a framework in place where scientific arguments and political necessity would not necessarily have to coincide, but where political or socio-economic criteria would be taken into account as of right. Part of the unease of many workshop participants was due to their feeling that science was

⁶ See the 1996 UBA booklet on agricultural practices and baselines: *Ecological Impacts of Traditional Crop Plants – A Basis for the Assessment of Transgenic Plants?*, UBA monography No. 75, Vienna.

⁷ Millstone, E., van Zwanenberg, P., Marris, C. Levidow, L. Torgersen, H., 2002, Science and governance in trade-related risk regulatory decision-making: comparative case studies. Draft final report for ‘The scientific basis of applying the Precautionary Principle in biotechnology-related potential Trade conflicts’, European Science and Technology Observatory (ESTO).

⁸ See pertinent activities performed by UBA, Annex IV.

'distorted' in order to gain arguments in support of a political decision. They conceived this distortion to be a fairly universal problem, not confined to Austria and its peculiar situation. Their desire to disentangle science and politics openly (and to 'de-stain' science) was mirrored in their preference for a two-tier concept of risk assessment/management, whereby decisions are based not only on the risks involved but also on weighing the risks against the benefits or political interests involved. Hence, they argued for 'other legitimate factors' to be taken into account officially, in a way that acknowledged they were definitely different, and should be kept different, from scientific arguments. Although there were various opinions on whether 'other' factors should be considered in risk assessment or be confined to risk management, their view was that in the end this did not matter too much as the crucial distinction was the one between science and politics.

Science, in such an understanding, has to serve politics by establishing facts, and politics has to deal with those facts in reconciling different interests. In this respect, the distinction is similar to the understanding prevalent in concept 1. However, politics, in making decisions, must take into account a variety of factors and facts. Thus, it has a role both in risk assessment (what to assess) and risk management (how to reconcile divergent interests). Similarly, science is involved both in risk assessment (establishing facts about risk) and in risk management (developing measures to manage the risk).

In this way, the underlying concept resembled the one aired in the European Commission's communication on the precautionary principle. However, the conceptualisation of other legitimate factors was distinctly different. Here, ideas about general contextual factors, including human rights, played a role; elsewhere such ideas would probably cause raised eyebrows. Apart from the difficulty of arguing why consideration of such factors should be confined to GM products (a problem acknowledged by workshop participants) the procedure for assessing them remained unclear, as cost-benefit analyses seemed too narrow in scope. The task of assessing the distribution of costs and benefits on an inter-personal level, not addressed so far, would probably make matters even more complicated. No mention was made of the institutional division of labour between risk assessment and risk management, since the main criteria for these activities have not yet been determined. The main problem for Austria appeared to be how to arrive at a consistent strategy for introducing a general framework, in the light of EU regulations (or Commission policy) aimed at becoming more 'risk-based'.

Moratorium and GM-free areas

The *de facto* moratorium was interpreted as a success for the Austrian position. It was an attempt 'not to take any decision in the light of public hostility', but also to gain more scientific insights – for example, insights that would support a more cautious approach to the introduction of GMOs. Consequently, many policy actors consider the prolongation of the moratorium desirable, for reasons compatible with all three concepts⁹. The revised Deliberate Release Directive was equally seen as influenced by Austrian ideas; it does not automatically end the moratorium nor does it automatically ensure that new GM products will gain market approval, since it provides new criteria that can be applied in order not to grant permission. However, interviewees were often uncertain about the role of the revised Directive *vis-à-vis* other more 'vertical' regulation in force or pending, such as the GM Food and Feed Regulation, which it was feared would marginalise environmental aspects.

Nevertheless, marketing permissions under the revised Directive would still allow the growing of GMOs everywhere in the EU, more or less irrespective of local conditions (unless explicitly declared). Another major problem for Austria would be the loss of its

⁹ Co-existence was not an issue at the time the moratorium was imposed, and since there were few concrete demands to be derived from it, workshop participants argued that it would be risky to demand that the moratorium be upheld because of unresolved questions around co-existence.

reputation as a source of GM-free products because of possible contamination through gene flow. Thus, the problem of contamination, at least in concept 2, becomes inevitably linked to the future of organic agriculture, which fits better with the widespread anti-GM attitude in Austria. This link has been involved, often in the form of a strategic argument along the lines of concept 3, in the debate about biotechnology from the beginning.

One means of ensuring the purity of organic and other GM-free produce is to establish identifiable, GM-free areas. Originally, this idea arose from the debate on the first release application, as an instrument to file an objection. A newspaper took up the idea and popularised it during the campaign for the anti-GM peoples' petition. The idea caught on through its simplified re-definition by the media, appealing to the general public attitude of Austria being an island. 'GM-free areas' have been promoted over the last two years in several regions, irrespective of party differences. Initially, they have only been in the form of a political declaration. Given the federal structure of agricultural regulations, legal provisions have been developed during 2003 in two regions.

After having rejected the draft law from Upper Austria, which attempted temporarily to establish an outright ban for GMOs in the entire region, the European Commission in principle accepted the Carinthian draft law, subject to some changes, in late 2003. This law establishes bans in specially protected and ecologically sensitive areas such as nature reserves, Alpine regions, near glaciers and within marshes and riverside forests. The law also requires growers to apply for permission in advance in order to grow GM crops. It stipulates minimum safety distances between GM and non-GM crops in order to prevent gene flow, in a way that will make a GM-based agriculture difficult in the light of the small average size of Carinthian fields. The European Commission was suspicious about whether this amounted to a ban 'through the back door', so they demanded some amendments to the law. For example, the Commission somewhat cryptically restricted bans in ecologically sensitive and/or protected areas in order to maintain proportionality; a ban may only be issued if it is 'also necessary for an authorisation on an EU wide level'.

Irrespective of such restrictions, the main significance of the Carinthian law seems to lie in setting an EU-wide precedent, through political-administrative negotiation over stringent but flexible rules. In addition, the general function of the possibility of setting up GM-free areas as a kind of reassuring rhetorical device should not be underestimated. Problems remain, however, for example in the definition and scope of what constitutes a GM-free area (whether it refers to the total absence of GMOs or relates to a certain species or product), of enforcement and of thresholds (as they are still inevitable for laboratory controls), and in the relation between regions and the Federal state in providing the infrastructure for controls.

Co-existence and a new Austrian strategy

The workshop participants unanimously regretted the fact that policy was virtually absent in the development of a national strategy on GM crops. They wanted constructive and co-ordinated Austrian proposals that would take into consideration socio-economic arguments, not least as an input to negotiations with the Commission and other member states. In particular, the question of 'OLFs' (other legitimate factors), and assessments within risk management that go beyond scientific evaluation of the more established potential risks, as well as the appropriate role of agricultural biotechnology on a national scale, were seen to be issues that civil servants may have ideas about but cannot resolve on their own. The main obstacles to devising a feasible strategy were identified as:

a reluctant public and agricultural sector, which would not welcome a change in policy towards the (still theoretical) introduction of GM crops;

a weakening of the Austrian position within the EU (as Austria's stance became less tenable);

little interest among policy makers, since the issue was contentious and would probably remain so for a considerable time;

little emphasis to date on devising a common approach among all players.

Given the reluctance of most of the workshop participants to accept GM crops, in the light of the widespread rejection among the public and stakeholders in Austria, participants were divided about the strategy to pursue. They unanimously rejected the general introduction of GM crops in a way similar to the situation in the USA; this was considered to be most unlikely throughout the EU, too. However, they did not agree on the aim of keeping out GM crops forever; rather they looked for medium-term strategies to get beyond the present impasse.

One possibility could be to try to keep Austria a GM-free area for a time, at least, because consumers and the agricultural sector would like it that way. Austria could devise arguments to uphold the *status quo* as long as possible. There were some political indications that this is being seriously considered. In spring 2003, leading farmers' representatives and the new minister of agriculture publicly spoke out very clearly against GM crops, so their cultivation in Austria will be unlikely in the immediate future. In summer 2003, the Committee on EU Relations in Parliament declared unanimously that the moratorium should be upheld. In our workshop, although there was a preference for a GM-free agriculture, it was clear to everyone that pertinent measures would be hard to defend against the European Commission and other member countries.

Another strategy could be deliberately to implement co-existence as the escape solution, the 'ultimate pragmatic way to reconcile otherwise incompatible stances', so as to meet the demands of the EU. Even those participants sceptical about GM agriculture saw a need to devise a suitable implementation strategy in order to be able to steer developments rather than to be overtaken by uncontrollable events triggered from outside. As co-existence is not an aim in itself, this strategy would demand a long-term consistent view about the future role of different forms of agriculture. There are still many problems, such as the inevitability of contamination – since Austria is dependent on imports for non-GM seed and feed. Another is the agreed threshold for contamination – one criterion proposed would keep it as low as possible while still being economically feasible (another entry point for socio-economic criteria). The main question, however, is regulation. The official Austrian position in 2003 was that the Commission should develop legally binding instruments to implement co-existence. The Federal government nevertheless did little in response to the Fischler proposal. Instead government seemed to be waiting for Commission guidelines, expected to become *de facto* mandatory through the activities of international NGOs monitoring their implementation.

The seeming reluctance on the part of policy makers was heavily criticised by many interviewees and by all our workshop participants – even though those participants seemed to be the people best placed to do something about it. This remarkable situation of indecisiveness as seen from 'inside' is hard to explain but seems to have its roots in avoidance behaviour by policy makers *vis-à-vis* the question of agricultural biotechnology, apart from general statements that 'Austria does not need GMOs'.

Conclusion

Motivations for national policy are 'to protect organic agriculture, as an economic asset, from biotechnology' and to follow a widespread and stable public attitude as manifested in the outcome of the anti-biotechnology people's petition of 1998 and documented in various surveys over the years. The obvious discrepancy between the views of large parts of the Austrian public, as well as important policy actors, on the one hand, and the obligations from EU regulation and trade agreements on the other, makes the issue especially contentious. The question is how to reconcile these largely consensual mainstream political aims with the existing European legal framework. GM-free areas, national assessments, prolongation of the moratorium, etc, are all at odds with European legislation and/or international treaties, although there has been some progress in the form of a 'precautionary' law on the regional

level. In the long run it will be necessary to devise additional measures that are compatible with the existing European framework.

Civil servants from several ministries stressed the point that the decision to pursue a GM-critical policy is a question of political will and not of scientific justification. Public opinion always has, and still does, influence Austrian policy on GMOs as a contextual factor, but the fact that important political actors, beyond those holding 'green' positions or supporting organic agriculture, have become increasingly averse towards GMOs cannot solely be attributed to public hostility. Rather, it is an admixture of economic and political factors that create conditions whereby GMOs seem to have no place in Austrian agriculture.

1 Introduction

1.1 Pre-1996

In the mid-1980s, biotechnology slowly started to become the subject of debate. While the scientific community denied the need for a specific law, the (not very prominent) pharmaceutical industry feared that the lack of a stable regulatory framework might lead to a loss in competitiveness. At the same time, Austria was beginning to come into line with EU regulations. In 1992, the Austrian Parliament held an expert commission of inquiry on 'technology assessment of genetic engineering'. Its findings were critical, particularly of the release of GMOs. But even when the Ministry of Health presented a draft law without waiting for Parliamentary agreement, there was little public reaction.

The law, enforced in 1995, did not only regulate the contained use, release and marketing of GMOs, but also genetic testing and gene therapy. Among the several principles mentioned, the 'ethical principle' referred to human applications only. The law also made provision for the avoidance of products that were 'socially unsustainable'. This banned products that exceeded the relevant theoretical risk criteria, i.e., it provided a means not to grant permission to products that may have posed 'inappropriate burden to groups of the population'. Apart from this, the law followed the EU Directives closely. The Ministry of Health became the Competent authority for releases and product approval¹⁰, while the Environment Agency (under the Ministry of the Environment) was put in charge of assessing pertinent applications. Its official criteria exceeded those of the European mainstream as it objected to possible negative environmental effects of agricultural practice, too. This position was later backed up by several studies and contributed to what after 1998 became the 'restrictive' Austrian position within the EU. However, neither this 'green' approach nor the Parliament's attempts to anticipate – and thus pro-actively mitigate – predictable conflicts with NGOs and the public, nor the attempt to avoid them via legal regulation, proved successful.

1.2 Mobilisation forerunner

Public mobilisation started in early 1996 and lasted for almost three years, preceding similar developments in other European countries. Environmental NGOs had taken up GMO releases as a major issue when the Ministry of Health was receiving the first release proposals. With the support of the Ministry, a public research institute proposed a GMO release (potatoes resistant to rot) in order to undertake biosafety research. The first public hearing, mandated by Austrian law, demonstrated the difficulty the Ministry faced in handling the case. Public opposition even increased when a proposal for herbicide-resistant maize was submitted; not least because genetically modified crops were seen as a threat to Austria's already growing number of organic farmers. The third proposal provoked a scandal when the company released the plants before permission was received. The Minister announced a moratorium after this 'illegal' release and, although the Chancellor immediately lifted it, the country has not yet seen any releases. This domestic Austrian public mobilisation set the scene for the conflicts that followed.

A new debate arose late in 1996 on the pending import of GM soy and maize from the US. Building on arguments already established, environmental NGOs made it clear that, despite EU regulations, they would object to any GM product being imported into Austria. This added a European dimension and resulted in two

¹⁰ Over several legislative periods, the department dealing with biotechnology within the Ministry of Health was temporarily incorporated into a variety of other ministries, such as the Ministry for Family Affairs and Consumer Protection, but remained essentially the same. It is at the moment part of the Ministry for Social Security and Generations. For the sake of clarity, in this report we will refer to this department as part of the Ministry of Health.

contradictory policy initiatives: one for banning and one for labelling GMOs. Spurred by domestic pressure, the government banned the import of Monsanto's GM MON 810 maize containing a Bt gene when the European product-marketing permit was adopted. Austria cited scientific reports raising doubts about previous conclusions¹¹ and, according to art.16 of the Directive 90/220, due to „new evidence of harm“, issued a ban invoicing the Precautionary Principle.¹² This was clearly an affront to the EU approval system for GM products. Since competent authorities in other countries considered the Austrian scientific reasoning to be flawed, the expectation was that the European Commission (or the European Court) would force Austria to withdraw its ban. However, the ban remained, as did subsequent bans.¹³

The large number of products containing soy shed a light on the problems inherent in GM food labelling. Critics of biotechnology considered that a negative labelling system would be more effective, indicating that products were 'genetic-engineering free'. However, even in official documents this was referred to as 'positive' labelling, implying that non-GM products were superior to GM ones. In 1997, NGOs joined forces with three big retail chains in a working group on GM-free food. The aim was to establish a pragmatic definition that would provide a workable threshold for contamination in order to enable the establishment of a non-GM market. The debate on labelling defined the consumer as a major anti-GM-food actor, and retailers began to fear a loss of consumer confidence. In April 1998, the Ministry's Commission on Food decreed a strict process-based definition with impractically low thresholds, ostensibly in order to protect the food industry's reputation. This almost eliminated the opportunity for a non-GM label.

After the 'illegal' release attempt in 1996, protesters exploited the political momentum to alter regulation. They launched a 'people's initiative' (Volksbegehren, a non-binding petition to Parliament to be supported by signature, i.e. full name) to ban GM food, the release of GMOs, and patents on genes. In spring 1997, the people's initiative came to be the second most successful of its kind ever, with more than 1.2 million signatures (roughly 20% of the Austrian constituency).

The success put the Austrian government under pressure from several fronts. On one hand, the EU demanded compliance, and Industry and the research community warned that Austria would technologically fall behind. On the other hand, NGOs supporting the people's initiative and the opposition reproached the government for following EU regulations against the people's will. As a reaction to the federal government's perceived immobility; some counties (provinces) considered declaring 'gene-technology-free areas'. Although initial attempts to ban agricultural biotechnology at the county level mostly failed, by the year 2000, ten municipalities had officially declared themselves to be 'free of genetic engineering'. Over the next three years, several release proposals were submitted, but NGO activists retaliated with public protests. This convinced the applicants that their attempts were futile, and official policy made it clear that governmental approval was not forthcoming.

In a revision of the law in 1998, the government met some of the critics' concerns. The method of appointment to the Scientific Advisory Commission, which had hitherto

¹¹ Bundesministerium für Frauenangelegenheiten und Verbraucherschutz, 1999, Reasons for the decision of the Republic of Austria, to prohibit the placing on the market of genetically engineered maize line MON 810, notified by Monsanto Europe SA following Directive 90/220 EEC and consent given by the French Republic on 5 August 1998, Vienna.

¹² Bundesgesetzblatt für die Republik Österreich, 1999, 175. Verordnung: Verbot des Inverkehrbringens des gentechnisch veränderten Maises *Zea mays* L., Linie MON 810, in Österreich. Vienna, 10.6.1999 Teil II.

¹³ For details of the argumentation on both sides see Torgersen, H., 2001, The Precautionary Principle: a Last Resort? The Austrian Ban According to Article 16 of the Directive 90/220/EEC on the Marketing of Monsanto MON 810 Maize Line Containing the Cry1A(b) Gene Encoding a *Bacillus thuringiensis* Toxin Directed Against the European Corn Borer. Case study for 'The scientific basis of applying the Precautionary Principle in biotechnology-related potential trade conflicts' European Science and Technology Observatory (ESTO).

kept a low profile, was amended (without raising the profile significantly). The public's right to be heard during the release application process was expanded (without such a procedure having taken place since). Provision was made for liability following a 'polluter pays' principle. Researchers and industry were highly critical, claiming that Austria would be the least attractive state within the EU for business and investment in biotechnology. Only now, the embarrassed Scientific Advisory Committee demanded a voice in the debate, as the scientific community had remained largely silent. Following the success of the people's initiative, scientists became suddenly aware that they had not been able to play a credible role and were further losing credibility in the public.

After 1998, interest turned to uncontested medical applications, while agricultural biotechnology and GM food were mostly considered unacceptable, without any further debate. The selective predominance of the food issue was again highlighted when Austrian MEPs voted in favour of the patent Directive – contrary to the promises given after the people's initiative. Even then no storm of protest arose: it was almost a non-issue.

Towards the late Nineties, after a policy realignment in major European countries such as France, the UK and Germany, the EU temporarily adopted positions much closer to what had always been the Austrian stance. Austria's ban on Monsanto's GM maize and the failure by EU institutions to come to a conclusion contributed to the realisation that the EU framework for decision-making on GMO marketing applications needed revising. Several amendments bringing the EU framework closer to the Austrian position were proposed in 1998 and adopted in 2000, such as time limits for marketing approvals and mandatory monitoring. When the EU adopted the Precautionary Principle as a general rule in biotechnology decision-making¹⁴, this corroborated the Austrian position even more. At the same time, pressure from the EU on the Austrian government diminished and, over time, the Austrian stance became less isolated. Between 1998 and 2000, several countries banned previously approved GM products as well, and restrictive demands from France often exceeded the Austrian position, rendering the Austria relatively mainstream among European Union member countries. The de facto moratorium of 1999 on the marketing of transgenic plants, while the Directive 90/220 was being revised, retrospectively gave legitimacy to the Austrian decisions to ban the import of some GM crops.

