



HAL
open science

Mexican Biosafety as a "performance of seriousness": Distancing and the Transgenic "contamination" of Mexican Maize

Jean Foyer, Christophe Bonneuil

► **To cite this version:**

Jean Foyer, Christophe Bonneuil. Mexican Biosafety as a "performance of seriousness": Distancing and the Transgenic "contamination" of Mexican Maize: Distancing and the Transgenic "contamination" of Mexican Maize. 2014. halshs-01092208

HAL Id: halshs-01092208

<https://shs.hal.science/halshs-01092208>

Preprint submitted on 8 Dec 2014

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

This version is an English and slightly different version of the original article published in Spanish in *Revista Mexicana de Sociología*, the original text is:

Foyer, J. et Bonneuil, C. « La bioseguridad mexicana : una “actuación de seriedad », *Revista Mexicana de Sociología*, vol. 77, n° 1, 2015, p. 37-68.

<http://www.revistas.unam.mx/index.php/rms/article/view/50821/45677>

**Mexican Biosafety Facing the Test of Transgenes:
Distancing and the Transgenic “contamination” of Mexican Maize**

Foyer, Jean, Institute of Communication Sciences (ISCC/CNRS), 20 rue Berbier du Mets,
75013 Paris, France

Bonneuil, Christophe, Alexandre Koyré Centre for the History of Science, 27 Damesme Street,
75013 Paris, France.

Abstract:

**Mexican Biosafety Facing the Test of Transgenes:
Distancing and the Transgenic “contamination” of Mexican Maize**

Taking the transgenic “contamination” of Mexican maize as its starting point, this article analyzes Mexican biosafety policies during the 2000s. We show how the issue of genetic “contamination” underwent various “distancing” strategies by different Mexican government authorities, that is, being removed from the agenda or sidelined. This distancing reflects the essentially symbolic character of biosafety policy in Mexico, which uses no concrete mechanism to control the release of GMOs into the environment, and is primarily intended to display ostensible respect for international environmental requirements (the Cartagena Protocol) without hindering the grain trade with the United States.

Jean Foyer is a sociologist at the Institute of Communication Sciences at CNRS. His work focuses on the relationship between science, society and the environment, specifically the controversies surrounding GMOs and biodiversity governance. His recent publications include *Il était une fois la bio-révolution* [Once Upon a Bio-Revolution] (PUF, 2010), and *De la integración nacional al desarrollo sustentable* [From National Integration to Sustainable Development] (CEDRSSA/IRD, 2011).

<http://www.iscc.cnrs.fr/spip.php?article1136>

Christophe Bonneuil is a research fellow at CNRS, a researcher at the Alexandre Koyré Centre of the History of Science and Technology, and an associate at INRA (SenS-IFRIS). He has written numerous books and articles on the history of biology and plant genetics, GMOs, and the changing relationship between science, nature and society. He is the author of *Gènes, pouvoirs et profits* [Genes, Power, Profit] (Ed. Quae, 2009, with F. Thomas) and *Sciences et Techniques en Société* [Science and Technology in Society] (La Découverte Benchmarks Collection, 2012, with P-B Joly).

Introduction

In 2001, the discovery of transgenes in Mexican maize landraces triggered a heated controversy in the columns of the most prestigious scientific journals, and elicited serious questions about the consequences of introducing GM corn into such a pivotal country of origin and diversity. Beyond scientific output relating directly to the controversy, it also generated various analyses by social science researchers observing its different dimensions and moments. Delborne analyzed the forms of scientific dissent at work in the controversy's first phase of alert; Kinchy focused on the social mobilization networks against GMOs, and the debate's "scientification"; McAfee highlighted the food and agricultural issues at work behind contesting the Commission for Environmental Cooperation's expertise; Mercer and Wainwright put forward a political ecology of transgenic contamination; and we delivered an overall reading of the controversy as a "blurring the boundaries" between scientific, political, environmental and cultural spheres.¹ As for Mexico's public policy on biosafety, although it has been given both general² and comparative³ analysis, we propose here a micro-sociological and constructivist reading, based on careful fieldwork⁴ and an original theoretical proposal exploring policy gaps, with transgenic "contamination" as its starting point.⁵ This issue was both a technical controversy and a political test during which the contours of Mexican biosafety policy were defined, at the crossroads of agricultural, environmental, political, and trade issues. Mexico, where corn is primarily grown for human consumption, is a center of origin and diversity for the plant. If GM "contamination" were to pose a problem in this particular context, the consequences for agricultural biodiversity and/or the health of Mexicans might generate a major crisis. In addition to this potential risk, there exist considerable economic interests affecting agricultural trade under the *North American Free Trade Agreement* (NAFTA).

At the intersection of the fields of Social Problems and Public Policy,⁶ and the Sociology of Risk,⁷ this work aims to propose a detailed analysis of Mexican biosafety policy as it is tested by the "contamination" of landraces by transgenes escaped from GM corn in North America. It pays particular attention to the mechanisms framing the issue as a social problem and object of public policy, as well as its placement onto the political agenda, and above all, the political, institutional and administrative mechanisms set up to address it—or to avoid addressing it. Our central hypothesis is that this transgene presence was subjected to "distancing" strategies⁸ by the various Mexican authorities charged with biosafety (Figure 1). In keeping with Marc Barbier's

¹ Delborn 2005, Kinchy 2007, McAfee 2008, Mercer and Wainwright 2008, Author

² Chauvet and Galvez 2005, Serratos 2008

³ Gupta 2010, Gupta and Falkner 2006

⁴ Following doctoral work on the controversies surrounding biotechnology in Mexico, we were able to conduct specific research into the escape of transgenes between scientific and political arenas in the ANR project BioTek. Apart from a literature review on the subject, this work is based on thirty interviews with Mexican scientists and politicians, and the collection of first-hand material, including unpublished official documents and drafts of articles and reviews.

