



CO-EXTRA

GM and non-GM supply chains: their CO-EXistence and TRAcability

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1 Summary

This work had for objective to put forward the juridical and political nature of the project “Coexistence between GMO and GMO-free supply chains” more than the way of doing’s technical details. From this, has been deduced certain results and recommendations.

Results :

→ The coexistence project is a new modality of government of techniques; it is particularly important concerning new technologies which until now have been managed only in reference to potential or proven risks. This has meant that it tends to prevent the involuntary spread of technology causing the elimination of other technologies.

→ This government of techniques’ modality could be linked to an objective of technological pluralism such as the « energy mix », which could be useful regarding nanotechnologies for example. The project itself is difficult to carry out; it is even harder to find the proper rules to make it sustainable.

→ The study shows how European authorities have reached this solution aiming at ending the crisis generated by the public’s distrust regarding GMOs food and feed. The study analyses the three government modalities that have been tried out to this day : the « *Law of the Alliance* » which designates a supple regulation conceived by experts, industry and administration ; « *Law as seen by the Rulers* », represented by the 90/220 directive, based on risks assessment without managing farm-produced products’ supply chains ; the « *Law as seen by the ruled* », implemented by the 2003 regulatory package.

→ It is finally proved that coexistence is a « more in depth » form of traditional freedom of commerce and industry; it lies on a paradox: to insure all a certain freedom, it is necessary to impose strong constraints and a certain mutual tolerance.

The study is presented in three section : 1) Why coexistence ? A change in the relations between the rulers and the ruled; 2) Technological pluralism as a mode of government of techniques; 3) Freedom of choice by operators as a more thorough expression of the freedom of trade and industry.

Recommandations :

- Officialise technological pluralism as a global project allowing the reconciliation of *knowledge society* and *risk society* by the promotion of a mechanism insuring public confidence.
- Conceiving rules so that this *pluralism be sustainable*.
- The coexistence strategies must from now on be thought of from the supply chain level and not only from field coexistence (present regulation).
- It is essential to insure a better distribution of supply chains’ segregation costs by establishing a main principle; those introducing a new technology will take in charge the costs of segregation from the field to the consumer. (Neighbourhood disturbances theory).
- It is important to quickly solve the question of various types of unknown or unauthorised events.

- Concerning seeds, it is important to quickly solve the matters of 1) the question of fortuitous present threshold 2) the one of the farmer's right to use « farm saved seeds »-but these seeds risk having an increasing level of unwanted GMOs in some species. 3) the question of the availability of conventional seeds which have been the object of a traditional technology of plant breeding to benefit from genetic progress.

In 2003, the Commission of the European Communities (EC) developed guidelines for a co-existence policy between genetically modified (GM) and non-GM supply chains. This project only applies to agri-food products, to the exclusion of all other genetically modified organisms (GMOs). In three founding texts¹, the Commission sets out guiding principles for a project of segregation of agri-food productions, leaving the responsibility of implementing it to the member States. The relevance and feasibility of such a policy have been the object of multiple debates which do not concern us here²; however, what has rarely been examined are the nature, the rationale and the meaning of co-existence in the light of the '**government of techniques**'³. This paper precisely seeks to address these questions. As it will be visible below, the co-existence choice is a compromise between law, as it was seen by the rulers on the one hand, and law, as it is conceived by the 'ruled' on the other (I). Therefore, we will then demonstrate that imposing **technological pluralism represents a new modality of the government of techniques** (II). Finally, it can be concluded that co-existence is a **new and more thorough expression of the freedom of trade and industry** (III). This state of matter might seem paradoxical when we think about the tough constraints this model imposes on operators.

The results of this case study could lead to several inferences which would be of interest in several other “new technologies” areas, such as nanotechnologies, cloned animals, etc.

1. Why Co-existence? A Change in the Relations between the Rulers and the 'Ruled'

Powerful scientific, industrial, agricultural, political and administrative lobbies have taken a stand in favour of GMOs. Facing those, there are numerous stakeholders, NGOs and networks, some more radical than others, encompassing scientists, farmers, consumers and some regional public authorities who oppose GMOs. Since 1998, they have launched a series of actions: destructions and attacks on GM crops and field trials for some, decisions to banish GM crops from a given territory for others. Though at varying degrees, all these actions clearly go against the law. Yet these illegal practices claim certain legitimacy drawn from public polls whose reveal that, year after year, a large part of the public is opposed to GM foods. This perennial convergence between small groups of activists and “the public” led to a deep crisis of confidence that European and national public authorities had to get through. It was then decided to opt for a strategic change in the government of agricultural biotechnologies. In 1999, after a meeting of the European Environmental Council, a *de facto* moratorium was imposed on GMO approvals, thus opening up a space to review the EU legal framework for biotechnologies.

¹ Commission Recommendation of 23 July 2003 on guidelines for the development of national strategies and best practices to ensure the co-existence of genetically modified crops with conventional and organic farming, OJEU L189/36 of 29.7.2003 ; Reg. 1829/2003 of the European Parliament and of the Council of 22 September 2003 regarding genetically modified food and animal feed, OJEU L268/1 of 18.10.2003; Reg. 1830/2003 of the European Parliament and of the Council of 22 September 2003 regarding the traceability and labelling of genetically modified organisms and the traceability of food or feed products produced from GMOs and amending Directive 2001/18, OJEU L268/24 of 18.10.2003.

