NGOs AND GMOs

A CASE STUDY IN *ALTERNATIVE* SCIENCE COMMUNICATION

PIETER MAESEELE

Abstract

This article seeks to understand how and why we find local NGOs performing a role as *alternative* science communicators in the social conflict concerning agricultural biotechnology. First, a literature review points out that in the face of modernisation risks techno-scientific development has become contradictory, an evolution exemplified as well as driven by interdisciplinary antagonisms. This creates opportunities for a scientifically supported public critique of science and technology by new social movements. In addition, the commercialisation of science has brought forward a "science-industrial complex" united by economic interests in the promotion of biotechnology on the one hand, and has contributed to a practice of science communication using the logic of public relations and corporate communication on the other. Once institutional science communication becomes hard to distinguish from corporate communication, NGOs are found to contest and reframe scientific knowledge by aiming at instigating epistemic shifts in institutionalised scientific conceptions and discursive changes in the social values underlying science. Second, I report on the findings of six in-depth interviews with spokespersons for these NGOs, the aim being to achieve an understanding of how these NGOs make sense of their encounters with science in the GM debate and how they situate themselves in their role as *alternative* science communicators. Finally, I conclude by making some recommendations for journalism in general and science journalism in particular.

Pieter Maeseele is a lecturer of Media Sociology, International Communication and Intercultural Communication at Erasmus University College Brussels; e-mail: Pieter.Maeseele@gmail.com.

Introduction

In December 2007, Vilt (the Flemish Information Centre on Agri- and Horticulture)[1] asked both a spokesperson for Greenpeace and the scientific director of the Flanders Interuniversity Institute for Biotechnology (VIB) to participate in a dual interview on the polarised issue of genetically manipulated (GM) crops and food for its weekly e-zine. The latter, however, refused to participate. In a published interview of December 10th the interviewee states that as scientific director of VIB he is expected to judge on the basis of "hard facts" (Vilt 2007). He further points out the conviction of "99.99 percent of his colleagues worldwide" that gene technology not only offers "fantastic possibilities" but is at the same time also "harmless." And he mentions how not only has nobody reported ill after ten years of growing millions of hectares of GM crops, quite on the contrary, studies have shown genetic modification to improve the quality of food crops. Therefore, he refuses to tolerate that organisations like Greenpeace ignore the science and continue "to scare people for the purpose of bringing in new members." When the interviewer subsequently asks him why dialogue is not an option, the scientific director answers he has no time to spend on such useless conversations as "[T]he arguments of Greenpeace are based on semi-scientific and unreliable information." Several weeks later, on February 4th, the spokesperson of Greenpeace replies that "all claims made by Greenpeace are based on scientific studies" (Vilt 2008), and she points out that she has not found a consensus on GM crops in the scientific community to date. She adds that many molecular biologists who focus on the level of the cell might think that these products are perfectly safe and healthy, but "more broadly educated" researchers that focus on interactions with, for instance, the ecosystem, reach "different conclusions."

These are the central themes of this paper. We find that in the case of the GM debate two science communicators confront one another: on the one hand, science communication from scientific institutes or "institutional" science communication, and on the other, science communication from new social movements/NGOs (non-governmental organisations), which I put forward as "alternative" science communication. The aim of this paper is twofold. First, I will seek for potential factors that may have contributed to this evolution by means of a literature review, and second, I will report on the findings of six in-depth interviews with spokespersons for NGOs from the NGO-platform against GM food in Northern Belgium, the aim being to achieve an understanding of how these NGOs make sense of their encounters with science in the GM debate and how they situate themselves in their role as *alternative* science communicators.

Reflexive Modernisation

Modernisation Risks

Social theorists such as Ulrich Beck (1992) and Anthony Giddens (1990) have argued that instead of living in a post-modern world (with the corresponding end of epistemology), we are witnessing a period of late modernity in which the consequences of modernity have only intensified. In his thesis on the "Risk Society" Beck (1992) elaborates on why the concepts and power relations of industrial society are no longer valid in the advanced industrial societies of late modernity.

Industrial society was the result of the *modernisation* of traditional (feudal) society, and Beck argues that the mere continuity of modernisation, i.e. the *modernisation* of industrial society, results into the social organisation of a(n) (industrial) *risk* society. In Beck's terminology, the former process is called *simple* and the latter *reflexive* modernisation. In these processes, Beck finds a corresponding change in the relationship between scientific practice and the public sphere: from primary to reflexive scientisation. In the model of *primary* scientisation, scientific results could be advanced in an authoritarian fashion in the public sphere under the conditions of a sharp distinction between tradition and modernity, lay person and expert, and an unbroken faith in science and progress. But whereas an unbroken faith in science and progress was characteristic for modernisation in industrial society in the 19th and first half of the 20th century, science is now confronted with its own products, negative side-effects and risks which subsequently become the object of scientific analysis (i.e. *reflexive* scientisation). The advance of human knowledge and its ensuing intervention into society and nature has created (high-consequence) modernisation risks such as nuclear and genetic engineering risks, and all kinds of toxins and pollutants, which are imperceptible unless in terms of physical and chemical formulas and therefore inevitably render us dependent on the instruments of science for their (risk) definition. Techno-scientific development, then, has become contradictory, as science not only creates these risks but also serves as the medium for their definition, as well the source for possible solutions. The competitive relations between scientific disciplines that lead them to target one another as producers of risks are an important factor driving reflexive scientisation. However, although the critique of science, progress, experts and technology is supported by scientific results, Beck argues that only public debate forces science to recognise these modernisation risks.

> *The social recognition and treatment of risks will run aground on the competitive problems that erupt here and the unresolvable conflicts between schools of thought, so long as the public sensibility with regard to certain problematic aspects of modernization does not grow, turn into criticism and perhaps even social movements, articulate itself and discharge itself as protests against science and technology. Modernization risks, then, can only be "forced on" the sciences, "dictated to them," from the outside, by way of public recognition. They are based not on intrascientific but on overall social definitions and relationships. Even within the sciences they can only develop their power through the motives in the background: the social agenda. This in turn presumes a so far unknown power of the critique of science and culture, which is based at least in part on a reception of alternative expertise. With reflexive modernization, public risk consciousness and risk conflicts will lead to forms of scientization of the protest against science* (Beck 1992, 160-1, emphasis in the original).

