

## **Disagreement or Misfit? Brazilian biotechnology faces socio and biodiversity**

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### **ABSTRACT**

This essay questions the role played by biotechnologists in Brazil. It argues that indigenous and traditional peoples, environmentalists and civil society also need be taken into account. If the priorities of techno-science and the market are the only ones to prevail, it is already time to think about the possible 'collateral damage'.

**Keywords:** *bio-diversity; bio-security law; biotechnology; transgenics.*

Quite often it has been argued that the twenty-first century is the century of biotechnology, that we are living in the era of biotechnology, that such technology expresses the future, and so on. In addition, since the beginning of the 1990s, there has been a lot of speculation about the relationship between biotechnology and biodiversity, an issue which, for us Brazilians, makes sense since we are still living in the most diverse country on the planet and we dispose of a certain critical mass in terms of biology and molecular biology. All these points matter and have to be taken into account when we think about biotechnology in Brazil. But there is one question that *never* or, perhaps *almost never* enters into the spectrum of Brazilian scientists: the presence in our nation of approximately two hundred indigenous peoples, most of whom are concentrated in the lands with the richest biological diversity, representing around 12% of the Legal Amazon region. For it seems that they simply are not supposed to exist, that they have not contributed at all to the singularity of nature and culture in the country, and that they do not mean anything for our scientific future. Therefore, it is no exaggeration to say that for techno-science, at least as it is practiced in Brazil, this presence, since it is so insignificant, becomes invisible.

It does not matter if the Brazilian State has signed international treaties that explicitly recognize the importance of indigenous peoples, such as the U.N. Declaration of the Rights of Indigenous Peoples, Resolution 169 of the International Labor Organization, the Convention on Biological Diversity, the FAO International Treaty on Phytogenetic Resources for Food and Agriculture, and the Convention on the Protection and Promotion of the Diversity of Cultural Expression. It does not matter, either, if a consistent anthropological bibliography was worked out by competent professionals, who have already studied the contacted peoples and written down in books much of their cosmology, their complex social organization, their sophisticated art, in summary much of their traditional knowledge. Nor does it help to point out that altruistic NGOs have dedicated themselves for decades to the defense of the interests of indigenous peoples - mapping the situation of territories and villages, as the *Instituto Socioambiental* has done; working closely with them, such as CTI and CCPY; recording and filming their way of life, like the *Video nas Aldeias Project*, or presenting to Western audiences their culture, dance and music, like Ideti. Finally, nobody seems to care if Villa-Lobos and other creators were inspired by their music, if Claudia Andujar and Maureen Bisilliat have photographed their beauty, if

Andrea Tonacci and others have filmed their dramas, if Mário and Oswald de Andrade have taken inspiration from them (remember Macunaíma, and the disturbing paradoxical maxim “Tupi or not Tupi, that’s the question”), if Montaigne reflected on their superiority, concerning freedom. One has to recognize that there is no work, research, or cultural initiative capable of breaching the prejudice against indigenous peoples and their knowledge and awakening a genuine interest in their thinking and their practices in relation to plants, animals and every sort of living being. Time goes by, for years and decades, and the mentality remains deep down the same as during colonial ages. So, it is quite revealing that on 1st November 2002, *Folha de Boa Vista* advertises, in the animal sections, a small text reading: “Yanomami cubs for sale, One year and six months old. R\$1.000,00. Contact 9971 3287”<sup>1</sup>.

Nobody cares. Unless I am mistaken no one in the scientific field even asks him or herself why indigenous societies preserve, conserve and produce forests whereas our society is incapable of preventing their devastation. Even worse: as stated by the Amazon journalist Lúcio Flávio Pinto: “Kingdom of light, water and forest challenging the cannons of knowledge based on other landscapes, Amazonia is — and it is ever increasingly less — the ideal territory for an ultimate experiment of man, the impenitent and impertinent *Homo agricola*: the founding of a forest civilization based on the intelligent use of the most noble good of this biome, and focused on the vegetal mass, [which is] the source of the greatest biodiversity on earth. Let us see, however, how we have entered the annals of human history: as the people who have most destroyed forests in all of time. In less than half a century more than 700,000 square kilometers of native forest have been knocked down. The speed and the scope of such destruction are quite impressive. In 1976 the Skylab satellite “photographed” the largest fire registered by an information device, causing international commotion. The inferno of almost 10,000 hectares had been brought about by Volkswagen, which was producing in the south of the Brazilian state of Pará not exactly cars, its specialty until then, but cattle, its ‘unspecialty’, to use a neology which Lewis Carroll would probably endorse, due to his aptitude for surreal language, the only language fitting the reproduction of foolishness patterns ruling the Amazon conquest”<sup>2</sup>.