1.3 Developments since 2000

In 2000 a conservative/right-wing coalition came to power. It broke up in September 2002 and was re-established in spring 2003 after protracted negotiations following general elections in November 2002. Traditionally, agricultural and industry interests are very strong within the conservative party, so it was to be expected that the issue of GMOs in agriculture would get promoted. Initially, this seemed the way the new government would go. Already in 1999, the old government had attempted to initiate a transgenic plant release, a virus resistant apricot tree, to do 'bio-safety research'. It was a high profile political question the new Council of Ministers (with the agricultural minister now also being in charge of the Environment, but still not the Competent Authority) officially discussed in early 2000, and they decided to go ahead with the release. In response to opposition and calls by NGOs, a 'gene summit' was held in spring 2000 to discuss the way forward. Caught between the de-escalation of the debate and the persistent rejection of agricultural biotechnology, it ended without any tangible result, and so far, authorities have not yet received any release applications.

In spring 2000, after approval by the relevant EU Standing Committee, cultivation and marketing of the AgrEvo Bt maize was banned in Austria. Throughout the years in 2000 and 2001, there were occasional reports that controls had found unauthorised GM material in crops, and government consequently commanded harvests to be destroyed. From 2002 on no contamination was reported. While NGOs, the political

¹⁴ European Commission, 2000, *On the Precautionary Principle* (Brussels: European Commission COM(2000)1).

opposition and media repeatedly took up the issue, attempts to mobilise the general public proved to be less successful than in previous years. Questions of food safety regained importance only temporarily, on the occasion of pesticides found in fruit and vegetables, in sharp contrast to the years of 1996-99, and the establishment of an Austrian food agency got hardly noticed.

Agricultural biotechnology nevertheless remained on the political agenda. Developments in the EU triggered political activity both at federal and county level. Despite its GM-sceptic policy, Austria had not been among the group of five countries (Denmark, Greece, France, Italy and Luxembourg) that went for an outright moratorium in June 1999, because Austrian representatives considered it a violation to the case-by-case principle. Nevertheless, Austria supported the declaration calling for 'a truly precautionary approach' and the 'demonstration of no adverse effect' by seven other countries.¹⁵ With the revised Directive, the comparatively comfortable status quo for Austria got under jeopardy. In July 2002, a petition handed in to the Parliamentary Committee for Justice Affairs by a Social Democratic MP criticised that existing regulation is insufficient. It demanded zero tolerance with respect to GMO contamination and to declare the whole of Austria a 'GM-free region'. While this was very popular but obviously politically unfeasible, especially the debate about GM-free regions and/or co-existence as well as the pertinent Fischler proposal in March 2003 led to an unprecedented consensus between government and opposition to strive for a GM-free agriculture – even if political conflicts on all other issues reached a climax. Several federal counties had been discussing and preparing laws aiming at officially establishing GM-free areas. While the European Commission rejected the approach chosen by the county of Upper Austria to issue an outright, if temporary, ban for the entire county, Carinthia was more successful with a more moderate solution called 'precaution law on gene technology' that could develop into a blueprint for similar approaches other places and will be implemented, after some amendments, by county law in 2004.

While the counties were very active, the federal government remained indecisive apart from rejecting the Bt 11 maize, the first application for authorising a transgenic food product under the Novel Food Regulation, in summer 2003. Up to shortly before, government officials still had considered GMOs worthwhile 'as a future option, if other and more useful products would finally be available'. Similarly, official farmer representatives would not declare themselves against or in favour of agricultural biotechnology. Now things seemed to have changed. Notwithstanding initial declarations, the more supportive government attitude towards GMOs had evaporated.

While the overall line was clear, and different actors even from industry and science embraced a non-GM future, federal policy seemed to lack co-ordination. Over 2003, attempts were made to devise a new and more consistent national strategy to cope with the challenges posed by the lifting of the moratorium. However, the means by which such a policy would be pursued remained unclear. Austria seemed to have manoeuvred itself into a catch-22 situation: on the one hand, an overwhelming national consensus demanded to stay GM-free, and on the other hand, the EU attempted, under the pressure of pending WTO complaints, to lift the moratorium and to establish an European approach towards incorporating the GM option into their agricultural policy concept.

¹⁵ European Council of the Environment Ministers, minutes of the 2194th meeting, 24.-25. June 1999.

2 Precaution

The Austrian law on biotechnology in its preamble contains five principles (see above). The first principle is a version of the PP, however, its formulation departs significantly from the wording used in the European Commission Communication or the Cartagena Protocol. Basically, it says that ‘work with GMOs, and releases of GMOs into the environment, are allowed only if, according to the state of the art, no adverse effects for safety are to be expected from this.’ Hence, it contains a prohibition in case of doubts about safety, but subject to scientific knowledge and practice. However, this principle has to be read against the second, the ‘future’ principle, which stipulates that ‘subject to safety, research in the field of genetic engineering and the implementation of its results must not meet inappropriate restrictions’. In other words, if ‘safety’ as determined by the ‘state of the art’ (i.e. defined by scientific experts) is doubtful, GMOs should not be applied.

This double demand translates into actors’ perceptions as well as into practice in very different ways. In the following section, different concepts of precaution will be discussed as derived from an analysis of interviews. Interestingly, little emphasis was laid on defining what exactly those ‘adverse effects’ are that would lead to the application of the PP. Rather, interviewees elaborated much more on the aspect of ‘doubt’. Since the interviews were carried out in summer 2002, they reflect a phase where there was still some controversy about the path that Austria should pursue with regard to GMOs in agriculture. For the description of the concepts of PP, there will be only little reference made to the workshop results.

In the section on ‘regulatory practices’ following the chapter on precaution, results from the three sessions of the Austrian workshop, indicated as such, will make up a comparatively greater part. They reflect the consensus among regulators and some important stakeholders and thus are less controversial than the results of the interviews, but this has also to be attributed to the consensual workshop atmosphere.

2.1 The precautionary principle: Austrian version(s)

2.1.1 Background

In a previous research project¹⁶ we had found an overwhelming agreement among Austrian officials, scientists and NGO representatives that Austria had spearheaded the promotion of the Precautionary Principle (in the following, PP). Austria had early incorporated the PP into several environmental laws including the law on genetic engineering. In the mid-1990s, Austria justified a temporary ban on imported tropical wood because it was produced in an unsustainable way. These imports were considered contrary to the interest of global climate protection and were therefore prohibited in accordance with the PP. Additionally, Austria was among the first countries to issue an import ban on beef products suspected to be contaminated with BSE long before the link to the human disease had become widely acknowledged.

Throughout the late 1990s, Austrian officials began emphasising the political implications of the PP. In 1997, the Department of Economic Affairs issued a paper on the joint efforts of Scandinavian EU member-states and Austria.¹⁷ This paper aimed to change the terms of reference, including an attempt to introduce the PP into the text of the SPS agreement. Additionally, the Austrian Chamber of Labour (the official representation of all Austrian workers) argued for enlarging the PP’s scope

¹⁶ Adapted from: Torgersen, H., Richmond, N., 2001, Political Precaution, Country Report on Austria for ‘The scientific basis of applying the Precautionary Principle in biotechnology-related potential trade conflicts’, European Science and Technology Observatory (ESTO).

¹⁷ Draft letter on SPS-related matters, and Draft Conclusions of Informal Working Group on WTO-rules. For the Consideration of Ministers of Agriculture of Austria, Denmark, Finland and Sweden at their Meeting 18 November 1997 (11-11-97 rev.1 resp. 15.03).

beyond applying it only to the Environment so that it would include other areas relevant to consumers such as food safety. The Chamber also attempted to acknowledge the political character of precaution.¹⁸

Apart from these reports, responses from the interviewees in our previous project already indicated that the PP is primarily viewed as a political tool. A decision 'to apply the PP' is widely regarded as political, in the positive (not pejorative) sense of being publicly accountable for risk-management judgements. In some cases, the PP was even perceived as a general constituent of political safety regulation, thereby decreasing its importance to that of nearly stating the obvious. Other perspectives viewed the PP as a mechanism to cater for mutual distrust amongst actors or to allow time for the discovery of sought after evidence. At least in terms of how the PP has been applied so far, interviewees from very different institutions emphasised its political contingencies and interpreted the handling of biotechnology, and transgenic maize in particular, as based on political considerations yet camouflaged with a scientific rationale. For example, most interviewees including regulators viewed 'risk' as a social (or political) construct where the role of science is relegated to providing advice. The nature of the risk was of considerably little importance, implying that there always will be uncertainty about some sort of risk that cannot be ruled out. Comparatively little effort was spent to list possible (scientific) risks or to define consequences from those risks that would be deemed intolerable so that the PP should be invoked, although this might be a key issue other places. Rather, it was a matter of how to deal with the inevitable uncertainty about (almost interchangeable) risks in the light of the presence or absence of benefits. Thus, values should be included in an overall consideration where science, resembling Andrew Stirling's concept, is 'on tap' and not 'on top' (without most interviewees knowing anything about the author's work.)

2.1.2 Three concepts of the PP

Departing from the above preliminary findings, we conducted a series of in-depth interviews using a concept elaborated on the basis of the agreed PEG framework. From statements made on different understandings of the PP, and taking into account different conceptualisations of uncertainty, we could construct three main 'concepts' of precaution addressing, among other aspects, the role of and the relation between science, politics and public perception. Sharing some commonalities with the three-layered concept of Millstone et al.¹⁹, there are important differences, though. In short, the three concepts can be sketched out as follows.

Scientific concept

Apart from a concession to public anxieties, aiming at better acceptance, the PP mainly implies that uncertainty must be reduced by means of new knowledge. That is preferably done through scientific investigation, under the (precautionary) hypothesis of possible risk. What the risks are, and which consequences would be unacceptable, is determined in relation to the 'state-of-the-art' of modern technology and agriculture. (Apart from this, the potential of a risk argument for being instrumentalised in mobilising campaigns plays a role as part of the concession to public anxieties.) Dealing with uncertainty, and hence precaution, has always been a constituent of the scientific method, since it proceeds from case to case making comparisons with already established knowledge. The question of benefit is irrelevant, as the gaining of knowledge already constitutes a benefit or, respectively, benefit is taken for granted within the existing system of exploitation of scientific research results. Hence, the PP demands more research, performed by those scientific disciplines that fulfil the criteria of (natural) science. Ethical aspects only play a role on a personal level and

¹⁸ http://www.akeu.at/ak/plsql/euref2.show_detail?id=24

¹⁹ Millstone, E., van Zwanenberg, P., Marris, C. Levidow, L. Torgersen, H., 2002, Science and governance in trade-related risk regulatory decision-making: comparative case studies. Draft final report for 'The scientific basis of applying the Precautionary Principle in biotechnology-related potential trade conflicts', European Science and Technology Observatory (ESTO).

hence, are scientifically irrelevant. Political decisions are rational provided they are taken primarily on the basis of natural scientific insights. It is preferable, but not necessary that scientists take decisions, as long as decisions are taken on the basis of science.

Political-economic concept

The PP provides guidance in cases of decisions under uncertainty. Criteria are not only scientific but derive from the expected distribution of risks and benefits, or from the compatibility with value judgements. They are therefore predominantly economic or ethical in character and essentially demand a political decision. Since science necessarily, and admittedly, produces uncertainty, there is always a residual uncertainty about possible risks. While risks from nature must be accepted, man-made risks can and should be minimised. However, the nature of the benefit is equally (if not more) important than the nature of the risk, therefore, the second main criteria for a decision is the uncertainty about benefits. Hence, what is at stake is not so much uncertainty about health or environmental risks (although they play a role), such as the EU Commission's interpretation of the PP might suggest, but uncertainty about the compatibility with consensual socio-economic aims, for example about nation-wide agreed necessities such as safeguarding the survival of small-scale organic farming. Since, however, only uncertainty about health and environmental risks are internationally acknowledged to be relevant, in taking a decision national authorities have to instrumentalise the all-abundant cognitive uncertainty about such risks as a trigger for invoking the PP in practice.

Normative systems-critical concept

Due to its systematic taking into account of non-quantifiable risks and long-term consequences, and due to the entailing slowing-down of the decision-making process, the PP opens up a space for 'holistic' decisions. The criteria for such decisions derive from the relevant actors' normative orientations. There are two such dominant critical orientations: on the one hand, environmental ethics based on a normatively charged conceptualisation of Nature; on the other hand, a modernisation critical position fighting increasing economic disparities and – on a political level – the quasi-technological logics of de facto constraints. The PP, in this interpretation, is a kind of 'resistance principle' to be applied in order to benefit nature understood as inherently reasonable or, respectively, to serve the protest against a democratic deficit or a monopolistic and all-engulfing capitalism in general by providing scientific arguments. A benefit, in this understanding, would be anything that promotes the political aim of a society oriented at sustainability. Risks being abundant, potential benefits of biotechnology, even if they could be framed according to this definition, get nevertheless rejected, since any acknowledgment of a benefit would weaken a position characterised by re-formulating questions of technology shaping into such of calling into question the present system.

These three concepts and their implications for some aspects dealt with in this report are summarised in Table 1.

Table 1 Three concepts of precaution

	Concept 1	Concept 2	Concept 3
Science	Essence of human rationality	Essential advisor (among others)	Provides arguments for political struggle
Precaution	Scientific principle	Stratified concept	Instrumental term
Uncertainty	Intrinsic to any research	Unavoidable, about both risks and benefits	Unavoidable, particularly severe with biotechnology
Handling of uncertainty	Reduce through research	Reduction futile, accept	Instrumentalise, create if necessary
Benefit	Knowledge gain,	Environmental + socio-economic	Environmental + socio-economic

	individual profit	aspects, common good	aspects promoting sustainability
Handling of benefit	Take for granted	Criteria for decision	Deny for strategic reasons
Risk	Impact x probability (socially: impact x uproar)	Distinction natural versus man-made additional	Main strategic argument
Handling of risk	Objective comparison	Establish thresholds defining acceptability	Tool for scientification of politics
Political decisions legitimate if	Based on science	Pursuing consensual socio-economic aims	Made through democratic participatory procedures

Distribution among interviewees

While scientists and civil servants from the Ministries of Research and of Trade tend to adhere to concept 1, civil servants from the Ministry of Health (competent authority) and from the Federal Environment Agency (Umweltbundesamt, UBA) as well as a member of the cabinet of the (conservative) minister of Agriculture and the Environment (in the following: politician, Conservatives) argued along the lines of concept 2. Not surprisingly, NGO representatives and politicians from the Social Democrats and the Greens entertained views in line with concept 3. However, such a seemingly sharp distinction is somewhat arbitrary as there were many overlaps; for example, concept 2 tended to incorporate issues from concept 3 by translating social norms into scientific uncertainty, and from concept 1 by accepting uncertainty as intrinsic to any (scientific) activity. Some citations may illustrate this and give an idea about the three interpretations of precaution as derived from our interviews.

2.1.3 The scientific concept

Precaution essentially means dealing with uncertainty by rational scientific means. It thus merely describes one aspect of science that is evident to any scientist. It is a *'scientific principle, as it is an extrapolation of scientific reason'* (scientist, Advisory Commission). Step by step, case by case, comparison with existing knowledge and assessment of familiarity, risk assessment in anticipation instead of waiting for risks to materialise, all are features of precaution. Science always had practiced precaution, but *'the public does not understand this'* due to their lack of knowledge (scientist, Advisory Commission).

A consequence of applying precaution, in this understanding, is to perform releases in order to gain more insights to be able to assess the consequences. Thus the deeper political meaning of the PP is to make releases possible in order to be able to really make a decision. *'I think the PP should create room to manoeuvre for decisions 'yes' or 'no'. I think this is the meaning of the PP,'* (scientist, Advisory Commission). Conversely, today the PP is not 'really' applied in Austria as one does not follow the PP's demand to reduce uncertainty by doing scientific release experiments. Thus, the PP is an instrument in order to get ahead with contested aspects of biotechnology research.

A consequence of this interpretation is that, in order to reduce uncertainty, interdisciplinary research is necessary as long as this research is performed according to natural scientific standards. Because, *'essentially, this is a natural scientific question, and natural scientific expertise should have the say,'* (scientist, Advisory Commission) Taking into account 'other rationalities', even if they may be justified, merely confuses things, as *'a contest of different rationalities'* will be created that obfuscate the problem, because incorporating other rationalities entails a political decision. *'To a certain degree it surely is helpful to get out of one's own discipline and to try to learn from other disciplines. But if I depart from the natural sciences, I will not get a natural scientific but a social scientific answer ... A combined or integrated decision-making –*

I don't know whether such thing really exists. Often it can only be either one. ...When it comes to substantial issues (for example 'how do genes spread in the environment') – of course I can assess it by means other than science, but this decision is then taken on another level, if ever possible. Then I take the decision out of the hands of the scientists...' (scientist, Advisory Commission)

While mostly put forward by natural scientists, this view was implicitly endorsed also by interviewees that were otherwise more critical about the scientific predominance in dealing with the issue of biotechnology. This came clearly to the fore when asked about the role of ethics as a means to deal with 'extra-scientific' aspects, as ethical dimensions were relegated to mere personal opinions. For example, 'the PP is an expression of the notion of individual responsibility,' (agronomist). The PP is seen as a scientific and not as an ethical principle 'although this is a deficit' (civil servant, UBA). Or even more bluntly, 'the ethical is the non-factual aspect of the issue', with a link to the public's general horror perceptions (politician, Conservatives).

2.1.4 The political-economic concept

In striking contrast, the political-economic concept tries to integrate 'different rationalities' or, rather, deliberately takes the decision out of the hands of scientists. Central to this concept is an inherent risk-benefit assessment.

Precaution is a multi-layered principle, which entails a variety of consequences. One of them is to 'minimise consequences to the necessary' (politician, Conservatives) without giving any hint on how to determine what is 'necessary'. And if a measure does not have the desired effect, one may highlight the residual risks and decline to implement it ('why should I release a genetically modified substance if the effect does not materialise? According to the PP I would avoid it, since there is always a residual risk.') Hence, a residual risk seems easily to be found, because precaution means that 'if there is suspicion of a risk, the PP demands to possibly dispel any such suspicion', and risks may not only be hazards to Health and environmental safety, but also 'indirect environmental risks, for example due to the negligent behaviour of farmers'. Hence, what is at stake is uncertainty about the benefit rather than about risks, since there is always a risk, however small, that can serve as an argument not to proceed with a project. Interestingly, the interviewee put categories generally considered 'floppy' like 'necessity' and 'benefit' as if they could be unanimously defined, and juxtaposed them against risks that seem arbitrary and abundant. The political position of this person gives such statements a special importance. One may speculate which necessities and benefits are considered to be such 'objective' facts.