Paradoxically, this means that the expansion of science is inevitably linked to its demystification on the one hand, and to public critique on the other. The apparently counter-modernistic scenario of a broad coalition of (new) social movements and others who voice their critique of science, technology and progress then is – unlike often claimed – not a feature of irrational fears of modernisation but, on the contrary, an expression of the success of modernisation (i.e. *reflexive* modernisation).

The scientific community, however, struggles to hold on to the power relationships of the model of primary scientisation (that have come under increasing pressure) and refuses the consequences of reflexive modernisation. The result is a conflictual constellation with a multiplicity of risk definitions based on competing rationality claims, values and interests.

Giddens (1990, 139-70) makes a similar observation when he concludes that the extreme dynamism of modernity makes living in the modern world like riding a juggernaut that threatens to rush out of our control. He nonetheless finds hope for being able to steer this juggernaut in the growth of social reflexivity in late modernity which allows us to envisage alternative technological futures. Here, he refers to social movements as being at the vanguard of defining these alternatives. Joining the older social movements (labour, free speech/democratic and peace movements), Giddens refers to the ecological/counterculture movements for whom the site of struggle is the "created environment": the world of nature transformed by modern industry and its associated constant revolutionising of technology. These movements are characterised by a heightened awareness of the high-consequence risks following industrial developments. Weingart (2004), for instance, refers to how protesting social movements in the nuclear power controversy proved to be right after the Three Mile Island (US 1979) and Chernobyl (Ukraine 1986) accidents, despite a general condemnation from scientists and engineers of "irrational behaviour." Nuclear power stands as a symbolic example for the high-consequence risks of modernity. Since then, it has become harder for technocratic elites to claim a monopoly on introducing new technologies: social movements demand safety guarantees first, thereby challenging the legitimacy of governments and their experts. Risk definitions, then, have become social constructs to be negotiated in a (sub-)political process in which social movements gather expertise in revealing "controversial and unsettled issues in the dominant knowledge, thus bringing internal conflicts and uncertainties into the open" (Weingart 2004, S53). Eventually, Beck (1992) considers public discussion of modernisation risks to be the necessary condition for the latter's transformation into opportunities for the expansion of science, and he finds the environmental movement to exemplify this interplay between the critique of progress, interdisciplinary antagonisms and protest movements. But what are these interdisciplinary antagonisms in the case of agricultural biotechnology?

Interdisciplinary Antagonisms and Epistemic Cultures

Krimsky (2005, 316) has identified two ways of understanding the effects of inserting foreign genes into organisms: a Lego- and Ecosystem model. The former starts from the assumption that genes function in isolation, which is a "highly mechanistic and reductionist" framing of the consequences of producing genetically modified organisms (GMOs), whereas the latter refers to a non-reductionist framing that starts from the assumption that adding a gene possibly affects the other genes. This distinction materialised into a schism between molecular biologists/geneticists and ecologists, respectively. These two scientific (sub-)disciplines can further be differentiated as two distinct *epistemic* cultures (Knorr Cetina 1999): "[t]hese consist of and are constituted by sets of specific practices of generating, validating, and communicating knowledge, each of which is characteristic of its

respective (sub-)disciplinary field" (Böschen et al. 2006, 296). Epistemic cultures can be characterised not only as scientific cultures of knowledge but also as scientific cultures of non-knowledge, referring to the fact that these cultures of knowledge also include specific practices of dealing with and producing non-knowledge. Applied molecular biology merges genetics with plant breeding and is characterised by de-contextualised laboratory experiments under controlled conditions. Through interviews with molecular biologists, Böschen and collaborators find that their expertise in controlling experimental conditions allows them to avoid unforeseen and unintended results as much as possible:

> *A paradoxical result of this is that the controlled research setting in the laboratory appears to be a source of both reliable knowledge and non-knowledge. The better the system is defined, the more variables tend to remain out of focus* (Böschen et al. 2006, 297-8).

Their attitude towards risk is a "semi-blind confidence" derived from everyday experience in the lab and a claimed lack of contradictory evidence. Summarised, molecular biology is characterised as a control-oriented scientific culture in which uncontrolled situations are avoided, complexity is reduced and replaced by "hard" facts, and scientific knowledge is de-contextualised *in vitro*. And last but not least: it is focused on product marketability. On the other hand, ecologists aim less at producing these reliable and reproducible results by taking part in inter- and intradisciplinary projects using observation techniques, idiographic description, comparative analysis, field experimentation, but also laboratory research and computer modelling. In contrast to molecular biologists, an unrestricted view is highly valued precisely to avoid an inadvertent reduction of unrecognised information:

> *In ecology, non-knowledge is seen as the result of the contingent experimental research strategy and the problematic (re-)transfer of experimental results to open, complex, and dynamic natural systems. This attitude is underlined by recurrent failures in forecasting the behavior of natural entities. Particularly in ecosystem ecology, major epistemic strategies appear to consist of maintaining an unprejudiced openness towards surprise and of a paradoxical effort "to expect the unexpected" in order to test and modify prevalent theoretical assumptions* (Böschen et al. 2006, 299).

In risk situations, ecologists adopt a precautionary attitude precisely because they refuse to reduce the object world to its observable and predicted traits. Summarised, ecology is characterised by an uncertainty-oriented scientific culture with a methodological sensitivity to unforeseen and unexpected results, observation *in situ*, by the acknowledgement of complexity, and a focus on ecosystem conservation. Both cultures of (non-)knowledge are equally "scientific" and "rational" and "associated with specific (implicit/explicit) motives and based on specific (known/unknown) implications and limitations" (Böschen et al. 2006, 300). This leaves society to choose between a control-oriented and an uncertainty-oriented approach in situations of unknown risks.