Thus, it seems that we have nothing to learn from the forest peoples in order to dealing with Amazonia and the forest civilization that it requires. As if they were not tropical societies, as if they had not thought for millennia about the environment in which they live, as if their intelligence and sensibility were incapable of making progress, learning, evolving – obviously, in contradistinction to our owns. So, apparently everything they know about the different manifestations of life is of no use for the ‘life sciences’, at least in the way they have been developed until now.

Such attitude reveals, on the one hand, the prevalence of old socio-cultural clichés that Brazilians have inherited from the past, which makes them despise or scorn all ‘non-white’ or non-western thought; on the other hand, it also reveals the arrogance and self-sufficiency that modern science and technology tend to assume in society. These features seem to be inherent to scientific and techno-scientific knowledge but, in this country, they are stressed precisely because our weakness as producers of invention and innovation (according to international standards) arouse in our scientists a hypersensitivity that makes them consider as irrational, superstitious or anti-scientific, not to say almost criminal, any expression of critical distancing or questioning of their unconditional defense of progress as a primordial good for mankind. Therefore, due to an uncritical evolutionist perspective, it makes no sense to pay any attention to traditional knowledge because this means opening the doors to contamination that can only lead to regression, or at the very least will compromise our progress. The issue becomes evident even when biologists and biotechnologists recognize that traditional knowledge contains, for example, know-how about an active principle; in that case, one isolates and

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<sup>1</sup> “3rd National Report on Human Rights in Brazil — 2002-2005”. São Paulo: Núcleo de Estudos da Violência, Universidade de São Paulo, 2007, p. 348.

<sup>2</sup> “Quatro décadas de destruição na Amazônia”. Text written for the international seminar “Ensaio Amazônicos”, organized by Eduardo Viveiros de Castro and Laymert Garcia dos Santos, and supported by the Instituto Goethe and SESC Paulista in São Paulo, 8 - 10 December 2006; to be published with the presentations of the other contributors in 2008 by Cosac Naify.

extracts the ‘information’ from the theoretical and epistemological context in which it makes proper sense, conceiving it as a useful raw material that needs to be freed from the creeds and superstitions that ‘surround’ it; at best, it can be occasionally admitted that the information collected has some value that could be considered under the heading ‘benefit sharing’, as stated by the Convention on Biological Diversity.

However, Brazilian scientists do not appear to be hostile only to the production of knowledge by indigenous societies. Within our own society they resist and seem to oppose sectors and groups that, even when not questioning the value of scientific knowledge, seek to problematize it, relating the development of new technologies, especially biotechnology, to the risks and ‘collateral effects’ that are inherent to them and which have to be considered when making technological choices. This issue became quite clear from 2003 on, when emerged the conflict that opposed scientists and environmentalists during the passing of the bio-safety law and the crisis in CTNBio. In fact both exposed the reality of conflict when Brazilians had to decide whether or not to adopt transgenic agriculture, showing that scientists are very unwilling to discuss the question of risk, since they think it could threaten the development of science and technology in the country.

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The sociology of risk (Beck and others) and, more recently, the sociology of virulence and Paul Virilio’s studies have led us to discover first that “risk”, “accident” and “collateral effect” are a constitutive part of technological progress and, secondly, that techno-science only knows how to deal with technological risks by proposing more technology, more technological solutions that change the risk level. In this sense, paradoxically enough, the greater the advance of progress, the greater the advance of risk and uncertainty.<sup>3</sup>

For all these reasons, the principle of precaution became crucial as well as the object of an intense political struggle in international fora during the 1990s<sup>4</sup>. Society began to realize that it could no longer leave the resolution of techno-scientific problems exclusively up to techno-science. The last thing techno-science wants is for non-specialists to tell them there are any limits at all. Like capital, which likewise tolerates no limitation to its valorization, it believes itself to be above society.