Indeed, the necessity to assess benefits seems to be a wide-spread consensus, from politicians ('the mainstream argumentation among the public is something like: I have very well lived so far without genetic engineering, so why should I now have it in my food?', politician, Social Democrats) to, not surprisingly, the NGO representative and even to a scientist, the latter demanding to assess indirect benefits from the avoidance of risks – for example, that the PP has to be applied in 'both directions', i.e. to assess what catastrophes will entail from not applying biotechnology (scientists 1, Advisory Commission).

Mostly consensual was the notion that biotechnology would not bring any benefits to the Austrian agricultural system due to its small-scaled structure; on the contrary, it would be a threat to organic farming. In the light of such a broad consensus the above statement about 'necessities' and 'benefits' sounds more understandable. In fact, it can be interpreted in the light of the Austrian tradition of concordance, which describes a policy style being more than just a preference for corporatist arrangements. Here, the subject of such concordance is the notion that the Austrian agricultural system is under siege from large-scale competitors not only in the EU but also overseas, that the most promising Austrian response was to boost organic farming in a (perhaps futile) attempt to combine modern marketing necessities with family farming, and that biotechnology is about to jeopardise this strategy. Add public anxieties, and it is not difficult to understand that there indeed is a fairly elaborated consensus among a variety of actors about 'benefits' and ensuing 'necessities'.

An emerging problem, though, may be the costs of pursuing this way of keeping structures that in a 'free market' would disappear: 'Those (countries) dictate the prices where one is allowed to raid most vigorously. In Austria we entertain a certain luxury, but for the moment we still can afford it,' (agronomist). This broad view of the PP obviously has connotations with the sustainability debate. The term, understood as plurality of ecological, social and economic arguments, came up during the interviews, and the PP was framed as a 'simplification of the concept of sustainability' (civil servant, UBA).²⁰

2.1.5 The normative systems-critical concept

In the eyes of some interviewees, there is a small step between the interpretation of the PP along the above concept and a „*strategy of wilful prevention*' (agronomist). Ideological conflicts are unavoidable, according to a civil servant (Ministry of Trade), because of the '*idealisation of tradition and Nature*'. Clearly and admittedly, interviewees primarily from the environmental NGO, but also from politics pursued such a strategy. For them, the PP was an instrument to promote their agenda – the peculiar about this position was that they openly said so. Their rationales fell into two partially overlapping categories, environmental ethics and modernisation systems critique.

Environmental ethics considers biotechnology a technology that allows interfering into natural processes in an unprecedented way: '*we have never intervened so deeply*' (agronomist). The basis of evolution is under jeopardy, as biotechnology entails an '*acceleration of natural processes, which is against Nature*.' The PP is thus a '*symbolic reaction to the acknowledgement that possible consequences may not be manageable*,' (politician, Conservatives). In the light of possible irreversible consequences, this acceleration has to be met with a deliberate slowing down in order to allow for more time to be spent for the process of technical development itself as well as for risk assessment '*according to the logics of Nature*', (politician, Conservatives, and almost identical, Politician, Green Party). The NGO representative framed it as the '*ethical principle of slowing down*'.

Practical advantages of slowing down are more time, money and opportunity for safety research, '*taking into account complexity*' (agronomist) – an argument compatible with the scientific concept, extended by the notion of fairness or equity between undervalued '*safety/risk research*' and the otherwise dominant instrumental '*research in order to get a permission*'.

Modernisation systems critique, in contrast, considers biotechnology to promote inequity. Mainly the NGO representative, the agronomist and the Politician, Green Party, stressed the role of biotechnology through patenting and the 'rule of the big companies', in exacerbating the economic disparities between the First and the Third World. It monopolises progress and restricts democratic participation about technological trajectories. Hence, this line of argumentation fits neatly into well-known and more general anti-globalisation and anti-capitalism rhetoric, criticising that freedom of choice has been abolished under seeming 'de facto constraints' through the implementation of a technological regime and an implicit colonisation by a US-type of large-scale agriculture. A more domestic stream of argumentation, in line with the support for small-scale organic farming in the political-economic concept, is that biotechnology perpetuates the systematic problems of intensive agriculture. 'So-called solutions through biotechnology do not tackle the problems because the latter are political in nature. What is at stake is the choice between agricultural systems' (NGO representative). Hence, biotechnology provokes a questioning of the system as such. This strategic orientation creates the need to reject all notions of possible incremental benefits, although such benefits might exist. Total rejection of

²⁰ Indeed, there are links to an understanding developed together with Scandinavian countries at an early point in time, recalling the 1990 Bergen Ministerial declaration. This link has largely dropped out of EU regulatory discussion during its becoming more 'science-based'.

biotechnology thus is 'scientifically irrational, but often strategically necessary' (NGO representative).

However, this strategic view needs scientific arguments in order to be credible. Therefore, all kinds of concerns have to be framed in scientific terms. By applying the PP, one may get a foot into the door: 'through the pp one may exploit the last remaining possibilities to put the questions in a political way', even if there are no concrete and justifiable allegations against GMOs. Applying the PP may exploit a situation of confusion created through expertises and counter-expertises, according to the NGO representative.

But even if politics may also at times apply the PP in a strategic way, such a radical strategy does not meet sympathy with politics: The conservative politician thought that demanding non-action as long as safety cannot be proven to be an 'extremists' view'.

2.1.6 The role of the PP in the Austrian workshop

In general, the distinction between the three concepts tended to blur in the workshop atmosphere, perhaps due to the perceived press to appear consensual. Another explanation would be that the political necessity to arrive at a rationale for keeping GM crops outside the country would demand a view along concept 2, or even concept 3, although many participants would rather cling to concept 1. Thus, from the basis of a 'scientific' understanding of the PP, its political implications were acknowledged to be valuable means in the political struggle to maintain the status quo (and, for many, a GM-free agriculture, but not necessarily because it was 'risky').

The PP was considered to be primarily an instrument to deal with identified data gaps in risk assessment, with a need to stick to the criteria of scientific scrutiny, i.e. to establish uncertainty about risks according to science. Participants unanimously held that the PP should be based on science, but they also agreed that its meaning had often been politically 'distorted'. They wanted to avoid this seeming misuse and devise measures to arrive at similar ends without muddling with the 'real' content of the PP.

A clear definition (for example according to the Commission Communication) was therefore considered a necessary condition for correctly applying the PP and to identify the questions to answer. The argument that there still existed unanswered questions was considered too weak. A concession was made that if reasoned analogies could be established, this would also be sufficient to indicate unresolved questions. In other words, if there were strong arguments derived from a good analogy, even 'assumptions' would be considered based on good reason, but they would eventually have to be verified (or falsified), if possible.

From the debate in the workshop we gained the impression that it perhaps was a matter of different understandings of science, or even the prevalence of different sciences, that was at the bottom of different conceptualisations of uncertainty. However, participants stopped at a point in the discussion where there was still a fair degree of consensus. For example, they agreed that, in order not to devalue the PP, it should not be permissible to declare every question an 'uncertainty'. A simple lack of data was seen as insufficient to invoke the PP; rather, there must be scientific data indicating unresolved questions about possible serious negative effects.

2.1.7 Related aspects: uncertainty

It is clear that different conceptualisations of how to deal with uncertainty plays a pivotal role in arguing along the lines of the three concepts:

uncertainty reduction through scientific research;

emphasising uncertainty about benefits in the light of the unavoidable uncertainty about risks; and

exploiting and even creating uncertainty as a strategic lever to challenge the system.

In the scientific concept, uncertainty is common company, but to different degrees, as 'critical' science may deliberately emphasise uncertainty as a counter-weight to over-simplification (agronomist). This ubiquitous residual uncertainty even may, at the same time, serve as a common ground: you have to accept it ('even organic seed can only be tested by sampling, and even if you do ever more tests, somewhere there must be an end', civil servant, Ministry of Research). This implies that uncertainty may hardly be used as an argument to restrict research ('one has to be allowed to do research even if there is awareness about a lack of knowledge', scientist, Advisory Commission).

There is a kind of meta-uncertainty: it is difficult to give exact criteria for 'serious' uncertainty. As the agronomist put it, criteria may be 'a critical mass of scientists that take uncertainty for granted'. The PP is not very helpful as it may not only be a tool to deal with uncertainty but also a means to create even more, through the 'broadening' of applications (civil servant, Ministry of Trade).

The political-economic concept sees uncertainty as a two-layered issue. Besides 'scientific' uncertainty, which has to be defined by science (NGO-representative; interestingly, in his view science is almost of a 'type 2' according to the model of Millstone et al. (2002)), there is another, a political, layer that must govern any decision. In general, there is broad consensus that acceptance of thresholds etc. cannot be scientifically determined (civil servant, UBA) and that a decision can never be scientific only, but must be political (civil servant, Ministry of Health). The PP is considered instrumentally, as a 'strategy to let the public know that everything is done to handle uncertainty' (civil servant, Ministry of Trade).

According to the normative systems critical concept, 'uncertainty is a strategic partner' (Politician, Green Party). As long as there is uncertainty, a technical question must remain political (NGO representative). And if there is no real risk, critics create uncertainty, because there is no argument against (agronomist). Hence, the PP is framed as a scientific principle that can be (mis)used for ideological purposes (civil servant, Ministry of Health). Consequently, the scientist felt frustrated: according to him, arguments about irreducible uncertainty are politically motivated and inaccessible for rational discussion. The scientist acknowledged that they have made mistakes at this level: 'antibiotic resistance markers and herbicide resistance – well, badly chosen. It was not possible to do it otherwise then...Nevertheless, well, this is a difficult line of argumentation (for scientists, add.)'

2.1.8 Conclusion

The three concepts of precaution imply a successive and step-wise opening up for non-scientific issues, from an understanding shaped by a strictly scientifically grounded rationality in concept 1, over a rationality strongly influenced by pragmatic-political reasoning in concept 2, to a deliberately normative determined view in concept 3 that sees science as a tool in a political struggle. Although concept 2 seems to be a kind of middle-ground, politically open and ideologically underdetermined framing, our analytical point of view implies that the various interpretations of precaution are based on particular worldviews and different understandings of political decision-making as well as the meaning of science in this process. Anyway, one can 'read' these interpretations as being functional for the actors according to their professional aims and interests. Obviously the NGO's interpretation of precaution opens the debate for arguments other than 'scientific' ones in order to keep the controversy about GMO living, as a means to put the industrialized system of production into question. On the other hand, science conceptualises the PP as a commitment for further research and, at the same time, as a means to address public anxieties. And regulators emphasise the PP as an open ended means to make decisions possible that are not determined from beforehand. In their view, it can be adapted to the needs of their daily political work or made to fit into what is thought to be a broad consensus about political aims or, respectively, about public needs, for example with respect to the future role of agriculture.

This provisional analytical framework helps in the interpretation of an otherwise somewhat enigmatic Austrian position and politics on GM crops. The Austrian position as represented by government officials largely follows concept 2 but also takes up arguments from concepts 1 and 3. This eclectic position has to be understood as a mosaic piece in a larger picture mainly determined by the need to promote the political aim of preserving the small-scaled structure of Austrian agriculture. For example, the last in a row of interests turning common was that of keeping Austria GM-free, on the one hand, from more ideological reasons and out of an acknowledgement of public sentiments, and on the other, because Austrian companies and farmers had been capitalising for years on the country's reputation as a source of guaranteed GM-free produce.

3 Three institutional practices

According to the project plan, the identified accounts of the PP were to be put in relation to 'how risk research, assessment and management are linked in practice'. The second question was 'how expert advisory bodies mediate between regulatory science and public-scientific controversy.' Finally, it was to be investigated 'how stakeholder groups attempt to influence regulatory measures, within or beyond formal procedures.'

3.1 Regulatory measures: dealing with risk

Investigating 'how risk research, assessment and management are linked in practice', we met the problem that Austria did not see a GMO release so far, so that it was clear, from the beginning, that there was not much 'practice'. In particular, it was difficult to see 'how such links are drawn by innovators, research institutes and regulators' as there are few innovators, and for several years no research institute had submitted a release application. Thus, it remained largely theoretical 'how priorities are set for the cause-effect uncertainties to be tested and managed' apart from those cases that came from abroad – comments on notification and marketing permits granted elsewhere and processed internally in the regulatory domain. These were handled entirely in-house as there was no legal provision that would involve the Advisory Commission, for example.

3.1.1 Risk research

Risk research is predominantly organised by the Ministry of Research and the CA. While the latter commissioned research predominantly in the form of literature studies, the former was responsible for a long lasting effort to arrive at a release under the header of risk research. However, by international standards there have been few laboratory investigations.

In the interviews, risk research turned nevertheless out to be a rhetorical favourite ('critical science should be better supported in Austria, this could be a strategic niche', politician, Social Democrats). Risk research is viewed as an enterprise where science plays an eminent role ('whether the wind comes from the left or from the right, scientists can do research on this, and that's what they love to do', agronomist). Here, concepts 1 and 2 seem to meet. Indeed, and as already mentioned, the Ministry of Health as the Austrian competent authority had repeatedly intended to devote the first Austrian release experiment to risk research and, by this, to gain acceptance with the public as well as to establish a niche for the otherwise rather tiny Austrian GM plant research community.

However, it is totally unclear when, if ever, this first release will take place. After the mis-handling of the GM potato case in 1996, the transgenic apricot tree resistant to the Sharka virus was scheduled for release. This tree had originally been created for agronomic purposes – and not for 'risk research' – a decade ago²¹ but never made it to the field. Recent attempts to arrive at a deliberate release during 2003 again failed, allegedly due to a lack of data relevant for the approval procedure. Many interviewees referred to political reasons responsible for the failure of risk research releases so far, despite political decision to go ahead, and predicted that the application filed in late 2002 would fail, since political support was scarce and influential NGOs were against. ('no support and no political consensus; the same will happen again this time with the apricots', civil servant, Ministry of Health). In fact, the project has attracted recent critique from an environmental NGO for being publicly funded despite 'nobody wanting it', and its fate remains unclear.

²¹ Torgersen, H., Palmetshofer, A., Gaugitsch, H., 1993, Beurteilungskriterien für Freisetzungen gentechnisch veränderter Organismen. Vorschläge für eine Vorgangsweise zur Beurteilung von Freisetzungsanträgen in Österreich. UBA Monographien Bd. 39, Vienna.

Apart from this project to establish an Austrian research agenda on GM risk research, the Ministry of Health supported or even commissioned several other studies²², for example to develop non-antibiotic resistance marker. More theoretical studies on risk aspects of GM plants led to preliminary assessments of plants possibly to be released in Austria (oilseed rape, maize and – apricot trees). Other research considered issues such as herbicide resistance and organic agriculture, ecological monitoring methods or aspects of toxicology and allergenicity of transgenic products. In a similar vein, the UBA has carried out, or commissioned, a series of studies that highlight risk aspects of transgenic plants (see annex 5). Especially with a view to international repercussion, UBA initiated a project and conference where the concept of substantial equivalence got challenged. Such activities are clearly aimed at both promoting an Austrian view on the issue in an international setting and to contribute to finding an Austrian position, however, they not always fit the mainstream understanding of ‘risk research’.

3.1.2 Risk assessment

In our interviews, we met our three concepts in different understandings of the role, and the possibilities, of risk assessment. At their basis, there are different (often stratified) understandings of risk as a subject to be assessed.

Within concept 1, scientists see ‘objective’ risks that can be compared (e.g. the risks from agro-chemicals considered to be ‘much higher than those from biotechnology’, scientist) as opposed to social constructions of risk that science has nothing to put against (our scientist gave a definition of the social construction of the magnitude of risk by the formula ‘impact times uproar’). ‘Real risk’ comparisons reveal, for example, that ‘biotechnology saves lives’, according to the scientist, since risks from biotechnology are not quantifiable (i.e. non-existent beyond a residual risk) while those from chemistry are. This position sees only quantifiable risks as relevant for decision-making. Risk assessment has been futile so far since risks from biotechnology are non-quantifiable for two reasons: i) risks are too small and ii) consequences are too complex to be properly assessed. Consequently, ‘as long as risks are non-quantifiable, acceptance will not be obtained’ (scientist), which leads one to the paradoxical conclusion that only a hypothetical future substantial impact could open the way towards acceptance.

Closer to concept 2, and within the scope of, but with regard to the consequences conceptually apart from, the ‘scientific’ framing of risk (consequence times probability) that scientists mostly cite, the politician from the Conservative party distinguished ‘natural’ from ‘additional, special’ risks emanating from human activities. According to this position, natural levels of risk do not automatically determine acceptable level of such ‘additional’ risks although they may provide a reference-point; rather, thresholds have to be politically decided. Many civil servants tend to see risk as a two-tiered concept; in the above understanding, there are ‘hard facts’, i.e. the scientific determinations of ‘objective’ risk, and there is the political evaluation of their acceptability. This acceptability is co-determined by social factors like habits or economic standard.

Since consequences may be complex, it is necessary to pursue a ‘holistic risk assessment, putting risks and uncertainty into context of those elicited by other products’ (civil servant, Ministry of Health). This ‘general context of agriculture’ (agronomist) is often linked to benefits (that may be underestimated for GMOs, according to the civil servant from the Ministry of Trade).

The quest for a broad scope risk assessment is in contrast to scientists’ and other actors’ perceptions of the difficulties risk assessment meets. Besides complexity and the lack of quantification, the a priori hypothesis of risk cannot be handled adequately and leads to immense costs (scientist, although it was exactly this hypothesis that was otherwise praised as a prerequisite of ‘scientific precaution’). The NGO

²² For a list of activities see http://www.gentechnik.gv.at/gentechnik/set/info_set.html

representative stressed that the 'real issues' go unrecognized because one only finds what one searches for, and this is determined by interests (in agreement with the agronomist).

More in line with concept 3, though related to this argument, is the notion of risk assessment as a tool in the political struggle, in the form that 'risk assessment is a kind of politically accepted form of rejection of technology'. Risks serve to argue, 'on a de facto basis', politically hot issues like the rejection due to a lack of benefits ('risk assessment often serves somehow as a justification, because one often has to (use it that way, add.). All the provisions are based on (the notion, add.) that one can only reject something if there is a risk', civil servant, UBA). The other way round, risk assessment may be viewed as a tool to serve strategic interests like 'no biotech' or as a cover to be able to do releases (Politician, Social Democrats).