⁵ Because of the lack in data on environmental and health effects of transgene escape, "undesirable presence of transgenes" is preferable to contamination, which is why we place the term "contamination" in scare quotes. We wish to keep this term nonetheless, to highlight the issue of definition, and how the Mexican authorities have sought to distance themselves from their initial approach to the problem as one of contamination.

⁶ Muller 2000

⁷ Callon, Lascoumes and Barthes 2001, Author, Chateauraynaud and Torny 1999

⁸ Barbier 2003

work on the BSE (Bovine Spongiform Encephalopathy), or “Mad Cow,” crisis in Europe, we seek to hone the existing analysis on distancing mechanisms for social problems. By distancing, we refer to the various political strategies used to avoid a social problem: rendering it invisible, considering it as resolved, redefining it as unproblematic, pushing it off the agenda, and addressing it minimally. Barbier identified three different distancing modalities at work in the BSE case: 1) “Psychologizing the crisis,” or blaming it on the irrationality of the public; 2) “Recycling criticism into institutional transformation,” or taking action under pressure from critics by establishing standards and mechanisms, without however avoiding a possible return of the crisis’s effects, and thus renewed criticism; 3) “Manufacturing a void,” or explicitly evasive strategies of denying or minimizing a problem’s existence. We wish to clarify and expand on this range of governmental techniques for not dealing with a problem, all the while giving the impression of doing so. If largely rely on the modalities defined by Barbier, it is their slightly different configurations that allow us to reinforce distancing theory. The originality of our approach, then, is to focus less on policy itself than on these various strategic forms of public inaction, and more precisely, the resistance or unwillingness of institutions to act against a potential risk. In the same sense that agnotology⁹ focuses on the scientific process of the construction of ignorance, we are interested in the more or less voluntary construction of political inaction.

In this case, we explain distancing partly through the Mexican authorities’ concern to meet competing or even contradictory international requirements. Mexican institutional responses must integrate both its commitments to free trade with Canada and the US through NAFTA, and a desire to appear respectful of international environmental governance. Mexico is a signatory to the Convention on Biological Diversity and the *Cartagena Protocol on Biosafety*, and has always been keen to be seen in international arenas as taking a proactive stand regarding the environmental.¹⁰

In the first part, we will see how the transgenic “contamination” is made an object of public policy, following its discovery in the state of Oaxaca by scientists at the University of California, Berkeley. This phase of alert puts a still fragile framework on biosafety to the test, and the Mexican authorities attempt to respond to the situation’s urgency by trying to control the production of scientific data.

The second part shows how the scientific data produced by these same authorities serve a process of political communication aiming to reassure the public. The “contamination” is minimized in an international scientific journal, a move seeking to legitimize the Mexican Environmental Ministry’s biosafety policy; and denied by agricultural authorities hoping not to impede US corn imports.

The third part highlights the legal, regulatory and technical response to the “contamination” through the introduction of a new biosafety framework aiming to establish conditions for “coexistence” between transgenic and local varieties.

⁹ Proctor and Shiebinger 2008

¹⁰ Dumoulin 2003

ENVIRONMENTAL AUTHORITIES Under the umbrella of SEMARNAT (Secretary of the Environment and Natural Resources)	INTER-MINISTERIAL BIOSAFETY AUTHORITIES	AGRICULTURAL AUTHORITIES Under the umbrella of SAGARPA (Secretary of Agriculture, Livestock, Rural Development, Fisheries and Food)
INE (National Institute of Ecology) CONABIO (National Commission for the Knowledge and Use of Biodiversity)	CIBIOGEM (Inter-ministerial Commission on Biosafety and Genetically Modified Organisms)	CNBA (National Agricultural Biosafety Committee) (1993-1999) SENASICA: (National Service for Health, Food Safety and Food Quality)

Figure 1: Institutional Mexican biosafety framework

Warning: Transgenes! Keeping the Data from Escaping (2000/2002)

During the 1990s, the management of the GMO issue in Mexico was confined to a committee of US-trained biosafety specialists, the CNBA (see Figure 1). This committee gradually polarized around the authorization of GM corn. One approach downplayed the problem of transgene flow, and highlighted the productive and commercial benefits of transgenic corn, while a second expressed concern about possible harm to corn biodiversity and advised precautions.¹¹ This second approach seemed to advance in 1998, when the agricultural authorities declared a de facto moratorium on the experimental and commercial cultivation of GM corn. In the late 90s, the government even seemed to consider the risks of GMOs to be a national problem, establishing in 1999 an inter-ministerial commission, CIBIOGEM, specialized on the issue; and being one of the early signers to the International Protocol on Biosafety in May 2000,¹² thereby aligning with international standards on biosafety. Yet at the same time, Mexican authorities were increasingly allowing imports of “unsorted” US corn capable of containing a large volume of GM corn, without any sanitary check, much less labeling.

The fragility of these biosafety mechanisms emerged into daylight following the November 2001 publication of an article in *Nature* by Berkeley researchers Ignacio Chapela and David Quist attesting to the presence of transgenes in landraces in the state of Oaxaca. If this revelation wasn’t explosive enough, Quist and Chapela placed their study in “the remote

¹¹ Serratos and Hernandez 2008
¹² Gupta and Falkner 2006

mountains of Oaxaca” during a moratorium on GM corn planting, which suggested “that more accessible regions are likely exposed to higher levels.”¹³ Jason Delborne has assessed Quist and Chapela’s strategically wide dissemination of their research into in *Nature*, a scientific journal of high international stature, as “constructing an audience,” in which the mode of dissemination is at least as important as the data itself.¹⁴ Quist and Chapela were certainly aware of their discovery’s scientific impact—until then, GM and non-GM gene flow had been anticipated, but not actually shown on the page—but also considered its socio-political impact. The actual existence of a “contamination” put into question the possibility of confining, and thus the safety, of transgenic plants, and even more directly, the effectiveness of Mexican biosafety policy. Even before its publication, the article caused a stir in the Mexican institutions responsible for biosafety, as the “contamination” transitioned from a potential problem to a one that must be urgently addressed.