² Among many other pieces written on potential coexistence, one can read “Plantes transgéniques”, a Letter of information for decision-makers, the public and awareness networks at www.ogm.org (see especially N°10); Contra, Assemblée Pagesa, Plataforma transgènica fora! Greenpeace : Impossible coexistence: Seven years of GMOs and contamination of organic and conventional maize from the cases of Catalunya and Aragon

³ See L. Levidow and K. Boschert, Coexistence or contradiction? GM crops versus alternative agricultures in Europe, *Geoforum* (2007) 01 001. In this article written from a political sociology perspective, the authors examine the issue with respect to agricultural policy whereas it is addressed here from a juridical standpoint.

In other words, political choices that had been made in the context of the Directive 90/220 by legitimate and democratic powers – since the European Parliament had played a major role into – were overturned by a conjunction that does not abide by the rules of representative democracy: although public opinion expressed in opinion polls may be considered as an indicator by decision-makers, this is not imperative. Illegal practices are even more contentious. Crop destructions are perceived, first-hand, as serious offences, even though some legal systems may consider them as acts of civil disobedience; as to GM-free zones, they have no legal stance under European law, and therefore, under national laws in their present form⁴.

However, the two combined phenomena occurring over a long period of time led the European Commission to seek out into a co-existence policy, a compromise between the two opposed groups. The intended aim is to safeguard the sustainability of the three agricultural systems: the organic model, the so-called conventional model and the transgenic model. No agricultural option must be excluded from the Community. In practice, the regulation obliges non-GM farmers to accept a threshold of 0.9 % of adventitious presence of legal GM material in their crops or derived products. In counterpart, GM farmers are responsible for adopting appropriate cultural practices and, in some cases, they must compensate their neighbours for “contaminations” by GM material that has been legally placed on the market and cultivated. In extra-European countries, no legislation have put into place co-existence regimen. In the absence of an identity preserved (IP) system, experience shows that GM material rapidly disseminates to fields of farmers that have not opted for GM crops, leading to a situation of generalised admixture that can hardly be resolved once it has occurred (except in the case of an IP system that is a private regimen).

This decision shows underlying signs of a profound transformation in the relations between 'rulers and ruled', a transformation that has not found to date its effective political expression in the institutional model, and that perhaps cannot ever find it. Indeed, illegal practices cannot legitimately be integrated into an institutional mechanism. Yet interestingly, these illegal practices of a particular nature, aim to intervene into the mode of government of the “technique” at its broader acceptance level. Attacks on GM crops aim at outlawing GMOs and declarations of GM-free zones by NGOs, local authorities, etc. are attempts to define the modalities of implementation of GM technology at the local level: by doing so, the 'ruled' merely “take seriously the participation principle”, a principle which was adopted in the context of representative democracy⁵. We face here what we called “illegal practices engendering law”⁶, as if “unexpected stakeholders” without legal competence had constrained law-makers to change the modality of government of techniques.

⁴ M-A. Hermitte: Les zones sans plantes génétiquement modifiées – l'illégalité comme stratégie juridique, *Journal international de bioéthique*, 2006, vol.17 n°3. There is on-going research on mechanisms that are likely to be legally acceptable. One of the most interesting such mechanisms deals with the decision of several Appellations of origin to ban GMO from animal feed.

⁵ L. Levidow notes that in 1979, D. Nelkin made the following remark in *Science, Technology and Political Conflict*, in *Controversy: Politics of technological decisions*, Edited by D. Nelkin, 9-24, London, Sage: “Protest was aimed less against specific technological decisions than against the declining capacity of citizens to shape policies that affect their interests ; less against science than the use of scientific rationality to mask political choices”, L. Levidow, J. Murphy and S. Carr: Recasting Substantial Equivalence: Transatlantic governance of GM food, *Science, Technology and Human Values*, 2007, 32:26 Online version <http://sth.sagepub.com/cgi/content/abstract/32/1/26>.

⁶ M-A.Hermitte: Les zones sans plantes génétiquement modifiées – op.cit.; M-A. Hermitte: Les acteurs du processus de décision : acteurs officiels, acteurs inattendus, in *Les vingt ans de la Commission du Génie biomoléculaire, L'expertise scientifique*, 20 septembre 2006, Paris: Ministère de l'agriculture et de la pêche, Direction générale de l'alimentation [2007].

2. Technological Pluralism as a Mode of Government of Techniques

The idea that techniques need to be 'governed' is a new idea for the modern era⁷. It came about in an unplanned and casuistic manner as a result of sanitary and environmental crisis in various domains: the pharmaceutical industry, the nuclear realm and the associated nuclear risk, some technological developments inaccessible to private investments (such as the space technology)... With genetic engineering, the first coherent framework for the government of technology emerged in Europe: it addressed the entire mode of production, and simultaneously dealt with innovation incentives (through patentability of biotechnological inventions) and risk management. Thus, the project of government emerged very early and has evolved rapidly over time: in thirty years, it has changed three times, co-existence being its own most recent expression, and the one departing the most from older modalities. A brief historical outline is called for understanding of the significance of these changes.

2.1. The first Mode of Government through Administration, Science and Industry: Law of the “Alliance”

What can be referred to as “Alliance”⁸ is the first modality of management of biotechnologies, between the Asilomar Moratorium in 1974 and the adoption of the Directive 90/220. During this period, unrestricted freedom is not the prevailing rule; scientists, manufacturers and administrations coordinate their action and establish a first set of guidelines applicable to contained use and later to the first experimental releases. The OECD takes charge of the task of harmonisation of guidelines in order to avoid obstacles to the international trade: we are thus already out of the first step of the “relationship to technology”. In fact, as the first GMOs arrive into laboratories, they are already subject to regulations, *which is unprecedented historically*. Until this time, it was the occurrence of proven damage that prompted the emergence of regulations.