From the result of the battle fought out in the Brazilian Parliament, the object of which was a new bio-safety law (Law 11.105/2005), we are able to know how the country intends to deal with the problem and, consequently, to build its future. At the level of discourse, all the forces at play evidently lay claim to society’s well-being in order to legitimize their positions; in practice, two conceptions of progress are at odds.

On one side, an alliance has been forged between so-called transnational “life science” companies, agribusiness and an important part of the scientific community to transform the bio-safety law into a law for biotechnological incentives. Its objective: instituting a legal framework that would impose no limits whatsoever upon the research and commercialization of genetic engineering. Its principal argument is that anything that stands in the way of either techno-scientific activity or the market

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<sup>3</sup> U. Beck. *Risk society — towards a new modernity*. London: Sage, 1992; B. Adam, U. Beck, U. and J. Van Loon (orgs.). *The risk society and beyond: critical issues for social theory*. London: Sage, 2000; J. Van Loon. *Risk and technological culture*. International Library of Sociology. London/New York: Routledge, 2002; H. Martins. *Technology, the risk society and post-history*. Lisbon: Instituto Superior de Ciências Sociais e Políticas, 1996; “Risco, incerteza e escatologia — Reflexões sobre o *experimentum mundi* tecnológico em curso”. *Episteme*, year 1, no. 1, Lisbon, Centro de Estudos de Epistemologia e História das Ciências e das Técnicas, Dec. 1997- Jan. 1998; and “Aceleração, progresso e *experimentum humanum*”. In: H. Martins and J. L. Garcia (orgs.). *Dilemas da civilização tecnológica*. Lisbon: Imprensa das Ciências Sociais, 2003, pp. 1-61; P. Virilio. *Velocidade e política*. São Paulo: Estação Liberdade, 1996.

<sup>4</sup> As it became evident to any observer of the Conferences of the Parties to the Convention on Biological Diversity during the 1990s.

constitutes a threat to progress and an obstacle to the fulfillment of the nation's future general happiness. Its motto: Brazil is in a hurry and needs to develop at any cost.

On the other hand, organized social and environmental movements (as well as a minority within the academic and scientific communities) do understand that a *de facto* bio-safety law should be created. Its purpose would be to protect society and the environment from risks inherent to the new technologies, and to hold responsible those who would, perchance, infringe upon the safety of the Brazilian population's diet and health. Their principal argument: there is no scientific evidence in the world (much less in Brazil) that the long-term effects of genetic engineering are not harmful<sup>5</sup>; and, even in the short and medium-range, it would be necessary to forget the generalizing clichés regarding progress to question who it is that benefits from the technological choices being made. Who pays the social and environmental costs that may perchance present themselves? Their motto: not even the imperative of progress dispenses with parameters – for progress in the present which might compromise progress in the future cannot present itself as such!

Not for nothing does the central focus of the conflict surrounding the bio-safety law concentrate on the meaning to be conferred upon the principle of precaution. The Preamble of the Convention on Biological Diversity, of which Brazil is a signatory, stipulates that “where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimize such a threat”. On the other hand, the second paragraph of Article 2 of the Cartagena Protocol, in force since September, 2003, states that “the Parties shall ensure that the development, handling, transport, use, transfer and release of any living modified organisms are undertaken in a manner that prevents or reduces the risks to biological diversity, taking also into account risks to human health”. To this end, the Protocol recommends that risk be assessed on a “case by case” basis. Finally, article 225 of the Brazilian Constitution of 1988 defines the right to biodiversity which, according to Carlos Frederico Marés de Souza Filho, elevates an ecologically balanced environment to the status of a legal commodity, something that may therefore be legally appropriated in a collective way, creating what is perhaps the most important of collective rights. According to the jurist, “This may be the most relevant of rights because it has been taking on an increasingly prominent role in the current world. The environment already interferes in various traditional legal institutes and subsystems, altering old legal dogmas and even the relationship of citizens to the State and commercial companies. (...) The text guarantees the integrity of the country's genetic patrimony, which means that any threat to the extinction of species should result in the State's intervention with the purpose of restoring balance, creating protected territorial geographic spaces and limiting or prohibiting harmful activities”<sup>6</sup>.

Therefore, considering all the established legal landmarks that celebrate the principal of precaution, the bill for the bio-safety law project was conceived in order that specialists, civil society and government might share in the elaboration and application of rules that affect the protection of living beings, final word on the subject being accorded to the State, not to the market nor even less to techno-science; for it is the State that must answer to the public, and bio-safety is a matter of public interest.