Parallel to the revision process of his article, from March to October 2001, Chapela took care to brief the leaders of major Mexican environmental and biosafety institutions, including the presidents of CONABIO, INE and CIBIOGEM (see Figure 1), asking them to keep the information confidential. Chapela’s objective was to avoid catching them off guard with the news, but without preventing the article’s publication in *Nature*, which generally doesn’t publish information that has already been widely disseminated in the general press. The news received divergent reactions from the different institutions, which almost immediately implemented various strategies to manage the alert.

The most radical reaction was that of CIBIOGEM’s Secretary Fernando Ortiz Monasterio, who attempted to silence, or at least to deflate, the alert. Chapela has described experiencing direct pressure and intimidation not to publish the article.¹⁵ Hoping to prevent its publication in *Nature*, Monasterio made plans to publicize the news about the transgenes himself in a semi-public meeting in mid-September. His strategy was thus to disseminate confidential information, preferring to see it published by less “prestigious” organizations or media. Indeed, in such scientific and political battles, the respectability and credibility of information sources carry extremely important symbolism. Chapela, understanding that his commitment to transparency vis-à-vis the Mexican authorities was being used to deflate the article’s effect, or even to jeopardize its publication, arranged to publish a note in *Nature*’s News section on September 27, 2001, announcing that transgenes had been found in Mexican maize, and that the forthcoming issue would include an article on the subject (Dalton, 2001).¹⁶ The international impact was immediate: beginning October 2, the news made *The New York Times*¹⁷ and *Le Monde*¹⁸, which did not prevent the scientific paper’s publication two months later.

The environmental authorities also reacted immediately to Quist and Chapela’s article. First, CONABIO and INE double-checked Chapela’s announcement using their own expertise. In May 2001, just days after being briefed by Chapela, the two organizations sent INE’s biosafety officer to collect landraces in Oaxaca. This rapid reaction showed the environmental

¹³ Quist and Chapela 2001

¹⁴ Delborne 2005, pp.43 and 167-170

¹⁵ Chapela, personal interview, 24/12/2004

¹⁶ Dalton 2001

¹⁷ *New York Times*, October 2, 2001

¹⁸ *Le Monde*, October 2, 2001

authorities took the “contamination” problem seriously. The collected samples were then analyzed in Mexican public laboratories with technical capacity for transgene detection. The first results were available at the end of 2001, almost simultaneous to the publication of Quist’s and Chapela’s article, and were presented at in November 2001 in the US by INE and CONABIO officials at an OECD conference on GMOs and the environment. The presentation thus took on the form of an official announcement by the Mexican environmental authorities, and the results (contamination in 95% of localities and 7.6% of samples) seemed to clearly confirm the transgene presence despite the moratorium.¹⁹ The full results of this study were supposed to be published in *Nature* to showcase the responsiveness of the environmental authorities, and to give their confirmation the scientific legitimacy it lacked. However, *Nature*’s referees rejected the manuscript in September 2002, citing overly delicate analysis at the high point of a raging controversy against the Quist and Chapela paper,²⁰ which called for the utmost care in the results of any new study.

The Ministry of Agriculture was no exception in responding to the crisis provoked by the Quist and Chapela article, and decided to produce its own expertise in addition to that of the environmental authorities. In October 2001, it created an interdisciplinary and inter-institutional structure, bringing together scientists alongside the heads of CONABIO, INE and CIBIOGEM. This “Ad-Hoc Committee” remained under the control of the Ministry of Agriculture, SAGARPA. Its October 3, 2001, meeting was called directly by then Deputy Secretary of Agriculture Victor Villalobos Arámbula, who closely followed the committee’s activities. One of the researchers responsible for genetic analysis has confirmed this high-level interest in the committee’s activities. “Yes, it went to a very high level. The Minister of Agriculture called us all the time, asking us how far we’d progressed. They were interested in [...] knowing what measures to take.”²¹ The committee’s mandate was to determine a systematic strategy for bio-monitoring, to “analyze the possible effects and amplitude of the transgenic presence in maize landraces” (Comité-Ad HOC, 2001) in the states of Oaxaca and Puebla, where a large sample collection was launched. These samples were then analyzed, and results of the first partial analyses for Oaxaca available by the end of 2002. These appeared alarming, with positive results for 37% of parcels. Despite the results’ significance, they were made public only through a brief presentation by the Committee Chairman at the Seventh International Symposium on Biosafety of Genetically Modified Organisms in Beijing, on October 13, 2002. The official document corresponding to the presentation filled only a single page and, while admitting that “transgenes such as cry1A can be found extensively in land races throughout the State of Oaxaca,” it gave no estimate as to the frequency of transgenes, preferring to note the absence of significant effects on the phenotypes of local corn.²² The report that was submitted by the Committee to the government on November 14, 2002, which estimated that transgenes were detected in 37% of the plots, remained confidential, despite recommendations by the Committee to the agricultural authorities to make the information available to the public.

We can see, then, that the alert by Quist and Chapela was taken very seriously by the various bodies responsible for biosafety in Mexico, since even before its publication in *Nature*, two collection/analysis initiatives were undertaken by the environmental and agricultural authorities to check the data. The Mexican authorities seemed to want to show that they were not

¹⁹ Ezcurra, Ortiz and Soberón 2002

²⁰ Metz and Futerrer 2002, Kaplinsky et al. 2002, Quist and Chapela 2002

²¹ Rivera, personal interview, February 13, 2009

²² Alvarez and Morales 2002

caught off guard by an announcement radically calling corn biosafety into question. However, the methods for managing the alert differed by government agency. While the President of CIBIOGEM initially sought to suppress or bypass the information, the environmental authorities deployed resources to confirm transgene presence and make the news public, if possible in publications that could offer serious scientific authority to the young INE. The Ministry of Agriculture attempted to maintain control by establishing significant information on the presence of transgenes, without, however, wishing to make the situation publicly known. In all cases, the goal was to control the production of scientific data vis-à-vis the interpretations of independent researchers. CIBIOGEM and SAGARPA engaged in distancing through by manufacturing a void: seeking to prevent the publication of certain data, or at least to keep confidential any data that seemed particularly alarming. The next sections will explore how biosafety policies gradually converged around information control, and an agreement regarding coexistence between GMO production and landraces of maize.