Commercialisation of Science

Universities, science organisations and individual scientists have increasingly become players in the *commercial* arena and the emerging biotechnology industry

in the 1980s is generally regarded as the driving force behind this development (Baskaran and Boden 2004; Meyer 2006; Bauer and Gregory 2007; Andersson 2008). Two elements have been decisive in this respect. First is the issue of university patenting. The Bayh-Dole Act was passed by the United States Congress in 1980 which allowed publicly funded research to be privately owned and exploited, and it thereby provided financial incentives for universities to commercialise basic research, in terms of licensing patents to industry or have scientists start up (spin-off) companies themselves (Jasanoff 2005; West 2007). That same year, the Supreme Court of the United States extended intellectual property ownership to all varieties of living organisms in the Diamond vs. Chakrabarty case:

> *The reduction of all genetically altered life forms to products of manufacture or patentable discoveries was a boon to the commercial investment in biotechnology and to the growth of university – industry partnerships. In addition, a single genetic alteration could transform an organism from being non-patentable to becoming patentable subject matter. Molecular biology departments became private enterprise zones practically overnight* (Krimsky 2005, 321).

Similar legislation has been introduced worldwide, such as the EU Directive 98/44/3C (European Communities 1998; Meyer 2006). A second decisive element has been the shift since the end of the 1970s and early 1980s from public to private patronage of scientific research, as Western governments framed the *privatisation* of scientific research as another interesting condition for stimulating economic growth within a context of global economic competitiveness. Programs were set up to reduce public expenditure on the one hand, while relocating scientific research within either the private commercial sphere or marketised public sector on the other. This has increased financial and market pressures on public scientific institutions and universities who have increasingly turned into public-private hybrids. Meyer (2006) has argued that biotechnology has developed its technological tools in a political and cultural climate in which the market-place and the ideals of competition are promoted as the most "efficient" guiding principles in the social organisation of society and therefore she asks whether the straightforward orientation towards the market in this area of science has been shaped by the social context in which it has been nurtured. Other authors (Bauer and Gaskell 2002; West 2007) have concluded that science and private business have blended together into a "science-industrial complex" united by powerful economic interests in the promotion of biotechnology. University campuses have become sites for industrial development, exemplified by biotech-valleys worldwide that group the biotech-departments of universities together with biotech-industries in one geographical location, as for instance in Ghent, Belgium. Governments – for whom technology has become an important export commodity as its contribution to trade and national development has been widely acknowledged – are usually broadly supportive of this evolution. West (2007, 133-4) further argues that this development is global in nature and largely independent of state control and as such has undermined the power and autonomy of the state in regulating biotechnology, which has led to a virtual deregulation of biotechnology in some parts of the world on the one hand, and a liberation of innovation from geo-political constraints on the other. In the end, scientific research and scientific knowledge have increasingly become "private goods" with the con-

comitant *commercialisation* and *marketisation* of science as an inevitable consequence. The ideal of the independent scientist that serves the "public interest" and provides disinterested knowledge has become much less credible, further weakening the claim that science provides a universal authority (Levidow 1999; Meyer 2006). This constitutes a challenge for science communication.

The Challenge for Science Communication

Science communication has predominantly been defined in terms of a *transmission* view that perceives the relation between science and society as a matter of transmitting information from the (unitary and consensual) scientific realm to the public (Lewenstein 1992; Bucchi 1996; Van Dijck 1998; Salleh 2004; Meyer 2006). This traditional model regards the public appreciation and acceptance of science and technology simply as a matter of overcoming resistance, for instance, by more science diffusion and by "educating" the public. It relies on an unproblematised notion of scientific consensus in debates about technological risk. This model has been given renewed vigor in the form of the "public understanding of science (PUS)"-movement initiated in the 1980s as a response of the scientific establishment to a perceived crisis of public legitimacy in a context of both reflexive modernisation and the commercialisation of science. Moreover, several authors have argued that the trend towards the commercialisation and privatisation of scientific knowledge has created a fertile context for a logic of marketing, advertising and public relations to thrive with respect to science (Bauer and Bucchi 2007; Bauer 2008). They conclude that today there is a new regime of science communication, PUS Inc., which stands for a practice of science communication using the logic of public relations and corporate communication:

> *Universities now function within a context where governmental, industrial, and financial milieus become less and less distinguishable. This privatised production of knowledge inevitably brings with it the logic of professional communication, of marketing, advertising, and public relations for science* (Bauer and Gregory 2007, 43-4).

For instance, media research has linked the recent advances in biotechnology to discourses of "genohype." This refers to media discourses that "hype" benefits and downplay risks, carrying headlines that proclaim the next big breakthrough. This hyping has been related to the increasing pressure on researchers and research institutions to justify their work in economic terms which creates a particular spin in terms of an optimistic picture (Caulfield 2004, 2005). Within this context of commercialisation, and the associated logic of corporate promotion in science communication, Meyer (2005; 2006) considers the consequences for journalism and wonders whether "a scientific researcher [should be considered as] just another power broker to be treated on par with any other power-broker?" (Meyer 2006, 239). Especially in the GM debate, scientists have been presented as "guided by vested interests." David (2005, 141-2) provides an account of how the support and rejection of the Hungarian scientist Arpad Pusztai's work on the effects of GM potatoes on the immune system of rats was directly related to which fellow scientist possessed financial links to the ongoing development of GM crops or food and which did not. As institutional proponents of the technology, science and industry prefer to foreclose debate over the problem of unforeseen consequences. They are

aided by the traditional transmission model which serves as a powerful tool in public discourse, for it sustains the social hierarchy of expertise and it preserves a role for the media as the secondary validators of institutionally validated "facts" or dominant risk definitions (Gamson 1999). Moreover, by conceptualising the relation between science and society in terms of transmission and communication, it forecloses any problematisation of the social uses of science or the trend towards corporate communication in the overall context of science communication, both of which are potentially problematic in the case of new technologies such as GM crops or food that come with many known and unknown risks. An illustrative example of these trends is the special September 2007 issue of the peer-reviewed *Biotechnology Journal*, dedicated to the public GM debate. In the opening editorial, Dr. Kristina Sinemus (PhD in agricultural biotechnology), CEO of "Genius Science & Communication," a German public relations consultancy company, laments the "scared, anxious and fearful" public and the emotional tone of the debate before writing:

> *Especially in the light of economic prosperity, which is highly dependent on science, hostility to innovation is counterproductive. The question is not whether societies want new technologies – there is simply an economic requirement for them. This in turn means that public understanding and a thorough exchange with scientists need to be methodically enforced* (Sinemus 2007, 1047).

First, the observation that a CEO of a PR-firm writes the editorial of a peer-reviewed scientific journal not only demonstrates how closely industry and science are entwined in the case of agricultural biotechnology, but also how its science is "sold" for private interests. Secondly, a crude economic rationality is invoked as the only important motivation for supporting agbiotech or science in general. Scientific progress is equalled to economic growth, and any sceptic is up for re-education.