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<sup>5</sup> Six points from the last FAO report can be cited here, acclaimed by the Brazilian press as a ‘demonstration’ that transgenic food is safe because it is supposed to help solving the problem of hunger in the world: 1. A greater research effort is necessary, because the ecological impacts on tropical regions have been evaluated for very few GMOs. 2. Regulatory landmarks need to be reinforced and rationalized to ensure that the environment and public health are protected and that procedures are transparent, predictable and based on science. 3. The handling strategy should include the avoidance of transgenic cultivation in centers of diversity or wherever there are related wild species, or establish buffer zones between cultivations. 4. There is a consensus that the liberation in the environment of GMOs should be compared with other agricultural practices and technological options. 5. There are still no evaluation methods for the environmental impacts at the international level, while the establishment of methodologies for the different eco-systems is necessary. 6. The absence of negative effects observed until now does not signify that they cannot occur, since much still remains unknown. FAO, *Agricultural biotechnology: meeting the needs of the poor?* Roma, May 2004.

<sup>6</sup> Carlos F. M. de Souza Filho. *O renascer dos povos indígenas para o direito*. 2nd. ed. Curitiba: Juruá, 1999, p. 181.

Clearly, this is intolerable to both techno-science and to the lobby of the transnational corporations and agribusiness<sup>7</sup>.

In effect, the governmental proposition engendered a struggle, both outside and within the government itself, for the conversion of the precaution principle (which is the bio-safety law's *raison d'être*), in a rhetorical ornamentation and a simulacrum of respect towards international conventions and the Constitution. Such a conversion would depend on the role that the law should attribute to the National Technical Committee of Bio-safety (*Comissão Técnica Nacional de Biossegurança* - CTNBio). Thus, the confrontation centered on two questions: 1) Should the CTNBio have the power to regulate research on genetically modified foods, or should it also have to authorize the commercialization of transgenic products? 2) Should stem cell research with human embryos and therapeutic cloning be forbidden or not? And should the CTNBio be in charge of this subject? As may be seen, in the first case, the emphasis lies primarily on a question of economic interest and affects agriculture, above all else; in the second instance, relevance is primarily techno-scientific and affects human health.

Strictly speaking, and for reasons of coherence, stem cell research should not be discussed in a bio-safety law, but should, instead, be the object of specific legislation – this is, in fact, what was defended by the Brazilian Society for the Progress of Science and by many environmentalists and members of social movements. However, its inappropriate inclusion in the bill approved by the Chamber of Deputies in March 2004 brought the interests of scientists into alignment with those of the transnational corporations and agribusiness<sup>8</sup>.

This was more than the Ruralist lobby could have hoped for, as scientists were now making short shrift of the inadequacy of studies on transgenic products in order to offer their collaboration and support for a cause that was not initially theirs. On the other hand, this adhesion brought about a polarization between scientists and environmentalists which accentuated the prejudice according to which defense of the environment is “archaic”, “retrograde” and “anti-progress”. A misguided polarization if we consider that the champions of the principle of precaution are clamoring for more scientific studies on the impact of the new technologies. Finally, as in the time of fascism, the promoters of the most modern technologies have wound up arm in arm with the most conservative sectors of society – technological advances fueling social backwardness.

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<sup>7</sup> In a very interesting article, Ingrid Sarti wrote: “Countering logic, the debate that is currently underway related to the National Bio-safety Bill, approved by the Congress three months ago, and now transformed into an obscure object of dispute while going through the Senate, is not exactly about bio-safety. [...] the crux of the problem is something else. [...] The economic issues hidden in the law since the debate in the Congress have transformed a conflict of interests into a dispute like a real Fla-Flu football match. The dispute has brought together sectors linked to agribusiness and researchers from the field of molecular genetics working in the development of transgenic organisms against environmentalists. Essentially, and in a few words, because the National Bio-safety Plan maintains a feature which is of fundamental importance to the precautionary principle: scrutiny in commercial licensing. [...] The investments and the safeguards related to flexibility throughout the research process; scrutiny in technical reports; and transparency in the political choices that determine in the final instance the opportunity to put a product on sale are fundamental questions for the development of science, questions that were not exhausted in the legislative process. The fact that all those issues had been taken into account is, however, a starting point for a government intending policy of science for citizenship”. “Biossegurança não é a questão”, *JC email 2531*, 25 May 2004, released on the electronic network *Ghente*, Fundação Oswaldo Cruz, Rio de Janeiro.