But this juridical framework is conceived only by those involved in the development of technology. Discussions were open neither to the public nor to the big environmental and consumer NGOs. Debates therefore only involve scientists (from the private or the public sector or the administration), in closed circles. The first opponents appeared in Germany and Denmark; they led to very restrictive laws, almost amounting to absolute prohibitions. At this point, European authorities felt compelled to intervene in order to avoid a segmentation of the European market between pro-GM and anti-GM laws. This is where the Directive 90/220 comes in.

2.2. Second Mode of Government: Precaution as seen by the Rulers

The Directive 90/220 was the first text to provide a general legal framework for biotechnologies at the European level. Insofar as legally instituted political authorities conceived it – as opposed to an unofficial “Alliance” between actors of technical development as in the preceding model –, it falls under the category of “rulers' law”. Moreover, at the time, there were no specific pressures from the 'ruled', either the public or the NGOs. For the second time, there was a breakthrough in the legal history of the techniques: the chosen options reflected mistrust towards a new mode of production, which had never been the case before, if we consider the development of the energy, chemical or nuclear power sectors⁹. This legal framework is a far cry from other regulations, such as the US regulations, leading to new tensions at the world level.

⁷ On the contrary, this idea was rather ordinary in the era of corporations. On the issue of modes of government for GMOs, see Gottweiss' sociological approach: H. Gottweiss, *Governing molecules: The Discursive Politics of Genetic Engineering in Europe and the United States*, Cambridge, MA, MIT Press, 1998. See also J. Lezaun, *Creating a New Object of Government: Making Genetically Modified Organisms Traceable*, *Social Studies of Science*, 36/4 August 2006, 499-531, www.sagepublications.com.

⁸ This is what Levidow et al. term as “scientized politics”, but is this truly “politics”? in L. Levidow, J. Murphy and S. Carr, *op. cit.*, p.33.

The Directive represented *a compromise between States*, some rather opposed to biotechnology and others more liberal, or even indifferent.

- To *States opposing GM technology*, the Directive provided the principle of authorisation for placing GMO on the market with prior assessment of environmental and health risks. For the first time, such a procedure for placing products on the market was imposed on a technique that had never been marketed before nor entailed any damage. This signals a rather strict implementation of the precautionary principle¹⁰.
- To *manufacturers and States rather favourable to GM technology*, the Directive granted the principle of a unique authorisation, valid for the entire European territory. The free movement of biotechnological products was thus ensured.

This text is consistent with the framework of freedom of trade and industry, only restricted by motives of public interest, protection of health and environment. The juridical tool to implement this restriction is an administrative authorisation demanding, as already done in third countries such as USA, companies to undertake a risk assessment study on the products they have in the pipeline before any dissemination.¹¹ Two models of authorisation procedures for placing products on the market must be distinguished.

- One is a rather liberal model of simple risk assessment;
- The other is a more constraining model based on a burden to demonstrate that the balance of risks and advantages weighs in favour of the product. The freedom of the manufacturer is not only curtailed by the necessity to avoid risks, but also by the obligation to prove that a new product represents advancement, as in the case of medicine for instance.

In the case of GMOs, European authorities decided to adopt the first model – a choice decried by people at large once the issue became public. The public argued against the adoption of an uncertain new technology given that the traditional technology of plant breeding seemed satisfactory and no clear advantage could be established for this new technology.

The freedom enjoyed by operators of agro-industrial sector further down the line suggests that the legal frame adopted for GMOs was a liberalist one. Indeed, farmers and agro-food manufacturers could freely choose whether or not to use transgenic technology, without taking any specific preventive measures apart from labelling certain products. Yet, even without a detailed knowledge of the mechanisms of admixtures, the occurrence of gene flows between crops of the same type (from maize to maize) and between cultivated crops and wild relatives (from oilseed rapeseed to wild radish) was known; it was also implicitly understood that in the absence of precautionary measures, there would be admixtures of transgenic and non-transgenic products as a result of agronomic and industrial processes. Everyone considered this as a known and normal phenomenon¹². Gene flows between neighbours had until then not been a matter of concern for farmers, as they generally had no economic consequences. In some cases, however, a certain level of varietal purity had to be maintained, as in seed production or in specific qualities of maize or rapeseed production. Farmers thus had to organise themselves amongst neighbours or in the framework of more or less integrated supply chains, with different degrees of intervention by public authorities.

trains. But these are only individual fears or fears of small isolated groups. What we have here is a legal text expressing actual mistrust of public authorities towards a new mode of production. This mistrust is not based on irrational fear but on the experience with other modes of production where lack of anticipation on the long-term consequences of technical choices invariably engenders damage.

¹⁰ M-A. Hermitte et C. Noiville: La dissémination des organismes génétiquement modifiés dans l'environnement - une première application du principe de prudence. *Revue juridique de l'environnement*, n°3, 1993, p.391.

¹¹ Marketing Authorization regimens exist in many fields of technology (drug ...) and especially in the food field (cf.Cf. D722.1).