Distancing the Transgenic “Contamination”: Reassuring the Public

Biosafety According to INE: Publish to Clean

Following *Nature*'s refusal to publish their results, INE and CONABIO decided to continue researching transgene presence in Oaxaca. Rather than working with Mexican governmental laboratories considered too unreliable, they enjoined a US company world-renowned for its work on detection: Genetic ID. Based on collections in 2003 and 2004, this next study found a resounding publication in the prestigious journal *PNAS* in June 2005. The article reported an “absence of detectable transgenes in local corn varieties in Oaxaca.”²³ The authors made several qualifications of this conclusion: they said their results did not contradict the data of Quist and Chapela, since they concerned different years. They also recognized that “although no Mexican government's revised (peer-reviewed) report has been published in scientific journals, the presence of transgenes in Oaxaca has been widely known,” and cautioned that these results should not be extrapolated onto other regions. Starting thus from the assumption that transgenes were indeed present in the region in 2001, the results suggested they had disappeared.

Reactions to this publication were not nearly as intense as those provoked by Quist and Chapela, but its impact in the scientific community and elsewhere was nevertheless considerable. Despite the aforementioned qualifications, this article was widely understood as a sign that transgenes had disappeared in Oaxaca, and even in all of Mexico. One notice was published in *Nature* entitled, “Four Years On, No Transgenes Found in Mexican Maize;”²⁴ along with another in *Science* entitled, “Calming Fears, No Foreign Genes Found in Mexico's Maize.”²⁵ A comment in *PNAS* by Peter Raven, Director of the prestigious Botanical Garden of St. Louis, Missouri, called the study of Ortiz et al. an “outstanding analysis,” but nevertheless said that the question of whether or not transgenes were present in the Mexican origin center didn't really matter, because GM technology is safe.²⁶ Thus, the interpretation that prevailed in the public sphere, to the satisfaction of the biotechnology industry, was that transgenes had disappeared. Indeed, the

²³ Ortiz et al. 2005

²⁴ Marris 2005

²⁵ Kaiser 2005

²⁶ Raven 2005

study's coordinator addressed this interpretation, saying, "I did not expect the industry and pro-GM scientists would lay such a claim to this article,"²⁷ and the article's authors all seemed to deplore this simplification of their conclusion.

Despite such reticence regarding their claims, one has to wonder about the goal of the study's publication in an international journal. According to one of the authors, intellectual honesty drove him to publish the results. "From my perspective, I think we did well to publish what had been found, even if it does not really suit us because we had previously said that transgenes were there. I think if you want to be consistent and are using public funds, you must make things transparent."²⁸ Beyond these justifications, a more politically realistic hypothesis can be advanced regarding the choice to publish negative results in *PNAS*. Indeed, one might imagine that as with the Quist and Chapela article, that of Ortiz et al. responded to a desire to give their results maximum impact, especially compared to previous government reports that, as noted above, are not peer-reviewed and do not hold the same legitimacy. In this vein, one of the article's authors noted that, "The problem in Mexico, and it is a general problem, is that if it's not published in an international journal, nobody pays attention."²⁹ International impact and scientific legitimacy are thus the advantages conferred by such a publication. The question which then arises then is why, of all the government analyses, only the one with negative results was published. Other governmental research studies, known to Ortiz and his team, suggested a significant presence of transgenes in many parts of the country, including in 2003 and 2004. Publishing that transgenes had disappeared in Oaxaca lent credibility to Mexico's biosafety policies, and gave weight to its effectiveness. Indeed, the notices in *Nature* and *Science* suggest the Mexican environmental authorities' information policy regarding farmers in Sierra Norte partly explains the reversibility of transgene presence. These farmers carried out a negative selection process against varieties likely to carry transgenes, prioritizing landraces. From there to the conclusion that the environmental authorities were conducting coherent biosafety policy regarding the "contamination" issue, and had the situation under control at the national level, it was just a short step that a hurried reader could easily take. The publication's overall effect is thus to have calmed the controversy by suggesting GM "contamination" was well-controlled.

Liberalizing Biosafety

For SAGARPA and CIBIOGEM, the "contamination" issue continued to be dealt with carefully, with a manifest desire to mitigate its extent and effects, but now in the context of an increasingly permissive biosafety policy.

Above, we saw how the Ad-Hoc Committee's research results were minimally communicated at an international meeting in Beijing in 2002. In the absence of results regarding the type of transgenes present, but with high detection rates of 37% of localities and 7.6% of plants analyzed,³⁰ one would expect a strong reaction from CIBIOGEM and the agricultural authorities. However, the results received minimal treatment in terms of both communication and reactive measures.

²⁷ Ortiz-Garcia, personal interview, September 21, 2008

²⁸ Acevedo, personal interview, November 21, 2008

²⁹ Ibid.

³⁰ CIBIOGEM-Comité Ad Hoc 2004

The results' sole publication was in a simple press release, and a press conference whose clear goal was to downplay the presence and its possible effects. The press release, dating February 13, 2004, stated that, "The Biosafety Advisory Council of CIBIOGEM informs that although transgenes were detected in maize samples in Oaxaca and Puebla, their presence decreases over time, and there is no scientific evidence that their presence represents a risk to human health, basic crops, or biodiversity in our country."³¹ It is curious that a statement admitting to transgene presence then put forward conclusions attesting to its decline and absence of effects, conclusions not mentioned in the Ad-Hoc Committee report. To infer such a decrease in presence, CIBIOGEM likely built on the initial results of the INE-CONABIO study that would be published in *PNAS* two years later, but the conclusion then seems quite hasty. And there was no study backing the idea that effects were nonexistent. At no time did the statement evoke the Committee's figures, which remained confidential. Instead, it emphasized the absence of the Cry9C StarLink gene, which is prohibited for human consumption, and pointed out that the use of GM crop varieties is now widespread and has "benefited agriculture and the environment due to the considerable decrease in pesticide use."³² (Ibid.) It stated that maize landraces were not in danger, and even concluded that these very plant-breeding activities had contributed to maintaining diversity. In this communication operation, the Committee's study results were downplayed, and no concrete basis for the conclusions presented.