Social Movements as *Alternative* Science Communicators

Democratising Science Movements

Worldwide, the promotion of GM crops and food has been challenged by a broad coalition of new social movements/NGOs (environmental, nature, north-south/Third World and farmer movements together with consumer organisations), often supported by independent (dissenting) scientists. There is, however, little literature to date on the relation of these organisations with science communication. Most of the literature focuses on the relation between movements and media (Gamson and Wolfsfeld 1993; Benford and Snow 2000; Ferree et al. 2002), sometimes specifically in the context of environmental risks (Hansen 1993; Allan et al. 2000; Anderson 2000). Nevertheless, several studies have indicated how social movements have organised in response to the control of governmental decision-making by expert knowledge influenced by corporate entities (Parajuli 1991; Epstein 1995; McCormick 2007). By empowering (certain kinds of) experts, while marginalising lay people, this process has often been found to contribute to social inequality. McCormick (2007) provides one of the most interesting studies to date on the relation between social movements and science. She has defined social movements that challenge scientisation as "democratising science movements" that (1) contest existing re-

search, (2) generate new research to counter it, (3) demand an enlarged scope of participation in government institutions, and (4) re-frame scientifically codified objects. They contest the seeming objectivity and neutrality of science by framing it as biased and politically driven and by forming alliances with sympathetic experts (lay-expert collaborations) who provide them with the necessary scientific information and back-up or who are asked to conduct new studies. These movements use scientific research as a material and discursive resource and often aim at instigating an epistemic shift in current institutionalised scientific conceptions on the one hand, and at discursive changes in the framing of the social values underlying science (in society) on the other. They emphasise social and environmental justice and equality, call for improving democratic practice by means of increasing the possibilities for participation, and promote the public understanding of *alternatives*. McCormick concluded from her study that "democratising science movements" can only change official discourse and governmental decision-making to make it respond to their interests by reshaping a dominant paradigm in terms of epistemic shifts and discursive changes.

A second interesting study is provided by Mormont and Dasnoy (1995) who have studied the source strategies of scientists and environmental movements in the mediatisation of climate change. They argue that the primary role of these movements is not necessarily an expert role in terms of publishing their own scientific reports, but a role as mediators between public opinion and scientific expertise. In this respect, their first function is publicly testing the credibility of scientists and their diagnoses, either by organising second expert-conferences, by seeking to reveal scientists' implicit commitments (are they close to industry?), or by intervening as genuine science communicators in providing additional information to public issues. The performance of this function comes close to helping laypeople contextualise the intrinsic value of research and the discourse of experts. Secondly, they provide their own risk definitions and they are found to do this mainly by seeking to define the widest range of potential consequences that may have some significance for each audience they address (health, ecological, economic, etc.). Generally, they do this much more explicitly than scientists, mixing the messages with (emotional) appeals to the preoccupations and daily experiences of regular people, or exposing the resistance of those who do not want any preventive policies. According to Mormont and Dasnoy (1995), when it comes to the matter of control of the public communication process, the roles and strategies of scientists and movements should be characterised as an interplay of complementarity and competition which can take on different configurations depending on the context. Whereas mainstream science and environmental organisations are found to be on the same side on the issue of climate change, the case is different with GM products. Yearly (2008) points out this dilemma by explaining that in the case of climate change the efforts of environmental organisations have been directed at emphasising, restating and publicising official messages while countering the claims of climate-sceptics, which implies that they align themselves with the scientific establishment whose claim to objectivity is thereby strengthened. Exactly the opposite is the case in the GM debate in which these organisations confront that same scientific establishment and its claim to objectivity when they address the limits of available scientific knowledge in terms of known and unknown risks

of genetic engineering. The dilemma then becomes how these organisations are able to distance themselves from the scientists' conclusions in cases such as the GM debate, without losing credibility and appearing arbitrary or tendentious.

The GM Debate

Several studies have found social movements/NGOs in the European GM debate to have either instigated epistemic shifts or succeeded in discursively reframing the values at stake. Concerning the former, the key has been the broadening of initial institutionalised scientific conceptions from the control-oriented approach of molecular biology/genetics to a more uncertainty-oriented approach of ecology in risk assessment and policy-making in general. In the case of France, organisations such as Greenpeace, Confédération Paysanne (farmers trade union) and Friends of the Earth were found to have played a large role in turning what had been a technical-agricultural debate limited to plant breeders and geneticists into a public controversy (Fillieule and Marijnen 2004; Roy and Joly 2000). These organisations not only carried out widely reported demonstrations and field trial destructions, but they also appealed to the French State Council to have an authorisation on the cultivation of GM maize revoked. Their argument was that the French government had neglected to apply the precautionary principle by not covering all potential impacts on the environment and public health, leading the state council eventually to appeal to the European Court of Justice about revoking its earlier authorisation. Backed by scientific studies, these organisations eventually succeeded in changing the links between scientific expertise and regulation: what had first been a risk assessment concerned with the intrinsic characteristics of the genetic modifications, assessing safety on the basis of molecular aspects only, changed in terms of broadening the range of uncertainties that would be taken into account. This refers, for instance, to risks concerning cross-pollination or multiple herbicide-tolerance. Backed up by media coverage, the organisations had not only succeeded in promoting broader definitions of "adverse effects" and unforeseen consequences, but the scope of participation was also broadened to include expertise in ecology and environmental NGOs in advisory committees. Furthermore, they challenged the implicit assumptions underpinning scientific risk assessment (for instance, agricultural productivism and an increasing dependence on multinationals in opposition to small-scale agriculture). Levidow (1999) has found NGOs similarly challenging the initial expert basis of safety claims in Britain. Schenkelaars (2005) has shown how in the Netherlands NGO-opposition did not only lead to new priorities for risk assessment but also to tighter criteria for evidence, and has contributed to analytical rigor in general. Their actions have further challenged the distinction between scientific-technical and societal-ethical aspects of safety regulation. Eventually, the successful mobilisation of counter-expertise to question the adequacy of the science in regulatory decision-making (see also Purdue 2000; Schurman 2004) is always found to be the most important element in this respect.