¹² When they became aware of this, seed dealers developed stewardship practices as part of seed sales contracts; results show that these practices have been unevenly adopted

With GMOs, there was a lack of anticipation of the problems of cultures contaminations,¹³ and the stakes rapidly rose to a situation of conflict, one reason being that regulations only dealt with the risk appraisal and seemed to have resolutely ignored the issue of gene flows. The 1996-1997 crisis is a direct result of having ignored the medium and long-term consequences of releases. Launched through the mobilisation of farmers and NGOs when the first shipments of GMOs arrived from the USA, this crisis soon won over the media, the public and the political realm; in 1997, the French Government refused to grant authorisation for growing a maize variety that had been authorised for sale at the European level. With every month that went by, the crisis deepened until the Council of European Environment Ministers took the decision, in June 1999, to halt the process of granting marketing authorisations for GMOs, implicitly recognising *de facto* the existence of a moratorium. Several reasons motivated it: improving the rigor and the transparency of the risk assessment procedures – in particular by giving appropriate consideration to the “specificity of European ecosystems” which entailed revising Directive 90/220; “restoring confidence from the public and the market”, reflecting upon regimes of responsibility, improving identification, labelling and traceability of GMOs. The term 'co-existence' was not openly used, but the idea of imposing systems of labelling and traceability logically led to it. What essentially needs to be kept in mind is that the moratorium is not meant to open a timeframe for improving scientific knowledge, but to devise a better legal framework. What therefore justified the moratorium was not the expectation of scientific results but a change of the political and legal framework.

And this change brought about the third mode of government of the technique, known as technological pluralism¹⁴.

2.3. Co-existence, a third Mode of Government: Technological Pluralism as Precaution seen by the 'Ruled'

In 1999, the moratorium opened the way for the vote, in 2001, of the Directive 2001/18, which deepened and clarified the methods of risk assessment – from a technical standpoint – without changing the legal framework for agricultural biotechnologies¹⁵. The system of an authorisation procedure valid for the entire European territory was remaining, with the risk assessment as a prerequisite but no evaluation of the pros and cons of GMOs (costs-benefits analysis); there was still no management of the presence of GMOs in the agri-food chain, and the mode of government thus saw no fundamental change.

Heralded by the 2002 Regulation laying down the General Principles of the Food Law¹⁶, the breakthrough occurred in 2003, when these principles were reworked in the specific context of GMOs in agriculture. In three texts, European authorities completely overturned their mode of government. Whereas the two preceding models were based only on the risk assessment and thus amounted to the simple risk management, in the new legal framework, the risk assessment is backed by a second step of management of agri-food productions.

The preliminary assertion that, “no form of agriculture, be it conventional, organic or agriculture using GMOs, should be excluded in the European Union”, reflects a will to ensure – and enforce through

¹³ We might also wonder whether it was voluntary or not, cf. Pierre Henri Gouyon et MAH nss

¹⁴ M-A.Hermitte: La fondation juridique d'une société des sciences et des techniques par les risques et les crises, in C. Burton-Jeangros et V. November: Face au risque, Georg, L'Equinoxe, 2007, p.29 - 71

¹⁵ Let us be reminded that GMOs for agriculture are now regulated by a complex set of texts that lack clarity on several grounds. For instance, Reg. 178/2002 sets out general principles of the Food Law, including traceability. Directive 2001/18 describes precise methods for risk assessment of GMOs as a general category. Reg. 1829/2003 reorganizes the entire operation for GM-food and GM-animal feed. Now the entire field of operation is covered, which is a progress. Yet, the European procedure and EFSA have more bearing than mandated national authorities. Due to this, the process may be simpler, but it lacks pluralism and transparency, as EFSA is not always clear on the reasons for refusing or accepting various reasoning, which the Commission admits to in a press release of 12 April 2007.

¹⁶ Reg. EC178/2002 of the European Parliament and of the Council of 28 January 2002 establishing general principles and general prescriptions for food legislation, instituting the European Food Safety Authority and setting out procedures for food safety. OJEU L31/1 of 4.02.2002.

adequate measures of agricultural management – that no given mode of production should exclude others by the way of gene flow and admixtures, which is bound to happen in the absence of appropriate measures. In other words, what we positively have here is a project of technological pluralism.

If we compare this ambitious project to what happened when agriculture started to go biochemical, technological pluralism would have consisted in building, side by side, organic agriculture – with a whole range of solutions provided by scientific research – and biochemical agriculture. Everything would have been different, since organic farmers would then have been able to develop their mode of production with equal chances and due protection from other modes of production and not in the small spaces left by them. This would have automatically made for a better collective management of water, of soils and a more precautionous use of chemical inputs – a course of action that is attempted today. In fact, the pursuit of technological pluralism is present in other domains, such as the energy sector, and could well constitute a project for the future. The co-existence model shows that an essential positive outcome could be, at least, a more cautious approach towards new techniques and, at best, the reversibility of technical choices with proven negative long-term effects.

The choice for co-existence was thus expressly stated as a compromise between opposed opinion groups, and no longer between opposed States (even though States play a major role in this choice): conventional and organic farmers, distributors, processing firms and consumers on the one hand, and GM distributors, processing firms, farmers and consumers on the other, all this against a backdrop of demonstrations and opinion polls. The aim of this compromise was to solve the crisis and thus, to allow for the development of GMOs without major adverse consequences on other farming systems. This can be seen as the result of the resistance of the ruled on the choices made by rulers in 1990s. Anti-GM activists are not satisfied as they want a totally GM-free Europe; in that sense, the chosen model still does not embody the law of the most resistant groups amongst the 'ruled'. Yet, the chosen compromise reflects quite closely not only the demands made by participants of the 1998 Citizens' Conference held in France¹⁷, but also the views gathered through opinion polls where radical anti-GM remains a minority and where freedom of choice prevails.

What remains now is to examine the kinds of constraints imposed to implement this model and their meaning with respect to the freedom of trade and industry.

3. Freedom of Choice by Operators as a more Thorough Expression of the Freedom of Trade and Industry

Given that the mode of government of biotechnologies has undergone three major transformations, we can hypothesize that the third mode of government – the one influenced by the 'ruled' – has altered the very content of freedom of trade and industry. When this freedom is implemented in a “conventional way” – without special precaution to protect the technology from each other –, the most powerful technology tends to exclude the others. With technological pluralism, there is a clear will to allow different technical options to co-exist in the name of the freedom of choice of operators (with GMOs), or to protect the general interest in the case of diversified packages of energy sources.