This communication strategy makes sense in the context of the biosafety policies of the time. In the press release as in the press conference, CIBIOGEM gave voice to "the need to implement an adequate surveillance and monitoring system to improve the technical capabilities and allow for compliance with the obligations of the Cartagena Protocol."³³ Indeed, Mexico had ratified the Cartagena Protocol on Biosafety on April 30, 2002, and it became effective on September 11, 2003, posing the challenge to Mexico of implementing a protocol that its major trading partners, the United States and Canada, had not ratified. To align NAFTA with the Cartagena Protocol, the Ministries of Agriculture of Mexico, Canada and the US agreed to establish NABI (the North American Biotechnology Initiative), whose main goal was to "promote and facilitate the use of agricultural biotechnology in North America."³⁴ Championed by the Mexican authorities as the implementation of the Cartagena Protocol, a subsequent agreement on documentation requirements for transboundary movements of GMOs, signed in October 2003 within the NABI framework, was denounced by Mexican GMO opponents as "transgenic NAFTA." Manuel Villalobos, one of the agreement's architects, rejected the activists' accusations, but confirmed the liberal vision of biosafety it reflected: "For Luis Usabiaga and myself, the main objective was to prevent the cessation of corn imports. At the time, we were importing almost 10 million tons and we knew that a certain proportion was transgenic because we had never asked that it be set apart. We never asked for this because of the price."³⁵ This main goal, that biosafety not present a barrier to corn commercialization and imports, corresponded to a pragmatic and liberal vision over which Mexico had neither the human nor the financial resources to implement effective control. Even if it not intended to be sown, these massive imports of GM corn clearly represented a possible source for the transgenic flow into landraces. Permissiveness toward unlabeled GMOs, and the absence of any concrete

³¹ CIBIOGEM-Consejo Consultivo de Bioseguridad 2004

³² Ibid.

³³ Ibid.

³⁴ Villalobos 2008

³⁵ Villalobos, personal interview, March 27, 2009

mechanism to implement biosafety policy, all in the name of administrative pragmatism, economic concerns, and a willingness not to restrict trade: these are NABI and SAGARPA's claimed principles.

Having reassured the public about the dangers of GM "contamination" and corn imports, Mexican agricultural and biosafety authorities logically sought to knock down the last barrier hindering the development of agricultural biotechnology in Mexico: the moratorium against it.

Legal and Institutional Distancing

Following this controlled publication on governmental efforts at bio-monitoring, the issue of transgenic "contamination" became the object of policy planning, with Mexican authorities appearing to gradually agree to organize coexistence between GM corn and landraces in new legislation. Despite new scientific publications clearly showing transgene presence in landraces throughout Mexican territory, the "contamination" issue seemed no longer to receive more than marginal attention by the authorities.

Taming the "contamination" in Legal Norms: Establishing Coexistence

Beginning in February 2005, the "contamination" issue was framed by the new Law on Biosafety of GMOs (LBGMO). This law was drafted jointly by the Mexican Academy of Sciences (AMC) and the National Commission of Science and Technology (CONACYT). It was the subject of considerable controversy, both in the social sphere, and during tense negotiations between Mexican institutions. For the Mexican authorities, the law's approval presented an opportunity to balance power between SAGARPA and SEMARNAT in terms of responsibility for biosafety issues. Despite many criticisms of this text's omissions and vagueness, SEMARNAT defended it because of the significant powers given to environmental institutions, notably Article 66, which gave it the power of binding opinions on the release of GMOs into the environment, to the extent that it concerned SAGARPA's powers. This article seems to have been grabbed at by the environmental sector following tough negotiations and clearly gave an important advantage to the Environmental Ministry over agricultural institutions. José Luis Solleiro, representing agricultural biotechnology companies through the association Agrobio Mexico, confirmed the differences in viewpoint between the ministries: "This law's disadvantages for the private sector tend to lay within its regulatory mechanisms, for example the joint authority of SAGARPA and SEMARNAT. It will be very difficult because they have different agendas. In the current administration, they have had some differences and are clearly opposed. I have attended meetings where they have very nearly come to blows."³⁶ The ministries of Agriculture and the Environment may have agreed on the need to reassure the public about transgenic contamination, but it was easy to see that their respective understandings of the issue remained divergent.

The moratorium on planting transgenic corn had thus been legally lifted, but the question of introducing GMOs into a center of origin was thoroughly covered in a law providing for the establishment of a Special Regime on corn. The absence of this Special Regime would be the main argument advanced by SENASICA, the body within SAGAPRA now responsible for

³⁶ Solleiro, personal interview, January 21, 2005

issuing permits for GM crops, when it refused all new applications for authorizations in 2005 and 2006.³⁷

Beyond the legal battles, Vicente Fox's lame duck administration probably didn't want to take political responsibility for authorizing the first experiments on transgenic corn. Beginning in March 2008, however, things really accelerated, both politically and legally. President Calderón's new administration (PAN) seemed to be increasingly decided to grant the first approvals for GMO corn experimentation, taking care to respect legal norms and environmental acceptability. On July 27, 2008, President Felipe Calderón declared before the General Assembly on National Agricultural, "Dear friends, I want to tell you that we are taking the necessary measures to ensure the genetic diversity of agricultural crops in the country, taking particular care with species native to Mexico. We are determined to protect all local maize varieties and their wild relatives in the face of the presence of transgenic material. But at the same time, we are aware of the importance of genetics and transgenic technology, which is vital to increasing the Mexican countryside's productivity. That is why, several years after the approval of the Law of Biosafety on Genetically Modified Organisms, I have issued the relevant regulations, and we are already working on first steps to liberalize the production of genetically modified corn."³⁸ This regulation seemed to evade, or at least circumvent, the thorny issue of the Special Regime, because Article 65 said that it would "consist of legal provisions on biosafety to be established by the authority." The Special Regime thus became a set of measures to be taken in an indefinite future, rather than a specific text on which experimentation permits depended. Henceforth, the legal and political path was wide open, especially since the new administration's agricultural and environment authorities seemed to agree on the need to expedite the permitting process. Victor Manuel Villalobos, a senior official at the Ministry of Agriculture and an expert on biosafety, explained that "the authorities at SEMARNAT and SAGARPA are going in the same direction [regarding transgenic corn]. There are subordinates within those institutions who will not agree. But I would say that the ministries of Agriculture and the Environment consider there to be more benefits than disadvantages, and that the risk can be controlled."³⁹ To confirm this positional rapprochement, Environmental Minister Rafael Elvira Quesada spoke at the end of 2011 of the possibility of planting two million hectares of GM corn to fight drought.⁴⁰