3.1.3 Workshop results on risk assessment

During the workshop, participants more or less agreed about a view on risk assessment as a predominantly technical issue. Hence, we meet large parts of the normative basis of concept 1. Scientific problems were considered sufficiently well structured in the meantime, and the criteria better defined in the revised Directive. However, there is still a need for further standardisation and harmonisation, especially with a view to the necessary data and the methods to collect them. This should be feasible as it is mainly an issue of scientific data collection. Since participants considered the application of the PP to be dependent upon data gaps, they concluded that the better the risk assessment, the less relevant the PP would be. Hence, there was not much difference to views that would have to be called 'science-based' other places.

In a similar vein, and at least according to participants more favourable to agricultural biotechnology, current scientific knowledge says that there is no GM-specific sort of risk. This view was adopted without major objection, although with different emphases and seemingly from different normative backgrounds. Rather than to assess GM plants only, so the demand, they ought to be compared with their conventional counterparts or, if not possible, with similar varieties. Criteria should be 'classic' parameters such as gene flow or persistency as well as, following the Austrian tradition, the effects of agricultural practices associated with growing the particular crop.

Up to recently, this used to be the point of divergence between the Austrian and other European CAs. Following ideas developed by UBA over the last couple of years, comparisons should cover (environmental) risk aspects of conventional, organic or 'integrated' forms of agriculture, in relation to unintended effects arising from conventional agricultural practice. The point is that it is not a question of any particular risk from GM crops as such, but that environmental protection demands that authorities must be cautious with granting approvals to a new technology in a field that already has led to major environmental problems. In addition, some parameters had so far received little attention, especially regarding toxicology and allergology with food (see Annex 5 for the relevant UBA report of 2003).

Participants in discussing options for the harmonisation of risk assessment frequently referred to the UK Guidance Documents, which they thought could serve as a reference and point of departure for developing EU-wide guidelines. The Documents were considered so general as to require little adaptation in order to provide a suitable baseline. Building upon them, one could develop more specific extensions to take account of local conditions. Austrian regulators had officially acknowledged them, although some had criticised them as being too general and not suited to taking into account local environmental conditions. Strong emphasis was placed on comparisons with non-GM varieties and practices in conventional agriculture as a possible part of such guidelines. This could be a means to 'trigger differentiation' among the public, i.e. for the discussion of consumer benefits from GM crops.

3.1.4 Risk management

The European Commission's Communication defines risk management as the arena where the PP should play a role. However, according to some interviewees, the PP has so far only been implicitly applied. One such application was the *de facto* moratorium, another is co-existence between biotechnology and traditional agriculture. Monitoring, in addition, is seen as 'a compromise between total precaution and industry interests to put products on the market' (civil servant, UBA).

The Conservative politician's understanding seems slightly at odds with the familiar distinction between assessment and management according to the EU Communication, but remains firmly within concept 2. He distinguished two layers of risk assessment, one 'de facto' (i.e. scientific), where also the PP should be applied in a pragmatic way, and one 'political' level where the fundamental question is put whether or not we need biotechnology. More in line with the Communication is the view provided by civil servant in the Ministry of Health, who saw a conflict between 'hard facts', i.e. science (risk assessment), and 'soft factors', i.e. politics (risk management). Although the gap between the two levels ought to be narrowed, this is far from being the case.

Concerning management measures apart from obvious topics like larger distances between fields, many interviewees stressed communication as being important, which points at the perception of risk as a social construct within concept 1. Creation of trust, open information, transparency, etc., is seen as important tool. The Conservative politician considered acceptance as stemming from two alternative sources, enlightenment or lack of interest. Both seem absent in today's Austria. The NGO representative draws a slightly different picture being more in line with concept 3, where risk perception is only a symptom for general criticism of industrialised agriculture, maximising revenues and the tendency to try to solve political problems by technological means. In a similar vein, liability is seen from two different points of view: on the one hand the agronomist stressed 'fairness' for biotech vis-à-vis other products, on the other hand, the politician from the Green Party demanded a special form of liability for biotechnology due to its intrinsic properties and residual risks.

3.1.5 Workshop results: 'other legitimate factors'

Beyond risk aspects, some participants would also have liked to include into the assessment 'other legitimate factors' (OLFs) defined through political deliberation. Here we meet an obvious reference to a view that would be compatible with concept 2. Out of a consensus that science was indeed capable of giving answers to questions about risk, workshop participants agreed that policy had to assess those answers and make decisions on that basis, with the proviso that 'other' factors should be seriously taken into account. Hence, a distinction was made between risk as determined by science, and everything else, but both must have their say.

The term 'OLF' was taken from risk management measures for food regulation (see Directive 178/2000), and derived from discussions around the Codex Alimentarius. According to the Directive, OLFs are not relevant to the risk assessment of GM crop cultivation. Apart from risk issues, participants could only see ethical considerations being covered. For authorisations according to food and feed regulations that would also cover cultivation, however, OLFs were considered to be instruments for risk management and hence relevant for the authorities' decision making. Thus, authorities might consider factors other than risk. Furthermore, OLFs might be of importance even if no risk was identified a priori.

Participants basically agreed that formerly, every GM-critical position had to be backed by an appropriate risk argument. Only scientific criteria, or arguments compatible with a scientific rationality, were considered relevant. This had led to the situation that arguments 'only giving the impression of being scientific' did not lead anywhere. In the meantime, (as a result of this insight?) 'other legitimate factors' are beginning to be acknowledged. Arguments formerly denounced as 'only political' are now considered to be legitimate and of increasing importance. Participants agreed that this provided a chance for new regulatory initiatives but thought that such 'other'

factors should be kept separate and clearly labelled as such – as a means to prohibit ‘scientific’ arguments to be misused.

Again: the division between science and policy does not imply that policy should have nothing to say in the decision making process. On the contrary, according to participants, its role should be better acknowledged. Introducing ‘other legitimate factors’ would open a possible entry point for taking into account factors that do not concern issues which only science would legitimately be able to determine.²³ The problem is that such factors are not defined beyond the point that they are ‘other’. It is not even clear whether participants would conceptualise them as pertinent to issues other than risk or to questions other than those that can be answered scientifically. However, by inference, one could argue that for most participants, these categories would fall together.

Although the term ‘risk’ does not necessarily exclude parameters that cannot be defined through (natural) science, the view that seemed to have most adherents is that any risk, in order to be acknowledged as such, must be identifiable, at least in principle, by scientific means. This, however, would also apply to environmental issues even if they arose from agricultural practice. Although there was no unanimous interpretation of what would count as a legitimate factor, this was seen as a common problem for policy and not as an exotic problem of science, nor confined to the issue of biotechnology. There was little, or even no, awareness of the problems associated with the intended separation of science from policy, irrespective of the participants’ positions as more in favour or more opposed to the use of GM crops.

Participants emphasised unanimously that rules for the implementation of OLFs (as additional points to consider) could only be introduced at the EU level as guidelines or basic principles. In addition, and because OLFs were primarily relevant at the level of member countries or even of regions, there must be room for regionally specific regulations. For example, they might be along similar lines to those for crop rotation or pesticide administration. In general, OLFs should not be too broad, participants emphasised, and they should have at least something to do with the protection of health and the environment.

Some participants, however, were eager to develop a framework including OLFs far beyond risk issues. For example, they proposed to take into consideration arguments of fair trade (such as avoiding child labour) or extended cost-benefit assessments (where farmers would be paid according to their investments), essentially to ‘minimise exploitation’. While this was hardly a consensual view, another point received more general support, namely arguments pertinent to the multi-functionality of agriculture. This was explicitly contrasted with corporate agriculture, such as seen as prevalent in the USA. Another argument was the possible deception of consumers, for example if slowly ageing but de facto old tomatoes turned out to be physiologically inferior to fresh ones. However, none of these arguments was considered GM-specific, and since rules for GM crops must not be different from those for all other crops no need was seen for a separate debate arising from the fact of genetic modification.

Participants also discussed whether it would count as an OLF if cultivation practices jeopardised co-existence (provided there was a definition of, and criteria for, co-existence). This would offer an opportunity to take into account co-existence as a criterion for risk management relevant to the authorisation process. An argument against such a proposal would be that in the process of authorisation only the relevant threshold values would serve as a basis for concrete measures. Segregation would not be necessary to safeguard other methods of cultivation. If co-existence became a value in itself, which could possibly be jeopardized by particular practices involving GM crops, one participant would expect equal opportunity for both GM and non-GM varieties; according to him, it remains a matter of deliberation which type of production would have to show consideration towards the other. Being a minority opinion, it nevertheless reflected the general prevalence for non-discriminatory

²³ The PP as a risk-management tool belonging to the scientific realm has proved to be of limited value in introducing ‘other’ considerations into the assessment procedure.

measures among many of the participants. Although non-discrimination appears to be in contrast to the implicit aim to keep GM crops away, such argumentation made sense in the context of efforts to establish a sustainable position within the scope of current scientific mainstream arguments and/or EU regulations that would allow to contain GM crops.

In a remarkable show of openness, participants agreed that for future policies, questions of the risk from and safety of GMOs were of secondary importance, while economic questions would prevail. Interpreting the recent anti-GM move of the chamber of agriculture, they concluded that farmers would use GM crops if it were economically advantageous; however, at present there would be no market for them. Farmers were considered institutionally constrained in their choice of what to grow, so they would tend to transfer the decision making to a level where cost-benefit assessments would make better sense. However, participants identified two drawbacks: firstly, consumer demand was an open question due to the lack of opportunity to purchase GM products (some participants argued for more GM products on the market to allow them to reveal benefits), although one participant proposed that authorisations of GM crops should be subject to 'substantial rejection' among the public. Secondly, the Austrian law on genetic engineering does not include an entitlement to carry out cost-benefit assessments, although, with its 'social sustainability' clause (soon to be amended), the Austrian law has made a step in this direction.

3.2 Regulatory measures: policy instruments

3.2.1 Moratorium

According to the civil servant in the Ministry of Health, the moratorium was 'a development and not a decision' out of a growing public unrest in many European countries. The reason was a series of counter-expertises that shook public confidence in the regulation. The remedy is, firstly, to gain time, and secondly, to create new and better regulations in the longer run (or, in the words of the civil servant from UBA, to create a space for discussions without pressure from applications and to 'round off the regulations'). Such regulations, we may interpret, should be better suited to take into account counter-expertises that could trigger public unrest – hence, to serve a double scientific and public relation task. The moratorium was an attempt not to take any decision in the light of public hostility. In Austria the reason for the moratorium was, according to the civil servant, that '(Austrian) agriculture does not need the products of biotechnology' due to its small-scaled structure and extensive practice, which invites interpretations along the line of concept 2.

Despite Austria's decline to accept the marketing permission for the MON 810 maize it did not join the initiating group of countries due to a conflict between the Environment minister and the Ministry of Health seemingly in favour of a moratorium. When the political climate in the country had developed towards unconditioned rejection of agro-biotechnology, this could no longer be upheld and Austria joined the 'moratorium countries' in 2001. When in 2002, the Austrian Parliament unanimously declared to support any attempt to uphold the moratorium, Austria again spearheaded the anti-biotech league.

There are different interpretations of the scientific implications. While a civil servant from the Ministry of Trade saw an arrest of research, civil servant from the Ministry of Health declined that there had been a moratorium on scientific projects at all. 'More insights' is to be expected according to the Conservative politician, and the civil servant in the Ministry of Research surprisingly, but understandably in terms of concept 1, saw the rationale in enabling the large-scale marketing of products that only could provide the basis for well-founded statements about consequences.

Politically, many officials and politicians considered the moratorium a success for the Austrian stance, even if they did not agree with its reasoning. It is mostly the time gain that is seen as an asset, both for scientific research and for 'influencing public

opinion' (politician, Conservatives), in the light of that there is no necessity for GM products. The NGO representative demanded every effort to sustain the moratorium in order to firstly, reduce juridical uncertainties and secondly, for strategic reasons, to practically implement the NGOs' demand for a general rejection of agricultural biotechnology. Consequently, many considered the prolongation of the moratorium desirable, from reasons compatible with all three concepts. 'Austria can comfortably sit back and wait, look at developments in the US, do research, etc., since one can do without presently available products' (member of minister's cabinet).

However, there are different opinions whether or not this will be possible. In the light of a general change of the political climate towards more industry influence in leading European countries such as France ('mostly for economic reason', civil servant, Ministry of Health) but also in Denmark that had been an ally so far, the legal situation looks dim (Politician, Green Party). The revised Directive does, however, not automatically entail new GM products on the market as it provides new criteria that can be applied in order not to grant a permission: 'if one does not want, one can always find something as a reason, so to say, to extend this 'de facto'.' (civil servant, UBA, using a concepts 2 and 3 motive).

In the workshop, most participants gave the impression that they would prefer if things would not change much, because Austria had fared better than feared so far. However, they expected that Austria would have to give up or substantially revise its position. Although the 'GM-critical' role of Austria was clearly not to the liking of the scientists, they remained in minority.

The *de facto* moratorium was expected to last no longer than 18 months more, until summer 2004. In the meantime, participants regarded it essential to develop analyses of best practice and to develop the PP further in order to develop arguments for a genuine and sustainable Austrian stance. It was not made explicit to what end (approval or delay) the PP should be further developed. Participants gave the impression that they would like to see clear criteria for both approval and delay, on condition that the criteria would not require a complete revision of the traditional Austrian policy.

3.2.2 Contamination and GM-free areas

Not surprisingly, some interviewees adhering to concept 1 stressed the fact that there always had been gene flow and herbicide resistance, which can be contained by developing new herbicides, rendering contamination a non-issue (civil servant, Ministry of Trade). However, the problem of contamination is, at least in concept 2, inevitably linked to the future of organic agriculture, which definitely is an issue in Austria and which has been involved, often in the form of a strategic argument along concept 3, in the debate about biotechnology from the very beginning (agronomist). In this instance, a spill-over from concept 3 to concept 2 has taken place due to the seemingly multiple problem solving capacity offered by the option of organic agriculture opening up a market niche for family farming. In this context, the problem of thresholds is pivotal. Scientists heavily criticised the official aim of 0.1% contamination as not applicable nor logically justifiable but pure tactics (scientist and 2, Advisory Commission). It is considered a politically derived convention and hence can be politically altered to 1 or 2%.

There is a similarity in the argumentation, namely to seek a niche and to escape the fierce competition in mainstream areas, between the plan to establish an Austrian 'risk research' agenda and the emphasis on boosting organic agriculture that better suits the widespread anti-GM attitude. One means to secure the purity of organic produce and to protect it from contamination by GM is to establish GM-free areas. This concept 2-interpretation is official policy, and goes unquestioned even by civil servants who would not approve (like the one from the Ministry of Trade). Originally, the idea had been born out of concept 3 in the wake of the debate about the first release application as an instrument to file an objection. A newspaper took it up and made it popular during the campaign for the anti-GM peoples' petition (Volksbegehren), although the petition itself did not explicitly mention it ('it was a self-

runner', agronomist). Ever since, the term made its way through the simplified re-definition by the media, and our interviewee related the appeal of this rhetorical device to a general public attitude: 'And it is no accident that the Austrians so easily pick up this term – this feeling that we are living on an island,' (agronomist).

The idea is a political self-runner indeed. 'GM-free areas' have so far been promoted not only in single municipalities, but also in several counties ('Bundesländer') such as Salzburg, Upper Austria (ruled by Conservatives), Burgenland (Social Democrats) and Carinthia (right-wing Freedom Party), irrespective of party differences. Initially, they were only politically declared, and legal provisions were lacking for a long time. Due to the federal structure of regulations on agriculture, there were better implementation chances if the pertinent regulation was to 'protect organic agriculture', and if it would be anchored in county rather than federal law. Several working groups explored possibilities to translate the rhetoric into practical rules and to adapt technical regulations on liability, buffer zones and contamination prevention under the header of 'GM-free areas' as a strategy to counteract EU regulations that 'undermine national regulation' (agronomist). As such, the initial value-framing gave rise to a problem definition and subsequently lead to technical solutions.

However, many interviewees emphasized problems. Apart from economic difficulties ('does not pay off', civil servant, Ministry of Trade), the legal situation was unclear, especially with respect to the Austrian genetic engineering law that foresees the right to apply for release permits (scientists 1 and 2, Advisory Commission). Hence, any GM-free area would be illogical from a legal point of view. Another problem is enforcement, as the civil servant from the Ministry of Research stressed: 'Prohibition does not help anything if I do not enforce it. And there is, for me, a limit to enforceability. You cannot analyze everything. And if I only take samples, then I implicitly accept sample variances and, hence, thresholds'. Therefore, he thought that GM-free areas are rhetorical devices rather than a real solution.

3.2.3 Workshop results on GM-free areas

Participants identified several inconsistencies in the definition of the term 'GM-free area', for example whether it refers to cultivation only or to feed, too. They felt that the term 'GM-free' with respect to an area could only refer to a single crop or product. There are examples in Austria considered highly successful, but only with regard to a single product, such as an association for farmers producing non-GM milk in Tyrol. However, the focus on a single product would jeopardize the image of particular regions as being entirely 'GM-free', which has been a major marketing argument that has been capitalised on by the whole of Austria. It was exactly this strategy that would be prohibited by co-existence, except through a legal prohibition of GM crops in an easily identifiable area, for example one that coincides with a political entity such as a county.

When over the last couple of years a handful of municipalities in Austria had declared themselves to be 'genetic engineering-free', this was to no great concern as there were no GMOs available in Austria anyway. In 2003, however, the counties of Burgenland and Upper Austria chose a legal approach based on an outright ban of GM crops for the entire county, if only for three years, despite the Fischler declaration. Workshop participants considered the law in Upper Austria to be strategically problematic, and they expected it to be rejected by the Commission, which eventually turned out to be the case. It was criticised for two reasons: firstly, it referred to the whole county, which was not in accordance with EU regulation, and secondly, it did not fulfil the demand for proportionality of ends and means (a major condition for withstanding challenge before the Austrian Supreme Court), according to a recent legal expertise²⁴. Later, the European Commission came to a similar

²⁴ Stelzer, M, Bernert, I. Gotsbacher, B., 2003, Moratorium der Gentechnik? Verfassungs- und europarechtliche Vorgaben der Errichtung gentechnikfreier Bewirtschaftungsgebiete. Rote Reihe des Bundesministeriums für Gesundheit und Frauen, Bd. 2/03, Vienna. The authors conclude that only a case-by-case decision based on ecological consideration, for example in NATURA 2000 areas, or on considerations, under certain conditions, based on safeguarding

conclusion when in the rejection of the proposed law they demanded that co-existence measures must be proportionate, which they did not consider to be the case with the proposal.²⁵

In contrast, the law in Carinthia appeared more 'proportionate', as it was based on defending neighbours' rights, and it got the approval (apart from some details that will be amended) of the European Commission. Hence, it could serve as a blueprint for similar initiatives in Austria as well as other places in Europe. Essentially, it prohibits the use of GMOs in environmentally sensitive and specially protected regions, and it demands that GMOs must only be grown on fields that are suitable to measures intended to prohibit contamination of neighbouring fields. The use of GMOs must be indicated four months in advance, and a 'Book of Genetic Engineering' will be established where all prohibited areas are indicated. Areas devoted to organic agriculture may also be included. There are special supportive provisions for groups of farmers who declare not to use GMOs. Carinthia had implemented a support program for GM-free production, thus it might be possible to achieve a relatively large and uninterrupted GM-free area on a voluntary basis. The Commission emphasised such measures and Carinthia will include a special paragraph on it.