<sup>8</sup> The veto on research was introduced at the last moment in the voting on the Bio-safety Bill in the Chamber of Deputies on 5 February 2004. Introduced into the Bill to meet the interests of the Evangelical and Catholic Representatives, it received strong criticism from the scientific community. The article 5 of the law passed in the Congress stated as follows: “Are forbidden: I — any genetic engineering procedure on living organisms or *in vitro* manipulation of natural or recombinant DNA/NRA carried out in disrespect of the norms stipulated in this Law; II — genetic manipulation in human germinal cells and in human embryos; III — human cloning for reproductive purposes; IV — production of human embryos destined to serve as available biological material; V — intervention in human genetic material *in vivo*, except if approved by the relevant authorities with jurisdiction for the purposes of: a) carrying out procedures for diagnosis, prevention and treatment of diseases and ailments; b) therapeutic cloning with pluripotent cells”.

Everything happened as if the group of scientists who closed ranks behind the National Association for Bio-safety (in defense of a law that assures total autonomy to the CTNBio) had never wanted a separate law to regulate stem cell research, as they now regarded the possibility of “pragmatically” exchanging commercial support for transgenic products to be more interesting than the approval of its own projects. However, it would be wise to observe that the alliance with the ruralist lobby carried with it a series of implications for scientists. In effect, they had to look the other way not only with regard to the absence of scientific studies regarding the environmental impact of transgenic soybeans in Brazil but also regarding the many illegal practices committed during the last few years as transgenic seeds were introduced into the country – planned contraband, clandestine planting, disrespect for legislation and legal decisions, false advertising and, last but not least, abuse of power by the CTNBio. Practices that, truth be told, were deemed innocent and rewarded with a legislation of exception, providential provisional measures by FHC and by Lula, in outrageous public statements that crime does, indeed, pay, and that scientists and ruralists would now legalize through the ratification of all of that committee’s previous decisions, which include the approval of Monsanto’s RR soy<sup>9</sup>. In the hurry to render irreversible certain options of genetic engineering, signatures were forged in an Open Letter to the Senate members by scientific societies and organizations led by the National Association for Bio-safety....<sup>10</sup>

The conduct of scientists in the episode of the bio-safety law approval therefore raises certain questions that express the partiality of their own “scientific spirit”. We should ask why the scientific community did not make any statement, as such, regarding the illegalities committed during the last few years to create the consummated fact of transgenic soy in Brazil. Why was there no objective

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<sup>9</sup> In her final considerations on the issue of transgenic plants in Brazil, Carmen Luiza Cabral Marinho wrote about CTNBio: “Until now the National Bio-safety Policy, one of the attributions of CTNBio, as ruled by the Bio-safety law [1995], has not been drafted. Also lacking are the normative instructions related to inspections and the necessary financial and human resources, amongst others, as well as the acceptable dimensions of areas allowed for experiments. Nevertheless, despite the absence of clear directives, licenses have been granted for release of GMOs in the environment in areas whose size varies from 0.006 to 110 hectares for the same transgenic and for the same purpose. It is impossible to find which scientific criteria justify such disparity. Equally irresponsible decisions can be found in the licensing of various experiments for ‘demonstration purposes’, a unique concession being granted to more than forty different private farms. Out of this chaotic scenario figures a total disconnection between the activities of the many officials dealing with the issue of bio-safety related to transgenics in the country. The ministries concerned did not proceed to the inspection required and followed the constant authorizations led by CTNBio, without intervening. On the other hand, despite being aware of the lack of inspection, the Commission continues to authorize experiments in the atmosphere”. *O discurso polissêmico sobre plantas transgênicas no Brasil: Estado da arte*. PhD thesis in Science, in the area of Public Health, Escola Nacional de Saúde Pública, Rio de Janeiro, 2003.