If we take a look at the second mutation, placing on the market of a GMO is conditioned by a sophisticated system of authorisation; the freedom of trade and industry remained unimpaired, since a firm could place any authorised product of its choice on the market and operators further down the supply chain could freely use these products. Conventional limits to this freedom – public health considerations and more recently environmental protection – had simply been moved further up the production line. Risks were assessed to the best extent possible, before and not after damage; this reflected a medium interpretation of the precautionary principle.

What matters in the third and deeper mutation, is not so much health and environmental protection, as the assertion of free production and consumption choices. In principle, the project is straight and

¹⁷ J-Y. Le Déaut: De la connaissance des gènes à leur utilisation, tome I, Rapport de l'Office parlementaire des choix scientifiques et techniques, 1998, <http://www.senat.fr/opecest/rapports.html>

simple: to uphold producers' freedom. However, we will see that this freedom translates into direct constraints on both non-GM and GM producers. Indeed, in the absence of correct intervention, the freedom of one group of producers impinges on the other's freedom. This is why constraints have to come into play.

3.1. The Recommendation of 23 July 2003 and the Farmers' Freedom of Choice¹⁸

The Recommendation is a *project of government of agricultural biotechnologies* (1) where implementation tools hinge upon two regulations addressing labelling and product traceability (2).

3.1.1. The Recommendation as a Project for the Government of Biotechnologies

The general framework of the co-existence project has been conceived in a Recommendation, a text with no legal value. This poses “transposition” problems since the text, despite being precise and well conceived, is not mandatory, as shown by many passages of the text written in the conditional form. Five points bear particular importance in our demonstration:

- Co-existence refers mostly to farmers' capacity to freely choose between transgenic, organic or conventional agriculture (pt. 3 and annex 1.1); the formulation differs in the case of consumers, whose freedom of choice is only indirectly ensured by systems of labelling and traceability. But the text does not guarantee for the availability of non-GM products to consumers. If all farmers were deciding to grow transgenic crops whereas consumers wanted GM-free products, the demand would not be met¹⁹. The system is organized so as to ensure that the agricultural sector has “the capacity to deliver a high degree of consumer choice consumers”, which “goes hand in hand with the ability to maintain different agricultural production systems”. Freedom of choice is in that case ensured for farmers, not for consumers. Deciding otherwise would have meant compelling some farmers to provide GM-free products to consumers: this would have gone against freedom of enterprise, in favour of authoritarian planning devised to protect consumers' freedom.
- The Commission proposed the co-existence principle as well as implementation guidelines, but member States have to frame their policy in accordance with the specificities of their agriculture. The Commission provided for a relatively free phase of implementation at the State level so as to compare results from this vast process of experimentation. If we take the example of isolation distances, Germany has taken 150 meters as a minimum distance for transgenic maize cultivated in the vicinity of a conventional farm and 300 meters for an organic farm. Meanwhile in 2007, France had declared, through a simple press release as far as we know, the distance of 50 meters as minimum isolation distance, regardless of the kind of farm or of specie involved. The results of these various policy tools can thus be evaluated and potentially used to evolved harmonised measures.
- The Recommendation is only concerned with co-existence at the farm level; measures must be based on available scientific data. But it is up to the member States to define the isolation distances because it appears that scientific data are not sufficient to do informed

¹⁸ Commission Recommendation of 23 July 2003 on guidelines for the development of national strategies and best practices to ensure the co-existence of genetically modified crops with conventional and organic farming, OJEU L189/36 of 29.7.2003.

¹⁹ This is an “imaginary” situation, but somehow it is a little what is happening in France with the bio: there is more demand than supply, leading to imports while French agriculture could obviously meet the demand.

choices. For that reason, the choices made by the different member States are very different from each other. Measures must show for a good level of cost efficiency (but so far this efficiency is differently appreciated by MS), and be taken at the appropriate level, ideally through an agreement between neighbours²⁰. Yet, the project will be meaningful only if criteria values are defined and for entire supply chains, thus extending all the way to the consumer end. The Commission plans on achieving this through labelling and tracing obligations and, implicitly, through demand pressures and agreements passed within a given production line²¹. Put in a nutshell, there will be no GM-free production if there is no demand for it, and the potential demand will not be met if no farmers are interested in GM-free production and if no acceptable values of criteria are defined.

- The national strategies for co-existence “should ensure an equitable balance between the interests of farmers of all production types”, which stands out as a general principle. However, the text goes on to state that “during the phase of introduction of a new production type in a region, operators who introduce the new production type should bear the responsibility of implementing the farm management measures necessary to limit gene flow”, whose acceptable limits are not specified. In other words, at the farm level, GM farmers must bear the costs of management measures but how far implemented to protect non-GM farms (for example isolation distances...). But no mention is made of the probably much larger costs incurred by non-GM farmers to have their production identified and controlled or on difficult to evaluate environmental costs of e.g. contaminated feral persistence. It seems like non-GM farmers have to bear these new expenses themselves.
- The Commission recommends that the States establish a Land Register to keep track of the exact location of GM-fields and thus to monitor production patterns on a seasonal basis (but the question of appropriate fields controls is not addressed). Apart from keeping local authorities informed, such a register could help in building coordination between neighbouring farms and in identifying responsibilities in case of adventitious GM presence above the legal threshold, provided all registered data are made available to producers. The text clearly reveals that the Commission intends to favour private coordination through voluntary arrangements between neighbouring farmers, without excluding possible public authorities’ intervention. A further provision suggests making the information contained in the Register publicly available via Internet (pt 3.5 and 3.6). But since the text is written in the conditional tense, there is no legal obligation to implement it. This explains why, in France in April 2008, the draft of legislation on GMOs provides information, that is limited to the public authorities and immediate neighbours for coordination, and not public information. It is not certain that it is sufficient for an efficient coordination.