The question is whether this can be a suitable means to promote a GM-free agriculture as there will be no outright ban. The politician responsible for agriculture in the Carinthian government (a conservative) stated freely in a newspaper interview that government intends to establish a buffer zone of three kilometres, and given the small scaled field structure in the county, this would effectively hinder the use of GMOs – no wonder the European Commission was suspicious of Carinthia establishing a ban 'through the back door'. Although the Commission could not see an immediate trade barrier, they demanded that the hurdles for GMOs must not be too high, i.e. proportionate (to the risk?), and that bans within protected or sensitive areas should only be accepted if this would also be necessary with an authorisation on the EU level.

Another problem will be proper control, which participants assumed could only be exercised through federal institutions. They therefore supposed that, in reality, the counties would rather like to leave the responsibility for co-existence (being a political 'hot potato') with the Federal level, irrespective of the fact that almost everything involving agriculture per se is a matter of the counties. Regarding biotechnology however, there are no constitutional rules in Austria, so in principle every level could institutionally be responsible; at the federal level, it depends on the matter, which Ministry was in charge. In the end, the question of responsibility is 'a matter of political strategy'. Similarly complicated situations due to the cross-subject nature of biotechnology would arise in all multi-level systems including that of the EU, which, according to workshop participants, could also open up considerable opportunities to shape decisions according to political preferences, rather than according to purely legalistic principles.

3.2.4 Co-existence

The scientist and the agronomist see co-existence as the escape solution, as 'the ultimate pragmatic way to reconcile otherwise incompatible stances.' The scientist agrees with the NGO representative that the problem whether or not co-existence will be achieved lies in the threshold. The current threshold of 0.1% is seen as a means to implicitly prevent any GM agriculture in Austria for the next 10 to 15 years (scientist). This exactly will be the NGO strategy for the time after the moratorium.

the basis of organic agriculture would be amenable to protect certain areas, provided the means are proportionate.

²⁵ European Commission, 2003, Decision of 2 September relating to national provisions on banning the use of GMOs in the region of Upper Austria notified by the Republic of Austria pursuant to Article 95(5) of the Treaty, 2003/653/EC, O.J. 16 September 2003, L230: 34-43. In arguing their view of disproportionality, the Commission saw no new evidence of environmental risk from GM crops.

The necessary buffer zones would have to be about 5 km broad (Carinthia intends to set it at 3 km), which would leave almost no space for GM agriculture given the small-scaled structure of Austrian farms. The scientist saw this as a trigger for a counter move: excessive control would make the promoters of biotechnology stand up.

Apart from contamination, further problems for co-existence could arise from the phasing-out, in the long run, of non-GM seed of, and feed products from, certain crops, which Austria is dependent upon and which get imported from other countries. Hence, 'if GM is allowed then there is no way back' (politician, Social Democrats). The Conservative politician thought of co-existence as only possible if the current public anti-GM attitude would give way for disinterest.

For the future, both promoting scientists and critics recognized an industry strategy to increase acceptance via 'intelligent products' such as functional food that would bring a health benefit. Health arguments could 'normalise' agricultural biotechnology and entail co-existence. The moment the argument of health holds sway, so both sides unanimously, resistance would fade, as has been the case with medical biotechnology. Depending on the personal view, this was seen as a desirable development or as a threat to the broad consensus not to use biotechnology in the Austrian agriculture.

A second line of argument from the side of scientists was a vision of 'organic GM production' that would bring benefits to producers and consumers. New properties of plants such as resistance against pests would render them better suited to be organically grown. 'Science will prove that the fundamental rejection of biotechnology is untenable' (scientist) – opposition is short sighted ('like that of the Catholic church against ordination for female priests') since biotechnology will take over anyway. Even the agronomist considered biotechnology an analytical asset to safeguard contamination-free organic feed, though not for production.

3.2.5 Workshop results on co-existence

The question of co-existence was a major issue over all three workshop-sessions. The official Austrian position in 2003 was that the Commission should develop legally binding instruments to implement co-existence, in other words, that the responsibility should lie with Brussels. The Fischler proposal deferring the implementation of co-existence to the member countries was judged not to be comprehensive enough, as it would give rise to problems if a farmer in a 'GM-free area' would decide to use GM crops – nobody could hinder this. The Federal Austrian government, however, did little in response apart from stressing that this was not acceptable. Realistically, 'passive' co-existence either with commercial GM crops or with imported GM products (even as a result of GM contamination) was considered probable in the longer term if nothing was done.

Although the Fischler proposal stressed non-binding guidelines, participants were aware that the rules for co-existence would have to be universal in Europe, not least because of trans-regional protected areas such as those under 'Natura 2000'. They expected the Commission to elaborate guidelines for measures to avoid contamination, on a regional level, in the form of non-binding recommendations. Through pressure from NGOs, according to participants, the level of protection specified in the guidelines would in practice serve as a minimal standard even if non-binding; thus it would become *de facto* mandatory also in Austria, irrespective whether Austria would agree or not.

Given the reluctance of most participants to accept GM crops in the light of the widespread rejection in the public and among stakeholders, participants were divided about the strategy to pursue under these circumstances. On the one hand, they could seek ways to implement co-existence so as to meet the demands of the EU. Even those sceptical about GM agriculture saw a need to devise a suitable implementation strategy in order to steer developments rather than be overtaken by uncontrollable events triggered from outside.

On the other hand, Austria could stick to the non-GM scenario and devise arguments to uphold the status quo as long as possible. Over the period of the workshop meetings, leading representatives of the Chamber of agriculture, the official farmers' representation, as well as the new minister of agriculture had publicly spoken out very clearly against GM crops. Austria has recently established a successful trade in guaranteed GM-free seed and other products, which may partly explain the Chamber's move and the Minister's position. This was nevertheless a new political development, as until spring 2003, the stance of the Chamber had been unclear. Now they had declared that 'Austrian agriculture does not need such produce', so participants considered the cultivation of GM crops in Austria to be unlikely in the immediate future. In addition, some of them warned that promoting co-existence could result in further restrictions or increased expenditure on controls for both GM and non-GM agriculture. Therefore, co-existence might be 'less moderate' than often assumed, because it could give rise to many side effects.

Although a preference was given to a GM-free agriculture, it was clear to everybody that this was going to be hard to argue in the EU and that future national solo acts would be increasingly difficult to perform. The basis of the moratorium had been the demand for labelling and traceability. Hence, any debate about upholding the moratorium must take into account the original demands. Co-existence was not an issue at the time the moratorium was imposed, and since there were few concrete demands to be derived from it, it would be risky to argue for upholding the moratorium because of unresolved questions around co-existence. Participants felt that Austria would run the danger to be overruled again.

Co-existence demands the setting of thresholds as a precondition, but the catch-22 situation between European standards and national demands reappeared on this issue. Participants assumed that Austria would have to adapt to European rules²⁶ and that there would be imports. Already now, most basic seeds are being imported; participants expected that any seed would be contaminated so that a 0.1% threshold would be generally untenable. In contrast, organic farming with its own concepts was considered incompatible with GM agriculture, so that the chance for co-existence of organic, conventional and GM agriculture with respect to widely agreed thresholds appeared dim.²⁷

As a pragmatic way out, participants proposed to commission a study in order to investigate how thresholds could be agreed upon and implemented in Austria. A suitable criterion could be that they should be as low as possible while being economically feasible, which would constitute another entry point for socio-economic criteria.

3.2.6 The role of the revised Deliberate Release Directive

Many interviewees thought that the way the revised Directive was designed was partly a result of Austrian influence. Whether exaggerated or not, this view is fairly frequent among Austrian civil servants. Nevertheless, the main aim of the Directive is still seen to harmonise provisions in order to facilitate the common market, despite opening up for 'other' arguments (agronomist).

Interviewees stressed both positive and negative aspects – from their points of view – of the revised Directive. Some considered it too restrictive ('more 'eco' than necessary', scientist). Others thought of it as being too lax ('simplified and concentrated procedures as a disadvantage', politician, Green Party) or illogical

²⁶ Rather than to influence them via setting precedents to which other member countries would then relate to. This view of a seemingly passive role of Austria is in some contrast, in retrospect, to the evidence as far as developments in the past are concerned ... See section 3.2.6.

²⁷ However, some participants reported that thinking among organic farmers had changed. The UBA had declared that it would commission an investigation in model regions with the aim of establishing the acceptability of a threshold of 0.9% GM contamination also for organic production, which would cause a sensation in Austria.

(‘should not only pertain GM plants but all biotechnological methods’, civil servant, Ministry of Health). Among the positive aspects cited were the perceived ‘concretisation and standardisation on a high level of protection’ (civil servant, UBA, who also stressed the administrative simplification due to stricter time limits). This is considered new because so far, there were different opinions among European countries as to the criteria for risk assessment. Especially the UK and the Netherlands were said, from an Austrian and Scandinavian point of view, to apply too narrow a scope and not to take sufficiently into consideration indirect or long-term effects, because they feared that the biotechnology industry might leave the country. The revised Directive has amended this ambiguity about criteria to be applied.

A civil servant in the Ministry of Health considered comprehensiveness a progress. Not only molecular biology (as had been practiced until five years ago) but also systems ecological arguments are now taken into consideration. However, much leaves still to be done in terms of clarity especially in questions of monitoring. The two annexes on risk assessment and monitoring are still not clear enough due to the time pressure to implement the Directive, and nobody knows how they will work in practice and what information companies will deliver (civil servant, UBA).

Another feature of the revised Directive the NGO representative, the politician (Social Democrats) as well as the civil servant (UBA) considered positive, especially as a means to handle uncertainty, is the time limit for permits in combination with mandatory monitoring. However, monitoring still places some questions with regard to enforcement and supervision (civil servant, Ministry of Trade). Also liability is still a problem; but this is more general a problem of environmental liability in the EU (agronomist)

Acceptance is considered to be enhanced by measures such as harmonisation, clarity and the enshrining of the PP (civil servant UBA) and, to a certain degree, mandatory labelling (NGO representative). This was put into question since the stricter provisions had the side effect of ‘suggesting a huge potential for hazard’, (civil servant, Ministry of Health). Interviewees from the Greens and NGO did not see any indication for more general acceptance as this is not a technical question but depends on political considerations (about the type of agriculture). The EU regulation is seen to undermine national approaches to handle the conflict potential due to the lack of participatory measures such as the involvement of NGOs in the decision making process. In addition, they deemed national assessments to be better suited to take into account local ecological peculiarities.

In the workshop, participants seemed uncertain about the role of the Deliberate Release Directive vis-à-vis other parallel or more ‘vertical’ regulation in force or pending, as it had not yet been established how the bits and pieces would work together. ‘Normalisation’ (i.e. the normal functioning of the regulatory process without major public unease and uncertainty for companies applying for permits) would only take place if uncertainty about future procedures as a serious obstacle to a smooth regulatory process could be reduced. Risk assessment harmonisation and animal feed regulation were welcomed, but several participants expected that verticalisation and centralisation would lead to less emphasis on environmental issues, and that procedures would be more relaxed. In line with a long-established element of the Austrian position, even scientists active in genetic engineering emphasised the importance of environmental concerns. Accordingly, they thought that normalisation would only occur if environmental concerns were to be adequately considered in future risk assessments.

3.2.7 A way forward for Austria?

GM-free areas, national assessments, prolongation of the moratorium, etc, are clearly at odds with European legislation and/or international treaties. Civil servants from several Ministries stress the point that the decision to pursue such a line is only a question of political will and not of scientific justification, as demonstrated by the declaration of the Austrian Parliament from May 2002 that did not provide any

scientific arguments. Since then, the issue is on the political agenda in Parliamentary commissions, but hardly in the public debate.

The underlying rationale is 'to protect organic agriculture as an economic factor from biotechnology' (civil servant, Ministry of Health). Another motivation is to follow a widespread and stable public attitude as manifested in the outcome of the anti-biotech peoples' petition (Volksbegehren) of 1998 and documented in various surveys over the years. The question is how to reconcile these more or less consensual or, at least, mainstream political aims with the existing legal framework (politician, Conservatives). For the moment, the situation is stable, but in the long run it will be necessary to widen the room to manoeuvre, or to devise measures that are compatible with the existing framework such as political support, subsidies, public choice through co-existence, pressure on food companies from social protest or partnership with other countries that have similarly structured agricultural systems like Switzerland, Hungary or Bavaria (politician, Greens).

The Ministry of Health had commissioned several studies (still on their way) that should investigate the feasibility of a special Austrian way. Accordingly, for example, ethical arguments could be put forward, especially if pressure from the public would increase, such as the 'right on maintaining an ecologically intact and unadulterated agronomical culture', which could be argued through a paragraph in the Directive that allows for ethics assessments. Another way would be to activate the 'social sustainability clause' of the Austrian gene technology law²⁸, which prohibits 'inappropriate disadvantages' for societal groups through biotechnology, since organic farmers may suffer from such disadvantages, 'but this too, demands manoeuvres' (civil servant, Ministry of Health) to reconcile interests from industry and research. A possible solution could be to allow for research but not for production.

The European Commission is expected to inhibit national 'special ways' on the grounds of own risk studies and to bring member countries before the European Court. Hence, it is an uphill struggle. Austria had expected this step already when it issued its moratorium on the MON 810 maize, but at that time, the political situation in other member countries would not have allowed the Commission to proceed. This has more recently changed due to a European conservative turn-around. Nevertheless, NGOs expect for the next three to four year that the status quo can be maintained, even if the moratorium will come to an end – there is no economic necessity for new products, and public opinion is strictly against.

3.2.8 Workshop results: towards a new strategy

Workshop participants considered the reluctance to express an opinion on matters relating to biotechnology a notorious problem among Austrian politicians, authorities and stakeholders. Few ideas on biotechnology regulation had been passed from politics to the administration in recent times.²⁹ In the past, the Austrian position had developed from a division of labour between the competent authority and the institutions involved in activities such as performing risk assessments and reviewing notifications. While this process still functions, it appears that there is little co-ordination between Ministries, which makes it increasingly difficult to pursue a well-prepared and tenable stance in Brussels. The Austrian position had, in recent times, been a product of contingencies and well-intended but sometimes ill-coordinated single initiatives. Many policy actors still seem to have no clear view of how to manage the future, while others, such as some NGOs, prepare for a new round in the struggle.

²⁸ On the feasibility of this clause see Seifert, F., Torgersen, H., 1997, How to keep out what we don't want. An assessment of „Sozialverträglichkeit' under the Austrian Genetic Engineering Act. *Public Understanding of Science*, 6/97, pp. 301-327.

²⁹ As a first step over summer 2003, in order to stimulate participation, the Ministry of Agriculture had sent out a questionnaire to stakeholders both in the counties and at the federal level. The results would serve to develop ideas about aims and means.

Responsibility for the issue of biotechnology, in all its facets, is divided between different Ministries and between different levels of the state. When Austria joined the EU, an additional level was introduced that made matters even more complicated. While this is not unique to biotechnology regulation, the obvious discrepancy between the views of large parts of the Austrian public as well as of important policy actors on the one hand, and the obligations from EU regulation and trade agreements on the other, makes the issue especially contentious. Seeking ways to reconcile these views in a multi-layered regulatory structure leads to initiatives that sometimes conflict with one another.

The Federal layer appears to offer inadequate regulatory power for devising a solution compatible with the demands of both the counties and the EU. Hence, regulators are restricted to devising instruments that have to be implemented at a regional level while negotiating their appropriateness with Brussels. Without any clear policy guidance about the line to be pursued, however, this is difficult.

Participants unanimously regretted that there was no politically coherent strategy on, and little interest among politicians in, the development of a national strategy on GM crops. This was attributed to the fact that the issue was, and still is, contentious and that politicians have nothing to gain from engaging in it. While this is obvious in Austria, many participants thought the same problem was apparent almost everywhere in Europe. Accordingly, most politicians argue that, if nobody needs it, then we don't want it. For agriculture in Europe (apart from Spain), very few applications could be identified where GM crops were 'really necessary'. Since there were so few 'pros', participants expected that, not unlike the situation in Austria, most Ministers of Agriculture in Europe would remain cautious about advocating the use of GM crops.

However, participants considered this to be short-sighted, as problems do not disappear simply as a result of neglect. They thought that policy-makers should engage with the issues in a more constructive way, especially with respect to those that were seen as genuinely political. They demanded constructive and co-ordinated Austrian proposals that would also take into consideration socio-economic arguments, not the least as an input for negotiations with the Commission and other member states. In particular, the question of 'OLFs', and assessments within risk management that go beyond scientific evaluation of the more established potential risks, as well as the proper role of agricultural biotechnology on a national scale were seen to be issues that civil servants may have ideas about but cannot resolve on their own. The main obstacles to devising a tenable strategy were identified as:

a reluctant public and agricultural sector, which would not welcome a change in policy towards the (still theoretical) introduction of GM crops';

a weakening of the Austrian position within the EU (as Austria's stance became less tenable);

little interest among policy makers since the issue was contentious and would probably remain so for a considerable time;

little emphasis to date on devising a common approach among all players.

This situation provides an opportunity to re-think the respective positions of policy actors and of the Austrian government vis-à-vis the European Union and individual member states, with the aim of developing a consistent and tenable stance that will fulfil the demands of the legal framework while still serving Austrian interests.

Participants considered it necessary to develop the new national position along the most probable scenarios. One aim could be to keep Austria a GM-free area, because consumers and the agricultural sector would like to have it that way, and argued accordingly. With such a scenario ('GM-free'), one would have to assess its desirability, its feasibility and possible alternatives. Another aim could be to implement co-existence, and to find a suitable way to become used to the fact that GMOs are going to be cultivated in Austria. Such a scenario, however, would demand a more long-term view, and co-existence alone, as one participant stressed, would be

too shallow to serve as an aim in itself. Although co-existence seemed to be the most likely scenario, they thought it would be premature to confine the discussion to just one possible future, since this would preclude the finding of new strategies. A third alternative, such as general implementation of GM crops in a way similar to the situation in the USA, was considered to be most unlikely in the EU: today, the estimates are that GM crops will account for a maximum of 10% of production in Western Europe.