NGOs have also been very successful in reframing the (values at stake in the) debate on agricultural biotechnology in Europe (Bauer and Gaskell 2002). Previous research into the media representation of this debate in Northern Belgium between 2000 and 2004 has shown how the local NGO-platform succeeded in reframing the debate from a matter of "scientific progress" and "economic prospects" to a

matter of "public accountability" and "unforeseen consequences" (Maeseele and Schuurman 2008). NGOs have eagerly employed the discursive weapon and have communicated many alternative frames for people to interpret this technology (GMOs as time bombs, as irreversible threats with unpredictable effects) as well as mobilising metaphors such as "genetic pollution/contamination," "Frankenfoods," "killing fields," "pandora's box," etc. (Levidow 1999; Hellsten 2002; Schurman 2004; Wagner et al. 2006).

NGOs in Northern Belgium's GM Debate

In Northern Belgium, a region of approximately six million inhabitants, an NGO-platform of over a dozen organisations arose by the end of 1999 campaigning around the country against agricultural biotechnology. This happened in a context where they confronted a very dynamic "science-industrial complex," as northern Belgian scientists developed the technique to transfer foreign genes into the plant genome in the seventies (Van Larebeke et al. 1975), and subsequently founded Plant Genetic Systems (PGS) in the eighties which was the first company to develop genetically engineered plants with insect tolerance. To make a long history short, these events further developed into a "Biotech Valley" in the university city of Ghent that today hosts, on the one hand, VIB which unites the research departments of four universities and was established by the regional government with as its main objective "to turn [its scientific research] into new economic growth" (VIB 2003) for the region, and on the other, agro-biotech multinationals such as Bayer CropScience (formerly PGS), BASF Plant Science (formerly VIB spin-off CropDesign) and deVGen (VIB spin-off; 4th most important shareholder is Monsanto). In 2006, there were 140 biotechnology companies in Northern Belgium that make up for seven percent of the European industry and deliver 16 percent of total European biotech output, which makes it a significant and important industrial sector (VIB 2008). Confronting industry and VIB in Northern Belgium was a very active NGO-platform which for the purposes of this study has been limited to the five NGOs which have played the most visible role during the GM controversy and debates: Greenpeace, JNM, Velt, Wervel and BBL. Greenpeace is a well-known international ecological movement with regional and national sections. JNM is the Dutch abbreviation for Youth Organisation for Nature and Environment and is a youth-movement for youths until the age of 25. Velt stands for Ecological Living and Cultivation and profiles itself as a (alternative) consumer organisation for organic food and agriculture. Wervel is the Working Group for a Just and Responsible Agriculture. Although not an ecological organisation, their explicit aim is to bring together farmer, environment, consumer and the Third World (Wervel 2009). And last we have BBL, the League for a Better Environment, which is the federation that unites more than 140 environmental and nature organisations in Northern Belgium. There is a clear division of labour between these NGOs: Greenpeace and JNM are the militant protest organisations with a clear aim at media attention, but whereas Greenpeace goes for more spectacular campaigns to reach the national ("quality") media, JNM and its numerous regional sections go for local protest actions and local ("popular") media. As a federation BBL takes part in legislative discussions with government and industry, and as such it takes a more moderate view than many of its member organisations. Wervel and Velt are less visibly present in the

media, but have taken part in many debates around the country representing the NGO-platform from a content point of view. Media research has shown that these NGOs, despite their powerful opponents, have not only succeeded in becoming the number one media source between 2000 and 2004 (at the height of the controversy) in popular newspapers but also in reframing the debate from a matter of scientific progress and economic prospects to a matter of public accountability and unforeseen consequences (Maeseele and Schuurman 2008).

Methodology

The in-depth, face-to-face semi-structured expert interview was singled out to obtain a nuanced insight into the thinking of an NGO as a collective actor. Organising the interviews around a number of topics allowed the respondents to talk freely and at length and created the necessary space to allow them to give meaning to their social experiences as an actor in the GM debate using their own words. Topics and specific questions were decided during group discussions with students who took a seminar on this topic. The eventual interview was structured around four topics: (1) an introduction of their NGO and its position in the field, (2) the NGOs' goals and strategies in the GM debate, (3) the role of science and scientific information, and the claiming of epistemic authority by scientists in universities or business, and (4) the role of ideology. The interviews were conducted by the author together with two students for every NGO, this to make sure that all the necessary topics would be addressed and to create a maximum space for elaborating on particular elements or possible unarticulated assumptions. The interviews were audio taped and transcribed, and lasted between 90 and 255 minutes. Of the five initial interviews, there was one which was rather unsatisfactory because the spokesperson for Greenpeace would only be interviewed for 90 minutes, which was far too short for our topic list to be addressed. However, we succeeded in retracing the individual who had been the campaign director of Greenpeace during the comprehensive campaign in the "years of controversy," bringing our total to six interviews[2]. The interviews were conducted in February and March 2008. Through these interviews, we wanted to know how these NGOs make sense of their encounters with science in the GM debate and how they situate themselves in their role as *alternative* science communicators. The results have been paraphrased and structured in five topics, of which each is introduced by a quote from the interviews.

Adversaries in the Public Forum: Not Industry, but the Public Scientific Institute

> *Between 1996 and the moment European legislation got underway we were amazed to find a debate between scientists and consumers instead of between industry and consumers. Their strategy, from a corporate point of view, was to leave the debate to the scientists as they thought these had better odds in winning the debate against us. They went underground themselves and didn't show anymore* (Jan Turf, ex-Greenpeace).

When discussing the role and strategies of their foes on the public stage, Wervel, Velt, Greenpeace and JNM look at the debate as involving only them and VIB, whereas the industry itself is perceived as sending out the university scientists to do its work. There is a general feeling that the industry has shied away from pub-

lic debate and has chosen to keep a low profile as its agenda does not necessarily need public attention: it is are perfectly fine waiting until the social debate fades out or evolves to its advantage. What we find here are the social consequences of the principle of cumulative inequality that NGOs in general face (see Gamson and Wolfsfeld 1993): institutional actors, such as industry, do not need the media for mobilisation purposes or for validating their existence as influential actors. They have automatic access to institutional channels of influence as they are part of achieving government's goals in economic development. And for controversial industries like agbiotech-corporations, it is often more worthwhile to lobby in private than to seek public debate.