²⁰ There are some discussions on the notion of “appropriate level”. Some are considering that “acceptable” contamination level is not defined and that corn pollen dissemination show contaminations superior to several km: Brunet et al. 2003; nevertheless, “acceptable” contamination level is theoretically of 0.9%. Dispersion du pollen de maïs à longue distance : sources, transport, dépôt (2004-06), Yves BRUNET, Laurent HUBER, Xavier FOUPELLASSAR, Jean-Pierre PINTY, Pierre TULET *Projet soutenu dans le cadre de l’ACI 2004 (MR3)*.

²¹ These contracts are studied in the Co-Extra D7.22

3.1.2. The Regulations No 1829 and 1830/2003 as Implementation Instruments

The European Community Regulation 1829/2003 carries several functions²². Some of them are directly concerned with supply chains co-existence. The first provision on this issue amends Directive 2001/18 through the addition of Article 26bis entitled “Measures to avoid the unintended presence of GMOs”. This article authorises member States to take any necessary measures to “avoid the unintended presence of GMOs in other products”. The exact term used is “may” and not “must”, which is awkward. Indeed, it makes for a rather unclear legal framework: labelling and traceability – two significant elements of the co-existence project – are compulsory less than one regulation whereas other elements of the project are merely recommended. The second round of provisions deals with labelling rules. Above the 0.9% threshold of “adventitious or technically unavoidable presence of genetically modified material”, a product must be labelled as GMO, be it containing or consisting of GMOs or produced from a GMO²³. Again the units used for calculation are again not defined and impact differently the stakeholders using either mass, kernels or DNA as calibrates.

The Regulation 1830/2003 completes this scheme by organising identification with a unique identification (OECD based) code and traceability of approved GMOs all along production lines, from their point of production or importation into EC until consumer end²⁴.

Without the unique identification code to identify, there is no univocal labelling, and without identification and labelling, no “tracing” is possible, all these elements together wishing ensure the choice of consumers and operators. Finally, without a tolerance threshold, one of the two modes of production disappears: either GMO because of they are sources of contamination (a 0% threshold is impossible to scientifically certify), or non-GMO because they get contaminated. If the co-existence project is to have any meaning, all these elements must be present: they are the technical instruments of the political project, even in absence of seeds threshold definition.

3.1.3. High Levels of Constraints for greater Freedom!

Running a farm according to one's own choice – organic, conventional or transgenic production – certainly conforms to the freedom of trade and industry. However, it entails high levels of constraints for all producers. What, then, is the relation between constraint and freedom? Apparently, we could argue that the more constraints, the more freedom, or from a chronological viewpoint, it appears that in order to ensure freedom, constraints have to be instituted.

3.1.3.1 The Constraints of Co-existence

Co-existence materialises at every step of production. It weighs on seed producers (for which seeds threshold is not defined) and farmers via co-existence at the field level, on transporters, storage corporations, grain traders and processors via traceability, and on distributors via labelling. It weighs on seeds producers by assuming they can make a clear relationship between seeds fortuitous presence threshold and final contamination level (e.g. in absence of fields contaminations) and on farmers by assuming they can also define the relationships between seeds admixture, local conditions of cropping and final contamination level. For the sake of simplicity, we will only illustrate the constraints

²² Reg. 1829/2003 of the European Parliament and of the Council of 22 September 2003 regarding genetically modified food and animal feed, OJEU L268/1 of 18.10.2003. This regulation extends the field of risk assessment to the entire agro-food domain – genetically modified crops for cultivation or consumption, all products derived from these crops (oil, sugar) and all products using or containing GM crops (Art. 12). It also sets out a specific risk assessment procedure, especially for risks in food. This point does not concern us here.

²³ Thus excludes voluntary mixing done by storage corporations between stocks with low degree of contamination and stocks with higher degree of contamination. This choice is unavailable according to the spirit of the regulation (fortuitous presence) even to third countries producers for which such mixing would drastically decrease the costs for implementing coexistence.

²⁴ Reg. 1830/2003 of the European Parliament and of the Council of 22 September 2003 regarding the traceability and labelling... OJEU L268/24 of 18.10.2003.

weighing on farmers once they have purchased seeds, bearing in mind that the same level of complexity applies to every link in the chain (cf. D.7.22 & D.7.23).

A farmer growing GM crops has to abide by a series of precautionary rules described in the Recommendation of 2003 under the title “Indicative catalogue of measures for co-existence”. As far as farm measures go, GM producers must plan their fields according to minimum isolation distances from their non-GM neighbours, provided they know them (it may be recalled that in 2007, the French regulation provided a register, but GM crops indication was made at the “Canton” level which did not allow farmers to know who were cultivating GM crops). These distances depend on the crop species involved, each crop having a specific outcrossing potential. In addition, to carefully planning field borders – by planting a non-GM crop or another crop species – to respect isolation distances, GM farmers also potentially have to create other buffer zones, install pollen traps, adopt suitable crop rotation systems and optimal sowing dates, avoid cultivation methods such as mould-board ploughing after harvest (to avoid germination of GM seed stored in the ground), manage field borders, carefully clean farm equipment such as seed drills, share equipment only with GM farmers or farmers oblivious to GM, monitor fields during and after harvest to avoid immediate admixtures and the development of volunteers, make a clear mention of the presence of GMO when contracting for transportation and storage, label the production to avoid misleading consumers, inform neighbours about sowing plans, propose voluntary regional arrangements with other farmers on zones of a single production type, ensure appropriate on-farm monitoring, develop on-farm record-keeping for public authorities' access to planting information (what crop and where), GM seed supplies, GM produce sales (for the sake of traceability), and finally attend training courses.