3.3 Expert judgements

The project plan foresaw to look at 'how expert advisory bodies mediate between regulatory science and public-scientific controversy'. Again, in Austria it was difficult to identify the activity of the official expert advisory body, the Commission on Genetic Engineering. This was due to the fact that the body is asked to give its opinion only if there is a national release application. Since there was none over the last couple of years, the body did not take formal action as it was not called upon. In contrast, UBA gave its opinion because its remit is to comment on marketing application files from other member countries. Secondly, the question of 'how such bodies are broadened or supplemented' is difficult to answer as it was very broad already from its beginning, albeit its composition was again slightly changed after the successful anti-GMO petition, however with little practical significance. Finally, to investigate 'how they set criteria for evidence, environmental norms' and 'how these criteria relate to wider concerns' would demand that there was any activity in this direction – so far, in Austria the body was largely marginalised.

The role that such a body plays in other countries was partly replaced by internal expertise within government ministries or from institutions closely linked to government such as UBA. Thus, there was a slightly different view on the role of experts than what might be found in other countries. Characteristically, the relation of politics and science was depicted as 'a practical implementation of precaution': policy listens to science, but scientific pluralism allows political actors to choose among several expertises to find a suitable one. In matters stricken with uncertainty, politics tends to stay on the safe side; hence, they 'of course' listen more to critical voices.

3.3.1 Role of experts

Civil servants considered experts as providing often contradictory advice for decision-making, but 'that does not mean that policy gets voluntary' (civil servant, Ministry of Research). Experts are necessary, as has been demonstrated when the annexes to the release Directive were debated. The Monitoring annex had been negotiated without experts on a purely political basis, and negotiators could not come to terms, while the Risk Assessment annex had been prepared with the help of an expert group from the member countries and is much more to the point (civil servant, UBA).

While this is compatible with the scientific concept (1) so far, many are clear over that there are limits to expert judgements and that 'the rest has to be decided politically, democratically', (agronomist). In the economic-political concept 2, this reads like: "Political' risk assessment puts the central question: do we need biotechnology?' This is a value question that the public has to decide. Only when the safety of a technology has been shown we do not need any more this 'detour' over politics and the public,' (member of minister's cabinet).

However, there are also voices that put it more ideologically, in line with the systems critical concept 3. 'Science does not provide objective solutions. In the end, it is about competing ideologies and world views' (NGO representative). There is, however, a delicate balance between science and ideology. If biotechnology was only a political question and could not be criticised from a scientific point of view, too, then NGOs would be like 'religious sects'. Critical science delivers arguments to support NGO positions. 'Experts are vehicles for political aims. I do not see this negatively, though, since political aims are something positive ..., information is relative, and information is always an instrument to reach something one aims at. And these fundamental positions will not change.' (NGO representative).

Although interviewees other than NGO representative held that NGOs, in most cases, only highlight uncertainties or point at missing data, policy seems to have acknowledged this instrumental view on science. As the civil servant from UBA put it, the Parliamentary decision to prolong the moratorium shows that politics listen to science, but scientific pluralism allows political actors to choose among several expertises to find a suitable one. In matters stricken with uncertainty, politics tends to stay on the safe side; hence, they 'of course' listen more to critical voices. This, by the way, is a practical implementation of precaution. Even more instrumental was the view from the civil servant in charge (Ministry of Health): Scientific arguments for justifications are necessary but easy to find since there are always ambiguities and shortcomings in applications. 'This means that one argues scientifically against something one does not like.' Here the revised Directive is an improvement: fulfilling the criteria to the letter helps to find weaknesses. Although the Directive brings about concretisations and harmonisations 'we are not going to approve new applications during the next year (2003, add.) either'. It seems difficult to put it more bluntly.

Not surprisingly, not everybody is totally happy with such a line. Scientists accuse the Ministry of not executing the law and give permissions to releases, although this had been agreed with the Advisory Commission. 'The majority opinion is fixed, scientific arguments are dismissed. ... It was never about science, I am convinced. I can remember a meeting of the Advisory Commission ... where she (the Green member, add.) stood up and said she was not interested in scientific arguments. There are no arguments any more, and now it is only about politics.' (scientist). The politician (Social Democrats) seem to corroborate this lack of mutual understanding when saying that science does not understand that rejection of biotechnology is not a question of knowledge but a question of politics. People simply do not want to bear the risk (whatever it may be) because there are simply no good reasons for it.

3.3.2 Role of science

Scientists do not seem to have an easy life in such a climate. Nevertheless, their self-esteem seems unbroken. The Scientist interviewed explained that the public ought to understand that science only wants to do good and never to do harm (except for some criminal deviations within science), as it is the 'essence of human ratio'. Hence, institutions like the Advisory Commission are essentially unnecessary. Only through science can the world's problems be solved, i.e., problems are mostly technical. However, since science proceeds so quickly, people cannot follow, so it is necessary to create a 'basic trust' in the benevolence of science. Without such trust that risks are quickly detected, 'research gets impossible'. However, it is a pity that science seems to be unable to communicate its sake and to convince people of its fundamental benevolence. At least, attempts have failed so far.

Less emphatically, but in a similar vein, the civil servant from the Ministry of Research is convinced of the objectivity of science: 'no matter who it does, the result will be the same,' because science deals with problems while following logical rules. It (objectively) determines probabilities of error and limits to exactness (civil servant, Ministry of Health) and quantifies risks in order to sort manageable from unmanageable, 'rational' from 'irrational' risks (politician, Conservatives).

The 'critical' side astonishingly mirrors this picture of objective science. With a view to the Parliamentary enquiry commission of 1992 preparing the genetic engineering law the politician, Green Party, stated that politics had deliberately sacrificed unanimity that would have been possible on the basis of 'scientific preparatory work'. Hence, pro-biotech lobby politics did not acknowledge objective scientific findings that would have demanded a more restrictive law. Essentially, the view on science is not so different from the above.³⁰ Hence, there seems to be a broad consensus that (natural) science should govern the assessment of risks. Inter-disciplinarity, according

³⁰ In a previous round of interviews, the representative of Greenpeace Austria, upon being challenged about who should have the say, stated that, in the end, scientific facts decide, see Torgersen / Richmond 2001.

to the scientist, may be beneficial to a certain degree, but 'substantial' problems should be answered by science. The Conservative politician separated the de facto from the normative aspect: de facto, science answers the question 'what is it', normatively, policy answers the question 'what is allowed'. Nevertheless, for the political decision this is the more relevant question: 'in the end, it is politics that decides' (scientist).

This distinction between science and politics is a relevant aspect throughout. The civil servant in the Ministry of Research sees the border between science and politics where complexity can no longer be handled by scientific means. 'I think one cannot force science beyond a certain point. One cannot demand that they should predict the weather, the temperature ever more accurately. This is the end of science. Everything else then becomes a political decision.' But this is open for ideological framing: the discourse about 'facts' turns into a discourse about values when de facto borders are reached or, respectively, if one cannot decide 'de factoly' whether responsibility about a technology can be taken (politician, Conservatives). In other words, where there is uncertainty about risks, it is impossible to take responsibility on the grounds of de facto information, and only then struggles over values hold sway. Such a view implies obviously an implicit rationale that everybody can agree upon, i.e. a consensual value base that is taken for granted, that does not need to be addressed and that is firmly embedded in the status quo. Concerning agriculture in Austria, one may speculate that it is the maintenance of small-scaled, area-wide, preferably family-owned farming, keeping the population on the countryside and preserving the (conservative) agricultural clientele. Organic farming is then a means to that end.

However, the story about the intrinsic benevolence of science is not unanimously shared. For example, a civil servant in the Health Ministry distinguishes three historic phases of science, from pure knowledge gaining over exploitation for the common good to a 'crass commercialisation' explaining the lack of trust in the public. Scientists, as everybody, behave as rational participants of markets (implying that government has to oversee their activities).

3.3.3 Workshop results: politics based on science, Austrian version

Irrespective of their position vis-à-vis transgenic crops, participants agreed that science and policy can be, and have to be, kept separate, and that each has its tasks, which cannot be taken over by the other. Ultimately, and not unlike a decisionist approach, it is science that determines facts, and policy that determines value questions. The opening up of GM assessment to 'politics', in combination with a clear separation of 'politics' from 'science' seemed to be a way of avoiding the 'contamination' of the latter by the former. Uncertainty arises where science is unable to provide clear answers, for various reasons. Then it is the task of policy to decide, under the condition of the PP, whether or not the risk is worth taking. This strict separation of science and policy is largely in line with the Commission Communication, but the remit for taking into account 'other' factors seems to be greater, and Austrian decision takes seem to accept a more complex and uncertain account of science compared to the understanding implicitly conveyed by the Commission Communication.

Seemingly transgressing their role, scientists in the workshop argued for taking into account socio-economic factors. Among participants, we noticed a robust acceptance of their argumentation. Essentially, the reasoning is as follows:

Current scientific knowledge about the risk aspects of GMOs demands a comparison of GM plants with conventional plants, rather than the assessment of GM plants alone because, from a scientific point of view, there is no a priori GM-specific sort of risk. Postulating any risk deriving from the method of genetic engineering without looking at the properties of the organism is unscientific, and any regulation must be based on science.

Comparing GM and conventional plants, there could be products to be considered 'beneficial' under Austrian conditions. Other products do not offer enough benefits, notwithstanding that they might be beneficial other places. Essentially, this is akin to

the reasoning behind the case-by-case principle, but taking the analysis to 'possible benefits' as well.

Consequently, with respect to co-existence, there is currently a pressing need for constructive and co-ordinated proposals for regulation that takes into account socio-economic parameters.

The main problem seemed to be to gain a clear vision about what a possible 'benefit' might be. On the one hand, there was a tendency to assume a benefit where participants saw a market niche as in the case of crops for 'renewable resources' adapted to Austrian conditions (for example, potato and oilseed varieties producing substances for industrial processing). Crops with pest resistance, if ever applied, should be tailor-made to address Austrian agricultural problems, whereas current GM varieties were designed for use in countries with different climatic and environmental conditions and, hence, for solving other problems (for example, Bt maize - the corn borer is not the biggest problem for maize farmers in Austria). Such crops should be designed not only to raise farmers' profits but also to address environmental sustainability, conservation of biodiversity, reduced pesticide use, minimisation of erosion, and reduced demand for water, which implies careful adaptation to local conditions.³¹

On the other hand, assumed public acceptance was clearly a criterion. Hence, GM food would have to offer obvious benefits to the consumer beyond a lower price only, but it was unclear whether participants felt that there would ever be such a product that would find acceptance in Austria.

3.4 Stakeholder roles

The project aimed at investigating 'how stakeholder groups attempt to influence regulatory measures, within or beyond formal procedures.' This implied to analyse 'how they participate in deliberative procedures' and 'how they promote accounts of evidence, uncertainty, precaution and sustainable agriculture.' As we have seen, many scientists would belong to the group of stakeholders rather than being in the driving seat of giving 'independent' advice to regulatory decision-making. This is not the only peculiarity; in particular, and compared to other countries, industry has been less successful to promote their interests in agricultural biotechnology. However, it appears as if government policy has taken up certain NGOs' and organic farmers' demands so that the latter got institutionally marginalised as well, although from other reasons compared to scientists and industry. Nevertheless, some scientists, industry representatives and leading NGO members have influence on a personal basis. The overall impression is that ministries and institutions linked to government such as UBA aim at staying 'at arm's length' from scientific bodies as well as from industry and NGOs, choosing arguments and demands from all stakeholders in forming their own policy.

3.4.1 Role of industry

As there is only a tiny seed industry in Austria, representatives of industry hardly show up in the public debate. Among our interviewees, industry bashing was a common attitude not only with the NGO representative, the agronomist and (left wing) politicians but also with scientists. The scientist accused industry of two severe mistakes: they had mistakenly believed that it is possible to transfer results from the laboratory to the field without taking into consideration the complexities of ecosystems (which, as he had stated other places, cannot be assessed at all). Secondly, they had followed a lousy communication strategy, which resulted in that they, now, are 'unable to move without risking their head, very dramatically, and that is the reason why nothing moves on.' The politician (Social Democrats) agreed that

³¹ Interestingly, over the late 1990s, industry argued to include similar socio-economic criteria in the DRD revision of the Deliberate Release directive which led to the Directive 2001/18, though without success.

industry's strategy to gain acceptance for GM products in Europe without labelling had been at the basis of the widespread rejection that had been prevalent over the last years. Only where the influence of consumers had been weak (such as with feed) had industry been successful. This perceived contrast between consumer and industry interests was a familiar feature in many interviewees' responses. Therefore the agronomist stated that 'the broader context of normal agriculture and consumers' interests, respectively' should determine official policy and not 'specialised science'.

As in many other European countries, retail chains had been very influential in the rejection of GM products in Austria. They are not supposed to change their policy, according to the Green and Social Democrat politicians, so that there is hardly any influential actor in Austria that would want to introduce GM products. The scientist thinks that if only the retail chains would be more courageous the situation could 'normalise'.

In striking contrast, organic farming is perceived as the manifestation of the opposite of the GM strategy. It is perceived as the result of a political emancipation process and caters for traditional know-how (for example how to fight weeds 'naturally'). It provides the means to proceed step by step and to try out different alternatives without rushing into unwanted technological trajectories (agronomist).

Over recent years, specialist seed suppliers as well as farmers have considerably capitalised on the reputation of Austria as a guaranteed GM-free country. Hence, the pressure from industry and from farmers willing to apply GM crops has decreased or even turned into a rejection. Consequently, the Chamber of Agriculture, the official representation of farmers within the Austrian 'Social Partnership', has spoken out against the implementation of a GM-based agriculture in early 2003, similar to the new Minister of Agriculture a little later. Both are said to have a firm stance with mainstream agriculture, i.e. rather big farmers, and not only to be a voice of the organic movement within agriculture, which still is a tiny faction only.

3.4.2 Role of NGOs

Many scientists and some civil servants see NGOs as systematically blocking the dialogue for their own (economic) interests. They are 'normal interest driven industrial enterprises' selling world-views (scientist). He alleged them of falsifying results, lying and compared them to 'propaganda departments 50 or 60 years ago'. Less dramatically, a civil servant in the Health Ministry saw them pursuing their business according to market forces, dwelling on 'generally accepted aims to protect'.

While the scientist proposed to remedy the situation by involving NGOs into decision-making and thus 'taming' them, this is exactly what has been the case, according to their own interpretation. After having brought up the issue of biotechnology in 1996, they now are involved in establishing GM-free areas (politician Social Democrats). They have triggered more stringent regulations and the implementation of new environmental technologies. According to the NGO representative, their role now is that of a kind of professional consumers' service; a piecemeal 'repair function' dealing with small improvements (such as finding arguments against certain GMOs) and thereby supporting the current political system rather than a fundamental critic of it. Hence, a side effect of their success is a loss of their original agenda, namely the struggle for a political alternative. At the end of the day, 'genetic engineering free areas are going to make them unemployed,' as the agronomist put it, and they will get trapped in their success.

This is the reason why NGOs are seen to be dependent on conflicts, and why they strategically seek to uphold views that diverge from those of industry people and scientists even if representatives, in personal discussions, concede for example that biotechnology may bring benefits in certain cases even according to the value system of the NGO. Indulging into technical issues has been necessary for strategic reasons, but it is a dangerous thing to do, as strategic argumentation is necessary that is sometimes difficult to uphold. This makes it necessary to seek alliances.

Although, according to the NGO representative, biotechnology was planned to be an issue in the election campaign, and NGOs intended to provide arguments to every party that would support their agenda, even to the right-wing Freedom Party, biotechnology got hardly ever mentioned. The issue of agricultural biotechnology prevention was popular but uncontested, so that there were hardly any differences between positions.

In late 2003, Greenpeace and Global 2000 started efforts to get the issue on the agenda again. Greenpeace held a press conference on the findings of a Hungarian group which could have amounted to an European version of the monarch story in the US, however, with almost no repercussion in the media and no political reaction. In December 2003, Global 2000 staged an event with a giant inflated rubber tomato protesting against federal spending for the transgenic plum tree 'safety research' project, with similarly little result. It seems as if the public (or rather the media) would not consider GM crops a worthwhile issue to debate any more.

3.4.3 Role of the public

Many think that 'the public is the *Kronen Zeitung*' (civil servant, Ministry of Trade), and the role of this tabloid has definitely been pivotal. It has such a high circulation that virtually every second Austrian reads it, and its editor heavily supported the campaign for the anti-GM peoples' petition (*Volksbegehren*). It has a reputation for entertaining a right-wing populist and xenophobic agenda (for example until recently, Mr Haider's statements were frequently covered in a rather positive way) and, at the same time, supporting 'green' issues (such as the rejection of nuclear power back in the 1970s). No doubt, the *Kronen Zeitung* had its share on the formation of public opinion on biotechnology over the last years, but has recently been rather reluctant to engage in the issue.³² One reason may be that the process of opinion formation has been finished and rejection is firmly established; the demand for information or comments is satisfied (Politician, Social Democrats). Hence, biotechnology rejection is a matter of course and nothing that would attract media attention.

In interpreting the reasons for this rejection, scientists and the NGO representative came to similar conclusions. Scientist referred to a general sceptic vis-à-vis science, because scientists are seen to pursue their own interests or those of industry. Another reason, according to the scientist interviewed, is the 'zeitgeist' that is influenced by certain popular myths about 'health', while science has problems to establish 'the truth' against majority opinions. He also referred to technological innovations to come too quick for the understanding of common people. Similarly, the NGO representative held that it is not a general suspicion against biotechnology but rather the problem to assess case by case, and to this end to collect extensive knowledge, that is too much for normal people to understand. Hence, both agreed that it is mainly the cognitive problem that leads to general rejection.

Finally, the civil servant in the Ministry of Research (as well as the agronomist) traced public distrust back to differing expert assessments. The public needs a feeling whom to trust. 'There are many such areas including health issues. How do I know that the medical doctor actually treating me is indeed the best one that could ever treat me?'

There is a lack of enlightened debate, as both the press has stopped to publish balanced and informative articles in favour of 'advertising' type of sensational coverage, if ever. Likewise, discourse in Austria has been far from satisfying, and especially during the last years (new conservative government) elitism has resurrected, as could be seen with decisions to establish an ethics committee (agronomist).