Science and Scientific Credibility

> *VIB-people are academics who enjoy a certain social esteem. Sometimes they make slippery statements they get away with because these people are considered to be knowledgeable. Recently, there was that scientist that refused to do the Vilt-interview claiming that Greenpeace is unscientific. This is difficult for us to respond to, since he's a scientist and people are inclined to believe him, whereas we try to do as much scientific research as possible* (Jonas Hulsens, Greenpeace).

It is clear from our interviews that a scientific basis and scientific credibility are a *condition sine qua non* for each NGO. The GM-debate is not perceived as an anti-science debate, quite the contrary, the science comes first. The interviewees relate this to a basic notion of credibility without which it would be impossible as an organisation to appear on the public stage without being marginalised. Each NGO emphasises that fundamental scientific research in laboratories (so-called "contained use") is not its target: only the release of GM products in the environment or their circulation in the food chain is, thereby implying that the scientific community should not feel attacked. Referring to the Vilt-incident, Greenpeace emphasises that VIB usually accuses them of hampering scientific developments, not of being unscientific, and considers the former to be true in respect of undermining the financial basis for the application of VIB's scientific achievements. This implies, however, that the scientific institute conceives public debate in terms of its financial ramifications for the private sector. Greenpeace further refers to a VIB-exhibition ("Let's eat Genetic") taking place in 2001-02 in which it succeeded in agreeing with VIB-scientists on a common definition of the ecological risks of GM products. The scientists acknowledged those risks, but simultaneously insisted that these were only temporary problems, which differentiated their position from Greenpeace's again. In deploring VIB's refusal for the dual Vilt-interview, several spokespersons refer to the fact that VIB is a public institute, for which science communication is a core mission. The epistemic and cultural authority which the science institute is able to draw from is clearly interpreted as a problem for the NGO-sector in general.

Science Communication

> *In addition to the biotechnology of VIB, you find biologists who study the potential impact of GMOs on biodiversity and in biotopes, and who have been the first to warn us that something was wrong, because Greenpeace*

of course didn't invent that. We're just some people that come together to protect the environment and it is only when the science comes up and says: there is a threat there, that we can do something with that. In that sense, the fundamental relationship of Greenpeace with science is that Greenpeace tries to popularise existing scientific knowledge, popularise it for decision-makers. … So what we did was communicate a different science. They communicated about the biotechnology of annotating genomes and the cut and paste of adding properties to plants. But that was not what our debate was about; our debate is and has always been that when you take a plant with that kind of property into an existing biotope, what happens then? They didn't care about that, so what they did was some kind of niche communication, but not science communication. They communicated about their own little domain, they were not interested in a broader type of science communication, and in that sense, you could say, they were the allies of those who were making money [with GMOs], and didn't care otherwise (Jan Turf, ex-Greenpeace).

Among our interviewees, there is a general perception that "independent" science is increasingly put at the service of industry, and VIB and the agbiotech-sector in general are considered to exemplify this evolution. Therefore, the role of the scientific institute VIB is under fire. Each NGO has had different experiences with the institute during the GM debate. For Velt and Wervel it is impossible to consider VIB as an independent scientific institute referring to their previous experiences with VIB in debate panels. JNM elaborates on this point when confirming the scientific merits of the institute, but the many links to industry and the fact that their public communication is always supportive of the technology, makes VIB into the voice of industry for JNM. Although acknowledging that VIB takes care of the public communication of the local industry (each one of which were originally VIB spin-offs), BBL takes a more moderate view in emphasising that VIB does this without taking resort to the kind of "hype" arguments that are often used to promote biotechnology.

The quote above clearly refers to the interdisciplinary antagonisms that exist when it comes to the risks of agricultural biotechnology and how the local biotechnology institute (with a public mandate to communicate on biotechnology) only communicates from the control-oriented perspective to unknown risks of molecular biology. We find different references in the interviews to the epistemic differences between molecular biology and ecology and how this relates to how their communication differs from "institutional" science communication. It is emphasised that they start from a "different" science, which however does not lead to profit-making products, but takes into account the consequences for the ecosystem as a carrying force. For instance, the argument of GM crops as leading the way to a more sustainable agriculture is refuted by foregrounding a conceptualisation of sustainable agriculture that attributes a central role to biodiversity and its "natural repair tools" for cleaning water or recycling nutrients. The reductionist approach of biotechnology, on the other hand, is said to degrade biodiversity, arguing that the final result of worldwide GM agriculture would be worldwide monocultures. Referring to the Farm Scale Evaluations[3], BBL condemns the lack of polemics and controversy in the scientific community between "biotechnologists" on the one hand and ecologists and biologists on the other. Producing the GMOs is one thing, but studying the

consequences of their introduction is another. And somehow, this second step had been glossed when the first generation of GM crops was commercialised. There had not been any a large-scale evaluation of their ecological consequences, and BBL attributes this to a lack of debate within the scientific community.

Different Framing

> *Eventually, a nefarious development carries on globally for economic reasons. The argumentation is always the same: the "hard arguments" are economic arguments, these are dominant, and the soft NGO-sector that stands up for social justice … those are defenseless arguments … In a certain sense, in the eyes of those whose primary goal is safeguarding their profitable sector, we embody irrationality and stupidity* (Louis De Bruyn, Wervel).

These five NGOs were indeed found to aim not only at instigating an epistemic shift, but also for a different framing of the social choices that have to be made in agriculture in general. Whereas today, the economic arguments of growth, efficiency, profit and cost reduction are the dominant interpretations in making policy choices, these NGOs emphasise the importance of social justice and ecological sustainability, while in the eyes of their opponents they are blocking "scientific progress" and the development of "high-tech agriculture." The protection worldwide of an autonomous agricultural sector in which farming is able to develop within its economic and ecological environment into a self-sustaining and labour-intensive activity, is interpreted as an important element of these "soft" values which stand in opposition to the current global trends pushing for more trade liberalisation and large-scale high-tech agriculture. Eventually, the main limitations these NGOs are found to face are not *structural* limitations, although financial resources and access to the media are said to be limiting factors, but a *cultural* limitation: the domination of the corporate-economic logic in our societies, of which the current GM crops, which are predominantly engineered to be resistant to a herbicide or insecticide (or a combination of both) from the exact same company, are considered a prime example. It is in this context that these organisations state to seek the boundaries of social debate and aim at shifting them.