All things considered, this is neither small matter as no training is currently available nor concertation and coordination institutions.

The situation of a non-GM farmer seems less constraining at first sight, but it involves risks. If we look at the Annexes of the Recommendation, non-GM farmers have no obligations, except of course that of planting non-GM seeds, an undefined notion particularly dangerous when one remember (i) that some member States and Competent Authorities use a “gentlemen agreement” of seeds fortuitous presence based on the 2001 advice of the former EC Scientific Committee of Plants (recommending acceptable threshold of seeds fortuitous presence between 0.3 and 0.7%) and (ii) that imported soybean seeds for French organic culture were contaminated up to 7% in 2001. This implicit obligation is problematic for farmers who produce seeds from their own harvest (farm saved seeds) of the previous year – which constitutes a right under Article 14 of the Regulation of 1994 on Plant Breeders' Rights²⁵. A harvest unavoidably contains a small amount of admixtures coming from neighbouring or distant fields (see Brunet results on contamination of corn over several kilometres), even though this proportion may be inferior to the future legal threshold; in some species at least, contamination will drastically raise from one year to the next, except if care is taken to remove GM kernels from the harvest²⁶. In the present situation, farmers are not technically equipped to segregate GM from non-GM grains, taking into account that they first would have to master sampling and detection methods. Purchasing certified seeds on a yearly basis is a solution, but it deprives farmers of the right to save their own seeds.

The Recommendation further suggests that farmers introducing GMOs in a region are directly responsible for taking agricultural management measures to limit gene flow and for informing their neighbours about the presence of GMOs in their fields. Therefore, instead of systematically compelling GM farmers to take precautionary measures, what has been proposed is a kind of 'theory of pre-occupation', as an exception to the “theory of neighbourhood disturbances »'. In the initial years following the introduction of GMOs, the 'theory of neighbourhood unrest' will provide sufficient protection to non-GM farmers. In the aftermath, however, and as fields owners change, some non-GM farmers will start to establish themselves near GM farmers. If the Recommendation provisions are strictly applied, these farmers will be considered as new occupants. Their neighbours will therefore not

²⁵ Reg. CE 2100/1994 of 27 July 1994 instituting a Community regime for the protection of plant breeders' rights, OJEC L227 of 1 September 1994 (only for some species)

²⁶ New case studies on the coexistence of GM and non GM crops in European agriculture, EUR 22102 en, European commission, JCR, European science and technology observatory, ITPS, 2006, pp.24 onwards.

have to take special provision to avoid contaminating the crops of the new comer. It will then be up to him to take on his field necessary precaution distances and not up to its neighbours: it is the 'theory of pre-occupation'. They will not be protected against GM contamination and they will have to protect their farm by their own means. Non-GM farmers purchasing farms with genetically modified material stored in the soil or growing adventitiously will face the same situation. Clearly, the ruling principle of the 2003 Recommendation (pt.2.1.7) offers little protection and could generate complications in the long run, especially for organic producers who generally farm small areas of land. Non-GM farmers must also take sure that their mode of production carries no risk of crop mixing with neighbouring GM farms, through equipment-sharing for instance.

These concerns from the Recommendation of 2003 are of small significance when compared to the consequences of Regulation 1829/2003 for non-GM farmers. Under this Regulation, non-GM farmers have a right not to label their crop as “GM” using the official mandatory terminology, provided that the presence of GMOs is fortuitous or technically unavoidable and below the 0.9% threshold. If their crops are contaminated beyond this threshold and if they do not see it, they will send without label. It will be sanctioned by the law on misleading advertising and by the law on fraud repression existing, in a form or another, in all member States. The absence of labelling therefore involves a high risk of condemnation, on the basis of the different national laws, for a farmer who does not ensure through appropriate control methods that his crop is not in conformity with the legislation, unless it can prove by its assurance quality that the fault lies on the shoulders of a provider or has been fortuitous. All the costs associated with the control procedures have to be supported by non-GM farmers, although this situation can be improved by contract if the operator of a supply-chain agrees to defray some costs.

Thus, the reference to a kind of 'theory of neighbourhood disturbance' and the 'theory of pre-occupation'²⁷ in the Recommendation of 2003 penalizes non-GM farmers who run high risk of condemnation and are forced to face expenditures to avoid such consequences.

The agro-industrial sector also faces high levels of constraints. One of them is the obligation to label their products. Everything containing over 0.9% of genetically modified material must be labelled. This implies important monitoring and control costs at every stage from production to distribution. Traceability is meant to ensure a rational implementation of this obligation. Yet, experience has shown that none of these procedures were sufficient to eliminate contamination risks, and resounding cases of unwanted contaminations have brought evidence of the enormous costs of such accidents, as with Star Link Maize and more recently with LI Rice 601²⁸.