In general, surveys in major European countries including Austria show that the rejection of GMOs seems to have reached a steady level fairly independent of major

³² For an analysis of the Austrian quality press coverage of biotechnology see Torgesen *et al.* 2001.

public mobilisation.³³ The opinion that GMOs are something to be avoided has deeply entrenched public opinion without activists having to feed the fire. It is therefore not surprising that there have been little attempts over recent years to mobilise the wider public.

3.4.4 Workshop results: public acceptance

All participants defined their positions with a view to public opinion as well as to the published opinion of various NGOs irrespective of whether or not they shared some of the NGOs' positions. 'The public' has always been a crucial reference point in Austria for all experts dealing with the regulatory issues of biotechnology, and Austrian civil servants had always been aware of public acceptance. They were concerned about new applications for the commercialisation of GM crops that Austria would have to accept. One of the most important questions would then be how the Austrian public would react. Some participants considered the authorisation of GMOs in the EU, and hence in Austria, to be an experiment that would reveal the 'true level of acceptance', or rather non-acceptance, provided labelling was fully implemented.

Participants in favour of GM crops felt that consumers must be challenged in a gentle way to promote differentiation, i.e. to gain a view on advantages and disadvantages of GM versus non-GM products. As long as there was no immediate and obvious benefit for the consumer, GM crops would remain contentious. The question of whether 'functional food' would change the current aversion to GM products was answered differently. Most participants did not consider them to be convincing enough to trigger a significant change in the opinion of a generally reluctant public. Therefore, and for the time being, GM crops were considered decidedly unwanted in Austria. This would also explain the current position of the official agricultural interest representation, including the Ministry of Agriculture, as farmers gained business by being able to offer GM-free crops.

It was especially with a view to public acceptance that members of the group preferred not to restrict the assessment to criteria of 'scientific risk' but to include, for example, cost-benefit analyses on a case-by-case basis if considered appropriate or necessary. The advantage would be that costs and conditions for the respective risk management measures could reveal advantages and disadvantages for consumers. On the other hand, costs-benefit considerations would be cumbersome and complex and one could not expect to arrive at unambiguous statements, since local conditions would play a significant role.

While public opinion in Austria after the moratorium remained enigmatic, participants were sure that environmental and consumer NGOs would keep the issue on their agenda. Although they considered that NGOs would soon run out of risk arguments against GM crops if they stuck to their established lines of argument, they expected NGO arguments to evolve, and NGOs were seen to be currently developing strategies for what to do when GM crops arrive in Austria. The moratorium gave time to NGOs to revise their strategies and to address potentially changed preferences among the public.

3.4.5 Role of civil servants

In the workshop sessions, civil servants (hence, most of the participants) were seen somewhere in between science and politics: ideally, civil servants should objectively inform their head of department and stay devoid of emotion. They should not support a particular direction but should mention concerns and collect arguments in a balanced way, never running somebody down. They were, so to say, considered a special sort of experts.

³³ For example, see the results from the 2002 Eurobarometer 58.0 on attitudes towards GMOs: Gaskell G., *et al.*, Europeans and Biotechnology in 2002, Eurobarometer 58.0, A report to the EC Directorate General for Research from the project 'Life Sciences in European Society' QLG7-CT-1999-00286, europa.eu.int/comm/public_opinion/archives/eb/ebs_177_en.pdf

For example, an important role for the administration was identified in the improvement of GM applications. The scientific content of the applications proved often to be rather questionable or they were incomplete. Even the molecular data seemed to be wrong at times. Thus participants saw a need, and a clear role, for the administration in the improvement, harmonisation and standardisation of data, especially with respect to environmental effects and, with food, to allergology and toxicology. Participants did not explicitly define standards applicants would have to oblige to as data demands could only be considered from case to case. Wrong molecular data, however, definitely would not meet the standard.

This almost Weberian ideal must frequently be given up as civil servants cannot avoid departing from their 'objective' role, since they have to actively prepare political decisions. The role of policy was seen to decide, taking into account not only scientific facts but also appropriate levels of costs and benefits, to identify OLFs or pursue national interests.

3.4.6 Role of politics

The politician (Social Democrats), from her experience as a campaigner for an NGO, gave an interesting account in her interview of how the Austrian political stance had formed. The 'critical point' was with the first release applications. Politics had no choice other than to withdraw the permission after the 'illegal' release in 1996. Hence, it was not a strategic or reflected political decision; rather, it was forced upon them by the circumstances in order to prevent an 'ice breaker' effect in favour of industry.

Ever since, parties had no choice than to follow this line. All except the Conservative Party (now in power) were totally against GM products, and the (former) Minister for Agriculture and the Environment was isolated with his more positive opinion (politician Greens). The Conservative Party (representing established agricultural interests) had been split, as agriculture had always been more in favour of biotechnology, yet did not dare to say it loudly (politician, Social Democrats). This seems to have changed meanwhile, and larger parts of the Conservatives now (half-heartedly, or for strategic reasons) support an anti-GM policy. The Social Democrats, for strategic reasons, support organic agriculture as a niche market in order to compete against big producer countries such as Germany and France. They are therefore ready to collaborate with the anti-biotech movement, irrespective who they are. However, only being 'anti-GM' has been frequently criticised, from different point of views, to be no sufficient replacement for a consistent policy on agriculture.

Remains the fundamental controversy about what kind of modernisation we should embark on. On the one hand, the NGO representative (in line with the agronomist) stressed that NGOs wanted to keep this question open and to fight against the pending danger of expertocracy.³⁴ The decision about biotechnology is fundamental, and people must take it according to their preferences. For the NGO representative, future modernisation must be guided by the idea of sustainability, which is incompatible with the implementation of GM crops in agriculture. In addition, however, our whole life has to be changed accordingly, including wider and systemic policy implications.

Concept 2 does not aim to change the political system; rather, it implies the protection of the current political set-up by preventing disturbances, on several levels, arising from the challenge of introducing GM crops into agricultural practice. In order to do so, ideas from several sources including those adhering to concept 3 get incorporated. By implication, the view on modernisation behind concept 2 can be described as rather traditional and may even be more in line with that of concept 1.

³⁴ In the light of current scientific pluralism about the effects of transgenic crops, in retrospect this danger seems to be less real. Obviously, and with the significant help of NGOs pointing at data gaps, even mainstream scientists are ready to acknowledge (at least) uncertainty over some possible effects. Thus, the one-way path of smooth implementation of transgenic crops warned against by NGO activists not so long ago has not materialised in Europe.

In striking contrast to the NGO representative, the scientist expressing a view within concept 1 thought that, due to differing interests and levels of education, there will never be a consensus about biotechnology and therefore scientific progress gets permanently blocked. Hence, 'democracy does not function in this issue'. His solution: 'One must say that perhaps we need visionary politicians, who say that now we want to have a look at this and we do it ... And we take everybody on board, they may participate. Those who do not want to participate, those that always say no, we will leave behind to the left or to the right, wherever they belong.'

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Annexes

Annex I: Key events in Austrian policy 2000-2003

Date	Trigger	Description	Outcome
Feb. 2000	New Austrian coalition government starts work	After lengthy negotiations following the Oct. 1999 general elections, a new government between the People's Party (ÖVP) and the Freedomite Party (FPÖ) is formed	Shifts in ministerial competences: former Ministry for Womens' Affairs is dissolved and integrated into a new Ministry for Social Affairs (Ministry for Social Security and Generations, later renamed Ministry for Health and Women's Affairs) – biotechnology and consumer protection competencies now reside in this new Ministry and in the new Ministries for Agriculture and Environment and for Economy and Work; critique in Parliament (by Interpellation; 430/J XXI. GP), as this 'does not correspond to the EU emphasis on consumer protection' since 1997
Feb./Mar. 2000	On Jan. 28, EU committee on seeds and propagating material for agriculture approves three types of GM maize for cultivation	Greenpeace and Social Democrats warn that there only exist 'import bans' for two of these maize types, and demand a ban on the third type (AgrEvo, T25) – otherwise it could be released	NGO and opposition critique (parliamentary interpellation 421/J XXI. GP); designated Social Affairs Minister announces investigation of the case and decree prohibiting marketing and cultivation of T25 maize
Mar. 2000	Study of 'Life Cycle Assessment' presented	Study, commissioned by the Environment Ministry and the Federal Environmental Agency, compared effects of cultivation of transgenic rape and maize varieties with conventional ones	Study concludes that given the structure of Austrian agriculture Bt maize, in particular, would not have any benefit
Mar. 2000	County Parliament of Salzburg holds a session to decide about 'genetic engineering free region' according to regional environmental	NGO and organic farmers' protest in the region of Salzburg	No decision; instead it is proposed that farmers should declare voluntary agreement disclaiming use of GM seed

	law		
Apr. 1 2000	New Minister for Social Affairs takes over biotech agenda	Minister plans 'gene technology summit' (with NGOs) and announces ban on cultivation of AgrEvo maize	Minister signs ban on AgrEvo maize on April 13 (based on art. 16/Dir. 90/220) and announces summit for May 4
Apr. 11 2000	Austrian Cabinet approves release experiment with GM apricots	New release application by the University of Agricultural Sciences, Vienna (BOKU) to the Minister of Science in charge of university research on biotechnology	NGO and opposition polemic about the Minister's position on biotechnology, as she backs the experiment; due to various interpellations, this experiment is repeatedly dealt with in Parliament; no release to date
Aug/Sept 2000	Checks on seeds in stockpiles and on farms for GM contamination	GM maize and rape found; no public protest comparable to former years, discussion mainly restricted to political actors, NGOs etc.	Harvest from contaminated seed is destroyed; Minister for Agriculture in a response to a Parliamentary Interpellation (1131 J/XXI. GP) declares that in accordance with the European Commission an Action Plan has been devised (-> control system) later (Jan. 2002), an amendment to the Seed Law is enacted
Feb. 2001	Amendment to Deliberate Release Directive 90/220 (2001/18)	Reference to the precautionary principle, includes phasing-out of antibiotic-resistance markers, labelling, monitoring system and traceability	Transposition into national law planned for autumn 2002 (Oct. 17) – but no draft bill to date (February 2004)
Feb. 2001	Announcement of, and media reports on, Euro-barometer results	Platform 'Gene Technology and We' (financed by several Ministries) plans to foster dialogue between science and the general public in order to inform public debate	Critique from Social Democratic and Green opposition concerning the public funding of the platform in Parliament – remains restricted to this arena; no public impact
Feb.-Mar. 2001	Amendment to the regional environment protection law in Salzburg drafted	While leading politicians argue that such a regional law declaring a gene technology free region could not be upheld and that national and European regulations are sufficient, NGOs and organic farmers' associations press for the declaration of a gene technology free region in Salzburg and organise	The amendment to the law is finally defeated in the County Parliament on March 21 – organic farmers criticise the decision as this will endanger their methods of cultivation and in particular the organic farming sector

		demonstrations; frequent references made to the region of Tuscany, earlier declared a 'gene technology free area'	
Mar. 14 2001	Greenpeace blockades a cargo-ship with 1500 t of GM soya	As feeding meat and bone meal was prohibited after the BSE crisis, GM soya is increasingly used for the production of feed; Greenpeace tries to mobilise the public by activism	Like Greenpeace, the opposition criticises this as endangering agricultural production and consumers, as neither farmers nor consumers can know if GM soya was used or not; Social Democrats issue another Parliamentary Interpellation (218 J/XXI. GP) demanding investigation and control of imports, and ensuring consumers' protection
Apr./May 2001	Greenpeace brings a charge against Austria's biggest producer of feed and later against a seed company because of 'gainful betrayal'	In February, Greenpeace had 14 feed brands analysed for GM soya, all of them including between 10 and 60% of GM soya; in a first reaction, a big retail chain demands a disclaimer from its producers; in early May, it becomes known that seed imported from the US and distributed in Austria contained GM maize (Bt11)	Greenpeace demands the Ministers for Health and for Agriculture to enact labelling for GM feed (if necessary, in a national solo attempt); Social Democratic MPs issue a series of Parliamentary Interpellations accusing the Government of having reacted belatedly and thus being responsible for the 'biggest illegal release' in Austria; maize harvested from contaminated seed has to be destroyed; NGOs and opposition demand import ban on Bt11 maize; farmers react with insecurity, but no public outcry as compared to previous mobilisation
Summer/ winter 2001	General debate on 'red' (medical) biotechnology in Europe	Interviews with experts and politicians, diverse symposia etc. are reported in the media	By and large 'red' biotechnology receives increasing attention, whereas 'green' biotechnology loses in importance, however debate remains restricted and does not develop the same mobilising effects as was the case with 'green' (plant) biotechnology in previous years
Nov. 2001	Planned decree on seed provides for tolerable	NGO and opposition critique	Decree (BGBl. II 478/2001) is enacted by Jan. 2002; petition with 1900 signatures is handed in to the relevant

	limit of 0.5% GM material for conventional seed and 0.1% for seed for organic farming		Parliamentary Committee, as the regulation is perceived insufficient – general demand of the petition is that the whole of Austria should be declared a 'gene technology free area' (in terms of agricultural use) from spring to autumn 2002, opposition issues a series of Parliamentary Interpellations to the Agriculture Minister, mostly concerned with auditing of 'GM contamination' of seed – illegal releases as compared to 2001 shall be avoided – Minister announces that controls had negative results and that no GM seed is cultivated in Austria in 2002 thanks to the newly established monitoring system; Implementation of Deliberate Release Dir. 2001/18 by amendment to the Gene Technology Act advised for autumn 2002 (not yet enacted)
Feb. 2002	Supermarket controls organised by Global 2000	Tests show that fruit and vegetables contain pesticides	Following the EU Commission's proposal for Novel Food/Feed from summer 2001 and some new food scandals, issues of food safety, labelling and organic production temporarily gain in importance
Apr. 2002	County of Burgenland is declared 'gene technology free area'	County Parliament passes resolution with the votes of Social Democrats, Greens and Freedomites, ÖVP is opposed to decision; 60 Austrian communities have already declared themselves gene technology free areas; a similar initiative is pending in Carinthia; after the failed attempt the year before, debate in Salzburg flares up again; framing connected to organic farming	Implementation planned for October 2002; Ministries for Health and for Agriculture commission studies to investigate options for gene technology free areas County Parliament in Salzburg takes up the issue again and this time unanimously agrees on the plan – implementation is supposed to be elaborated in December 2002
May 2002	Presentation of the new Food Agency	Following the EU wide discussion on food safety and related initiatives at the EU level	By a new Food Safety Act (BGBl. 744/2002), the establishment of the Austrian Agency for Food Safety and of

		in response to food scandals, the establishment of an Austrian Food Safety Agency decided upon	the Federal Agency for Food Safety is enacted by June 1, 2002
June 2002	EP discusses labelling of GM food	Austrian Conservative MEPs first announce that they are not willing to vote for labelling, then change their minds	Draft regulations on labelling and traceability, and on GM food and feed (both are codified forms of detailed appendices to the 2001/18/EC Directive) are being given first reading in the EP in early July; Regulation not yet decided upon, as it has to make its way through the EU co-decision procedure
July 2002	Amendment to the Contained Use Directive 90/219 (98/81)	Amendment to Directive 90/219 to be implemented in national law by change of the Gene Technology Act	Amendment to change in Gene Technology Act enacted by July 1, 2002 (BGBl. 94/2002)
Feb. 2003	Upper Austria draft law	Law declaring the whole county to be a GM-free area for three years	Despite experts' warnings that the draft law would violate EU regulations, the county parliament decides to go ahead
Apr. 2003	Carinthian draft law on 'precaution in genetic engineering'	Law to implement co-existence of GM and non-GM agriculture sent out for comments	Aims to protect the 'natural development of plants and animals' from consequences of nearby GMO releases, to safeguard organic production from GMO contamination and to keep protected areas free of GMOs
May 2003	New conservative/right wing Federal government	New Minister of Agriculture, government plans to implement 'GM-free areas'	New minister critical of GM agriculture backed by opposition parties
June 4 2003	Parliamentary declaration on keeping the moratorium	In the Parliament sub-committee on EU affairs, unanimous agreement on maintaining the moratorium	Following a proposal from the Green Party, all four Parliamentary parties demand that the moratorium should be maintained 'as long as the questions of co-existence, traceability, labelling and liability have not been solved EU-wide'. They also demand legal measures for co-existence instead of guidelines
June 2003	Carinthian law submitted to European Commission	EU Commission to assess Carinthian draft law for compatibility with EU regulation	Special emphasis on possible trade barriers
July 2003	Commission objects to	Draft law declared to be not compatible with EU	The Commission states that no new evidence has been

	Upper Austria draft law	regulation as it bans GMOs altogether	presented
Sept. 2003	Commission decides on Upper Austria law	The Commission rejects the law declaring the whole county a (temporarily) 'GM-free area'	The county of Upper Austria nevertheless declares that it would stick to the proposal and go the European Court
Dec. 15 2003	Deadline for European Commission's assessment of Carinthian law	After prolongation of the assessment period, Commission approves in principle	Some changes have to be made in order to prevent a 'ban through the back door'. In particular, conditions for banning GMOs in protected areas must be the same throughout the EU
Dec. 2003	Global 2000 demonstration	Global 2000 protests against publicly funded agbiotech research in Austria	In an attempt to re-invigorate public debate about GMOs, Global 2000 demands a halt to research on virus resistant plum trees, the only 'safety research' project in Austria

Acknowledgement. This table is based on a similar list compiled by Petra Grabner, University of Salzburg, for another project supported by the European Commission ('Life Sciences in European Society', QL7-CT-1990-00286).