In 2009, SENASICA received 34 applications for experiments involving GM corn from Monsanto, Pioneer and Dow. These requests were reviewed by SAGARPA and SEMARNAT, which granted permits for 33 of them on a total of 34 hectares.⁴¹ In 2010, 76 applications were received. As of April 20, 2011, 45 were accepted, seven rejected and the rest still under evaluation. In July 2011, 24 applications were resubmitted.⁴² The challenge for companies seemed to have passed from the experimental phase of production on one hectare, to the pre-commercial pilot phase. In 2010, some of Dow's applications reached 200 hectares, and the maximum area authorized was 8.2 hectares, in the state of Sinaloa. Most of these experiments took place in the Northern states, the main commercial corn producers. The Mexican authorities appeared to be moving toward a partitioning of the country into North, where transgenic corn would be authorized, and Center-South, where conservation policies for landraces would be

³⁷ Author

³⁸ Calderón 2008

³⁹ Villalobos, personal interview, March 27, 2009

⁴⁰ La Jornada, November 15, 2011

⁴¹ SENASICA 2010

⁴² SENASICA 2011

marginally implemented. The geographic distribution of the country probably reduces the risk of transgenic “contamination” to landraces, but certainly does not eliminate it.

The Return of Transgenes

Parallel to these legal and administrative developments, a new series of scientific publications is showing that transgenes are far from extinguishing landraces, and that the question of detecting them remains largely unresolved. Three studies with positive results in various states were published between 2007 and 2009. The first found transgenic corn proteins in the soil of the Conservation Zone of the Federal District of Mexico.⁴³

The second publication, by Piñeyro-Nelson et al. (*Molecular Ecology* 2009), reawakened the controversy over transgene presence Oaxaca landraces,⁴⁴ by explicitly questioning the PNASS study. Piñeyro et al. strongly suggested that the failure by Ortiz et al. to detect transgenes could be due to a sampling problem, or to false negatives by Genetic ID’s analysis. In addition to the results it presented, the article provided many methodological considerations to improve transgene biomonitoring, both for sampling techniques and analysis. In particular, the article in *Molecular Ecology* pointed out Genetic ID’s calibration of detection techniques, which are suitable to standardized commercial corn, but not to the diverse native Mexican maize genomes.⁴⁵ This article had a certain amount of reverberation in the international scientific press,⁴⁶ and was even greeted by one of the co-authors of the Ortiz et al. article as a “remarkable work resolving apparent contradictions in the scientific literature.”⁴⁷ On the other hand, Bernd Shoel and John Fagan, Genetic ID’s executives, responded curtly to the article. They asserted that Piñeyro et al. had incorrectly interpreted the positive results, which probably indicated a “contamination” in the laboratory (Shoel and Fagan, 2009). Despite the accumulation of published and unpublished data showing transgene presence, they concluded that no publication to date had evidenced such a presence of Mexican maize. This scientific controversy involved issues fundamental to Mexican biosafety policy, questioning which the authorities would place their trust in: a private North American company, or a Mexican public laboratory. In the article, Piñeyro et al. not only questioned the results of Ortiz et al., but the Mexican environmental authorities’ entire biomonitoring strategy, until then based on Genetic ID’s internationally-sold detection techniques. With international funding, and in accordance with the 2005 LBOGM, Mexican authorities were expected to develop a biomonitoring system capable of tracing possible risks of GMO release to the environment and health. This obviously implied detection capability, including competent analytical laboratories. But in Mexico as well as in Latin America more broadly, official detection certification passes through Genetic ID’s international certification process. The inadequacy of Genetic ID’s detection techniques would thus signify a major flaw in the Mexican system, but even now, Mexican authorities prefer to place their trust in Genetic ID’s international standard. The methodological considerations for improved sampling and detection techniques advanced by Piñeyro et al. have not been taken into account. A Mexican biomonitoring network able to follow GM “contamination” in real time is still far

⁴³ Serratos et al. 2007

⁴⁴ Piñeyro-Nelson et al. 2009

⁴⁵ Authors, 2012

⁴⁶ Dalton 2008, 2009

⁴⁷ Snow 2009

from complete for both technical and financial reasons. By the admission of CONABIO members, “Mexico has not established an effective mechanism for monitoring cross-pollination and gene flow in local agriculture, despite statements that this mechanism has been established.”⁴⁸

Contradicting Genetic ID’s claims about the lack of evidence for transgene presence in maize landraces, an article by Dyer et al., with the participation of Mexican scientists involved in previous publications, was published in *Plos One* in May 2009.⁴⁹ The article presents positive results for 5% of a national sample conducted in 2002 in 49 localities in 14 of Mexico’s 31 states. Transgene presence is shown to be particularly significant in the southeastern and central-west region of the country. The article advances the hypothesis that the origin of transgenic spread may come from non-certified seeds that are sold as conventional.