<sup>10</sup> On 17 February 2004, Brazilian scientific societies and organizations sent an open letter to senators on the bio-safety bill, which dealt with four points: 1. That the National Technical Commission on Bio-Safety was the only and definitive authority to evaluate the scientific nature of the matter and that the CTNBio technical report would apply both to research activities as well as to trade. 2. That CTNBio was the only and definitive authority to evaluate the safety of the products of science and technology in Brazil, with the National Bio-Safety Commission being responsible for considering the socio-economic relevance of permission to trade. 3. That the acts already practiced by CTNBio from 1995 onwards should be stressed, irrespective of whether they were related to trade or to research. 4. That CTNBio should also be considered as having the legitimacy to have the final word on research involving embryo stem cells. The letter was signed by the Brazilian Academy of Science, the National Association of Bio-Safety, the Brazilian Association of Muscular Dystrophy, the Brazilian Association for Food Protection, the Brazilian Center of Gene Storage, the Center of Studies of the Human Genome, the Brazilian Society for Food and Nutrition, the Brazilian Society of Food Science and Technology, the Brazilian Society of Genetics, the Brazilian Society for the Improvement of Plants and the Brazilian Society of Microbiology. Later, the Brazilian Society of Genetics and the Brazilian Society of Microbiology denied having signed the letter. In addition, according to its former president, Luiz Eduardo R. de Carvalho, the Brazilian Society of Food Science and Technology did not sign the letter. Cf. “Carta de cientistas teve assinaturas forjadas”, *Folha de S.Paulo*, 4 March 2004, and “Sociedade Brasileira de C&T de Alimentos também não assinou documento sobre projeto de bio-security law, *JC email 2477*, 5 March 2004, resent by the *Ghente* electronic network, owned by the Fundação Oswaldo Cruz, Rio de Janeiro.

study of Monsanto's study on transgenic soy? Why has there been no in-depth discussion regarding the comparative advantages of different types of planting – a discussion that would encompass the full complexity that such a subject demands? Why did [the scientific community] not manifest itself publicly when the National Bank of Economic and Social Development recently award 40 million dollars to Monsanto, money that would a glyphosate factory in Camaçari, a factory built with R\$ 225 million financing from the Investment Fund for the Northeast in December, 1999 (more than 60% of Fund's total budget for the year 2000)? And for glyphosate, the controversial agrototoxic substance that led Monsanto to ask the Brazilian National Health Vigilance Agency to expand the maximum limit of residues permitted in soy grains from 0,2 mg/kg to 10 mg/kg, i.e., an increase of 50 times? And why was Anvisa not held accountable for making Monsanto's studies on glyphosate available in its "public consultation"? Finally, as researcher Sônia Barroso has inquired, "Why do lobbyists not inform their research financing? Why is the Code of Ethics and Control of Biotechnological Research not discussed? Why is the process of negotiating the approval of laws not done with information regarding all the data such as, for example, the contamination of non-transgenic cultures that occurred in [the Brazilian] state of Paraná?"<sup>11</sup>

It is interesting to note that if, on the one hand, scientists have remained silent on so many occasions, they spoke in chorus with the *ruralistas* who wanted to restrict the representation of civil society in CTNBio, arguing that NGOs and consumer protection groups shouldn't have a seat on the committee even if allowed to nominate scientists, as it was possible that the latter might be "partial" and "not objective". In defense of a purely scientific and technical perspective, the scientists therefore assumed that the most convenient option for techno-science is the most adequate for society as a whole. In addition to which, scientists and rural entrepreneurs did not want the ministries (or, especially, the Ministry of the Environment) to have access to any level of decision-making. Thus, whereas some European countries have committees that congregate all parties interested in technological options in order that these may be discussed before political decisions are made, we in Brazil consider it an outrage that civil society should want or be able to participate...

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The need to examine the role that biotechnologists have assumed in Brazil is thus evident, concerning their non-relationship with indigenous and traditional peoples as well as their negative relationship with environmentalists and sectors of civil society who want to participate in decisions related to technological options. In the first case because the relations between bio- and socio-diversity, due to their intensity and relevance, should not be systematically ignored, since our negligence can cost us a lot; in the second because if only techno-science and market interests prevail society should have instruments to hold them responsible, in case of adverse 'collateral effects'.

However, instead of moving apart from indigenous peoples and civil society, biologists and biotechnologists should establish positive links with them. A dislocation of perception and focus, and hence of mentality would lead them to rediscover Brazil and to confront the conflict and misfit which seems to mark their relationship with socio- and bio-diversity. Otherwise we will never be able to understand the difference between bio-technology here and everywhere else on the planet.

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<sup>11</sup> Cf. discussion list on the *Ghente* electronic network, 5 May 2004.

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