Discussion

In the context of a "science-industrial complex" with strong economic interests in the promotion of GM crops and food, which moreover enjoys the benefits of largely promotional institutional science communication channels to foreclose any debate over the problem of known and unknown risks, local NGOs are found to perform a role as *alternative* science communicators who whish (1) to instigate an epistemic shift to an uncertainty-oriented approach in risk assessment, and (2) reframe the (values at stake in the) debate. This requires us to return to Meyer's earlier question about the consequences of these evolutions for journalism (2006). In the traditional model, "science journalism" is conceptualised as an extension of institutional science communication, with (science) journalists seen as only "transporting" scientific knowledge from scientists to the public while identifying with the scientific profession instead of with the public. Therefore, Meyer (2006) argues that in the context of the present commercialisation of science, the idea of knowledge as a common good can only be saved by breaking with the convention

of science transmission and its associated marketing practices in order to promote and facilitate public scrutiny, discussion and reflection on questions of knowledge and technological innovation. For example, she juxtaposes the convention of science transmission in the context of the logic of corporate communication with the convention of investigative journalism, where the former's identification with the scientific profession should be replaced by identification with the public within the perceived dichotomy of "the people versus the interests." Salleh (2004) joins Meyer by arguing that responsible journalism in this context is not equal to amplifying the idea of a scientific consensus on technological risks. To the contrary, it implies framing "risk debates" as a *conflict* between opposing responses to unforeseen consequences, by revealing the competing sets of assumptions and values underlying these responses. However, she adds that this will only be possible when the dichotomy between scientific and non-scientific, between "hard facts"/"sound science" and epistemically-vacuous values, is exceeded in favour of a journalistic approach that shows how *different* responses to uncertainty have *legitimate* standing in the debate. Furthermore, it also implies a redefinition of the journalistic notion of objectivity, because this notion is directly related to the reification of scientific authority, either as a professional ideal by leading journalists to uphold a positivist notion of science (as the ultimate arbiter of truth), or as a method by which journalists choose to rely on official institutional sources (as a proxy for credibility) rather than dissenting sources, such as NGOs in the GM debate. Both argue that it is only by framing scientific and technological developments as social issues, in which conflicting epistemological, normative and axiological views are exposed, that news media live up to their role as facilitators of public discussion and (science) democratisation. Here the role of NGOs as *alternative* science communicators could prove particularly valuable.

Acknowledgements

This study would not have been possible without the financial support of Ghent University , the intellectual and material support from its Centre for Critical Philosophy and the Dept. of Communication Studies, and the students of the seminar 'Media Sociology; module: NGOs en GMOs' (2007-2008) Tim Derycke, Matthias De Vlieger, Kenneth Calliauw, Astrid De Wael, Sarah Van Leuven, Maarten De Ruyck, Ruth Vanden Berghe, Julie Beysens, Bregt Timmerman and Félicie Martens. I would also like to thank Ruben Baert, Stijn Joye, Veva Leye, Thomas Maeseele, Gertrudis Van de Vijver and Hans Verstraeten for their fruitful comments on this paper.

Notes:

1. Vilt is subsidised by the Flemish regional government and the private sector for public communication on agri- and horticulture. Flanders is the Northern Dutch-speaking region of Belgium to which we will refer as Northern Belgium in the remainder of this paper.

2. Velt: Luc Naets; JNM: Liesbeth Janssens; Wervel: Louis De Bruyn; BBL: Joris Gansemans; Greenpeace: Jonas Hulsens and Jan Turf.

3. The Farm Scale Evaluations were set up by the British (government) Dept. for Environment Food and Rural affairs (DEFRA) as "a four-year programme of research by independent scientists aimed at studying the effect, if any, that the management practices associated with Genetically Modified Herbicide Tolerant (GMHT) crops might have on farmland wildlife, when compared with weed control used with non-GM crops" (http://www.defra.gov.uk/environment/gm/fse/). It is still the principal study to date on the environmental impact of GM crops anywhere in the world.

References:

Allan, Stuart, Adam Barbara and Cynthia Carter, eds. 2000. *Environmental Risks and the Media*. London: Routledge.

Anderson, Alison. 2000. Environmental Pressure Politics and the "Risk Society." In S. Allan, A. Barbara, and C. Carter (eds.), *Environmental Risks and the Media*, 93-104. London: Routledge.

Andersson, Kjell. 2008. *Transparency and Accountability in Science and Politics. The Awareness Principle*. Houndsmills: Palgrave MacMillan.

Baskaran, Angathevar and Rebecca Boden. 2004. Science: A Controversial Commodity. *Science, Technology & Society* 9, 1, 1-26.

Bauer, Martin and Massimiano Bucchi, eds. 2007. *Journalism, Science and Society. Science Communication between News and Public Relations*. New York: Routledge.

Bauer, Martin and George Gaskell, eds. 2002. *Biotechnology – The Making of a Global Controversy*. Cambridge: Cambridge University Press.

Bauer, Martin and Jane Gregory. 2007. From Journalism to Corporate Communication in Post-War Britain. In M. W. Bauer and M. Bucchi (eds.), *Journalism, Science and Society: Science Communication between News and Public Relations,* 33-52. New York: Routledge.

Beck, Ulrich. 1992. *Risk Society. Towards a New Modernity*. London: Sage.

Benford, Robert and David Snow. 2000. Framing Processes and Social Movements: An Overview and Assessment. *Annual Review of Sociology* 26, 1, 611-39.

Böschen, Stefan, Karen Kastenhofer, Luitgard Marshall, et al. 2006. Scientific Cultures of Non-Knowledge in the Controversy over Genetically Modified Organisms (GMO). The Cases of Molecular Biology and Ecology, *GAIA* 15, 4, 294-301.

Bucchi, Massimiano. 1996. When Scientists Turn to the Public: Alternative Routes in Science Communication. *Public Understanding of Science* 5, 4, 375-94.

Caulfield, Timothy. 2004. Biotechnology and the Popular Press: Hype and the Selling of Science. *Trends in Biotechnology* 22, 7, 337-39.

Caulfield, Timothy. 2005. Popular Media, Biotechnology and the "Cycle of Hype." *Journal of Health Law and Policy* 5, 213-33.