It is interesting to note that all these scientific articles, as with that of Quist and Chapela, have failed to weigh into public debate and to influence Mexican biosafety policy, whose line is now clearly defined as supporting coexistence between transgenic corn and local maize. The two main authors of these articles, specifically Jose Antonio Serratos (an author in all three articles, and a former member of the CNBA and the Ad-Hoc Committee), and Elena Alvarez Buylla (an author in two of the three articles, and a supervisor of the first analyses by the National Ecology Institute), are scientists who participated in various official biosafety initiatives, before being discarded by the authorities with whom they collaborated. Following Chapela, these scientists are whistleblowers, whose activity “is most often to ‘wake up’ officials absorbed by routine, and naturally inclined to downplay or relativize the impact of events.”⁵⁰ These publications coincide with the moment that GM experiments on corn are about to be reallocated. They thus constitute a renewed alert and attempt to resist the government’s distancing maneuvers, but are not, however, taken into account by the Mexican authorities.

Conclusion: Biosafety in Mexico as a Symbolic Politics

We have seen in this article how the issue of GM “contamination” was gradually subjected to distancing by the Mexican government, through various strategies we will summarize here. The alert, launched in an international journal, evidenced the limits of the effectiveness of biosafety mechanisms, and forced the different Mexican authorities to react by producing their own expertise to gain control over the scientific results. Initially, at least, the Mexican authorities did not so much dismiss the problem of transgenic “contamination” as due to public irrationality (per Barbier’s “psychologizing” modality), as demonstrate their ability to identify the problem, while avoiding data that challenged their biosafety policy. One might call this modality of distancing “strategic downplaying”: faced with a potentially imminent problem, the authorities showed themselves to be early reactors, addressing the situation to attenuate its problematic aspects, reassuring the international community on the 'soundness' of its biosafety policy, and allaying public fears in Mexico about the extent of the transgenic “contamination” and its effects on the country. Within Marc Barbier’s interpretation of European institutional strategies for dealing with BSE, this phase corresponds to a strategy of “manufacturing a void,” in which the authorities’ control over scientific activity translated into a “handling of the

⁴⁸ Acevedo et al. 2011

⁴⁹ Dyer et al. 2009

⁵⁰ Chateauraynaud and Tornay 1999

uncertainty [...] primarily designed to reassure, rather than to act using precaution.”⁵¹ Indeed, institutional logic means that “in the absence scientific proof, there is no point in make protective decisions that are disruptive to the market.”⁵² Following this phase of regaining control over science and communications, transgene flow was addressed in the context of biosafety policy, relying on a new legal framework whose objective was to separate the country between GMO production areas and landrace conservation areas. The establishment of a laboratory detection network was also supposed to allow for continuous monitoring of transgene flow. This phase corresponded to using through institutional and judicial transformations to handle the alert (ibid.) that was supposed to solve the problem. However, a new series of publications has again shown the fragility of Mexican biosafety mechanisms and their largely symbolic dimension.

In effect, we can describe Mexican biosafety policy as symbolic,⁵³ not in the sense that they are principally implemented through symbols, but more in the sense that beyond institutions, norms and declarations, they are based on no mechanism that actually works. Biosafety initiatives that are implemented (the signing of international agreements, the appointment of committees, scientific publications, press conferences, and the adoption of new legislation) are above all rhetorical. They are not accompanied by any real introduction of devices allowing the exertion of effective control over transgene flow. The absence of border controls on corn imports from the United States, the permissiveness of labeling standards, weak detection capabilities, weak biomonitoring that does not allow for the continuous monitoring of transgenes, and the fuzzy controls of experiments in progress, are all factors that suggest multiple entry points for transgenes that are left open and uncontrolled. The weakness of these control mechanisms contrasts with the heavy-duty biosafety devices developed in Europe, for example, like the construction of segregation infrastructure and systematic bio-monitoring. It is possible that Europe’s more heavyweight mechanisms do not ensure better control over an undesirable presence of transgenes, because the phenomenon seems extremely difficult to contain. However, it does attest to an approach that, relatively speaking, is based more clearly on a precautionary principle. Certainly, this difference reflects, to some extent, a lack of technical and economic means specific to a country in transition. But it also, and more probably, reflects a very real desire to meet two conflicting agendas: to open pathways to unhindered trade, all while respecting, at least in appearance, the international standards of environmental governance. A symbolic politics of biosafety is also a political realist approach. By signing international protocols, publishing in international journals, and establishing a law and a biosafety commission, Mexico acts “as if” had put into place a strict biosafety policy. At the hour when the first commercial approvals of GM corn are about to be granted, the weakness of these mechanisms, and the paucity of research on possible adverse effects of transgenic presence, should cause concern throughout the international biosafety community.

References:

Acevedo, Francisca; Huerta, Elleli; Burgeff, Caroline; Koleff Patricia et Sarukhán, José. 2011. Is transgenic maize what Mexico really needs? *Nature Biotechnology*, 29, (1): 23-24

⁵¹ Barbier 2003

⁵² Ibid.

⁵³ Edelman 1976, Blühdorn 2007

Alvarez-Morales, A. 2002. *Transgenes in maize landraces in Oaxaca: Official report on the extent and implications*, The 7th International Symposium on the Biosafety of Genetically Modified Organisms: Meeting Proceedings of the International Society for Biosafety Research, Beijing, China, 13 October, pp. 65.

Available at: <http://www.isbr.info/symposia/docs/isbgmo.pdf>, accessed 20 march 2011

Blühdorn, Ingolfur. 2007. Sustaining the unsustainable: symbolic politics and the politics of simulation. *Environmental Politics*, 16, (2): 251-275

Calderón, Felipe

Discurso del Presidente Felipe Calderón en la comida con motivo de la Clausura de la XXV Asamblea General Ordinaria del Consejo Nacional Agropecuario. 2008.

Available at: <http://www.presidencia.gob.mx/prensa/?contenido=37470> accessed 3, august, 2009

Callon, Michel ; Lascoumes, Pierre et Barthe, Yannick. 2001. *Agir dans un monde incertain : essai sur la démocratie technique*. Paris : Seuil.