Annex II: List of interviewees

DI Richard Dietrich, agronomist, Austrian Association for Agronomic Research (ÖVAF)	27/05/ 2002
Dr. Ernst Streeruwitz, member of the Cabinet of the Minister for Agriculture, Forestry, Water Management and the Environment	29/05/2002
DI Josef Schmidt, scientist, member of the Advisory Commission, Seibersdorf Research Centre, Department of Life Sciences	10/06/2002
Prof. Karl Kuchler, scientist, member of the Advisory Commission, Platform Gentechnik & Wir, Institute of Biochemistry, University of Vienna	11/06/2002
DI Walter Kucera, agronomist, conference of the Presidents of Austrian Agricultural Chambers	11/06/2002
Dr. Alexander Haslberger, civil servant, Federal Ministry of Social Security and Generations (formerly: Federal Ministry of Health, Federal Ministry of Families and Consumer Protection)	12/06/2002
Daniel Hausknost, NGO representative, Global 2000 (Friends of the Earth)	13/06/2002
Dr. Eva Glawischnigg, Member of Parliament, Green Party	14/06/2002
Dr. Alois Haslinger, civil servant, Federal Ministry of Education and Research	18/06/2002
Mag. Ulrike Sima, Member of Parliament, Social Democratic Party	18/06/2002
Dr. Sabine Ecker, civil servant, Federal Ministry of Trade	27/06/2002
Dr. Josef Hoppichler, agronomist, Austrian Association of Mountain Farmers	28/06/2002
Dr. Helmut Gaugitsch, civil servant, Federal Environmental Agency (UBA)	03/07/2002
Dr. Michel Haas, civil servant, Federal Ministry of Social Security and Generations (formerly: Federal Ministry of Health, Federal Ministry of Families and Consumer Protection)	09/07/2002

Annex III: The official Austrian statement on Bt 11 maize

Safety assessment

Austria objected to the authorization of the Syngenta Bt 11 maize sweet corn. The competent authority, the Ministry of Health, submitted a safety assessment officially performed by the Environment section of the Ministry for Agriculture and the Environment, elaborated with the help of experts from UBA. Partially overlapping with criticism from other Competent Authorities, it indicated severe shortcomings of the data submitted. Accordingly, there were only literature references and hardly any genuine experimental results on safety assessments, which rendered risk assessments impossible, in particular with reference to human consumption. Data, however non-conclusive, were only provided for the Bt 11 maize itself and not for hybrids also covered under the permission. In particular, the section criticized:

- 1 Imports would probably lead to involuntary releases, which would have an impact on future co-existence strategies. Permissions should not be granted before such strategies have been developed.
- 2 No sequence information is given on the flanking regions, i.e. the plant genome at the borders of the genetic cassette introduced into the plant. As this information is necessary for developing identification methods and to trace for genetic stability, the information given in the notification is not sufficient.
- 3 The submitted PCR protocol lacks data for validation, such as the working document on validation requirements of GMO detection methods by the JRC demands. In addition, the submitted method is not suitable to identify the specific Bt-11 variety as it is not event specific. A quantitative PCR method is required but not submitted.
- 4 The environmental risk assessment is only based on the assumption, grounded in a single literature reference, that there are no negative effects to be expected. In contrast, 'many current research results indicate negative environmental interactions of Bt 11 plants, for example impacts on non-target organisms and/or impacts and persistence of the Bt 11 toxin in the soil', which the applicant neglects or plays down. Information about prior releases is also insufficient as it only states that there were no negative effects.
- 5 Concerning the toxic/allergenic potential, the arguments provided are not sufficient to claim zero risk, as the applicant does. Data were gathered (mainly 'electronically' from data bases and comparisons) using the isolated Cry1Ab or PAT protein and not the plant itself, which would be necessary given that the product is intended for human consumption. In vivo transfer of DNA should also be considered in the risk assessment.
- 6 From data on substantial equivalence provided it does not become clear whether they are comparable. Deviating data are declared to be 'irrelevant' without any explanation.
- 7 There is no monitoring plan (as there are no negative effects expected), except for a general reference to the 'Insect Resistance Management Plan' of the EU Working Group on Insect Resistance Management yet to be finalised. There are still many open questions regarding the monitoring plan. According to the submitted application, unintended effects will be analysed only if there is 'a chain of scientific proofs' for their existence, eliminating any responsibility for the applicant. Volunteers are not regarded an agronomic problem in the application.
- 8 The range of permission is unclear, since the product is intended for human consumption, which the French authorities in their favourable assessment exclude. In addition, the applicant puts under the objectives 'to identify [...] adverse effects [...] that the placing on the market of Bt11 maize for cultivation purposes in Europe, may have [...]']

- 9 Labelling is not mentioned in the summary, nor is there any plan for the appropriate labelling of hybrids.

Final statement

In their final official statement, which the above assessment was the basis of, the Austrian Competent Authority criticized that 'toxicological assessments were based primarily on acute toxicity testing and assumptions due to the absence of reports on toxicity (especially with regard to the PAT protein).' Furthermore, there was a 'lack of information on sub-chronic toxicity' and 'no information on long-term effects'. In addition, the 'allergenic assessment relies on assumptions based on reasoning and indirect testing'. Authorities stated an 'insufficient assessment of the allergenic properties of introduced proteins' and considered it not possible to establish 'predictions on the allergenic properties of the whole GM food ... without comparative immunization studies.' These points were considered in contradiction to section 4 (General Requirement of Food Law) of Regulation 178/2002, article 14 (4).

Concerning traceability, Austrian authorities 'welcome the development of guidance on sampling and detection' as foreseen in Regulation 1830/2003, but doubt that 'operators along the food chain will have in place the necessary systems and procedures to guarantee traceability' before 1. Jan. 2005, according to Regulation 178/2002. In other words, due to the lack of traceability, any authorization request would meet the same critique until that date.

Another point of critique was the basis of the authorization (258/97) 'after Regulation 1829/2003 has entered in force already'. Since the authorization should take effect only from 18 April 2004, 'not even notification requirements according to Articles 5 (8) and 17 (8) of Regulation 1829/2003 would apply in this case' – there is no legal basis for it at all.

Finally, the Austrian authorities demanded a monitoring plan according to Article 5 (5) of Regulation 1829/2003 (in contrast to 258/97) 'for environmental effects conforming with annex VII to Directive 2001/18/EC in the case of GMOs or food containing or consisting of GMOs.'

Annex IV: UBA and its activities

Mission statement

In its homepage (http://www.ubavie.gv.at/english/Info_htm), the Austrian Federal Environment Agency (UBA) describes itself as providing expertise on 'the condition of the environment and environmental changes, as well as on measures to avoid or reduce environmental pollution. The studies made by the Federal Environment Agency form the basis for planning and implementing environmental policy measures...' It draws its expertise from 'its own staff, cooperation with other federal offices, provincial and municipal authorities, integration of other Austrian specialist institutions (universities etc) on the basis of commissions or work contracts and consultation of foreign specialist institutions and international databanks.' Hence, in-house capacity comes first, and there is a reason to this: 'The Federal Environment Agency is the only Austrian specialist institution which deals with all areas of environmental protection on a nation-wide basis and whose single task it is to protect the environment. Thus, thanks to its design, the Federal Environment Agency is not subject to conflicts of interest. The Federal Environment Agency employs specialists from most of the environmentally relevant disciplines. It is thus able to cope with the problems of environmental protection in an interdisciplinary manner.'

As an institution, it resembles the German Umweltbundesamt but seems to have much better possibility to pursue its own policy with respect to biotechnology. Contrary to Germany with its Robert Koch-Institute, in Austria there is hardly any powerful national institution that would be able to compete.

The Agency is involved in the implementation of several environmental laws from the Waste Management to the Environmental Information act as well as the Genetic Engineering act as far as releases and marketing proposals of GMOs are concerned (though it is not Competent Authority). It also carries out measurements of environmental pollution on behalf of the Minister, which links its remit to the task of monitoring. It runs several databases and provides focal points for international environmental activities run by the UN and the EU, and it is involved in many other supranational issues, making it a main player, in its own understanding, of Austrian EU level biotechnology policy. In summary, the Austrian UBA thinks that it 'has been able to act till now as a specialist institution independent of external authorities.' Additionally, it 'is also concerning itself with new topics on the basis of observations on national and international developments.... providing an impulse for future strategies in environmental protection.' In other words, the UBA sees as one of its tasks to design new (legal) instruments for environmental protection in a wide understanding.

Research projects and publications

The UBA publishes the results of in-house as well as commissioned research activities in the form of 'monographies'. Over the last decade, around 150 monographies were published, approximately a tenth of which dealt with aspects of agricultural biotechnology. Additionally, the UBA organises symposia and conferences around its research projects or in order to present them to the public, which results in additional conference papers. Publications serve to disseminate UBA's views to a broader domestic public and to international institutions.

Among the most interesting recent publications are two monographies on monitoring. UBA has long been promoting post-marketing monitoring as a means to enhance knowledge about and contain undesired side effects of transgenic organisms. In (Traxler et al. 2001) there is an interesting account of different views of ecologists, molecular biologists and industry representatives about monitoring, which, according to the authors, relates to different rationalities. This is the reason why there has been so many difficulties in devising a framework for monitoring, rather than differences in the 'scientific' estimation of the risk attached to different organisms. The authors arrive at a proposal to take into account not only the organisms but also, and to a

great extent, the biogeographical conditions of the respective site. They consider it essential to determine the executing institutions, but also to define threshold values, suspension criteria and limits of acceptable change as well as of ecological damage.

Müller (2001) compiled a 'handbook' for monitoring Bt crop plants, basing his recommendations on a very critical re-appraisal of established literature. Arguing with a 'safety margin' he arrives at up to 50% unsprayed areas. Concerning non-target effects he criticises that 'only one study investigated methodological problems of those studies which did not identify harmful effects of transgenic Bt-plants on non-target organism'.

Another field of investigation by the UBA has been to re-evaluate the assessment criteria currently in use in EU countries. Departing from the notion that assessment practice varies, and that some countries (like the Netherlands and the UK) place too little weight, according to an UBA official, to possible long-term and indirect effects, UBA commissioned several attempts to arrive at different criteria. The most noteworthy of those attempts was a rather large study involving several Austrian and German institutions with the aim to apply the concept of Life Cycle Assessment to a comparison of several transgenic crop plants with their non-transgenic siblings. Despite the fact that large scale experiences with transgenic crop plants were only available in America, and the comparison should make statements about European or Austrian conditions, the study tried to establish differences in the respective environmental performance according to established criteria derived from the directive on LCA issued by the highly respected VDI (Association of German Engineers). One problem, however, seemed insurmountable: how to quantify uncertain risks from genetic engineering. The solution adopted was to establish a category of 'risks of the deliberate release of GMOs'. 'For the calculation of a factor for characterizing a specific genetically modified crop plant, a risk number is determined on the basis of the likelihood of each risk category being realized. This depends on the likelihood of dissemination in a specific climate zone as well as on the number of transferred or modified genes. This risk number is combined with the number of the potentially affected areas of protection.' According to the authors, such a calculation is possible and renders comparable insights.

Tappeser et al. (2001) from the German 'Öko-Institute' (an established 'green' institution with a long-standing reputation for holding an anti-GMO stance) performed a survey of 'really' observed undesired effects of GMO releases with a view to reformulate assessment criteria. The paper re-assesses various effects reported and comes to the conclusion that in many cases, there is some evidence or at least, that the risk arguments cannot be dismissed on the basis of existing data, especially taking into account that it was mainly from companies with a stake that negative results (i.e. no effects) were reported. For microorganisms, risks remained mainly theoretical as there were hardly any effects reported so far. Implications were based on the argument that the lack of serious research into effects hitherto could not dismiss theoretical considerations about possible risks. Similarly, with transgenic plants, some effects have been established but are still contested. However, 'up to now field experiments to study the effects of transgenic plants on non-target organisms have predominantly been carried out by companies wanting to place transgenic plants on the market. No effects have been ascertained. Laboratory or greenhouse investigations, however, indicated possible direct and indirect damage to beneficial animals through transgenic insect-resistant plants.'

Pfanzagl (1999) proposed assessment criteria according to the trait introduced into the respective transgenic plant, as well as according to their potential to 'run wild' and to cross out, including experimental determination. For plants with a toxin, criteria similar to those in pesticide assessments should be applied. Monitoring should be used to determine the most environmentally favourable mode to apply herbicides in case of herbicide resistance. To facilitate comparisons with non-GM plants, baseline data from monitoring conventional crops are deemed necessary.

The most significant symposium (co-)organised by UBA in recent times was the Workshop 'Evaluating Substantial Equivalence' held in Vienna in October 2001 as part of the project Standardization of Toxicological and Allergenic Safety Evaluation

of GMO Products' commissioned by the Competent Authority. The concept of substantial equivalence for the assessment of food derived from GM plants had received some criticism; this served as a point of departure for the contributions both pro and con. In the summarising words of the editors, 'substantial Equivalence – as concept of relative safety – is still a highly controversial issue. However, this concept could be more easily implemented compared with concepts aiming at an absolutely defined level of safety.' Criticism endorsed at the workshop aims on the 'normative premises of the concept, e.g. the acceptability of the safety of traditional counterparts and on the reliability of conclusions drawn'. Criticism on the practice was based on the evaluation of application dossiers according to the EU Novel Food and Release regulations, which showed that 'the use of the concept differs a lot between the applicants, the line of reasoning and the interpretation of testing results cannot be verified in each case and has to be questioned.' However, a 'learning process' could be noticed within the Competent institutions on all levels. The concept is far from being dead, especially considering the lack of alternatives, but must be further developed. 'The challenges to be met in order to base the concept more on accepted scientific principles, lie within the non-intended secondary effects and in establishing the foundations of and the specifications for the comparative analysis of genetically modified plants with their traditional counterparts', which demands applying new technologies and establishing a data base from conventional plants against to which effects could be compared.

In 2002 and 2003 a two-volume report on 'Toxicology and Allergology of GMO Products' appeared featuring 'recommendations for standardisation of the safety assessment of genetically modified plants on the basis of the Directive 90/220 (2001/18)' and 'investigations into the practice and recommendations for standardisation of the safety assessment of genetically modified food products'. A consortium of authors commissioned by UBA assessed applications for commercialisation permits for GM crop plants and derived food products (Novel Food) from a toxicological and allergological point of view and compared pertinent regulations in the EU and the US. They came to the conclusion that, i.a., the data base was shallow and that the criteria for substantial equivalence were not met. In addition, they criticised that substantial equivalence was not used as a criterion for decision, but as an end point of the assessment, and considered it not a suitable concept in the way it is currently applied. In the recommendations they demanded quite far-reaching procedural and methodological improvements in order to better assess the associated risks.

From all these publications a picture emerges that suggest a stance taken by UBA that resembles rather closely that of established 'Green' or anti-GM activists. However, this may be mistaken, as it is not so much genetic technology as such that meets suspicion with the UBA; rather, it is the lack of taking into account regional conditions and agricultural practices in conventional risk assessments so far. UBA deduced the demand to differentiate according to environmental conditions of the particular region where a release should take place from the case-to-case principle; hence, when it came to support the *de facto* moratorium, the Austrian position (strongly influenced by UBA) was not to go for a general moratorium as it would violate this very principle. As to agricultural practice, already in a 1996 conceptual publication, the strict comparability of GM and non-GM plants was questioned not on principle grounds; rather, the baseline of comparison did not seem to be adequately established (Torgersen 1996) since those parameters that are important in risk assessment have so far been of only marginal interest with the agronomic testing of conventional crop plants. Since agricultural practice is mostly responsible for environmental effects of any crop plant, and since particular traits may influence this practice, it was proposed to take into account agricultural practice as a possible parameter in risk assessment, on the condition that it was really prohibiting negative environmental effects that regulators were out after. Over the years, this became more mainstream reasoning also with the European Commission.

International networking

Apart from commissioning, or carrying out, studies that are published in-house, the UBA also heavily engages in international work. The civil servant in charge of biotechnology at the UBA (HG) has acquired several influential positions in international organisations' working groups and, of course, in Austrian delegations to the European institutions. He is a member of the Austrian delegation to the European Commission in the Art. 21 Committee and in the Committee of Competent Authorities, where, due to his long involvement in the field, he seems to play a role that by far exceeds the formal status of UBA as an institution that only 'comments' on proposals rather than being the Competent Authority. Also, he is responsible for questions of biotechnology in the Working Groups of the European Council on the Environment and on International Environmental Issues, where he advises the Austrian Minister of the Environment. Perhaps even more important, he is chairman of the OECD Working Group on Harmonisation of Regulatory Oversight in Biotechnology and firmly integrated in the OECD mechanism of negotiating trans-Atlantic discrepancies on the way of doing assessments. For example, Austria, despite its low industrial and research profile on agricultural biotechnology, was one of the countries that devised parts of the Working Group's contribution to OECD's answer to the G8's request for a comprehensive statement about 'Biotechnology and Other Aspects of Food Safety'.

The UNECE (UN Economic Commission for Europe) is an organisation that sets out to enhance economic co-operation among European countries, especially between Western and Central and Eastern Europe. Under their environmental activities, the Aarhus Convention was created to secure 'Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters.' Among several others, a GMO Working Group (<http://www.unece.org/env/pp/gmo.htm>) was established despite some initial wondering whether biotechnology should be a topic under the protocol. HG, according to interviews, has been heavily involved in setting up the group and is now the chairman. The group bases its activities on the implementation of Article 6, paragraph 11 of the Convention, which 'requires Parties to apply, within the framework of national legislation, the public participation provisions set out in article 6 to decisions on whether to permit deliberate of GMOs 'to the extent necessary and feasible'.' So far, both legally binding and non-binding ways of implementation have been discussed (while HG's preference is the legally binding way). An important aspect is capacity building also with respect to the establishment of a viable NGO scene in Central and Eastern European countries, which is facilitated by established contacts between UBA and both domestic and international NGOs.

Additionally, HG is, as a person but in his property of being a UBA employee, National Focal Point for the Cartagena Protocol on Biodiversity's Clearing House mechanism and chairman of the Austrian delegation to the Cartagena Protocol on Biodiversity. He has been involved in negotiations on the Protocol's parts on GMOs in various functions, but seems to have now reduced his activities somewhat.

Another route towards influencing future developments according to the above mission statement is an activity that has gained prominence during the last half a decade. The EU has issued EU Twinning Projects on various aspects of the EU legislation in order to help new accession countries adopt the European regulatory framework. Twinning projects on biosafety exist between Austria and Poland and Lithuania with the UBA in charge. Apart from official projects, the civil servant has a long-standing collaboration with Piet van der Meer from the Dutch Ministry of Housing, Spatial Planning and Water Management, the CA for GMO releases/marketing in the NL, who had been in charge of reviewing release and marketing applications for GMOs until the events around the *de facto* moratorium made him resign. From November 1999, the UBA participated in several workshops in Slovenia, Slovakia, Hungary and other Eastern and Central European countries to introduce decision makers to the practice of risk assessment and the handling of applications for releases and marketing of GMOs. It may appear remarkable that the civil servant in charge, who to a large degree influenced UBA's position on agricultural biotechnology, should join forces with one of the most prominent exponents of a rather restricted view on how risk assessments should be performed.

However, from both sides a great deal of mutual understanding has developed over time, and this particular process of introducing accession countries' civil servants and scientific experts to the EU way of doing assessments was based on a rather open and pluralistic approach taking on board the contributions from both NGOs and Industry. Besides scientific arguments, also aspects such as public participation are addressed. Thus, apart from lessons how to 'do' assessments, an aim was also to establish a functioning NGO and Industry scene as a prerequisite for the social embedding of all aspects of agricultural biotechnology even if controversial.

Through the person of HG, supported both from staff and, politically, from 'above', UBA has acquired have several prominent entry points for its positions into international biotechnology regulatory affairs, mainly by networking and taking on responsibility in international organisations' working groups. Thus, the role of UBA has been much bigger than suggested by its statutory task of just 'commenting' on proposals.