David, Matthew. 2005. *Science in Society*. New York: Palgrave Macmillan.

Epstein, Steven. 1995. The Construction of Lay Expertise: AIDS Activism and the Forging of Credibility in the Reform of Clinical Trials. *Science, Technology & Human Values* 20, 4, 408-37.

European Communities. 1998. Directive 98/44/EC of the European Parliament and of the Council of 6 July 1998 on the legal protection of biotechnological inventions. *Official Journal of the European Communities* 41 (L213), 13-21.

Ferree, Myra Marx, William Gamson, Jürgen Gerhards, and Dieter Rucht, eds. 2002. *Shaping Abortion Discourse. Democracy and the Public Sphere in Germany and the United States*. Cambridge: Cambridge University Press.

Fillieulle, Olivier and Anne Marijnen. 2004. Alliances for All and Europeanisation for a Few: Anti GMOs Mobilizations in France. Paper presented at the ECPR Conference, Uppsala, Sweden, 13-18 April 2004.

Gamson, William. 1999. Beyond the Science-versus-Advocacy Distinction. *Contemporary Sociology* 28, 1, 23-6.

Gamson, William and Gadi Wolfsfeld. 1993. Movements and Media as Interacting Systems. *The Annals of the American Academy of Political and Social Science* 528, 1, 114-25.

Giddens, Anthony. 1990. *The Consequences of Modernity*. Cambridge, UK: Polity Press.

Hansen, Anders. 1993. *The Mass Media and Environmental Issues*. Leicester: Leicester University Press.

Hellsten, Ina. 2002. *The Politics of Metaphor. Biotechnology and Biodiversity in the Media*. Tampere: Tampere University Press.

Jasanoff, Sheila. 2005. *Designs on Nature. Science and Democracy in Europe and the United States*. Princeton: Princeton University Press.

Knorr Cetina, Karin. 1999. *Epistemic Cultures. How the Sciences Make Knowledge*. Cambridge, MA: Harvard University Press.

Krimsky, Sheldon. 2005. From Asilomar to Industrial Biotechnology: Risks, Reductionism and Regulation. *Science as Culture* 14, 4, 309-23.

Levidow, Les. 1999. Britain's Biotechnology Controversy: Elusive Science, Contested Expertise. *New Genetics and Society* 18, 1, 47-64.

Lewenstein, Bruce. 1992. The Meaning of "Public Understanding of Science" in the United States after World War II. *Public Understanding of Science* 1, 1, 45-68.

Maeseele, Pieter and Dimitri Schuurman. 2008. Biotechnology and the Popular Press in Northern Belgium. A Case Study of Hegemonic Media Discourses and the Interpretive Struggle. *Science Communication* 29, 4, 435-71.

McCormick, Sabrina. 2007. Democratizing Science Movements: A New Framework for Mobilization and Contestation. *Social Studies of Science* 37, 4, 609-23.

Meyer, Gitte. 2006. Journalism and Science: How to Erode the Idea of Knowledge. *Journal of Agricultural and Environmental Ethics* 19, 3, 239-52.

Mormont, Marc and Christine Dasnoy. 1995. Source Strategies and the Mediatization of Climate Change. *Media, Culture & Society* 17, 1, 49-65.

Parajuli, Pramod. 1991. Power and Knowledge in Development Discourse: New Social Movements and the State in India. *International Social Science Journal* 43, 127, 173-90.

Purdue, Derrick. 2000. *Anti-Genetix: The Emergence of the Anti-GM Movement*. Aldershot, UK: Ashgate.

Roy, Alexis and Pierre-Benoit Joly. 2000. France: Broadening Precautionary Expertise? *Journal of Risk Research* 3, 3, 247-54.

Salleh, Anna. 2004. Journalism at Risk: Factors Influencing Journalistic Coverage of the GM Food and Crops Debate (Australia, 1999-2001) and Prospects for Critical Journalism. Unpublished PhD thesis. School of Social Sciences, Media and Communication, University of Wollongong, Australia.

Schenkelaars, Piet. 2005. Regulating GM Crops in the Netherlands: Precaution as Societal–Ethical Evaluation. *Science and Public Policy* 32, 4, 309-16.

Schurman, Rachel. 2004. Fighting "Frankenfoods": Industry Opportunities Structures and the Efficacy of the Anti-Biotech Movements in Western Europe. *Social Problems* 51, 2, 243-68.

Sinemus, Kristina. 2007. Talking with the Public – Challenging the Public Scare. *Biotechnology Journal* 2, 9, 1047.

Van Dijck, José. 1998. *Imagenation: Popular Images of Genetics*. New York: New York University Press.

Van Larebeke, N., C. Genetello, J. Schell et al. 1975. Acquisition of Tumour-Inducing Ability by Non-Oncogenic Agrobacteria as a Result of Plasmid Transfer. *Nature* 255, 742-3.

VIB. 2003. A Flemish Government Initiative. <http://www.vib.be/VIB/EN/VIB+at+a+glance/History/ >

VIB. 2008. Information Sought. <http://www.vib.be/InfoEdu/EN/Educational+material/>

Vilt. 2007. Genmodificatie enige vorm van zuivere landbouw. <http://www.vilt.be//gevilt/detail.phtml?id=1114>

Vilt. 2008. Waar blijven ggo's van de tweede generatie? <http://www.vilt.be/gevilt/detail.phtml?id=1130>

Wagner, Wolfgang et al. 2006. *The Monster in the Public Imagination*. In G. Gaskell and M. W. Bauer (eds.), *Genomics & Society: Legal, Ethical and Social Dimensions*, 150-68. London: Earthscan.

Weingart, Peter. 2004. Science in a Political Environment. The Dynamics of Research, Risk Perception and Policy Making. *EMBO Reports* 5, S1, S52-S55.

Wervel. 2009. Wat doen we. <http://www.wervel.be/wat-doen-we.html>

West, Darrel. 2007. *Biotechnology Policy Across National Boundaries. The Science-Industrial Complex*. New York: Palgrave Macmillan.

Yearly, Steven. 2008. Environmental Action Groups and other NGOs as Communicators of Science. In M. Bucchi and B. Trench (eds.), *Handbook of Public Communication of Science and Technology*, 159-71. London: Routledge.