Finally, public authorities also have their share of complications, as noted by Y. Bertheau and J. Davison. In order to help conceive norms for implementing the co-existence project, vast and costly research programmes have been undertaken. Follow-up and control of this complex project mobilised an entire administration, including the Community Reference Laboratory (Ispra CRL), the Bureau for Co-existence created by the Commission, the European Network of Laboratories (ENGL)... Considerable identification problems must be resolved when “transformation events” cannot be tracked, when they have multiple causes, etc...²⁹

3.1.3.2 Which freedom is at stake?

The constraints entailed by the project are such that one tends, spontaneously, to see them as hindrances to the freedom of trade and industry. On the contrary, what is intended is to reach a balanced expression of freedoms. It is difficult to draw conclusions from foreign cases, but experiences from various parts of the world strongly suggest where no contractual or regulatory

²⁷ Pre-occupation is not taken in the sense of « concern » but in the sense of the first occupant right

²⁸ Commission Decision of 6 November 2006 amending Decision 2006/601/EC on emergency measures regarding the non-authorized genetically modified organism LL RICE 601 in rice products OJEU n° L 306, 07/11/2006 p.17.

²⁹ Y. Bertheau, J. Davison: The Theory and practice of European traceability regulations for genetically modified food and feed,; on the notion of 'transformation event', see the interesting article by J. Lezaun, Creating a new Object of Government – Making genetically modified organisms traceable, SSS 36/4, August 2006, p.502.

protections exist, non-GM farmers' fields invariably end up contaminated³⁰. The stake therefore lies in the protection of everyone's freedom through efforts made by the entire chain of actors.

What sets this co-existence project apart from the classical notion of the freedom of trade and industry? There is a common understanding that National and European jurisprudence can restrict this freedom on the basis of general interest considerations such as personal security (withdraw of dangerous products from the market), safeguarding public services operating as monopolies, management of professions (prior authorisations, necessity to hold specific degrees), natural resource management (fishing quotas) or market management (milk quotas). The Judge pursues then an external interest.

On the opposite, co-existence is only indirectly set in the pursuit of general interest – the freedom of choice for consumers and more importantly, though implicitly, reversibility of the authorised use of GMOs. The primary aim of co-existence is to protect non-GM producers' freedom, which would be undermined by GM producers' freedom if the latter remained unregulated. In this case, the issue is not the protection of an external interest through imposed restrictions on freedom (health for example), but the protection of a parallel freedom of similar nature. The debate is thus located in a different framework, that of technological pluralism as a chosen new model.

It is worth noting that in its classical interpretation, the freedom of trade and industry undermines technological options that some actors would have liked to maintain. As a general rule, there is a kind of struggle between technological options to have the upper hand one over the other. Numerous weapons are used in this war: superiority of a technology based on consumers' needs or desires (digital technology); planned elimination of the older technology by the most powerful groups in order to make the patented and more cost-efficient technology victorious (e.g. CDs over records); State subsidies (some agricultural subsidies are only granted if farmers use certified seeds rather than farm save seeds); normalisation procedures...

This change of perspective is most likely the result of two main factors: as we have seen, the first is the public intervention in decision-making processes. The second is no less interesting. It perhaps lies in a change of decision-makers' attitude towards technical progress, which is progressively seen less as a linear mechanism where the new replaces the old, and more as a necessary proliferation of distinct models.

3.1.3.3 Which sustainability for the co-existence project?

We tried here to show the big modernity of the idea of technological pluralism, which co-existence is an element. But that idea is fragile and it is not useful in organizing the co-existence if the elements necessary to its sustainability are not gathered. We will then try to give some tracks. The first is the question of the availability of performing GM-free seed. It is divided into two phases.

First, seeds at very low rate of fortuitous presence are needed. More low is this rate, more the supply-chains become tolerant to a series of minor contaminations, but that may be added to each other. A more demanding commitment from public authorities is then needed. To dispose of non-transgenic plant varieties that can effectively compete with transgenic varieties, it is indeed necessary to pursue specific research for genetic progress adapted to organic and conventional agriculture needs³¹. It is even more difficult that it is not the project of the private companies at the moment. Similarly, governments focused on the risks of transgenic plant research seek to protect it without seeing that this is the other aspect which is the most threatened.

Co-existence must then be facilitated all throughout the supply-chains, i.e. the cheapest possible. So reciprocal tolerance solutions must always be selected. On the other hand, as we saw, the cost distribution must be more equitable, since the main burden rests today on the non-GM supply-chains. The whole system has to be continually reviewed to identify all the problems that lead to make it too heavy, and solve then one after the other.

³⁰ cf. press release of Percy Schmeiser March 19, 2008 : « Monsanto reconnaît une contamination des champs de Percy Schmeiser et fait une transaction » (It is the second case P.Schmeiser, Monsanto).

³¹ J-M.Meynard & M-H.Jeuffroy : Quel progrès génétique pour une agriculture durable ? Dossier de l'environnement de l'INRA, n°30 p.15

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We should not overestimate the meaning of the co-existence as a policy choice. While the voluntary “proliferation” model holds if we consider biotechnology in the light of the energy sector, overall, there are very few applications of this policy option. Agricultural biotechnology is the only domain where co-existence applies. In the pharmaceutical realm for instance, debates are few and there is no real critique of biotechnology-based options – that at any rate remains promptly reversible if problems occur³². At the minimum bare, the co-existence policy provides the opportunity to go beyond conflict over risk, which is virtually unsolvable given that expertises can always be questioned. The legitimacy of scientific establishment is now affected by this uneasy situation, which is bound to last for a certain time: situations of high uncertainty or inability to master the fundamentals of genetics have shown the limits of science as a political institution. Adopting the 'free choice' option is a way for public authorities to admit their unrelenting perplexity. Yet, free choice as a political project keeps science at a reasonable distance: science becomes an instrument for detection of anomalies or calculation of planting distances, etc. and is no longer a tool in decision-making processes...for this moment!

³² There are only very special cases where patients want to conserve older medicine; for instance, some people suffering from haemophiliac continue to use factors VIII derived from human blood rather than the product derived quite long ago from genetic engineering and with no proven undesirable side effects. But it is a marginal phenomenon.