Chauvet, Michelle and Galvez, Amanda, 2005. Learning about biosafety in Mexico, between competitiveness and conservation. *International Journal of Biotechnology*, 7, (1, 2, 3) 2005.

CIBIOGEM-Comité Ad-Hoc. 2004. *Reporte técnico acerca de la presencia de maíz transgénico en México*. 12 January 2004.

CIBIOGEM-Consejo Consultivo de Bioseguridad.2004. *Comunicado de prensa*, 13 february 2004.

Comité Ad-Hoc. 2002. *Primer informe sobre el análisis de la presencia de maíz transgénico en Oaxaca y Puebla*.

Chateauraynaud, Francis et Torny, Didier. 1999. *Les sombres précurseurs : une sociologie pragmatique de l'alerte et du risque*. Paris: EHESS.

Dalton, Rex. 2008. Modified genes spread to local maize. *Nature*, 456: 149

Dalton, Rex. 2009. Mexico's transgenic maize under fire. *Nature*, vol. 462:404

Delborne, Jason. 2005. *Pathways of scientific dissent in agriculture biotechnology*. Dissertation for a PHD of philosophy in environmental science, University of California, Berkeley.

Dumoulin, David. 2003. *Les politiques de la nature confrontées aux politiques du renouveau indien : une étude transnationale depuis le Mexique*. Dissertation for a PHD in political sociology, Institut d'Etudes Politiques de Paris.

Dyer G.A., Serratos-Hernández J.A., Perales H.R., Gepts P., Piñeyro-Nelson A., Chávez A., Salinas-Arreortua N., Yúnez-Naude A., Taylor J.E., Alvarez-Buylla E.R. 2009. Dispersal of transgenes through maize seed systems in Mexico. *Plos One*, 4(5).

- Edelman, M. 1976. *The symbolic uses of politics*. Urbana: University of Illinois Press.
- Escurra E., Ortiz, S. and Soberón Mainero, J. 2002. Evidence of gene flow from transgenic maize to local varieties in Mexico. In LMO's and the environment. *Proceedings of an international conference*, 2002. pp. 289-294
Available at : <http://www.oecd.org/dataoecd/9/37/31778752.pdf>, accessed 22 february 2012
- Gupta, Aarti. 2010. Transparency as Contested Political Terrain: Who Knows What about the Global GMO Trade and Why does it Matter? *Global Environmental Politics*, 10(3): 32-52
- Gupta, Aarti and Robert Falkner. 2006. "The influence of the Cartagena Protocol on Biosafety: Comparing Mexico, China and South Africa" *Global Environmental Politics* 6 (4) 23-55.
- Kaiser, Jocelyn. 2005. Calming fears, no foreign genes found in Mexican maize. *Science*, 309 (5737): 1000
- Kaplinsjy, N. et al. 2002. Maize transgene results in Mexico are artefacts. *Nature*, 416: 601-602
- Kinchy, Abby J. 2007. *Genes out of place: science, activism and the politics of biotechnology*. Dissertation for a PHD in sociology, University of Wisconsin-Madison.
- Marris, Emma. 2005. Four years on, no transgenes found in Mexican Maize. *Nature*, 436: 760.
- MC Affee, Kathleen. 2008. Beyond techno-science: transgenic maize in the fight over Mexico's future. *Geoforum*, 39, (1) :148-160
- Mercer, Kristin et Wainwright, Joel. 2008. Geneflow from transgenic maize to landrace in Mexico: An analysis. *Agriculture Ecosystem and Environment*, n°123: 109-115
- Metz, M. et Fütterer, J. 2002. Suspect evidence of transgenic contamination. *Nature*, 416: 600-601
- Muller, Pierre. 2000. L'analyse cognitive des politiques publiques : vers une sociologie politique de l'action publique. *Revue française de science politique*, 2, 2000 : 189-208.
- Ortiz-García, S. ; Ezcurrea, E. ; Schoel, B. ; Acevedo, F. ; Soberón, J. and Snow, A. 2005. Absence of detectable transgenes in local landraces of maize in Oaxaca, Mexico (2003-2004). *PNAS*, 102, (35): 12338-12343
- Piñeyro-Nelson, A.; Van Heerwaarden, J, Perales H. R., Serratos-Hernandez J.A.; Rangel, A.; Hufford, M.B.; Gepts, P.; Garay-Arroyo, A.; Rivera-Bustmante, R. et Alvarez Buylla, E. 2009. Transgenes in Mexican maize: molecular evidence and methodological considerations for GMO detection in landrace populations. *Molecular ecology*, 18, (4), 2009: 750-761.

Quist, David and Chapela, Ignacio.2001. Transgenic DNA introgressed into traditional maize landraces in Oaxaca, Mexico. *Nature* 414 (6863): 541-543

Raven, Peter.2005. Transgene in Mexican maize : desirability or inevitability. *PNAS*, 102, (37): 13003-13004.

SENASICA.2010. Estatus de solicitudes de maíz, 2009.

Available at: <http://www.senasica.gob.mx/?id=2220>, accessed 22 february 2012

SENASICA. 2011. Estatus de solicitudes de permiso de liberación al ambiente de maíz genéticamente modificado ingresadas en 2010.

Available at: <http://www.senasica.gob.mx/?id=2220>, accessed 22 february 2012

Serratos Hernandez, Jose Antonio ; Gomez Olivarez, Jose Luis Salinas, Noé ; Buendía, Enrique ; Islas, Fabián and De Ita, Ana. 2007. Transgenic proteins in maize in the Soil Conservation area of Federal District, Mexico. *Frontiers in Ecology and the Environment*, 5, (5): 247-252

Shoel Bernd and Fagan, John. 2009. Insufficient evidence for the discovery of transgenes in Mexican Landraces. *Molecular Ecology*, 18, (20): 4143-4144.

Snow, Allison.2009. Unwanted transgenes rediscovered in Oaxacan Maize. *Molecular Ecology*, 18, (4): 569-571

Villalobos,A., V.M. 2008. *Los transgénicos, oportunidades y amenazas*. México DF : Mundi-Prensa.